VOLUME 2

APPENDICES

Appendix 1.Herbaria Which Loaned Herbarium Specimens

Herbaria addresses are preceded by their accepted codes, as listed in Holmgren and Schofield (1981).

BM British Museum (Natural History), Cromwell Rd, London, SW7 5BD, England, Great Britain.

CAI Herbarium, Department of Botany, Faculty of Science, A'in Shams University, Abbassia, Cairo, Egypt.

CAIM Herbarium, Flora and Phtotaxonomy Researches, Ministry of Agriculture, Dokki, Cairo, Egypt.

E Herbarium, Royal Botanic Garden, Inverleith Row, Edinburgh, EH3 5LR, Scotland, Great Britain.

ERE Dept. Of Plant Taxonomy & Geography, Botanical Institute of the Academy of Science of the Armenian SSR., Yerevan 63, 375063, U.S.S.R.

G Herbarium, Conservatoire et Jardin botaniques de la Ville de Geneve, Case postale 60, CH-1292 Chambesy/GE, Switzerland.

HUJ Herbarium, Department of Botany, The Hebrew University, Givath Ram, Jerusalem, Israel.

K Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey, TW9 3AB, England, Great Britain.

LE V.L. Komarov Botanical Institute of the Academy of Sciences of the U.S.S.R, Prof. Popov Street 2, 197022, Leningrad, U.S.S.R.

MADM Herbarium, Museu Municipal do Funchal, 9000, Funchal, Madeira, Portugal.

MEXU Herbario Nacional de Mexico, Departamento de Botanica, Instituto de Biologia, Universidad Nacional Autonoma de Mexico, 70-367, Mexico 20, Distrito Federal, Mexico.

MO Herbarium, Missouri Botanical Garden, P.O. Box 299, St. Louis, Missouri 63166, U.S.A.

MPU Institut de Botanique, 163 rue Anguste Broussonnet, 34000 Montpellier, France.

OXF Fielding-Druce Herbarium, Department of Botany, University of Oxford, Botany School, South Parks Road, Oxford, OX1 3RA, England, Great Britain.

RNG Herbarium, Plant Science Laboratories, University of Reading, Whiteknights, Reading, RG6 2AS, England, Great Britain.

SPN Herbarium, Biology Department, Southampton University, Building 44, Southampton, SO9 5NH, England, Great Britain.

W Naturhistorisches Museum, Botanische Abteilung, Burgring 7, Postfach 417, A-1014, Wein, Austria.

WIR Herbarium, The All-Union Institute of Plant Industry, Herzen Street 44, 190000, Leningrad.

Appendix 2. Subgeneric Character Set

Char. No.	Characters	State No.	Description
1	Life form	1	annual
		2	perennial
2	Growth habit	1	erect
		2	ascending
		3	decumbent
3	Plant height		cm high
4	Stipule length		mm long
5	Stipule width		mm wide
6	Stipule length-width ratio		
7	Stipule shape	1	entire
		2	semi-hastate
		3	semi-sagittate
8	Stipule apex shape	1	acute
		2	obtuse mucronate
9	Number of teeth on distal edge	1	none
		2	1-2 teeth
		3	3-5 teeth
		4	more than 5
10	Number of teeth on proximal edge	1	none
		2	1-2 teeth
		3	3-5 teeth
		4	more than 5
11	Stipule edge form	1	entire
		2	uneven with swollen hairs
12	Stipule edge	1	translucent
		2	not-translucent
13	Stipule colour (upper plant)	1	green
		2	green with purple
		3	purple
14	Stipule pubescence	1	glabrous
		2	hairs located only on edge
		3	> 10 hairs per mm^2
		4	= or > 10 hairs per mm^2

15	Leaf length		mm long
16	Petiole length		mm long
17	Average leaflet internode length		mm long
18	Leaflet length		mm long
19	Leaflet width		mm wide
20	Tendril or mucro length		mm long
21	Average leaf internode length		mm long
22	Petiolule length		mm long
23	Leaf apex (see Plates 1-4)	1 2 3	mucronate tendrilous terminal leaflet
24	Tendril branching	1 2 3 4 5	inapplicable simple with 2 branches with 3 branches with > 3 branches
25	Leaflet shape symmetry (see Plate 5)	1 2	symmetric asymmetric
26	Relative leaflet size	1 2	all same size smaller towards leaf apex
27	Number of leaflets per leaf		
28	Upper leaflet margin (see Plates 6-8)	1 2 3 4	entire < 7 serrations > 6 serrations incised dentate
29	Lower leaflet margin (see Plate 9)	1 2 3	entire incised dentate crenate
30	Leaflet margins	1 2	undulating level

Plates I-4 Character 23 - leaf apex

Plate I. Leaf apex mucronate
Live plant x I, V. faba.

Plate 2. Leaf apex tendrilous
Live plant x I, V. bithynica.

Plate 3. Leaf apex tendrilous
Muratova 6237 x I, V. johannis
var. johannis.

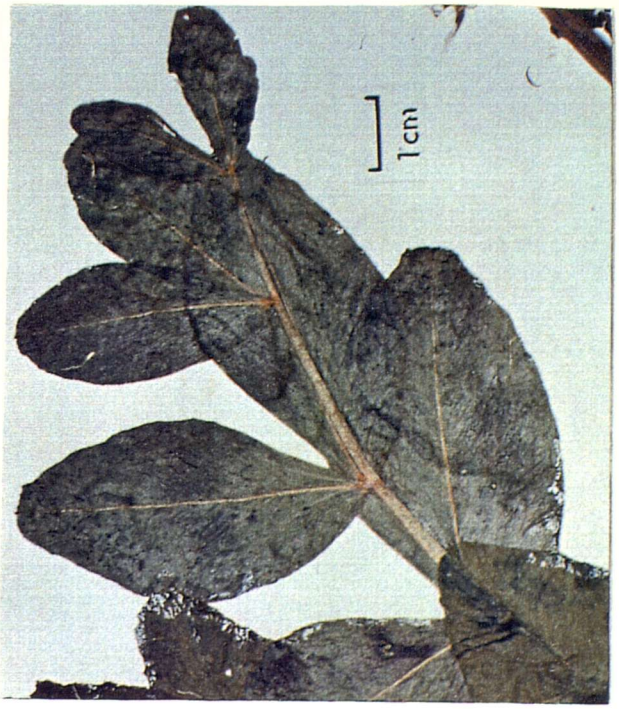


Plate 4. Leaf apex with terminal
leaflet Vvedensky 270 x I,
V. johannis var. ecirrhosa.

Plate 5 Character 25 - Leaf shape symmetry.
Character 28 - Upper leaflet margin.

Plate 5. Leaf shape asymmetric Live plant x I
Upper leaflet margin entire.
V. johannis var. johannis.

Plates 6-9 Character 28 - Upper leaflet margin
Charcater 29 - Lower leaflet margin

Plate 6. Upper leaflet margin with less than 7 serrations.
Mashtakov s.n. x I, V. johannis.

Plate 7. Upper leaflet margin with serrate margin.
Live plant x I, V. serratifolia.

Plate 8. Upper leaflet margin incised dentate.
Live plant x .8, V. sativa subsp. incisa.

Plate 9. Lower leaflet margin crenate.
Live plant x I, V. narbonensis var. salmonea.

31	Leaflet shape	1	narrow linear
		2	broad linear
		3	linear elliptic
		4	narrow elliptic
		5	broad elliptic
		6	elliptic ovate
		7	narrow ovate
		8	broad ovate
32	Leaflet apex shape	1	retuse
		2	mucro-emarginate
		3	mucronate
		4	acute
		5	obtuse
33	Leaflet base shape	1	angustate
		2	truncate to angustate
		3	truncate
34	Leaflet broadest point	1	at apex
		2	in middle
		3	at base
35	Leaflets distribution pattern	1	unpaired
		2	paired
36	Leaflet adaxial hairs density	1	absent
		2	< 10 per mm^2
		3	10-50 per mm^2
		4	> 50 per mm^2
37	Leaflet adaxial hair length	1	inapplicable
		2	hairs < 0.5 mm
		3	hairs 0 5-1 5 mm
		4	hairs > 1 5 mm
38	Leaflet abaxial hair density	1	absent
		2	< 10 per mm^2
		3	10-50 per mm^2
		4	> 50 per mm^2
39	Leaflet abaxial hair length	1	inapplicable
		2	hairs < 0.5 mm
		3	hairs 0.5-1.5 mm
		4	hairs > 1.5 mm
40	Petiole hairs density	1	absent
		2	< 10 per mm^2
		3	10-50 per mm^2
		4	> 50 per mm^2
41	Stem node colour (upper part of plant)	1	green
		2	purple

42	Peduncle Type (see Plates 10-13)	1 2 3 4	absent obsolescent > 2mm shorter than flower > flower
43	Peduncle length		mm long
44	Rachis length		mm long
45	Pedicel length		mm long
46	Flower length		mm long
47	Ratio of peduncle to rachis length		
48	Ratio of rachis to pedicel length		
49	Ratio of peduncle to flower length		
50	Peduncular cusp	1 2 3 4	inapplicable absent < 2.1 mm long > 2.0 mm long
51	Number of flowers per inflorescence	1 2 3 4	one two three or four more than four
52	Pedicel hair density	1 2 3 4	glabrous < 10 per mm^2 with 10-50 mm^2 > 50 per mm^2
53	Pedicel hair length	1 2 3 4	inapplicable < 0.5 mm long 0.5-1.5 mm long > 1.5 mm long
54	Calyx lower tooth length		mm long
55	Calyx lateral teeth length		mm long
56	Calyx upper tooth length		mm long
57	Calyx tube length		mm long
58	Ratio of lower tooth to tube length		

Plates IO-II. Character 42 - Peduncle type.

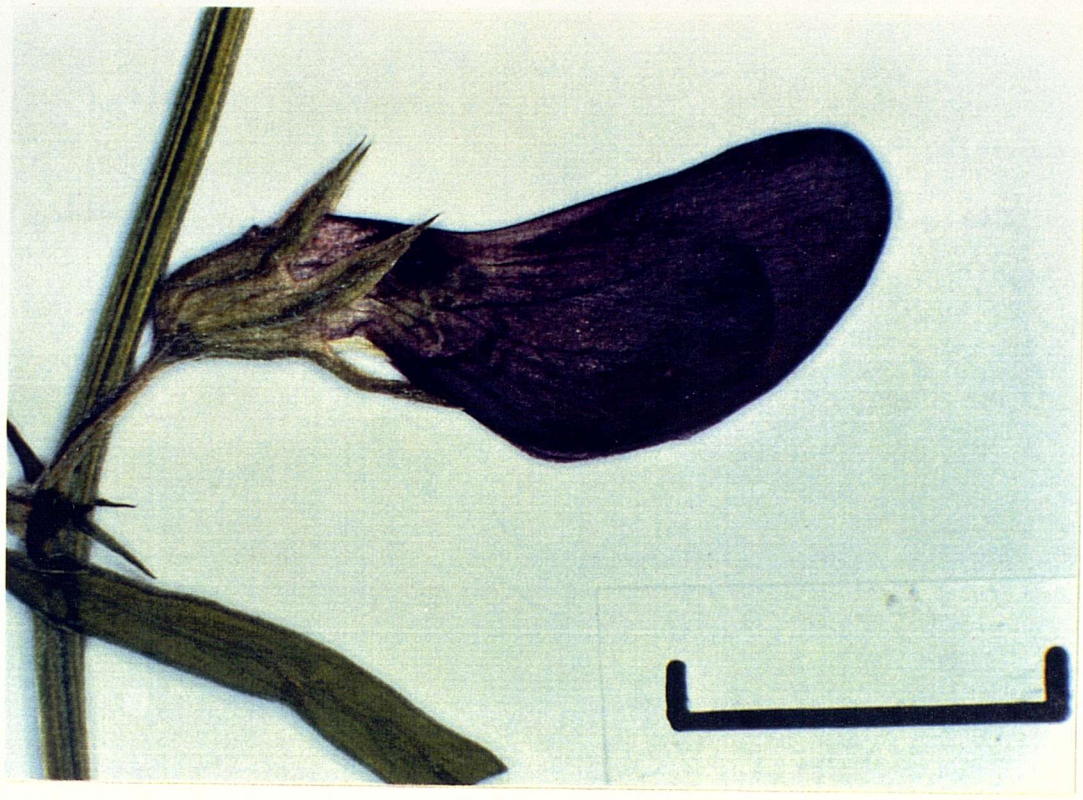


Plate IO. Peduncle absent V. peregrina , Maxted, Allkin & Kitiki 4I63 x 5.

Plate II Peduncle obsolescent, V. barbazitae, Maxted, Allkin & Kitiki 43I9 x 4.5.

Plate I2-I3. Character 42 - Peduncle type.

Plate I2. Peduncle longer than 2mm but shorter than flower, Maxted I269, V. noeana, x 4.5.

Plate I3. Peduncle longer than flower, Khattab 63, V. bithynica. x I.I.

59	Calyx base shape	1 2 3	not gibbose slightly gibbose strongly gibbose
60	Calyx tube mouth shape	1 2 3	truncate slightly oblique strongly oblique
61	Calyx teeth reflexing	1 2	absent present
62	Calyx upper tooth curvature (see Plates 14-15)	1 2	absent present
63	Calyx exterior nectaries	1 2 3	absent lateral teeth all teeth
64	Calyx hairs distribution	1 2 3	absent calyx teeth only covering calyx
65	Calyx exterior hair density	1 2 3 4 5	inapplicable < 10 per mm^2 10-35 per mm^2 36-60 per mm^2 > 61 per mm^2
66	Calyx exterior hair length	1 2 3 4	inapplicable < 0.5 mm long 0.5-1.5 mm long > 1.5 mm long
67	Calyx hair elevation (see Plates 16-17)	1 2 3	inapplicable hairs adpressed hairs erect
68	Calyx colour	1 2 3 4	green purple base purple teeth purple
69	Standard length		mm
70	Standard limb length		mm
71	Standard claw length		mm
72	Standard limb width		mm
73	Standard claw width		mm
74	Ratio of standard length to standard limb width		

Plates I4-I5. Character 62 - Calyx upper tooth curvature.

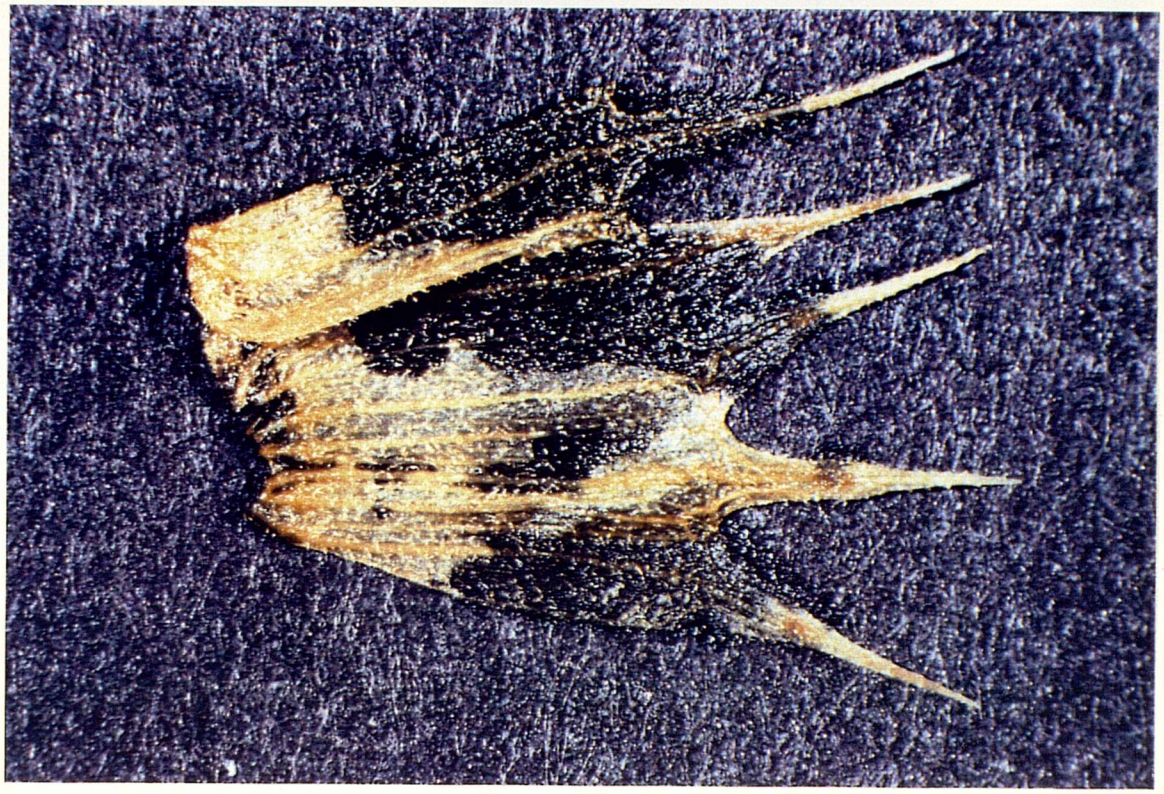


Plate I4. Calyx upper tooth curvature absent, V. barbazitae, Maxted, Allkin & Kitiki 4319 x 4.

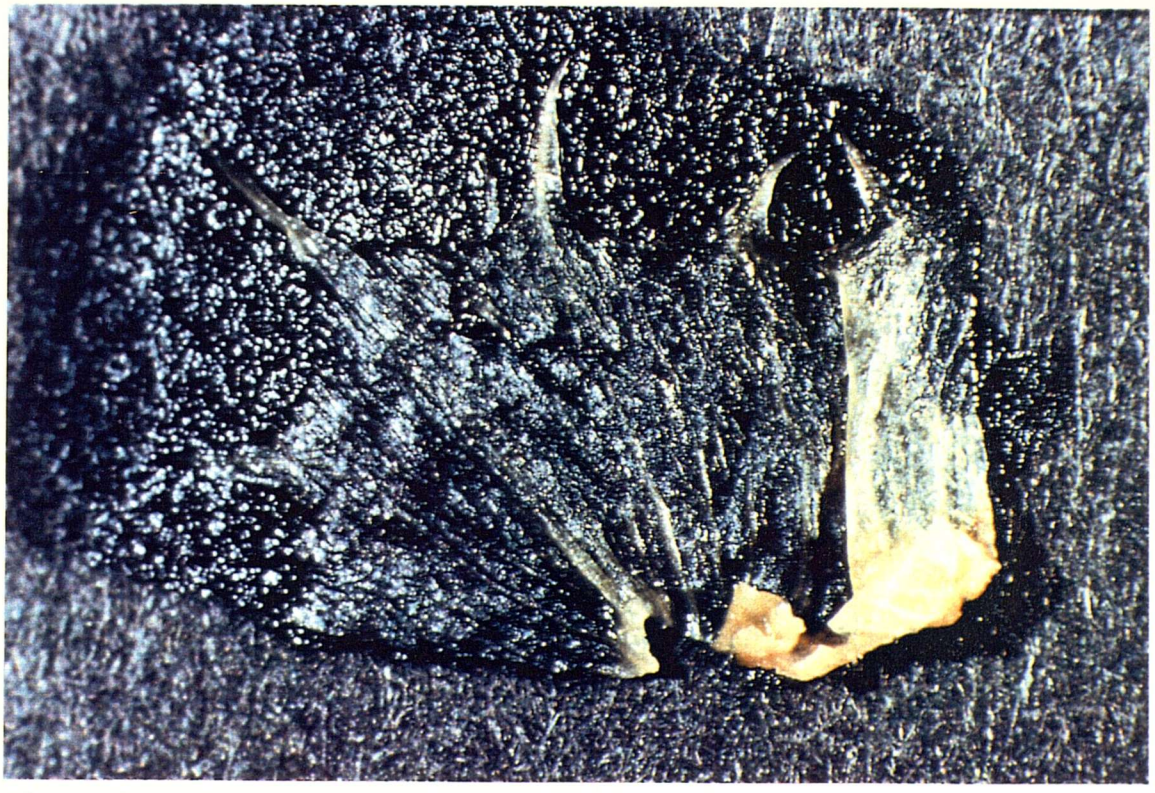


Plate I5. Calyx upper tooth curvature present, V. noeana Maxted 1269 x 4.

Plates I6-I7. Calyx hair elevation.

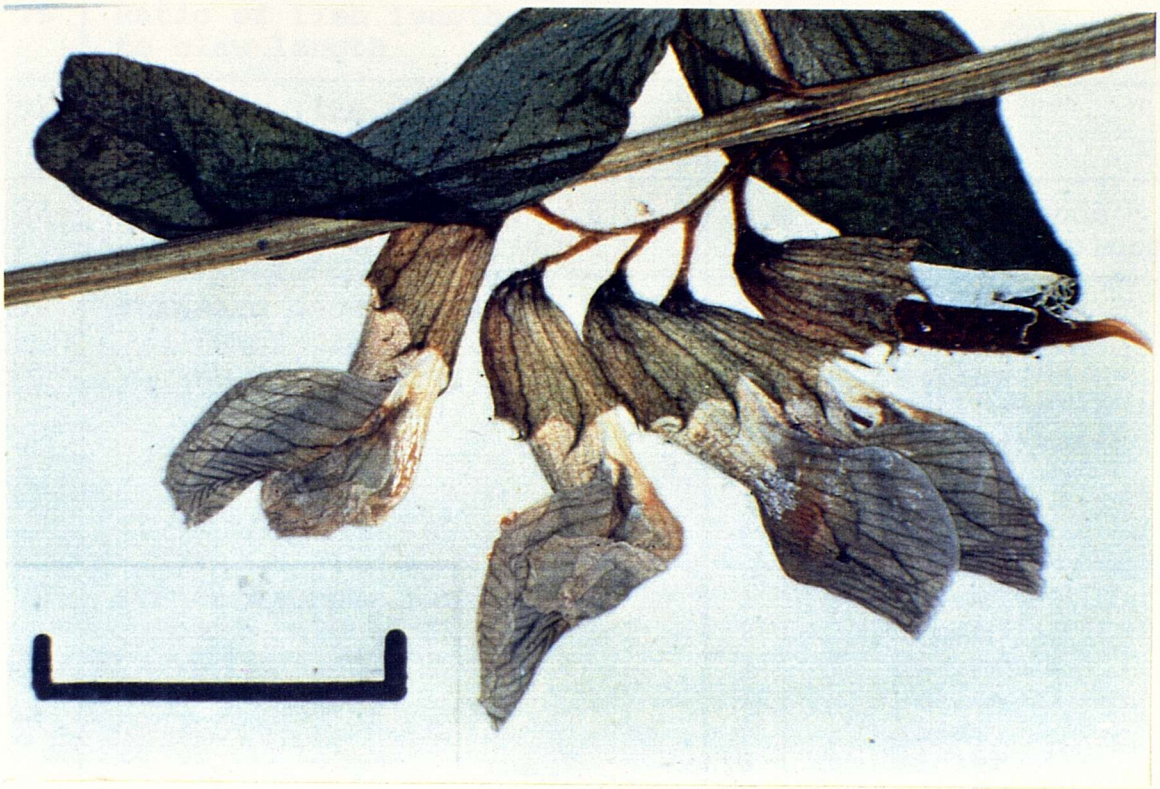


Plate I6. Calyx hair elevation absent, V. sepium var. sepium, Wolf 14.07.68 x 4.5.

Plate 17. Calyx hair elevation present, V. sepium var. eriocalyx, Smith 4383 x 4.5.

75	Ratio of limb length to claw length		
76	Ratio of limb width to claw width		
77	Corolla petals colour	1 2	concolorous not concolorous
78	Standard face colour	1 2 3 4 5 6 7 8	white cream yellow yellow-pink yellow-green lilac violet purple
79	Standard upper surface colour	1 2 3 4 5 6 7	white cream yellow yellow-brown lilac violet purple
80	Standard face-vein colour	1 2	no distinct vein distinct veins
81	Standard shape	1 2	platynychioid stenonychioid
82	Standard apex shape	1 2 3 4	strongly-emarginate emarginate emarginate with mucro obtuse
83	Standard claw bowing (see Plate 18)	1 2	absent present
84	Standard back pubescence	1 2	glabrous subadpressed pubescent
85	Standard vein number	1 2 3	face vein absent 3-5 face veins > 5 face veins
86	Wing length		mm
87	Wing limb length		mm
88	Wing claw length		mm

Plates 18-19. Character 83 - Standard claw bowing.
Character 97 - Wing limb base kinking.

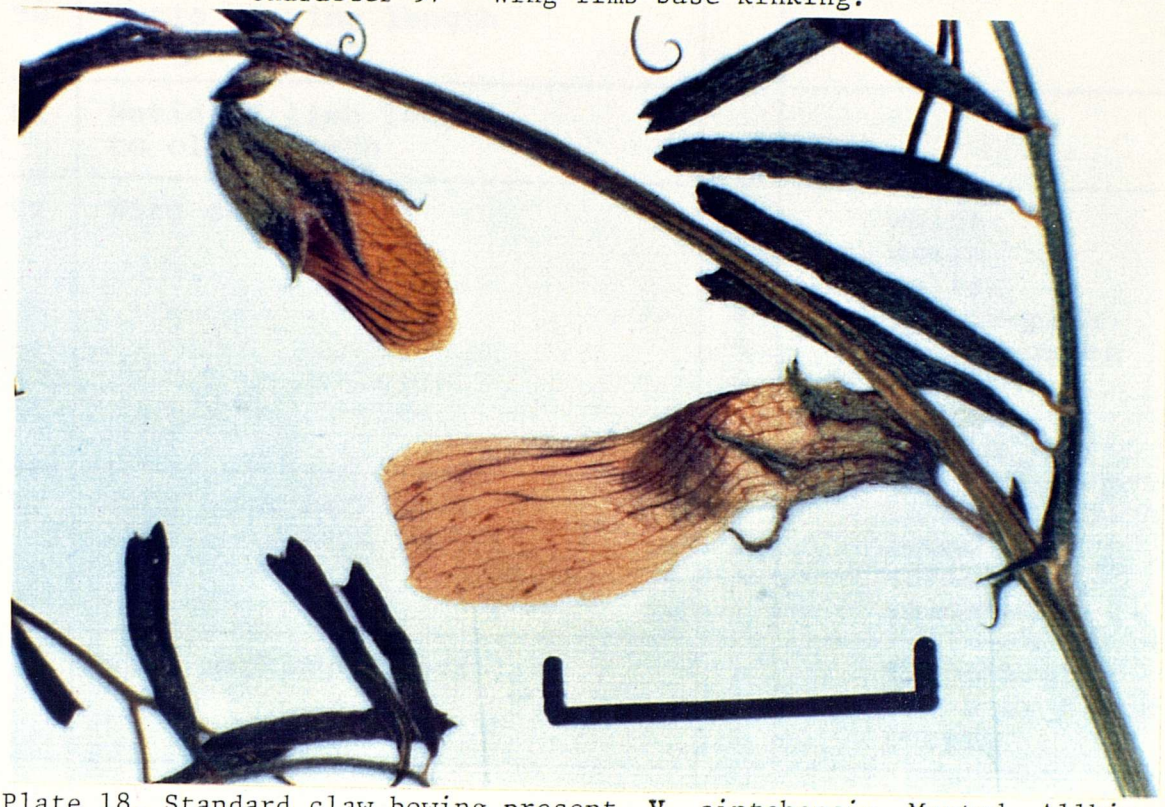


Plate 18. Standard claw bowing present, V. aintabensis, Maxted, Allkin & Kitiki 2174 x 5

Plate 19. Wing limb base kinking present, V. noeana, Maxted 1269, x 10.

89	Wing limb width		mm
90	Ratio of wing length to limb width		
91	Ratio of limb length to claw length		
92	Wing colour	1 2 3 4 5 6 7 8	white cream yellow yellow-pink yellow-green lilac violet purple
93	Wing apex markings	1 2 3	markings absent round spot entire tip coloured
94	Wing marking colour	1 2 3	inapplicable brown or black purple
95	Wing limb shape		see Figure A2.1
96	Wing claw shape		see Figure A2.2
97	Wing limb base kinking (see Plate 19)	1 2 3	absent weak strong
98	Wing limb pouch	1 2	absent present
99	Wing to keel adhesion	1 2	weak strong
100	Keel length		mm
101	Keel hood length		mm
102	Keel claw length		mm
103	Keel hood width		mm
104	Ratio of hood length to claw length		
105	Ratio of hood length to hood width		

Figure A2.1. Character 95 - Wing limb shape.

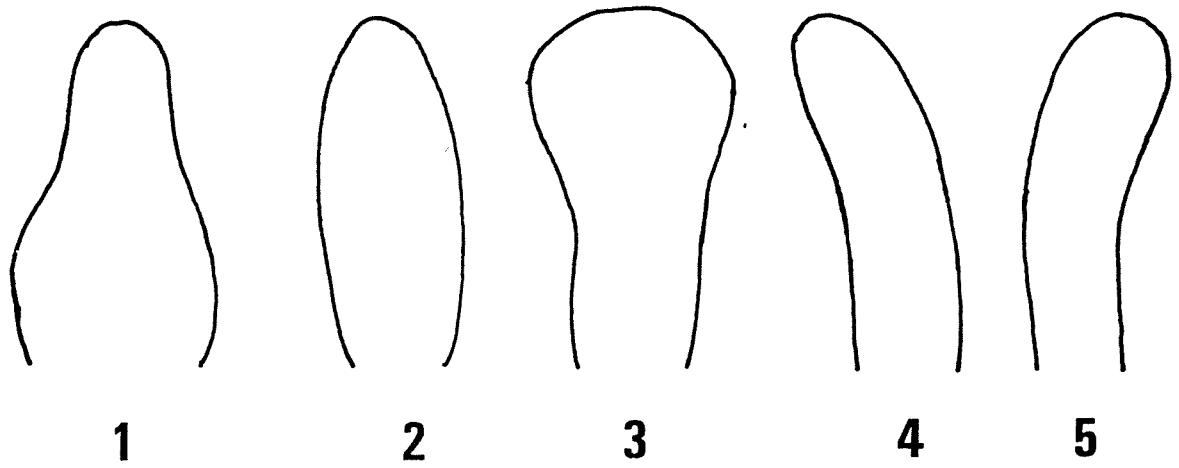


Figure A2.2 Character 96 - Wing claw shape.

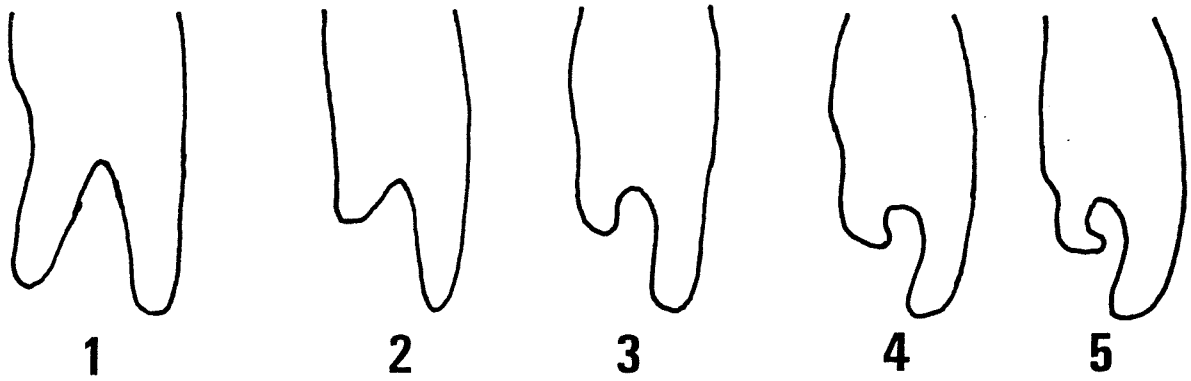
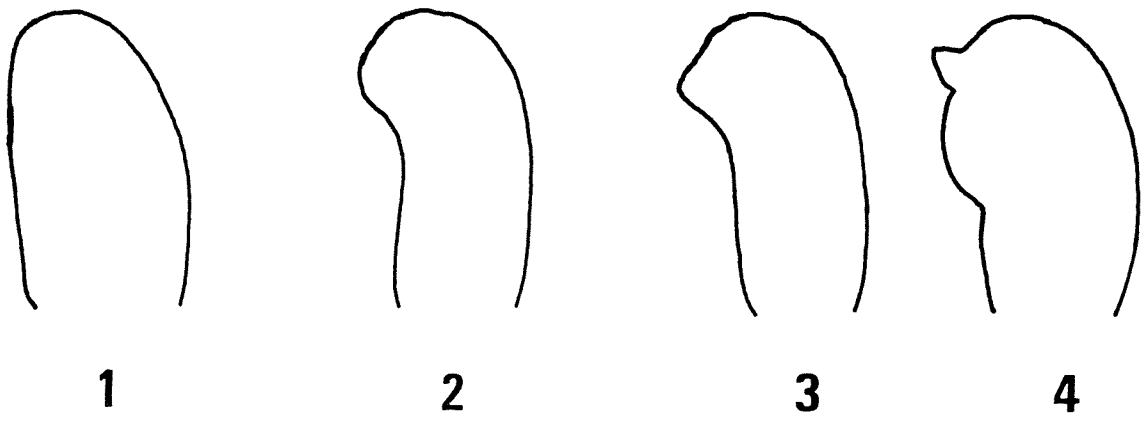


Figure A2.3. Character 108 - Keel limb shape.



106	Keel colour	1 2	white purple or brown
107	Keel hood apex colouring	1 2	not coloured coloured
108	Keel limb shape		see Figure A2.3
109	Keel claw shape		see Figure A2.4
110	Keel pouch	1 2	absent present
111	Staminal tube length		mm
112	Staminal filament length		mm
113	Ratio of tube to filament length		
114	Comparative filament length	1 2	all equal 5th stamen extended
115	Staminal distinct tube vein colouring (see Plate 20)	1 2	absent present
116	Ovary length		mm long
117	Style length		mm long
118	Supra-ovary extension (see Plate 21)		mm long
119	Ovary shape	1 2 3	linear intermediate oblong
120	Style apex cross section	1 2	round dorsi-ventral flattened
121	Stigma shape	1 2 3	globose conical discoid
122	Supra-ovary curvature	1 2	absent present

Figure A2.4. Character 109 - Keel claw shape.

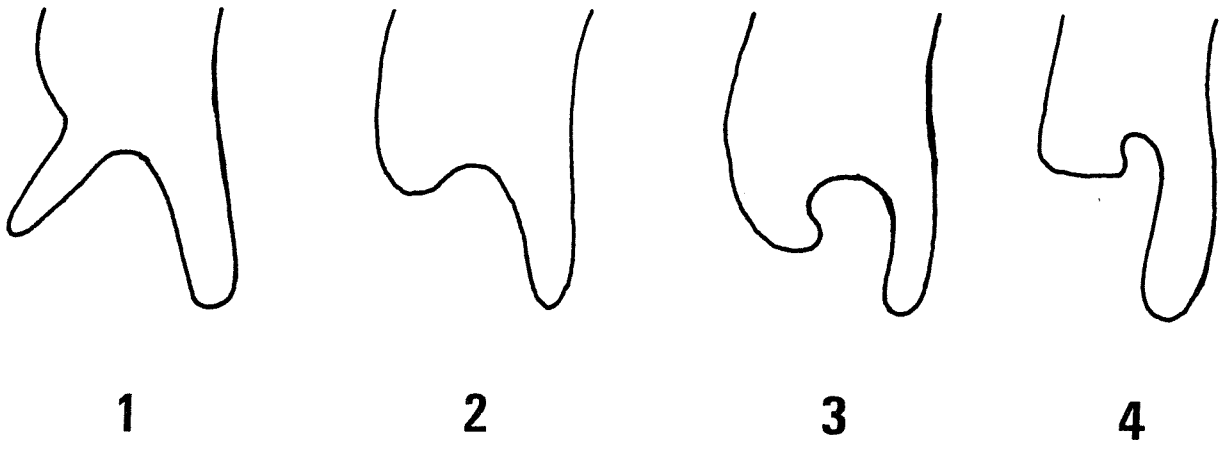


Figure A2.5. Character 124 - Style apex pubescence type.

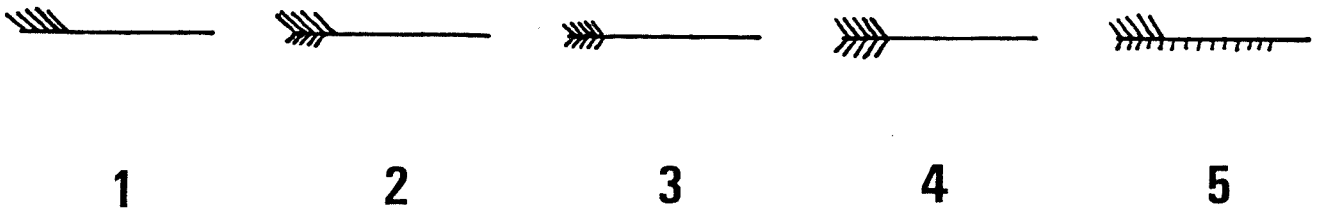


Plate 20-21. Character 115 - Staminal tube vein colouring.
Character 118 - Supra-ovary extension.

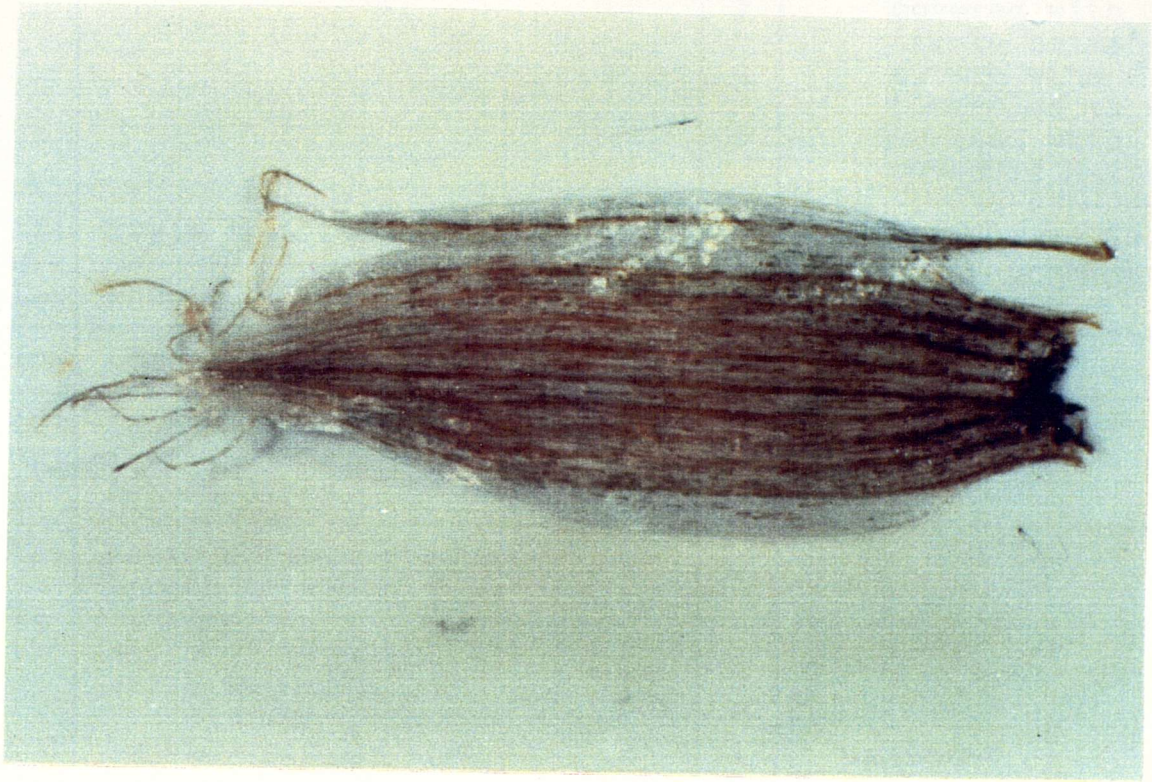


Plate 20. Staminal tube vein colouring present, V. bithynica, Maxted, Ehrman & Khattab 3518, x 10.

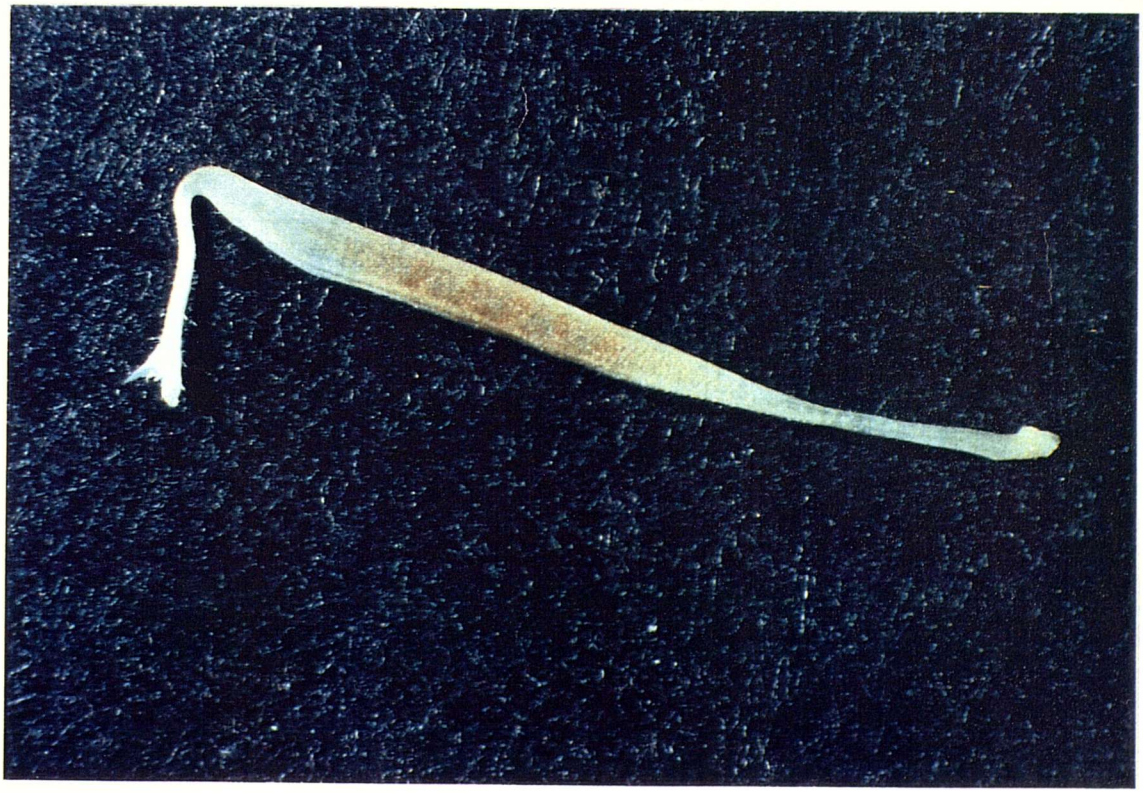


Plate 21. Supra-ovary extension, V. noeana, Maxted 1269, x 10.

123	Ovary pubescence	1	glabrous
		2	sutures with simple hairs
		3	covered with simple hairs
		4	suture with tubercled hairs
		5	covered with tubercle hairs
124	Style apex pubescence type		see Figure A2.5
125	Number of ovules per ovary		
126	Legume length		mm long
127	Legume width		mm wide
128	Legume depth		mm deep
129	Ratio of legume length to width		
130	Ratio of legume width to depth		
131	Amphicarpic legumes	1	absent
		2	present
132	Legume colour	1	yellow
		2	yellow-brown
		3	brown
		4	black
133	Legume colouration	1	uniform
		2	brown or black veins
		3	purple patches
134	Legume shape	1	linear
		2	rectangular
		3	rhomboid
		4	oblong
135	Legume cross-sectional	1	round
		2	rounded to flat
		3	laterally flat
136	Legume curvature	1	not falcate
		2	falcate
137	Legume suture curvature	1	unparallel
		2	parallel

138	Legume distal end shape	1	unbeaked
		2	slightly beaked
		3	strongly beaked
139	Legume valve surface	1	not torulose
		2	torulose
140	Legume valve surface	1	smooth
		2	ridged with veins
		3	prominent ridging
141	Legume venation	1	inconspicuous
		2	reticulate
		3	fishbone
		4	longitudinal
142	Legume partitioning	1	absent
		2	present
143	Legume hair density	1	glabrous
		2	< 10 per mm^2
		3	10-35 per mm^2
		4	36-60 per mm^2
		5	> 61 per mm^2
144	Legume hair length	1	inapplicable
		2	< 0.5 mm long
		3	0.5-1.5 mm long
		4	> 1.5 mm long
145	Legume hair position	1	inapplicable
		2	sutures only
		3	entire legume
146	Suture surface	1	smooth
		2	rough
		3	denticulate
		4	ciliate, < 1 mm
		5	ciliate, > 1 mm
		6	ciliate, hairs tubercular
147	Hair tubercles length (see Plates 22-23)	1	inapplicable
		2	tubercles absent
		3	tubercles short
		4	tubercles long
148	Dehiscent legume twisting	1	loose
		2	medium
		3	tight
		4	very tight
149	Number of seeds per legume		
150	Seed length		mm long

Plates 22-23. Character 147. - Legume hair tubercule length.

Plate 22. Legume hair tubercule long, V. eristalioides, Maxted, Allkin & Kitiki 4256 x 3.5.

Plate 23. Detail of legume valve surface showing long hair tubercule x 20.

151	Seed width		mm wide
152	Seed depth		mm deep
153	Seed circumference		mm circumference
154	Hilum length		mm long
155	Distance from hilum to lens		mm long
156	Seed length to width ratio		
157	Seed length to depth ratio		
158	Seed circumference to hilum length ratio of		
159	Seed shape	1 2 3	spherical spherical to cubic oblong
160	Seed shape in side view	1 2	spherical laterally compressed
161	Seed colour	1 2 3 4	yellow red-brown brown black
162	Seed colour mottling (see Plate 24)	1 2	absent present
163	Seed surface finish	1 2 3	shiny variable matt
164	Seed surface (see Plate 25)	1 2 3 4	smooth wrinkled tuberculate pitted
165	Hilum shape	1 2 3 4	round oval elongated, < third of circumference very elongated, > third of circumference
166	Hilum position in lateral view	1 2	level sunken

Plates 24-25. Character 162 - Seed colour mottling.
Character 164 - Seed surface.

Plate 24. Seed colour mottling present, V. bithynica, Maxted, Ehrman & Khattab 3518 x 3.

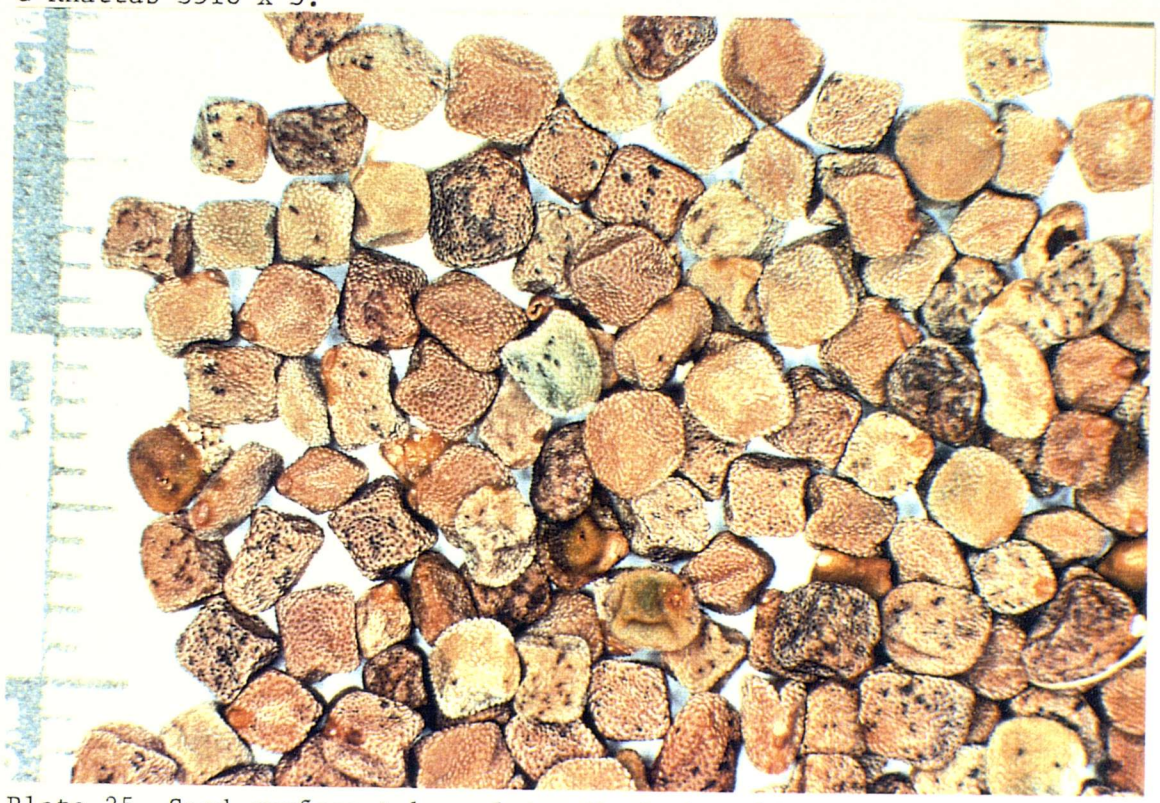


Plate 25. Seed surface tuberculate, V. lathyroides, Maxted, Ehrman & Khattab 2955 x 4.5.

167	Hilum surface profile	1 2 3	convex level concave
168	Hilum colour	1 2 3 4	yellow red-brown brown black
169	Hilum groove colour	1 2 3 4	beige same as hilum red-brown white
170	Hilum positioned	1 2 3	seed end seed corner seed side
171	Hilum surface excess tissue	1 2	absent present
172	Lens position	1 2 3 4	confluent to hilum < 1.6 mm from hilum > 1.5 mm from hilum opposite hilum
173	Lens prominence	1 2	prominent not prominent
174	Aril presence (see Plate 26)	1 2	absent present

Plate 26. Character 174 - Aril presence.

Aril present, V. grandiflora, Maxted, Allkin & Kitiki 4430 x 4.5.

Appendix 3. Phenetic Analysis Character Set Usage

Character use is indicated below, the character sets used for the different sets of analysis are detailed in the text (Chapter Seven). + = used and selected using F ratio from SPSSX, * = selected intuitively, - = unused.

	Different Analysis Runs																														
CHAR NOS.	1	2	3	4	5	6	7	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	122	80	V72	F61	H27
C001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	*	*	-	-
C002	*	*	*	*	*	*	*	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	*	*	-	-
C003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	-	*	-	-
C004	*	*	*	*	*	*	*	*	*	*	-	*	-	*	-	-	*	-	-	-	+	-	-	-	-	-	*	*	-	-	-
C005	*	*	*	*	*	*	*	-	*	-	-	*	-	-	-	*	-	-	-	-	-	-	-	-	-	-	*	*	-	-	-
C006	*	*	*	*	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C007	*	*	*	*	*	*	*	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	*	*	-	*	-
C008	*	*	*	*	*	*	*	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C009	*	*	*	*	*	*	*	-	-	-	-	*	+	+	-	-	-	-	*	-	-	-	-	-	-	-	*	-	*	*	-
C010	*	*	*	*	*	*	*	-	-	-	-	-	-	+	-	-	-	-	*	+	-	-	-	-	-	-	*	*	*	*	-
C011	*	*	*	*	*	*	*	-	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	*	*	-	*	-
C012	*	*	*	*	*	*	*	-	+	-	-	-	-	-	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
C013	*	*	*	*	*	*	*	-	-	+	-	+	+	-	-	-	+	-	-	-	-	-	-	-	-	-	*	*	*	*	*
C014	*	*	*	*	*	*	*	+	+	+	-	-	-	+	-	-	+	-	*	-	*	-	-	-	-	-	*	*	-	-	-
C015	*	*	*	*	*	*	*	*	+	+	-	*	-	+	-	-	+	-	-	-	-	*	-	-	-	-	*	-	*	*	*
C016	*	*	*	*	*	*	*	+	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	*	*	-	*
C017	*	*	*	*	*	*	*	+	-	+	-	+	-	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
C018	*	*	*	*	*	*	*	+	-	-	-	+	-	+	*	-	-	*	*	-	-	*	+	-	+	-	*	*	*	-	*
C019	*	*	*	*	*	*	*	+	-	+	-	+	-	-	*	*	-	*	*	-	-	*	+	+	-	+	*	*	*	*	-
C020	*	*	*	*	*	*	*	+	-	+	-	+	-	+	-	-	-	*	-	-	-	*	-	-	-	-	*	*	*	*	-
C021	*	*	*	*	*	*	*	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C022	*	*	*	*	*	*	*	*	+	-	*	*	-	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C023	*	*	*	*	*	*	*	-	-	-	-	+	+	-	-	-	-	-	-	+	-	-	-	-	-	-	*	*	-	*	-
C024	*	*	*	*	*	*	*	+	-	+	-	+	-	+	-	-	+	-	-	-	-	-	-	-	-	-	*	*	*	*	-

CHAR NOS.	1	2	3	4	5	6	7	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	122	80	V72	F61	H27
C025	*	*	*	*	*	*	*	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	*	*	-	*	-
C026	*	*	*	*	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C027	*	*	*	*	*	*	*	-	+	-	-	*	-	-	-	-	+	*	*	+	+	-	-	-	-	-	*	*	*	*	-
C028	*	*	*	*	*	*	*	-	-	-	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	*	*	*	*	-
C029	*	*	*	*	*	*	*	-	-	-	-	-	+	-	+	-	-	-	-	-	-	-	+	-	-	-	*	*	*	*	-
C030	*	*	*	*	*	*	*	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	*	*	-	*	-
C031	*	*	*	*	*	*	*	+	-	+	-	-	-	+	*	-	+	-	+	-	-	-	-	*	+	-	*	*	*	-	-
C032	*	*	*	*	*	*	*	*	-	+	-	-	-	-	-	-	-	-	*	-	*	-	-	*	-	-	*	*	-	-	-
C033	*	*	*	*	*	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C034	*	*	*	*	*	*	*	-	-	-	-	-	-	-	-	-	+	-	+	-	-	-	-	-	+	-	-	-	-	-	-
C035	*	*	*	*	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C036	*	*	*	*	*	*	*	+	-	-	-	-	-	+	-	-	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-
C037	*	*	*	*	*	*	*	+	-	-	-	-	-	+	-	-	-	-	*	-	+	-	-	-	-	-	-	-	-	-	-
C038	*	*	*	*	*	*	*	+	-	+	-	-	+	+	-	-	-	-	+	-	+	-	-	-	-	-	*	*	*	*	-
C039	*	*	*	*	*	*	*	+	-	-	-	-	-	-	-	+	-	-	*	-	+	-	+	-	-	-	*	*	*	*	*
C040	*	*	*	*	*	*	*	+	+	+	-	-	-	-	-	-	+	-	+	-	+	-	-	-	-	-	*	-	-	-	-
C041	*	*	*	*	*	*	*	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	*	*	-	*	-
C042	*	*	*	*	*	*	*	*	-	+	-	-	-	+	*	-	+	-	-	-	-	-	-	-	-	-	*	*	*	*	-
C043	*	*	*	*	*	*	*	*	-	-	-	*	-	-	*	-	-	*	-	-	-	-	-	-	-	-	*	*	*	*	*
C044	*	*	*	*	*	*	*	-	-	-	-	*	-	-	*	-	-	-	-	-	-	-	-	-	-	-	*	-	-	-	*
C045	*	*	*	*	*	*	*	+	-	+	-	-	-	-	-	-	+	-	*	-	-	-	-	-	-	-	*	-	-	-	-
C046	*	*	*	*	*	*	*	+	+	-	-	+	-	+	*	-	+	*	-	-	-	+	-	-	-	-	*	*	*	-	-
C047	*	*	*	*	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C048	*	*	*	*	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C049	*	*	*	*	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	*	*	-	*
C050	*	*	*	*	*	*	*	+	-	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
C051	*	*	*	*	*	*	*	-	-	+	-	-	+	+	-	-	+	*	*	-	-	-	-	-	-	-	*	*	*	*	-
C052	*	*	*	*	*	*	*	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C053	*	*	*	*	*	*	*	+	+	+	-	-	-	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
C054	*	*	*	*	*	*	*	-	+	+	*	+	-	+	-	-	-	-	-	-	-	-	-	+	-	+	*	*	*	*	-
C055	*	*	*	*	*	*	*	-	+	+	-	+	-	+	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-
C056	*	*	*	*	*	*	*	-	+	+	-	+	-	+	+	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-

CHAR NOS.	1	2	3	4	5	6	7	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	122	80	V72	F61	H27
C057	*	*	*	*	*	*	*	+	+	+	-	+	-	+	-	-	+	-	-	-	-	*	-	*	-	+	*	*	*	*	-
C058	*	*	*	*	*	*	*	+	+	-	-	-	-	+	+	-	-	-	-	-	-	-	-	+	-	-	*	-	*	-	-
C059	*	*	*	*	*	*	*	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	*	*	-	-	-
C060	*	*	*	*	*	*	*	-	-	+	-	*	-	-	-	-	-	-	-	-	-	-	-	*	-	-	*	*	-	-	-
C061	*	*	*	*	*	*	*	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	*	-	-	-
C062	*	*	*	*	*	*	*	+	-	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	*	-	-	*	*
C063	*	*	*	*	*	*	*	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	*	-	*	-	-
C064	*	*	*	*	*	*	*	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	-	*	-	-
C065	*	*	*	*	*	*	*	+	+	+	-	*	+	+	-	*	-	-	-	-	*	-	-	-	-	-	*	-	*	-	*
C066	*	*	*	*	*	*	*	+	+	+	-	*	-	-	-	*	-	-	-	-	+	-	-	-	-	-	*	-	*	-	*
C067	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	*	-	-	-
C068	*	*	*	*	*	*	*	-	-	-	+	-	-	+	-	+	+	-	-	-	-	-	-	*	-	-	*	-	-	*	-
C069	*	*	*	*	*	*	*	*	+	-	*	+	-	+	-	-	+	-	*	-	-	+	-	-	-	+	*	*	*	*	-
C070	*	*	*	*	*	*	*	*	+	-	-	*	-	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C071	*	*	*	*	*	*	*	*	+	+	-	+	-	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C072	*	*	*	*	*	*	*	*	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	*	*	*	-	-
C073	*	*	*	*	*	*	*	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	-	*	-	-
C074	*	*	*	*	*	*	*	+	+	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-
C075	*	*	*	*	*	*	*	+	+	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-
C076	*	*	*	*	*	*	*	+	+	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C077	*	*	*	*	*	*	*	-	+	+	-	-	+	+	*	-	-	-	-	-	-	-	+	-	-	-	*	*	*	*	-
C078	*	*	*	*	*	*	*	+	+	+	+	*	+	+	-	-	+	-	-	-	*	*	+	-	-	-	*	-	*	*	*
C079	*	*	*	*	*	*	*	+	+	+	+	-	+	+	-	-	-	-	-	-	-	+	-	-	-	*	*	*	*	-
C080	*	*	*	*	*	*	*	+	+	+	+	-	+	-	-	-	+	-	-	-	-	+	-	+	-	-	-	-	-	-
C081	*	*	*	*	*	*	*	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	*	*	*	-	-
C082	*	*	*	*	*	*	*	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	*	-	-	-	-
C083	*	*	*	*	*	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	*	-	-	-
C084	*	*	*	*	*	*	*	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	*	*	-	-	-
C085	*	*	*	*	*	*	*	+	+	+	+	-	+	-	-	-	+	-	-	-	-	-	-	-	+	-	*	-	*	*	-
C086	*	*	*	*	*	*	*	*	+	-	*	+	-	+	-	-	+	-	-	-	-	+	-	-	-	-	*	-	-	*	-
C087	*	*	*	*	*	*	*	-	+	-	-	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C088	*	*	*	*	*	*	*	-	+	-	-	+	-	+	-	-	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-

CHAR NOS.	1	2	3	4	5	6	7	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	122	80	V72	F61	H27
C089	*	*	*	*	*	*	*	-	+	-	-	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	*	-	*	-	*
C090	*	*	*	*	*	*	*	-	-	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C091	*	*	*	*	*	*	*	-	+	+	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C092	*	*	*	*	*	*	*	+	+	+	+	-	+	+	-	-	+	-	-	-	-	*	+	-	-	-	*	*	*	*	*
C093	*	*	*	*	*	*	*	-	-	-	-	-	+	-	-	-	+	-	-	+	-	-	+	-	-	-	*	*	-	*	-
C094	*	*	*	*	*	*	*	-	-	-	-	-	+	-	-	-	+	-	-	+	-	-	+	-	-	-	*	*	-	*	-
C095	*	*	*	*	*	*	*	+	+	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-	*	-	*	*	-
C096	*	*	*	*	*	*	*	+	+	+	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	*	-	*	-	-
C097	*	*	*	*	*	*	*	-	-	-	-	+	-	+	-	-	+	-	-	-	-	-	-	-	-	-	*	*	-	-	-
C098	*	*	*	*	*	*	*	+	-	+	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C099	*	*	*	*	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C100	*	*	*	*	*	*	*	*	+	+	*	+	-	+	-	-	+	-	-	-	-	+	-	-	-	-	*	-	-	*	-
C101	*	*	*	*	*	*	*	-	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C102	*	*	*	*	*	*	*	-	+	+	-	+	-	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C103	*	*	*	*	*	*	*	-	+	-	-	+	-	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C104	*	*	*	*	*	*	*	-	-	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C105	*	*	*	*	*	*	*	*	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C106	*	*	*	*	*	*	*	+	-	+	-	-	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C107	*	*	*	*	*	*	*	-	-	+	-	-	-	-	-	-	-	-	-	-	-	*	-	-	-	-	*	-	-	-	-
C108	*	*	*	*	*	*	*	*	-	-	-	+	-	+	-	-	+	-	-	-	-	-	-	-	-	-	*	-	*	*	*
C109	*	*	*	*	*	*	*	-	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	*	-	*	-	-
C110	*	*	*	*	*	*	*	-	-	+	-	-	+	+	-	-	-	+	-	-	-	-	-	-	-	-	*	-	-	-	-
C111	*	*	*	*	*	*	*	-	+	+	-	+	-	+	-	-	+	-	-	-	-	-	-	-	-	-	*	-	-	-	-
C112	*	*	*	*	*	*	*	-	-	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	*	-	-	-	*
C113	*	*	*	*	*	*	*	-	+	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C114	*	*	*	*	*	*	*	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	-	*	-	-
C115	*	*	*	*	*	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	*	-	*	-
C116	*	*	*	*	*	*	*	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	-	*	-	-
C117	*	*	*	*	*	*	*	*	+	+	-	+	+	+	-	-	+	-	-	-	-	-	-	-	-	-	*	-	*	-	-
C118	*	*	*	*	*	*	*	-	-	+	-	+	-	+	-	-	+	-	-	-	-	+	-	-	-	-	*	*	-	-	*
C119	*	*	*	*	*	*	*	-	+	+	-	-	-	+	+	-	+	-	-	-	-	-	-	-	-	-	*	-	-	-	*
C120	*	*	*	*	*	*	*	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	*	-	-	-	-

CHAR NOS.	1	2	3	4	5	6	7	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	122	80	V72	F61	H27
C121	*	*	*	*	*	*	*	-	-	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C122	*	*	*	*	*	*	*	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	*	-	-	-
C123	*	*	*	*	*	*	*	-	+	+	-	-	-	+	-	-	+	-	-	-	*	-	-	-	-	-	*	*	*	*	-
C124	*	*	*	*	*	*	*	+	-	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	*	-	-	-	-
C125	*	*	*	*	*	*	*	-	+	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	*	*	*	-	-
C126	-	-	-	-	-	-	-	*	-	-	-	*	-	*	*	-	-	*	-	-	-	*	-	-	-	+	*	*	*	*	-
C127	-	-	-	-	-	-	-	*	*	*	-	*	-	*	*	-	*	*	*	-	-	*	-	-	+	+	*	*	*	*	*
C128	-	-	-	-	-	-	-	*	*	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	*	-	-	-	-
C129	-	-	-	-	-	-	-	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	*	-	*	-
C130	-	-	-	-	-	-	-	*	*	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C131	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	*	*	*	-	-
C132	-	-	-	-	-	-	-	*	-	*	-	-	-	-	*	-	*	-	-	-	-	-	-	-	-	+	*	-	*	*	-
C133	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	*	-	-	-
C134	-	-	-	-	-	-	-	*	*	-	-	-	-	-	*	-	-	-	*	-	-	-	-	-	-	-	*	*	*	*	-
C135	-	-	-	-	-	-	-	-	*	-	-	-	-	*	-	-	-	-	-	-	-	*	-	-	-	-	*	*	*	*	*
C136	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	*	*	-	-
C137	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C138	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	-	*	-	-
C139	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	+	*	*	*	*	-
C140	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	+	*	*	*	-	*
C141	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C142	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	*	-	*	-
C143	-	-	-	-	-	-	-	*	*	*	-	-	-	-	-	-	*	-	*	-	*	-	-	-	-	-	*	*	*	*	*
C144	-	-	-	-	-	-	-	*	-	*	-	-	-	-	-	-	*	-	*	-	*	-	-	-	-	-	*	-	*	*	*
C145	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	-	-	-	-	-	*	-	-	*	*
C146	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C147	-	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	*	-	-	-	-	-	*	*	-	*	*
C148	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C149	-	-	-	-	-	-	-	-	*	*	-	-	-	*	*	-	*	-	-	-	-	-	-	-	+	-	*	*	*	*	-
C150	-	-	-	-	-	-	-	*	*	*	-	-	-	*	-	-	*	*	-	-	-	-	-	-	+	-	*	*	*	*	*
C151	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	+	-	*	*	-	*	-
C152	-	-	-	-	-	-	-	*	-	-	-	-	-	*	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-

CHAR NOS.	1	2	3	4	5	6	7	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	122	80	V72	F61	H27
C153	-	-	-	-	-	-	-	*	*	*	-	*	-	*	-	-	*	*	-	-	-	-	-	-	+	-	*	*	*	*	-
C154	-	-	-	-	-	-	-	-	-	-	-	-	-	*	-	-	-	*	-	-	-	-	-	-	-	-	*	*	*	*	-
C155	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	*	-	-	-
C156	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	*	-	-	-	-
C157	-	-	-	-	-	-	-	-	*	-	-	-	-	*	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-
C158	-	-	-	-	-	-	-	*	*	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	*	-	*	-	-
C159	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	+	-	*	*	*	*	*
C160	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	*	*	*	*	-
C161	-	-	-	-	-	-	-	*	*	*	-	-	-	*	-	-	*	*	-	-	-	-	-	-	-	-	*	*	*	*	-
C162	-	-	-	-	-	-	-	*	-	*	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	*	*	-	-	-
C163	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-
C164	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	*	*	-	-
C165	-	-	-	-	-	-	-	-	-	-	-	-	*	-	-	-	*	-	-	-	-	-	-	-	-	-	*	*	*	*	-
C166	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C167	-	-	-	-	-	-	-	-	-	-	-	-	-	*	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-
C168	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	-	-	-	-
C169	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	-	-	*	-
C170	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-
C171	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C172	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	*	-	-	-
C173	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C174	-	-	-	-	-	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	*	*	*	-	-

Appendix 4. Example Run Files Used in Phenetic Analysis

A SPSSX (DISCRIMINANT) - Discriminant function analysis

```
TITLE DISCRIMINANT SECTION HYPECHUSA DISCRIMINANT ANANLYSIS
FILE HANDLE CASES / NAME = "HYSPSSX DAT"
DATA LIST FILE = CASES FREE / IDENT v1 to v122
compute v43a=1
compute v43b=1
compute v43c=1
if (v43 eq 0) v43a=0
if (v43 eq 0) v43b=0
if (v43 eq 0) v43c=0
if (v43 eq 1) v43a=2
if (v43 eq 2) v43b=2
if (v43 eq 3) v43c=2
compute v44a=1
compute v44b=1
compute v44c=1
compute v44d=1
if (v44 eq 0) v44a=0
if (v44 eq 0) v44b=0
if (v44 eq 0) v44c=0
if (v44 eq 0) v44d=0
if (v44 eq 1) v44a=2
if (v44 eq 2) v44b=2
if (v44 eq 3) v44c=2
if (v44 eq 4) v44d=2

---- further multistate to binary character conversions-----

compute v121a=1
compute v121b=1
compute v121c=1
compute v121d=1
if (v121 eq 0) v121a=0
if (v121 eq 0) v121b=0
if (v121 eq 0) v121c=0
if (v121 eq 0) v121d=0
if (v121 eq 1) v121a=2
if (v121 eq 2) v121b=2
if (v121 eq 3) v121c=2
if (v121 eq 4) v121d=2
descriptives variables=   v1 to v41
  /save
recode zv1 to zv41 (missing=0)
discriminant groups=ident(1,2)
 /variables = zv1 to zv41 v42 v43a to v43c v44a to v44d v45a
to v45d v46a to v46d v47 v48a to v48c v49a to v49d v50a to
v50c v51a to v51e v52 v53a to v53d v54a to v54d v55a to v55h
v56a to v56e v57 v58a to v58d v59a to v59d v60a to v60d v61
v62a to v62d v63a to v63d v64a to v64c v65a to v65c v66 v67
v68a to v68c v69a to v69c v70a to v70e v71a to v71d v72a to
v72c v73a to v73d v74 v75a to v75h v76a to v76g v77 v78a to
v78d v79 v80 v81a to v81c v82a to v82g v83a to v83c v84a to
v84c v85a to v85c v86a to v86e v87a to v87e v88 v89a to v89e
```

```
v90a to v90d v91 to v93 v94a to v94c v95 v96a to v96e v97a to
v97e v98 v99 v100a to v100d v101a to v101c v102a to v102d v103
v104 to v104c v105a to v105c v106 v107a to v107c v108 v109a to
v109e v110a to v110d v111a to v111d v112a to v112d v113a to
v113c v114 v115a to v115d v116 v117a to v117d v118a to v118d
v119a to v119d v120a to v120d v121a to v121d v122
 /MISSING=INCLUDE
 /STATISTICS = UNIVF TABLE
FINISH
```

```
B    CLUSTAN (CLUSTER) - Average and Wards method of cluster
                         analysis

SIZE HUGE
ASSIGN FILE = RAW, SPEC = 'Faba BATHROOM'
READ DATA, VARIABLES CONTINUOUS 1-2, MULTISTATE 3-27,
MISSINGVALUES 27*0, CASES 491,
TITLE "SECTION Faba OTU'S - USING SELECTED CHARACTERS",
INFILE = RAW
READ LABELS CASES
6001    10026   11004   14001   16017   17009   18001   20003
23012   24001   25015   26023   37006   38003   39006   40004
41006   42019   64013   66005   71003   6002    6003    6004

        --------------- Bulk of Labels -----------------


64074   64075   64076   64077   64078   64079   64080   64081
64082   64083   64084   64085   66001   66002   66003   66004
66006   71001   71002
CLUSTER, METHOD WARDS, MEASURE SEUCLID, TRANSFORM RANGES,
PRINT FUSIONS, ICICLE MIN 1 MAX 20 INC 5
PRINT RESULTS
TREE, STYLE=VERTICAL
CLUSTER, METHOD MEDIAN, MEASURE SEUCLID, TRANSFORM RANGES,
PRINT FUSIONS, ICICLE MIN 1 MAX 20 INC 5
PRINT RESULTS
TREE, STYLE=VERTICAL
CLUSTER, METHOD CENTROID, MEASURE EUCLID, TRANSFORM RANGES,
PRINT FUSIONS, ICICLE MIN 1 MAX 20 INC 5
PRINT RESULTS
TREE, STYLE=HORIZONTAL
CLUSTER, METHOD CENTROID, MEASURE GOWER, TRANSFORM RANGES,
PRINT FUSIONS, ICICLE MIN 1 MAX 20 INC 5
PRINT RESULTS
TREE, STYLE=VERTICAL
CLUSTER, METHOD CENTROID, MEASURE POWER, p=2, r=1, TRANSFORM
RANGES,
PRINT FUSIONS, ICICLE MIN 1 MAX 20 INC 5
PRINT RESULTS
TREE, STYLE=VERTICAL
STOP
```

```
C     CLUSTER (SCATTER) - Principal components analysis

SIZE
3
FILE
SUBAV80
  61  80    0SC16E    X

     6     3    10    55    30     6    12     3    15   116     4     5
15     9     7    13
    12    11     2     7     4     3     8    26     7     4     6     3
4    10     6     1
     9    56     2     1     2     1     1     1     1     1     4     2
3     3     2     2
     1     2     2     2     2     3     1     3     1     3     1     2
2     2     1     3

          --------------- Bulk of Data -----------------

     1     3     4     3     2     2     2     1     2     8     1     2
2     1     2     1
     4     2     3     2     1     3     3     1     1     3     2     3
2     1     2     2
CORREL

HIERARCY
3  2  9
SCATTER
 -1 -3LXXX                      X  1

PLINK

VICIA SUBG. VICIA USING AVERAGE LINKAGE AND 80 CHARACTERS
STOP
```

```
D    LINKAGE - Single linkage cluster analysis

 101000
SECTION HYPECHUSA TAXA USING 27 CHARACTERS
111000
(I5,3X,27A1)
 035 8 025 5 035 8 018 5 015 3 035 5 0 8 3 0 0 0 0 0 0 018 4
027 5 0 0 0 0 0 0
 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0
 0 0 0999
9999
   44   J88A626349614233443222111112
   45   N99CA7635951323344322211111
   15   L86FCD7358523223443211323 21
   69   X9963D434A51322342332211112
    9   M8864373585232337732221112 1
   22   M78648634A51313333322111112
    3   I76C6D6337514134333232111 13
   48   K64545523742414422321244321
   49   M64545523742414488321143321
   36   95321132274141443313214432 1
    2   G45212323742414455432143321
   33   M77545624942413355522123211
   34   M77434422842313355521123221
   21   D54110725941413433431134321
    7   M68322323842413455332123221
   63   F4431B52485241432333114332 1
   29   D25110523852322332331123421
   31   D27110523852422422331134431
   -1
```

Appendix 5. Revision Conspectus for *Vicia* Subgenus *Vicia*

The conspectus is intended to be a summary of the taxonomic information for *Vicia* subgenus *Vicia*. It contains a synthesis of the revision products. Subgenus *Vicia* contains 92 taxa, with a distribution centring on Southern Europe and North West Asia. During the course of this revision I have travelled and collected throughout this area. This has enabled me to make field observations of all but the rarest taxa and this field knowledge has facilitated my conception of relationships between taxa.

In the conspectus sections, series, species, subspecies and varieties are listed in my conception of their natural sequence, from the primitive perennial species to the cultivated fababean. Where available the following information is provided for each taxon included in subgenus: accepted taxon name, author(s), date of publication, where published; type location and provenance; iconography (reference to published descriptions and illustration); common synonyms; taxon description; phenology; chromosome number; geographical distribution (using two letter country ISO-codes); ecological notes, including altitude and habitat notes; taxonomic notes and specimen citation for those specimens used during the revision. Type specimens that have been seen are marked by an exclamation mark.

All the data included in the conspectus, except the introduction and taxonomic notes, were produced from the subg. *Vicia* revision database. To present a complete coverage of geographical details, extra distributional data have been added from Allkin *et al*. (1983) and Greuter (1989).

The following abbreviation are used in the iconography:

Fl. Eur. Ball, P.W., (1968). Vicia in Flora Europaea, Vol. 2: 129-136. Cambridge University Press, Cambridge, U.K.;

Fl. Iran. Chrtkova-Zertova, A., (1979). Vicia in Flora Iranica Vol. 140: 16-57. Akademische Druck-u. Verlagsanstalt, Graz, Austria;

Fl. Iraq Townsend, C.C., (1974). Vicia in Flora of Iraq, Vol. 3: 512-544. Ministry of Agriculture & Agrarian Reform, Baghdad, Iraq.

Fl. Pal. Zohary, M., (1972). Vicia in Flora Palaestina, Vol. 2: text 194-209, plates 278-298. Israel Academy of Sciences and Humanities, Jerusalem, Israel.

Fl. Syr. Mouterde, P., (1966). Vicia in Nouvelle Flore du Liban et de la Syrie, Vol. 2: 396-414. Librairie Orientale, Beyrouth, Liban.

Fl. Tur. Davis, P.H. & Plitmann, U. (1970). Vicia in Flora of Turkey and the East Aegean Islands, Vol. 3: 274-325. Edinburgh University Press, Edinburgh, U.K.;

Fl. USSR. Fedtschenko, B.A., (1948). Vicia in Flora of the U.S.S.R. Vol. XIII: 406-475. Izdatel'stvo Akademii Nauk SSSR, Moskva, U.S.S.R.

Illust. Draw. Brit. Pl. Ross-Craig, S., (1948). Illustrated Drawings of British Plants, Vol. 3: 55-72.

Vicia Subgenus Vicia L., Sp. Pl., 734 (1753).

Type: V. sativa L., Sp. Pl., 736 (1753).
Iconography: Kupicha (1976) Notes Roy. Bot. Gard. Edinb., 34: 320.
Synonymy: Phaseolus L. (1753) Sp. Pl., 723. pro parte excl. typ.; Orobus L. (1753) Sp. Pl., 728. pro parte excl. typ.; Lathyrus L. (1753) Sp. Pl., 729. pro parte excl. typ.; Ervum L. (1753) Sp. Pl., 738. pro parte excl. typ.; Faba Miller (1754) Gard. Dict. Abr. ed 4. Arachus Medikus (1787) Vorles. Churpf. Phys.-Okon. Ges., 2: 360; Bona Medikus (1787) Vorles. Churpf. Phys.-Okon. Ges., 2: 360; Vicioides Moench (1794) Meth., 135; Wiggersia Gaertner, Meyer & Scherb. (1801) Fl. Wetterau 3(6): 33; Ervilia Link (1822) Enum. Hort. Berol. II: 240. pro parte excl. typ.; Vicia sect. Viciae Koch (1836) Fl. Germ. Helv. 1: 193; Hypechusa Alef. (1860) Bot. Zeit., 18(19): 165. Atossa Alef. (1861) Bonplandia, 9: 100; Cujunie Alef. (1861) Bonplandia, 9: 101; Tuamina Alef. (1861) Bonplandia, 9: 102; Vicia subg. Euvicia Rouy (1899) Fl. Fr. 5: 208.

Description: Plants annual or perennial. Leaves hypostomatic to hypo-amphistomatic, paripinnate, usually tendrilous, occasionally mucronate; stipules monomorphic, always with a glandular nectariferous pit on the abaxial side. Inflorescence 1-several flowered, peduncle very rarely longer than subtending leaf, commonly shorter than the flower, flower sometimes sessile in leaf axil. Calyx regular or irregular. Vexillum platynychioid or stenonychioid, rarely pubescent on abaxial surface. Style with hairs all round apex or only on abaxial side, always tufted abaxially. Legume not stipitate, containing +/- well-developed "woolly" parenchymatous tissue between the seeds; pods oblong, rhomboidal or linear. Seeds with long to short hila; testa smooth or rarely rough; lens near hilum or on opposite side of seed; canavanine absent.

Number of taxa: ninety two **Chromosome numbers:** 2n = 10, 12, 14, (16, 18)

Geographical distribution: Europe, North Africa, Near and Middle East, South-west Asia, Northern Asia. A few species have been introduced to other temperate areas of the world.

Taxonomic notes: The subgenus is divided into nine sections, nine series, 38 species, 14 subspecies and 22 varieties. This classification can be seen as a natural progression from the conception of Kupicha (1976). Who comments that:

> "No subsections are recognised, but sect. Vicilla, Cracca, Atossa, Vicia, Faba and Hypechusa could probably all be further subdivided."

The last four of these sections are included in subgenus Vicia and are here subdivided. The proposed classification attempts to reflect the taxa's natural relationships, while not producing such a fine classification that it loses its predictive value. It is difficult to represent the 'natural' relationship of taxa in a linear order and this has inevitably led to some loss of information. This order cannot, for instance, reflect the similarity between V. sepium and V. qatmensis, both of which have laterally flattened legumes and seeds with hila more than half the seed circumference length. Though in this case, the similarity could possibly have resulted from convergence.

The proposed sectional order is derived from the results of phenetic analysis. The order of the sections in Kupicha's classification goes from the primitive, erect, many flowered, shaded habitat species of sect. Atossa to the single flowered, adventitious weeds of sect. Peregrinae. In the proposed classification, the order of sections is markedly different to that proposed by Kupicha (1976). The starting point is sect. Atossa, but the few flowered, adventitious weeds of sects. Hypechusa, Peregrinae and Vicia are passed through to culminate in the more robust, crop-like forms of the V. narbonensis complex, and V. faba.

In a linear sequence, sect. Atossa (specifically V. oroboides), is the closest section to subg. Vicilla and so must

be placed first. V. faba is the most distinct species in the subgenus and should logically be placed at the end of the sequence. Logically the sequence must therefore run from V. oroboides to V. faba. The intervening sections between these two points are ordered in the manner suggested by the phenetic analysis results.

Within the subgenus the most distinct section is the monotypic sect. Faba, there has been much taxonomic controversy over the natural relationships of V. faba to Vicia. Should the species be in a distinct series, section, subgenus or genus? Ultimately, I have concluded that it should be placed in a monotypic section. This is because it does share distinct characteristics with the other members of this subgenus. However, a broader study of the generic limits of Vicia is required to confirm this view. The detailed relationship between V. faba and subgenus Vicia is discussed by Maxted et al. (1989).

Many of the taxonomic problems associated with this group are focused on four species aggregates based around V. narbonensis, V. sativa, V. peregrina and V. noeana. A resolution to the problems associated with these species aggregates is proposed. Some of the problems encountered by botanists attempting to identify taxa within these closely related groups are due to the difficulty in scoring diagnostic characters. These characters may be obscured for practical purposes i.e. they may be obvious if the full character set is available, but this is rarely the case. For example it is always difficult to score flower colour or any seed characters from herbarium specimens. In a closely related group all the key characters must be available if the taxa are to be correctly attributed.

Within the conspectus at the supra-specific level I have generally resisted the temptation to recognise taxa distinguished solely on the basis of vegetative characteristics. The genetic control of these characters is questionable and field observation

has indicated that these forms are likely to result from local environment conditions.

Several species of the subgenus are well established food or forage species, e.g. V. faba, V. narbonensis and V. sativa subsp. sativa. Recent ICARDA annual reports (ICARDA, 1987, 1988) have emphasised the potential of other subg. Vicia taxa for providing future fodder or forage crop. Active research programmes searching for 'new crops' at ICARDA involve : V. hybrida, V. hyaeniscyamus and V. noeana.

Key to Sections and Series of Vicia Subgenus Vicia.

1(0). Calyx mouth truncate..... 2
Calyx mouth oblique..... 6

2(1). Keel slightly shorter or approximately equal to wings; lens positioned near hilum..... 3
Keel markedly shorter than wings; lens positioned opposite hilum..... Sect. Microcarinae

3(2). Testa surface smooth..... 4
Testa surface sculptured..... Sect. Wiggersia

4(3). Legume hairs simple..... Sect. Vicia 5
Legume hairs tuberculate..... Sect. Bithynicae

5(4). Hilum less than half of seed circumference..... Ser. Vicia
Hilum over half seed circumference..... Ser. Grandiflorae

6(1). Lens positioned opposite hilum..... Sect. Hypechusa 7
Lens positioned near hilum..... 8

7(6). Peduncle possibly longer than 6mm; standard stenonychioid, upper surface glabrous; wing marking absent; wing limb with strongly kinking..... Ser. Hyrcanicae
Peduncle not longer than 6mm; standard platynychioid or stenonychioid; upper standard surface glabrous or pubescent; wing marking absent or present; wing limb with weak kinking..... Ser. Hypechusa

8(6). Perennial; hilum over half seed circumference; legume hairs absent..... Sect. Atossa 9
Annual; hilum less than quarter of seed circumference; legume hairs present..... 11

9(8). Leaves with 1-4 pairs of leaflets.. Ser. Pseudovicilla
Leaves with more than 4 pairs of leaflets..... 10

10(9). Standard yellow; legume hairs absent.....
..... Ser. Truncatulae
Standard blue or purple; legume hairs present.....
..... Ser. Atossa

11(8). Leaf rachis ending in a tendril..... 12
Leaf rachis ending in a mucro..... Sect. Faba

12(11). Standard claw bowed; leaflets symmetric; stem slender; calyx base gibbous..... Sect. Peregrinae
Standard claw bowing absent; leaflets asymmetric; stem stout; calyx base not gibbous.....
..... Sect. Narbonensis 13

13(12). Legume rectangular..... Ser. Narbonensis
Legume rhomboid..... Ser. Rhombocarpae

Key to Species of Vicia Subgenus Vicia.

1(0). Peduncle absent; legume oblong..... 2
Peduncle present; legume linear, rectangular, rhomboid or oblong..... 4

2(1). Standard face cream; number of teeth on stipule proximal edge none; seed circumference to hilum length ratio up to 0.1..... 3
Standard face purple; number of teeth on stipule proximal edge 1-2; seed circumference to hilum length ratio 0.11 to 0.3..... 22 V. peregrina

3(2). Legume cross-sectional shape rounded to flat; seed circumference 9 to 20mm; hilum surface excess tissue absent; seed shape spherical to cubic..... ..... 21 V. aintabensis
Legume cross-sectional shape flat; seed circumference 20.1 to 30mm; hilum surface excess tissue present; seed shape oblong..... 21 V. michauxii

4(1). Calyx mouth truncate..... 5
Calyx mouth oblique..... 12

5(4). Keel slightly shorter or approximately equal to wings; lens positioned near hilum..... 6
Keel markedly shorter than wings; lens positioned opposite hilum..... 5 V. dionysiensis

6(5). Annual, stolons absent; standard cream, yellow, or purple..... 7
Perennial, stoloniferous; standard purple..... ..... 25 V. pyrenaica

7(6). Stipules subentire, 2-4mm long; flowers 6-14mm; seeds sculptured; tendrils mostly simple..... 8
At least the lower stipules distinctly toothed, usually larger; flowers (10-)14-36mm; seeds smooth; tendrils simple or branched..... 9

8(7). Flowers 5-12mm; Legume falcate; Legume distal end strongly beaked; seed surface ruminate-reticulate.. ..... 23 V. cuspidata
Flowers 9-15mm; Legume not falcate; Legume distal end slightly beaked; seed surface tuberculate..... ..... 24 V. lathyroides

9(7). Wings purplish; legume rounded in cross-section; seed circumference to hilum length ratio 0.11 to 0.3..... 10
Wings cream or yellow; Legume distinctly laterally flattened in cross-section; Seed circumference to hilum length ratio of 0.61 or more..... 11

10(9). Standard face purple (rarely cream); wings reddish purple (rarely cream)..... 26 V. sativa
Standard face yellow; wings blueish purple..... ..... 27 V. barbazitae

11(9). Aril present and protruding; flower (19-)24-36mm; wing yellow..... 29 V. grandiflora
Aril absent; flower 20-21mm; wing cream..... ..... 28 V. gatmensis

12(4). Leaves with 1-3(-4)-pairs leaflets, large and usually asymmetric; legume sutures parallel; seeds with short hilum, lens near hilum..... 13
Leaves with 3-8-paired leaflets, smaller and symmetric; legume sutures not parallel; seeds with medium or short hilum, lens on opposite side of seed to the hilum..... 21

13(12). Leaf rachis ending in a mucro; calyx glabrous; flower white; legume hairs simple..... 38 V. faba
Leaf rachis ending in a tendril; calyx pubescent; flower cream, lilac or purple; legume hairs tuberculate..... 14

14(13). Stipules ovate-semi-sagittate; leaflets narrowly ovate to linear; calyx teeth subequal, longer than the tube; peduncle commonly longer than calyx..... 30 V. bithynica
Stipules orbicular-semi-sagittate; leaflets broadly ovate or obovate; peduncle rarely longer than calyx..... 15

15(14). Standard face cream, possibly tinged with purple; wing apex with distinct markings..... 16
Standard face purple, lilac or rarely cream; wing apex markings absent or if standard purple possibly present..... 18

16(15). Erect, robust plant; stipules purple; 5-6 flowers per inflorescence; flower cream yellow; legumes with numerous long hairs..... 37 V. hyaeniscyamus
Ascending semi-robust plant; stipules green; 1-3 flowers per inflorescence; flower cream; legume with few short hairs..... 17

17(16). Exterior calyx nectaries dark purple; less than 7 basal side shoots..... 34 V. galilaea
Exterior calyx nectaries green; more than 7 basal side shoots..... 33 V. johannis

18(15). Standard face cream or pale lilac..... 19
Standard face purple..... 20

19(18). Standard face lilac; legume rhomboid, hairs with long tubercles..... 31 V. eristalioides
Standard face cream; legume rectangular, hairs with short tubercles..... 32 V. kalakhensis

20(18). Leaflet margin with more than 6 serrations; wing apex markings present; 6-10 seeded; seeds 4-5(-6)mm..... 35 V. serratifolia
Leaflet margin with less than 7 serrations; wing apex markings absent; 4-7 seeded; seeds 4-10(-13)mm..... 36 V. narbonensis

21(12). Annual; leaf rachis ending in a tendril; standard shape stenonychioid or platynychioid; hilum less than half seed circumference; lens positioned opposite hilum..... 22
Perennial; leaf rachis ending in a tendril or mucro; standard shape platynychioid; hilum over half seed circumference; lens positioned near hilum..... 35

22(21). Standard upper surface subadpressed pubescent; legume pubescent..... 23
Standard upper surface glabrous; legume glabrous or pubescent..... 25

23(22). Inflorescence with 2-4-flowers; flowers 15-23mm, yellow or purple..... 16 V. pannonica
Inflorescence with 1(-2)-flowers; flowers 12-35mm, yellow..... 24

24(23). Flowers 18-35mm, flowers sulphur yellow; standard stenonychioid, limb equalling claw..... 17 V. hybrida
Flowers 15-18mm, standard yellow green, wing with dark brown apex; standard platynychioid, limb shorter than claw..... 14 V. anatolica

25(22). Flowers violet..... 7 V. esdraelonensis
Flowers yellowish (or rarely purple in V. lutea).... 26

26(25). Legume (and ovary) with hairy valves; peduncle much shorter than calyx tube..... 27
Legume (and ovary) with glabrous valves; peduncle equalling or longer than calyx tube..... 29

27(26). Peduncle 1-2mm; standard stenonychioid; legume with simple or tubercular hairs..... 19 V. lutea
Peduncle more than 2mm; standard platynychioid; legume with simple hairs..... 28

28(27). Plant +/- villous; tendrils simple; flowers 12-18mm, 1-3 in axil; wing apex marking present; fruit densely villous..... 15 V. mollis
Plants adpressed-pilose; tendrils mostly branched; flowers (15)18-29mm, mostly solitary; wing apex marking absent; fruit adpressed-sericeous..... ..... 18 V. sericocarpa

29(26). Sutures of legume tuberculate-ciliate; limb of standard shorter than claw..... 30
Sutures of legume glabrous; limb of standard shorter to longer than claw..... 31

30(31). Wing apex with distinct brown spot; peduncle 2-9mm; flowers (1-)2-4, 17-22mm..... 12 V. melanops
Wing apex with no apex spot; peduncle 2-3mm; flowers 1-2 per inflorescence, 12-15 long.... 13 V. ciliatula

31(29). Stem 10-35cm; tendrils rarely branched; lower calyx tooth 2-3.5mm; standard 15-20mm, pale yellow..... ..... 6 V. assyriaca
Stem taller; tendrils branched; lower calyx tooth 2-9mm; standard 17-30mm, yellow-pink or yellow-brown..... 32

32(31). Peduncle 1-3mm; corolla not concolorous; legume rhomboid..... 8 V. tigridis
Peduncle longer than 3mm; corolla concolorous; legume oblong..... 33

33(32). Peduncle 1-2-flowered; legume 8-12mm broad; limb of standard slightly shorter than claw.. 10 V. hyrcanica
Peduncle (1-)2-5-flowered; legume 8-10mm broad; limb of standard as long or slightly longer than claw.. 34

34(33). Hilum 1/6 of seed's circumference; calyx violet, green only if lowest tooth longer than tube; leaflets 2-5(-8)mm broad, never obovate..... ..... 9 V. galeata
Hilum 1/2 to 2/3 of seed's circumference; calyx green, teeth shorter than tube; leaflets 3-14mm broad, some obovate..... 11 V. noeana

35(21). Leaf rachis ending in a mucro..... 36
Leaf rachis ending in a tendril..... 37

36(35). Stem slender; leaves with 1-4 leaflet pairs; calyx teeth not reflexed; legume rounded to flat in cross-section..... 3 V. abbreviata
Stem stout; leaves with 4-7 leaflet pairs; calyx teeth reflexed; legume laterally flat in cross-sectional..... 1 V. oroboides

37(35). Stem stout; flower yellow; legume valve hairs absent..... 2 V. balansae
Stem slender; flower lilac; legume valve hairs present..... 4 V. sepium

Section Atossa

I **Section Atossa** (Alef.) Asch. & Graebner (1909) Syn. Mitteleur. Fl., 6, 2: 949.
Type: lectotype (Gunn, 1969) V. sepium L., Sp. Pl. 737 (1753).
Iconography: Kupicha (1976) Notes Roy. Bot. Gard., 34: 320.
Synonymy: Vicioides Moench (1794) Meth. 135; Vicia ser. Perennes Taubert (1894) Die Nat. Pl. III, 10: 351, nomen nudum; Vicia sect. Pedunculatae Rouy in Rouy & Fouc. (1899) Fl. Fr., 5: 221 pro parte excl. typ.; Vicia subsect. Brevicarpa Stankevich (1970) Tr. Prikl. Bot. Genet. Sel., 43: 113; Vicia sect. Sepium Radzhi (1971) Novosti Sist. Vyssh. Rast., 17: 235.

Description: Perennial; erect or climbing; stem slender or stout. Stipules entire or semi-hastate; length less than 3.5mm or 3.5 to 5.5mm; edge entire or with 1-2 teeth or with 3-5 teeth. Leaf apex tendrilous or mucronate; leaflet less than 20mm or 20-30mm or longer than 30mm; with 1-4 pairs or more than 4 pairs. Leaflets symmetric; margins entire. Number of flowers per inflorescence 1 to 2 or 3 to 4 or more than 4; peduncle 3-6mm or peduncle longer than 6mm. Calyx mouth oblique; lower tooth longer than upper; base gibbous. Pedicel shorter or equal to 3mm. Flowers shorter than 15mm or 15 to 20mm or longer than 20mm; standard yellow or blue or purple; shape platonychioid; claw bowing absent; upper standard surface glabrous. All petals approximately equal length. Wing marking absent; wing limb kinking absent or with slight kinking. Legume length less than 30mm or 30 to 50mm; width 5 to 10mm wide; oblong; laterally flattened; sutures straight or curved; valve hairs absent; septa absent; number of seeds per legume less than 7. Seeds less than 3.4mm or 3.5 to 6.0mm; round or oblong; not laterally flattened; hilum over half seed circumference; lens positioned near hilum; testa surface smooth.

Number of taxa: six. **Chromosome number:** 12, 14, 16, 18.
Geographical distribution: Europe except Sardinia and Turkey in Europe, N. Anatolia, Crimea, Caucasia, N. Iran, Asia eastward to the Pacific.

Taxonomic notes: This is a small and heterogenous section of perennials, which have a habitat preference for deciduous woods or hedgerows. The four species easily form three series. V. balansae and V. abbreviata are obviously closely related.

A **Series** Pseudovicilla Maxted ser. nov.
Planta perennis, erecta. Folium apice mucronata et in 1-4 paribus foliolorum divisum; foliola ovata ad apicem accuminata, plus quam 30mm longa. Calyx ad orem obliquus, ad basin gibbosus. Flores lutei, vexillo platynychioideo. Legumen oblongum, lateraliter compressum suturis curvatis et valvis glabris.
Type: V. oroboides Wulfen in Jacq. (1790) Coll. Bot. Chem. Hist. Nat. Sp., 4: 323.
Synonymy: Orobus L.(1753) Sp. Pl. 728, pro parte excl. typ.; Atossa Alef. (1861), in Bonplandia 9: 100;

Description: Perennial; erect; stem stout. Stipules entire or semi-hastate; length 3.5 to 5.5mm; edge entire or with 1-2 teeth. Leaf apex mucronate; leaflet longer than 30mm; with 1-4 pairs. Leaflets symmetric; margins entire. Number of flowers per inflorescence 3 to 4; peduncle 3-6mm or peduncle longer than 6mm. Calyx mouth oblique; lower tooth longer than upper; base gibbous. Pedicel shorter or equal to 3mm. Flowers 15 to 20mm; standard yellow; shape platonychioid; claw bowing absent; upper standard surface glabrous. All petals approximately equal length. Wing marking absent; wing limb with slight kinking. Legume length less than 30mm or 30 to 50mm; width 5 to 10mm wide; oblong; laterally flattened; sutures curved; valve hairs absent; septa absent; number of seeds per legume less than 7. Seeds less than 3.4mm; round or oblong; not laterally flattened; hilum over half seed circumference; lens positioned near hilum; testa surface smooth.

Number of taxa: one **Chromosome number:** 14
Geographical distribution: Central South-east Europe

1 **Accepted taxon:** V. oroboides Wulfen in Jacq. (1790) Coll. Bot. Chem. Hist. Nat. Sp., 4: 323.
Type: Holotype; Jacquin 460 (BM!).
Iconography: Fl. Eur., 2: 134.
Synonymy: Orobus lathyroides L.(1753) Sp. Pl. 1027; Orobus rupensis Lerchenf. (1785) Herb. Transs. Jun.; V. oroboides Willd. (1802) Sp. Pl., 3(2): 1103; Orobus vicioides Ser. in DC. (1825) Prodr., 2: 377; Orobus clusii Sprengel (1826) Linnaei Syst. Veget., 16(3): 259; Atossa clusii Alef. (1861) Bonplandia, 9: 101.

Description: VEGETATIVE CHARACTERS: Perennial; erect; 25-50cm high. Stipule length 4.5-9mm; 1.5-5mm wide. Stipule semi-hastate or semi-sagittate; apex acute; number of teeth on distal edge none or 1-2; number of teeth on proximal edge none; stipule edge form entire; not-translucent. Stipule colour (upper plant) green or green with purple; glabrous or hairs located edge only. Leaf 25-73mm long; petiole 3-14mm long; average leaflet internode 16-43mm long; leaflet 31-85mm long; leaflet 22-38(-45)mm wide; tendril or mucro 2-6mm long; average leaf internode 37-105mm long; petiolule 18-70mm long. Leaf apex mucronate. Leaflet shape symmetric; (2-)4-7 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet linear elliptic or broad ovate; apex acute; base angustate or truncate to angustate; broadest in middle or at base. Leaflet adaxial hairs absent or less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long; leaflet abaxial hair absent or less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; petiole hairs absent or less than 10 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle longer than 2mm, but shorter than flower or longer than flower. Peduncle length 7-28mm; rachis 5-16mm long; pedicel 1-3mm long; flower 14-16(-19)mm long; ratio of peduncle to flower length of 0.46-1.86; peduncular cusp absent. Number of flowers per inflorescence three or four (rarely) or more than four. Pedicel less than 10 hairs per mm sq or with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 3.5-5mm long; lateral teeth 2.5-4mm long; upper tooth 1.5-3mm long; tube 5-6mm long; ratio of lower tooth to tube length of 0.5-0.9. Calyx base slightly gibbous or strongly gibbous; tube mouth slightly oblique; teeth reflexing present. Tooth curvature present; exterior

nectaries absent. Calyx hairs only on calyx teeth or covering calyx; hair density less than 10 per mm sq; hair length less than 0.5mm long; hairs adpressed. Calyx colour purple. Standard length 13-17mm; limb length 6-11mm; claw length 6-9.5mm; limb width 8-11mm; claw width 5-8mm; ratio of limb length to claw length 0.73-1.83. Corolla petals concolorous; standard face yellow (pale) or yellow-pink; standard upper surface yellow; face without distinct veining. Standard shape platonychioid; apex emarginate or emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 10.5-15mm; limb length 5-7mm; claw length 5.5-8.5mm; limb width 2.5-4.5mm. Wing colour yellow (pale) or yellow-pink; markings absent. Wing shape 2; spur shape 2 or 4; limb base kinking weak; limb pouch present; wing to keel adhesion weak. Keel length 10-12.5mm; hood length 3.5-4.5mm; claw length 6.5-8mm; hood width 4-5.5mm. Keel colour white; hood apex not distinctly coloured. Keel shape 3; base shape 2; pouch absent. Staminal tube length 10-12mm; filament length 1.5-2mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 5.5-9mm; style length 3.5-5mm; supra-ovary extension 2-4mm. Ovary shape linear or intermediate; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent or present. Ovary glabrous; style apex pubescence type 1. Number of ovules per ovary 6-11.

LEGUME CHARACTERS: Legume 20-32(-40)mm long; 5-9mm wide; 3-5mm deep; ratio of legume length to width 3.33-5.4. Amphicarpic legumes absent. Legume colour black; uniform over legume. Legume shape oblong; cross-sectional shape laterally flat; not falcate; suture unparallel; distal end unbeaked; valve surface not torulose; surface smooth; partitioning absent. Legume glabrous; suture surface smooth. Dehiscent legume twisting tight or very tight; number of seeds per legume 3-7.

SEED CHARACTERS: Seed 2.5-3.5mm long; 3-4mm wide; 2-3mm deep; 7-12.5mm circumference; hilum 4-7mm long; distance from hilum to lens 0.5-1mm; seed length to width ratio of 0.71-1; seed circumference to hilum length ratio of 0.56-0.57. Seed shape spherical or oblong; shape in side view circular; seed colour red-brown or brown; mottling absent or present; surface matt; wrinkled. Hilum shape elongated, less than third of circumference or very elongated, more than third of circumference; coloured red-brown or coloured brown or coloured black; groove colour same as hilum or red-brown; hilum surface excess tissue absent. Lens position less than 1.6mm from hilum; prominent. Aril absent.

Phenology: May - September **Chromosome number:** 14.
Geographical distribution: AT, HU, IT, YU. See Map 1.
Ecology: Alt. 150 - 1400m; Hab. pasture and woodland on hill and mountainsides.

Taxonomic notes: Linnaeus considered V. oroboides a member of the genus Orobus (O. lathyroides) and the resemblance with the Lathyrus sect. Orobus and the oroboid Vicia is clear. Hanelt & Mettin (1970b), Bassler (1973) and Kupicha (1976) have each studied the relationship between V. oroboides and other Vicieae spp., using morphological and cytotaxonomic characters. They concluded that the species was a natural member of Vicia subg. Vicia and that it was distinct from the other oroboid Vicia in subg. Vicilla sect. Vicilla. Kupicha (1976) comment that although the oroboid species share a phenetic resemblance, these features have evolved separately several times in response to similar environmental conditions. Within subg. Vicia, V. oroboides possesses the diagnostic features of sect. Atossa and the oroboid features are likely to be the result of convergence between the different groups of oroboid species.

Specimen citation: Kristof 4256 (E); Sabransky 77 (E); Sabransky 4521 (E); Sabransky 4521 (W); Burri & Krendl s.n. (W); Burri & Krendl s.n. (W); Polatschek s.n. (W); Prior 1041 (K); Grat 1860 (K); Gilli s.n. (W); Fiori, Beguinot & Pampanini 303 (K); Ball s.n. (E); Wulfen s.n. (W); Maxted 6548 (SPN); Maxted 6526 (SPN); Gilliat-Smith 3089a (K); Gilliat-Smith 3089b (K); Smith s.n. (K); Jirus 1609 (MO).

B **Series** Truncatulae (B. Fedtsch. ex Radzhi) Maxted stat. nov. (1971) Novosti Sist. Vyssh. Rast., 7: 236.

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Map 1.

Type: V. abbreviata Fischer ex Sprengel (1813) Pl. Min. Cog. Pug. Prim., 1(86): 50.
Synonymy: Orobus L.(1753) Sp. Pl. 728, pro parte excl. typ.; Vicia subg. Megalusa Alef. (1860) Bonplandia 8: 70; Vicia subsect. Truncatulae Radzhi (1971) Novosti Sist. Vyssh. Rast., 7: 236; Vicia sect. Truncatula (Fedcenko) Diklic (1972) Fl. SR Srbije, 4: 340.

Description: Perennial; erect or climbing; stem slender or stout. Stipules entire or semi-hastate; length less than 3.5mm or 3.5 to 5.5mm; edge entire or with 1-2 teeth. Leaf apex tendrilous or mucronate; leaflet less than 20mm or 20-30mm or longer than 30mm; with more than 4 pairs. Leaflets symmetric; margins entire. Number of flowers per inflorescence 3 to 4 or more than 4; peduncle 3-6mm or peduncle longer than 6mm. Calyx mouth oblique; lower tooth longer than upper; base gibbous. Pedicel shorter or equal to 3mm. Flowers 15 to 20mm or longer than 20mm; standard yellow; shape platonychioid; claw bowing absent; upper standard surface glabrous. All petals approximately equal length. Wing marking absent; wing limb with slight kinking. Legume length less than 30mm or 30 to 50mm; width 5 to 10mm wide; oblong; laterally flattened; sutures curved; valve hairs absent; septa absent; number of seeds per legume less than 7. Seeds less than 3.4mm or 3.5 to 6.0mm; round or oblong; not laterally flattened; hilum over half seed circumference; lens positioned near hilum; testa surface smooth.
Number of taxa: two. **Chromosome number:** 14
Geographical distribution: Middle-east

Taxonomic notes: Stankevich (1988) considers the two taxa of this series to be subspecies of V. abbreviata. After studying natural populations in the Caucasus she concluded that the two taxa intergrade from one to the other. This she thought was especially apparent in the subalpine zone between Karmadon and Chmi in North Osetia, Georgia, USSR. She draws attention to a comment made by Davis (1970), who noted the presence of intermediate forms between Karakurt and Sarikamis, Kars, Turkey and to Boissier annotation of the type of V. balansae, which he suggests is V. truncatula "forma robusta". As a result of this evidence and as the two taxa are found in different habitats, she concludes that V. balansae and V. abbreviata are extreme forms of a continuum, that includes intermediate specimens. The two taxa, she comments, have remained distinct due to there preference for different ecological niches.

Stankevich, in fact, has misinterpreted Davis's comment from the Flora of Turkey, his comment on the V. truncatula specimen is:

"**A4** Kars: 10 km from Sarikamis to Karakurt,2050 m, D. 46542 p.p. (with V. balansae)!"

Davis is not inferring that the specimen is an intermediate, but that the two species are growing at the same location. The interpretation of Boissier comment can also be seen as a misinterpretation of his meaning, V. balansae is a robust form V. truncatula, just as V. pyrenaica is a perennial form of V. sativa. The relationship of the two latter taxa, however, does not lead us to suggest that V. pyrenaica should be considered as a subspecies of V. sativa. Boissier is simply relating an odd specimen to a related taxon.

While collecting in the Caucasus (Spring / Summer 1989), I located six populations of V. balansae. At five of these locations, V. abbreviata was also found to be growing. Within the five sites, where both species were found, neither species showed a clear niche distinction. All the population encountered in the field were clearly attributable to one or other species and no intermediacy was noted.

I have discussed the relationship between these two taxa with Stankevich and she showed me two specimens, Busch & Busch 8.7.1936 and Busch & Busch 19.7.1929 collected from the Caucasus that do show a degree of intermediacy. Both specimens were identified as V. balansae, but were less stout than normal and possessed a much reduced tendril. The two species are closely related, but the existence of a few hybrid or introgressive forms does not invalidate their specific distinction. The fact that the species are

commonly sympatric suggests that the species must be well reproductively isolated or the two species would not be able to maintain their distinctness. For these reasons I consider that V. balansae and V. abbreviata should retain their specific status.

2 **Accepted taxon:** **V. balansae** Boiss. (1872) Fl. Orient. 2: 569.
Type: Syntype, Balansa 1408, lapidosis regionis subalpinae, Vallei de Djimil, Rize, Turkey, 1830m (K!, G! & W!).
Iconography: Fl. Tur., 3: 304; Fl. USSR., 13: 457.
Synonymy: V. djimilensis Koch ex Boiss. (1872) Fl. Or., 2: 569; V. truncatula var. major Over in (1874) Zap. Kavk. Obshch. Selsk. Khoz., 6: 252; V. nordmanniana Over in ex Trautv. (1874) Acta. Horti. Petropolitani, 6: 252; V. abbreviata subsp. balansae (Boiss.) Stankevich (1988) Bull. App. Bot. Genet. Pl. Breed., 117: 85-90.

Description: VEGETATIVE CHARACTERS: Perennial; erect; 35-85cm high. Stipule length 3-4.5(-6)mm; 1.5-4mm wide. Stipule entire or semi-hastate; apex acute; number of teeth on distal edge none (rarely) or 1-2; number of teeth on proximal edge none or 1-2 teeth (rarely). Stipule edge form entire; not-translucent. Stipule colour (upper plant) green or green with purple; glabrous. Leaf 56-135mm long; petiole 1-5(-12)mm long; average leaflet internode 5-18mm long; leaflet (10-)18-35(-43)mm long; leaflet (3-)6-12(-20)mm wide; tendril or mucro 16-70mm long; average leaf internode 21-109mm long; petiolule 48-130mm long. Leaf apex tendrilous; simple or with 2 branches or with 3 branches or with more than 3 branches. Leaflet shape symmetric; 8-26 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet linear elliptic or narrow elliptic; apex mucronate and emarginate or mucronate; base angustate or truncate to angustate; broadest in middle or at base. Leaflet adaxial hairs absent; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; petiole hairs less than 10 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle longer than 2mm, but shorter than flower or longer than flower. Peduncle length 11-27mm; rachis 9-21mm long; pedicel 1-2mm long; flower 17-22mm long; ratio of peduncle to flower length of 0.57-1.5; peduncular cusp absent. Number of flowers per inflorescence more than four. Pedicel with 10-50 hairs per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 5-10mm long; lateral teeth 4-9mm long; upper tooth 1.5-4.5mm long; tube 6-8mm long; ratio of lower tooth to tube length of 0.56-1.5. Calyx base slightly gibbous or strongly gibbous; tube mouth slightly oblique or strongly oblique; teeth reflexing absent; tooth curvature present; exterior nectaries absent. Calyx hairs covering calyx; hair density less than 10 per mm sq or 10-35 per mm sq; hair length less than 0.5mm long or 0.5-1.5mm long or more than 1.5mm long; hairs adpressed. Calyx colour green or purple. Standard length 16-22mm; limb length 6-9mm; claw length 11-15.5mm; limb width 8-12mm; claw width 7.5-11mm; ratio of limb length to claw length 0.35-0.84. Corolla petals concolorous; standard face yellow (pale buff). Standard upper surface yellow; face without distinct veining. Standard shape platonychioid; apex emarginate; claw bowing absent; upper surface glabrous. Wing length 18-22mm; limb length 6-9mm; claw length 10-13mm; limb width 4-10mm. Wing colour yellow (pale buff). Markings absent. Wing shape 2 or 3 or 4; spur shape 4; limb base kinking weak; limb pouch absent or present; wing to keel adhesion weak. Keel length 15-18mm; hood length 3.5-6mm; claw length 6.5-13mm; hood width 4.5-7mm. Keel colour white; hood apex not distinctly coloured. Keel shape 1 or 3; base shape 2; pouch absent. Staminal tube length 13.5-17mm; filament length 2-3.5mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 9-11mm; style length 4-5.5mm; supra-ovary extension 2.5-5.5mm. Ovary shape linear or intermediate or oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent or present. Ovary glabrous or with simple hairs on sutures only; style apex pubescence type 3 or 5. Number of ovules per ovary 6-11.

LEGUME CHARACTERS: Legume 24-43mm long; 6-9mm wide; 3-5mm deep; ratio of legume length to width 2.88-4. Amphicarpic legumes absent. Legume colour yellow-brown or brown or black; uniform over legume. Legume shape oblong; cross-sectional shape rounded to flat; not falcate; suture unparallel; distal end unbeaked; valve surface not torulose; surface smooth; partitioning absent. Legume glabrous; suture surface smooth. Dehiscent legume twisting tight or very tight; number of seeds per legume 2-6.

SEED CHARACTERS: Seed 3.5mm long; 4.5mm wide; 3mm deep; 12.5-13mm circumference; hilum 6.5-7mm long; distance from hilum to lens 1-1.5mm; seed length to width ratio of 0.77; seed circumference to hilum length ratio of 0.45-0.52. Seed shape oblong; shape in side view circular; seed colour brown; mottling absent; surface matt; wrinkled. Hilum shape very elongated, more than third of circumference; coloured red-brown or coloured black; groove colour same as hilum or red-brown; hilum surface excess tissue absent. Lens position less than 1.6mm from hilum or more than 1.5mm from hilum; prominent. Aril absent.

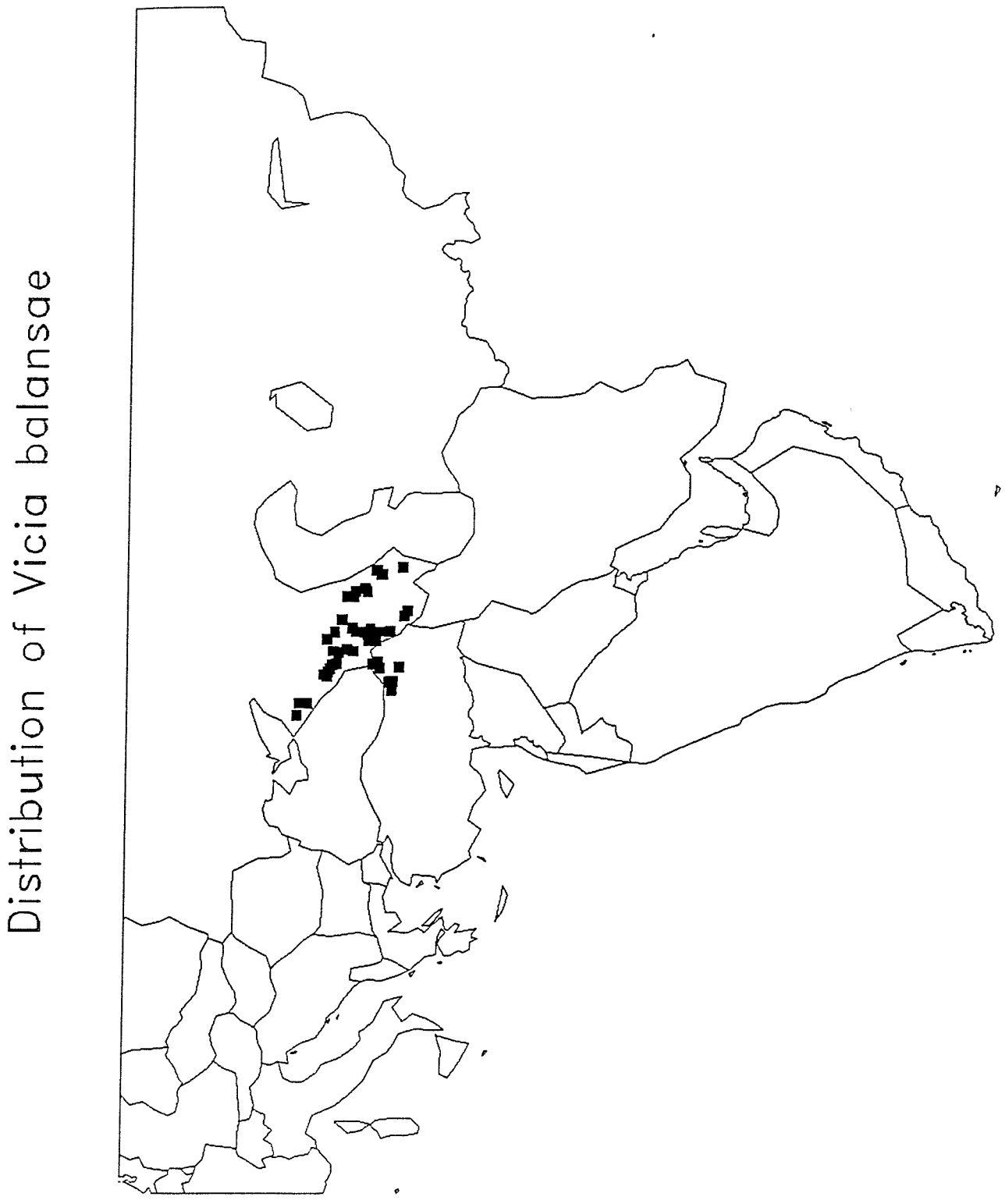
Phenology: May - August **Chromosome number:** 12, 14.
Geographical distribution: SU, TR. See Map 2.
Ecology: Alt. 550 - 2700m; Hab. Moist alpine pastures and forests

Specimen citation: Balansa 1408 (K); Balansa 1408a (K); Anon. s.n. (K); Schelkovnikov & Kara-Murza s.n. (E); Frazer Jenkins 3100 (BM); Busch s.n. (BM); Busch s.n. (K); Handgeyan s.n. (K); Busch s.n. (E); Handgeyan s.n. (E); Schischkin s.n. (W); Yuvaratskhgliya & Darbil s.n. (W); Balansa 1408 (W); Balansa 1408 (G); Kimeridze 40399 (WIR); Sinskaya & Gorsky s.n. (WIR); Stankevich & Legotina 2291 (WIR); Stankevich & Dorofeyev 2997 (WIR); Stankevich & Legotina 2255 (WIR); Stankevich & Legotina 2250 (WIR); Sinskaya & Sharapova s.n. (WIR); Stankevich & Legotina 1946 (WIR); Stankevich & Legotina 2095 (WIR); Stankevich 4478 (WIR); Bordodymova 9523 (WIR); Sinskaya 5914 (WIR); Barulina 5910 (WIR); Stankevich 4903 (WIR); Vlassov s.n. (WIR); Borkovskaya 9418 (WIR); Stankevich & Legotina 2318 (WIR); Busch & Busch s.n. (LE); Busch & Busch s.n. (LE); Leskov & Rusaleyev s.n. (LE); Vasilyev s.n. (LE); Lipsky s.n. (LE); Akinfiyev s.n. (LE); Endaurova s.n. (LE); Busch & Busch s.n. (LE); Busch & Busch s.n. (LE); Komarov & Komarov s.n. (LE); Steup s.n. (LE); Anon. s.n. (LE); Alexeyenko s.n. (LE); Poretsky s.n. (LE); Shiffers & Moreva s.n. (LE); Dmitriyeva s.n. (LE); Ruppecht s.n. (LE); Voronov s.n. (LE); Alexeyenko s.n. (LE); Juzepchuk s.n. (LE); Shiffers s.n. (LE); Voronov s.n. (LE); Akverdov s.n. (ERE); Balls 1880 (E); Balls 2147 (BM); Stainton 8398 (K); Stainton & Henderson 6195 (K); Balls 1880 (K); Davis & Hedge 29720 (E); Stainton & Henderson 6195 (E); Duzenli 582 (W).

3 **Accepted taxon:** V. abbreviata Fischer ex Sprengel (1813) Pl. Min. Cog. Pug. Prim., 1(86): 50;
Type: Holotype, Fischer (LE!), isotype (B), Tauria maxime meridionale, circa Nikitam (Crimea). Protologus: In pratis abbrevibus ad Beschtau et ad montem thermas Constantino montanis inico, 1801 m. von Bieberstein.
Iconography: Fl. Iran., 43-44; Fl. Tur., 3: 303-304; Fl. USSR., 13: 456-457; Illust. Fl. Iran., 32, fig. 3.
Synonymy: V. truncatula Fischer ex M. Bieb. 1812 Cat. Hort. Gorenk. 2: 72 nomen nudum. V. truncatula Fischer ex M. Bieb. (1819) Flora Taurico-caucasia, 3: 473; V. cassubica M. Bieb. (1819) Fl. Taur.-Cauc., 3: 466; Orobus caucasicus Sprengel (1826) Sys. Vege., 16(3): 261; V. truncatula Reichenb. (1832) Fl. Germ. Nov., 2: 250; Orobus anomalus Koch (1851) Linnaea, 24: 96; V. trichomera Alef. (1861) Bonplandia, 9: 70; V. truncatula var. major Boiss. (1872) Fl. Or., 2: 574; V. chlorantha Heuffel ex Nyman (1878) Cons. Fl. Europ., 1: 209.

Description: VEGETATIVE CHARACTERS: Perennial; erect or ascending (rarely). 15-35cm high. Stipule length 2.5-4mm; 1-2mm wide. Stipule entire or semi-hastate; apex acute; number of teeth on distal edge none or 1-2; number of teeth on proximal edge none; stipule edge form entire or uneven with swollen hairs; translucent or not-translucent. Stipule colour (upper plant) green or green with purple; glabrous. Leaf 51-154mm long; petiole 3-7mm long; average leaflet internode 4-13mm long; leaflet 11-36mm long; leaflet 3-12mm wide;

Map 2.



tendril or mucro 2-5mm long; average leaf internode 19-77mm long; petiolule 47-147mm long. Leaf apex mucronate. Leaflet shape symmetric; 14-28 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet linear elliptic or narrow elliptic; apex mucronate and emarginate or mucronate; base truncate to angustate or truncate; broadest in middle or at base. Leaflet adaxial hairs absent or 10-50 per mm sq; hairs 0.5-1.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long; petiole hairs less than 10 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle longer than 2mm, but shorter than flower or longer than flower. Peduncle length 8-32mm; rachis 5-24mm long; pedicel 1-2mm long; flower 15-17mm long; ratio of peduncle to flower length of 0.5-1.53; peduncular cusp absent. Number of flowers per inflorescence three or four or more than four. Pedicel with 10-50 hairs per mm sq; hairs 0.5-1.5mm long.

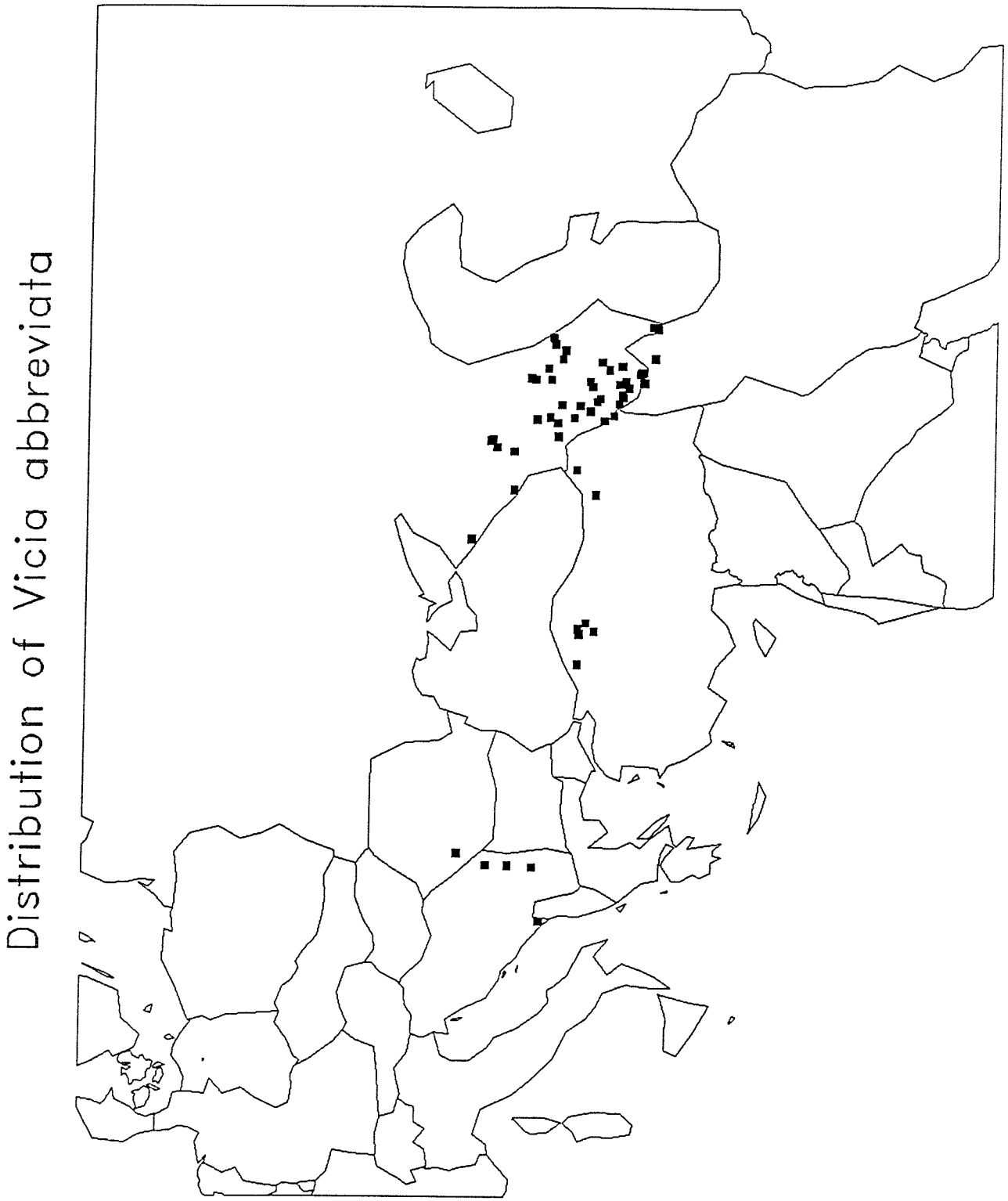
FLOWER CHARACTERS: Calyx lower tooth 1.5-7mm long; lateral teeth 1-5.5mm long; upper tooth 0.5-4.5mm long; tube 4-6mm long; ratio of lower tooth to tube length of 0.3-1.27. Calyx base strongly gibbous; tube mouth slightly oblique; teeth reflexing absent; tooth curvature present; exterior nectaries absent. Calyx hairs covering calyx; hair density less than 10 per mm sq or 10-35 per mm sq or 36-60 per mm sq; hair length less than 0.5mm long or 0.5-1.5mm long or more than 1.5mm long; hairs adpressed. Calyx colour green or purple. Standard length 8-22mm; limb length 2-11.5mm; claw length 6-12mm; limb width 6-12mm; claw width 6.5-9mm; ratio of limb length to claw length 0.33-1.09. Corolla petals concolorous; standard face yellow (buff). Standard upper surface yellow; face without distinct veining. Standard shape platonychioid; apex emarginate; claw bowing absent; upper surface glabrous or upper surface subadpressed pubescent. Wing length 14-20mm; limb length 5-10mm; claw length 9-11mm; limb width 2.5-6mm. Wing colour yellow (buff). Markings absent. Wing shape 2 or 3 or 4; spur shape 2; limb base kinking weak; limb pouch absent or present; wing to keel adhesion weak. Keel length 12.5-16mm; hood length 3-5.5mm; claw length 8.5-11mm; hood width 4.5-5.5mm. Keel colour white; hood apex not distinctly coloured. Keel shape 1 or 3; base shape 2; pouch absent. Staminal tube length 10.5-14mm; filament length 1.5-4mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 7.5-9.5mm; style length 3.5-5.5mm; supra-ovary extension 2-4mm. Ovary shape intermediate or oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent or present. Ovary glabrous or with simple hairs on sutures only or entirely covered with simple hairs; style apex pubescence type 5. Number of ovules per ovary 7-9.

LEGUME CHARACTERS: Legume 18-24(-33)mm long; 5-8mm wide; 4mm deep; ratio of legume length to width 3-3.16. Amphicarpic legumes absent. Legume colour brown or black; uniform over legume. Legume shape oblong; cross-sectional shape rounded to flat; not falcate; suture unparallel; distal end unbeaked; valve surface not torulose; surface smooth; partitioning absent. Legume glabrous; suture surface smooth. Dehiscent legume twisting medium or tight; number of seeds per legume 2-3.

SEED CHARACTERS: Seed 3-4mm long; 4-4.5mm wide; 2-3mm deep; 9.5-12mm circumference; hilum 5-6.5mm long; distance from hilum to lens 1.5mm; seed length to width ratio of 0.75-1; seed circumference to hilum length ratio of 0.53-0.54. Seed shape oblong; shape in side view circular; seed colour yellow or red-brown; mottling absent or present; surface matt; smooth or wrinkled. Hilum shape very elongated, more than third of circumference; coloured yellow or coloured red-brown; groove colour beige or same as hilum; hilum surface excess tissue absent. Lens position less than 1.6mm from hilum; prominent. Aril absent.

Phenology: May - August **Chromosome number:** unknown
Geographical distribution: AT, BG, BU, DE, IN, IR, RO, SU, TR, YU. See Map 3.
Ecology: Alt. 100 - 2400m; Hab. mountain forest and forest margins.

Map 3.



Taxonomic notes: Stankevich (1988) points out that the description of V. abbreviata Fisch. ex Sprengel included in the Flora of the USSR does not correspond to the protologue. The description is based on the type of V. montenegrina Rohlena of sect. Cracca. The type of V. abbreviata was grown in Moscow by Fischer from seed collected by Bieberstein in 1802 near Pyatigorsk on the Northern slopes of the Great Caucasus. Fischer's original description is poor and so the description was later elaborated by Busch. Who, unfortunately, based her improved description on the wrong type material and this error has remained in general usage ever since. Bieberstein's original notes describe a species with an almost sessile inflorescence of six, yellow flowers and tendril reduced to a mucro. He located the material in high grassy slopes and allied it to V. sepium. This description fits what has been widely referred to as V. truncatula and so V. abbreviata is the correct name for this taxon.

Specimen citation: Kovics 39 (E); Wierzbicki 1950 (E); Degen 2811 (K); Kovics s.n. (K); Petrovic 1964 (K); Adamovic 6/1897 (K); Hohenacker s.n. (BM); MB 1813 (K); Vasak s.n. (K); Manakyan s.n. (E); Lamond 4901 (E); Manakyan 9/7/1966 (W); Hohenacker s.n. (MO); Hohenacker 19064 (MO); Kolenati 1456 (MO); Stankevich & Legotina 1067 (WIR); Stankevich & Vlassov 320 (WIR); Stankevich & Legotina 908 (WIR); Stankevich & Legotina 1094 (WIR); Stankevich & Legotina 1535 (WIR); Kimeridze 40389 (WIR); Zhilenko s.n. (WIR); Vlassov & Doronina s.n. (WIR); Stankevich & Legotina 1946a (WIR); Stankevich 4614 (WIR); Stankevich 4443 (WIR); Stankevich & Vlassov 571 (WIR); Stankevich 4505 (WIR); Stankevich 4498 (WIR); Saakov 9447 (WIR); Stankevich 842 (WIR); Stankevich 1917 (WIR); Stankevich & Legotina 1917 (WIR); Stankevich & Legotina 1562 (WIR); Stankevich & Vlasson 759 (WIR); Stankevich 4477 (WIR); Stankevich & Legotina 1445 (WIR); Vlassov, Doronina & Petrova 191 (WIR); Vlassov & Doronina s.n. (WIR); Alexeyenko s.n. (LE); Grossheim s.n. (LE); Shiffers s.n. (LE); Smolyaninova s.n. (LE); Kazn s.n. (LE); Ilyinskaya s.n. (LE); Zedelmeyer s.n. (LE); Polyanskaya s.n. (LE); Alexeyenko s.n. (LE); Fedchenko & Fedchenko s.n. (LE); Arevschatyan s.n. (LE); Avetisyan s.n. (LE); Markowich s.n. (LE); Gordyagin s.n. (LE); Menitsky s.n. (LE); Fedchenko s.n. (LE); Savich s.n. (LE); Steup s.n. (LE); Anon. s.n. (LE); Arevschatyan s.n. (ERE); Degen s.n. (K); Balansa 1408 (K); Bornmuller & Bornmuller 14034 (K); Davis 21766 (BM); Edmondson 445 (W); Bozakman & Fitz 759 (W); Bornmuller & Bornmuller 14034 (W); Heussel 118 (MO).

C **Series** Atossa (Alef.) Aschers & Graebner (1909) Syn. Mitteleur. Fl., 6, 2: 949.
Type: lectotype (Gunn, 1969) V. sepium L., Sp. Pl. 737 (1753).
Synonymy: Orobus L.(1753) Sp. Pl. 728, pro parte excl. typ.; Vicioides Moench (1794) Meth., 135, pro parte.; Wiggersia Gaertner, Meyer & Scherb. (1801) Fl. Wetterau 3(6): 33, pro parte; Vicia sect. Aphaca Gray (1821) Brit. Pl. 2: 617, pro parte; Vicia sect. Euvicia Vis. (1852) Fl. Dalmatica 1: 317, pro parte; Atossa Alef. (1861), in Bonplandia 9: 100; Vicia ser. Sepium Buchenau (1894) Fl. Nordwest. d. Tiefeb., 323; Vicia sect. Sepium (Buchenau) Radzhi (1971) Novosti Sist. Vyssh. Rast., 7: 235.

Description: Perennial; climbing; stem slender. Stipules entire or semi-hastate; length less than 3.5mm or 3.5 to 5.5mm; edge entire or with 1-2 teeth or with 3-5 teeth. Leaf apex tendrilous; leaflet less than 20mm or 20-30mm or longer than 30mm; with more than 4 pairs. Leaflets symmetric; margins entire. Number of flowers per inflorescence 1 to 2 or 3 to 4 or more than 4; peduncle 3-6mm or peduncle longer than 6mm. Calyx mouth oblique; lower tooth longer than upper; base gibbous. Pedicel shorter or equal to 3mm. Flowers shorter than 15mm or 15 to 20mm; standard blue or purple; shape platonychioid; claw bowing absent; upper standard surface glabrous. All petals approximately equal length. Wing marking absent; wing limb kinking absent or with slight kinking. Legume length less than 30mm; width 5 to 10mm wide; oblong; laterally flattened; sutures straight or curved; valve hairs absent or present; hairs simple; septa absent; number of seeds per legume less than 7. Seeds less than 3.4mm or 3.5 to 6.0mm; round or oblong; not laterally flattened; hilum over half seed circumference; lens positioned near hilum; testa surface smooth.

Number of taxa: three. **Chromosome number:** 14, 18

Geographical distribution: Europe and Northern Asia

4 **Accepted taxon:** V. sepium L. (1753) Sp. Pl., 2: 737.
Type comment: LINN contains two V. sepium specimens 906.31 and 906.32. Specimen 906.31 has the distinctive long erect calyx hairs of var. eriocalyx, while the calyx hairs are short and adpressed on specimen 906.32 and thus the latter specimen is preferred as the lectotype.
Iconography: Fl. Eur., 2: 134; Fl. Tur., 3: 304; Fl. USSR., 13: 455-456; Illust. Draw. Brit. Pl., 3: 64.
Synonymy: Faba sepium Miller (1755) Gard. Dict. Abr., 4; V. rotundifolia Gilib. (1782) Fl. Lituan. 2: 106; Vicioides sepium Moench (1794) Meth. Pl. Hort. Bot. Marburgensis, 136; V. sordida Salisb. (1796) Prodr. Strip. Chapel Allerton, 1: 339; V. dumetorum Thuill. (1799) Fl. Env. Paris. 2(7): 366; Faba sepium Bernhardi (1800) Syst. Verz. Ref. 1: 250; Wiggersia sepium Gaertner, Meyer & Schreber (1801) Fl. Wett., 3(1): 34; V. anomala Boenn. (1824) Prodr. Fl. Mon. Westphalorum, 218; V. pratensis Wallr. (1840) Linnaea, 14: 626; V. pratensis var. ochroleuca Wallr. (1840) Fl. Hercynica, 256; Atossa sepium Alef. (1861) Bonplandia, 9: 100; V. oxyphylla Schur (1866) Enum. Pl. Transs., 167; V. tricolor Schur (1866) Enum. Pl. Transs., 167; V. drymeja Schur (1866) Enum. Pl. Transs., 167; V. subrotunda Schur (1866) Enum. Pl. Transs., 167; V. separia Dulac (1867) Fl. Hautes-Pyr., 287.

Description: VEGETATIVE CHARACTERS: Perennial; erect (weakly) or ascending; 25-75cm high. Stipule length 2.5-5.5(-17)mm; 1-6(-12)mm wide. Stipule entire or semi-hastate; without teeth on distal edge or 1-2 teeth on distal edge or 3-5 teeth on distal edge or more than 5 teeth on distal edge; without teeth on proximal edge or 1-2 teeth on proximal edge or more than 5 teeth on proximal edge. Stipule edge form entire; edge translucent or edge not-translucent. Stipule colour (upper plant) green or green with purple; apex acute; glabrous or hairs located edge only. Leaf 31-112mm long. Petiole 2-16mm long. Average leaflet internode 5-17mm long. Leaflet 11-41mm long. Leaflet 6-22(-31)mm wide. Tendril or mucro 15-58mm long. Average leaf internode 21-131mm long. Petiolule 27-97mm long. Leaf apex tendrilous; tendril with 3 branches or tendril with more than 3 branches. Leaflet shape symmetric; smaller towards leaf apex; 10-19 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire. Leaflet linear elliptic or narrow elliptic or narrow ovate or broad ovate; apex mucronate and emarginate or apex mucronate or apex acute; base angustate or base truncate to angustate or base truncate; broadest in middle or broadest at base. Leaflet margin level. Leaflet distribution pattern unpaired or paired. Leaflet adaxial hairs absent or less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long. Leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long or hairs more than 1.5mm long. Petiole hairs less than 10 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle longer than 2mm, but shorter than flower or Peduncle longer than flower. Peduncle lengthmm 3-18(-25). Rachis length 2-13(-22)mm. Pedicel length 1-2mm. Flower length 12-15mm. Ratio of peduncle to flower length 0.13-1.78. Peduncular cusp absent. Two flowers per inflorescence or Three or four flowers per inflorescence or More than four flowers per inflorescence. Pedicel less than 10 hairs per mm sq or with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long or hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 1.5-5mm long. Lateral teeth 1-5mm long. Upper tooth 0.5-4mm long. Tube 4.5-7mm long. Ratio of lower tooth to tube length 0.27-0.9. Calyx base slightly gibbous or strongly gibbous; tube mouth slightly oblique; teeth reflexing absent; tooth curvature absent; exterior nectaries absent. Calyx hairs covering calyx; hair density less than 10 per mm sq or hair density of 10-35 per mm sq or hair density of 36-60 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; hairs adpressed. Calyx colour green or purple. Standard length 11-16mm. Limb length 5.5-9.5mm. Claw length 5-9.5mm. Limb width 7-11mm. Claw width 2.5-7.5mm; 0.66-1.63. Corolla petals concolorous. Standard face lilac; upper surface lilac or upper surface violet. Standard shape platonychioid or stenonychioid; apex emarginate or

apex emarginate with mucro; claw bowing absent; upper surface glabrous; no distinct face veins. Wing length 10.5-14.5mm. Limb length 4.5-8mm. Claw length 4-7.5mm. Limb width 3-5mm. Wing colour lilac; markings absent. Wing limb base without kinking or with weak kinking; pouching absent or pouching present. Wing shape 2 or shape 3 or shape 4; spur shape 2 or spur shape 4. Wing to keel adhesion weak. Keel length 8-11.5mm. Hood length 2.5-4.5mm. Claw length 5-7mm. Hood width 3.5-5mm. Keel colour white; hood tip not differently coloured or hood tip differently coloured. Keel shape 3; base shape 2; pouching absent or pouching present. Staminal tube length 7.5-10.5mm. Filament length 1.5-2mm; all stamen approx. equal length. Staminal tube vein colouring absent. Ovary length 4.5-7.5mm. Style length 3.5-5mm. Supra-ovary extension 2-3mm. Ovary shape linear or intermediate; style apex cross section dorsi-ventral flattened; stigma shape globose. Ovary glabrous or with simple hairs on sutures only or entirely covered with simple hairs; style apex pubescence type 1. Number of ovules per ovary 8-14. Supra-ovary curvature absent or present.

LEGUME CHARACTERS: Legume 16-25mm; 6-7mm wide; 3-4mm deep. Ratio of legume length to width 2.28-3.66. Amphicarpic legumes absent. Legume colour black; uniform over legume. Legume shape oblong; curvature absent; rounded to flat in cross-section or laterally flat in cross-section; sutures unparallel or sutures straight; distal end unbeaked or distal end slightly beaked. Legume valve surface not torulose; surface smooth; venation inconspicuous or venation reticulate. Legume partitioning absent. Legume glabrous or hairs less than 10 per mm sq; hairs less than 0.5mm long; hairs on sutures only; sutures smooth or sutures ciliate, hairs less than 1mm long. Dehiscent legume twisting loose or tight or very tight. Number of seeds per legume 2-5(-7).

SEED CHARACTERS: Seed 3-4mm long; 3.5-5mm wide; 2.5-3mm deep; 9.5-13mm circumference. Hilum 5-9mm long. Distance from hilum to lens 0.5-1mm. Seed length to width ratio of 0.66-1.33. Seed circumference to hilum length ratio of 0.53-0.69. Seed shape spherical to cubic or oblong; circular in side view. Seed colour yellow or red-brown or brown; without mottling or with mottling. Seed finish matt; with wrinkled surface. Hilum shape very elongated, more than third of circumference; coloured yellow or coloured red-brown; groove colour beige. Hilum positioned on seed end; with surface excess tissue absent. Lens position less than 1.6mm from hilum; not prominent. Aril absent.

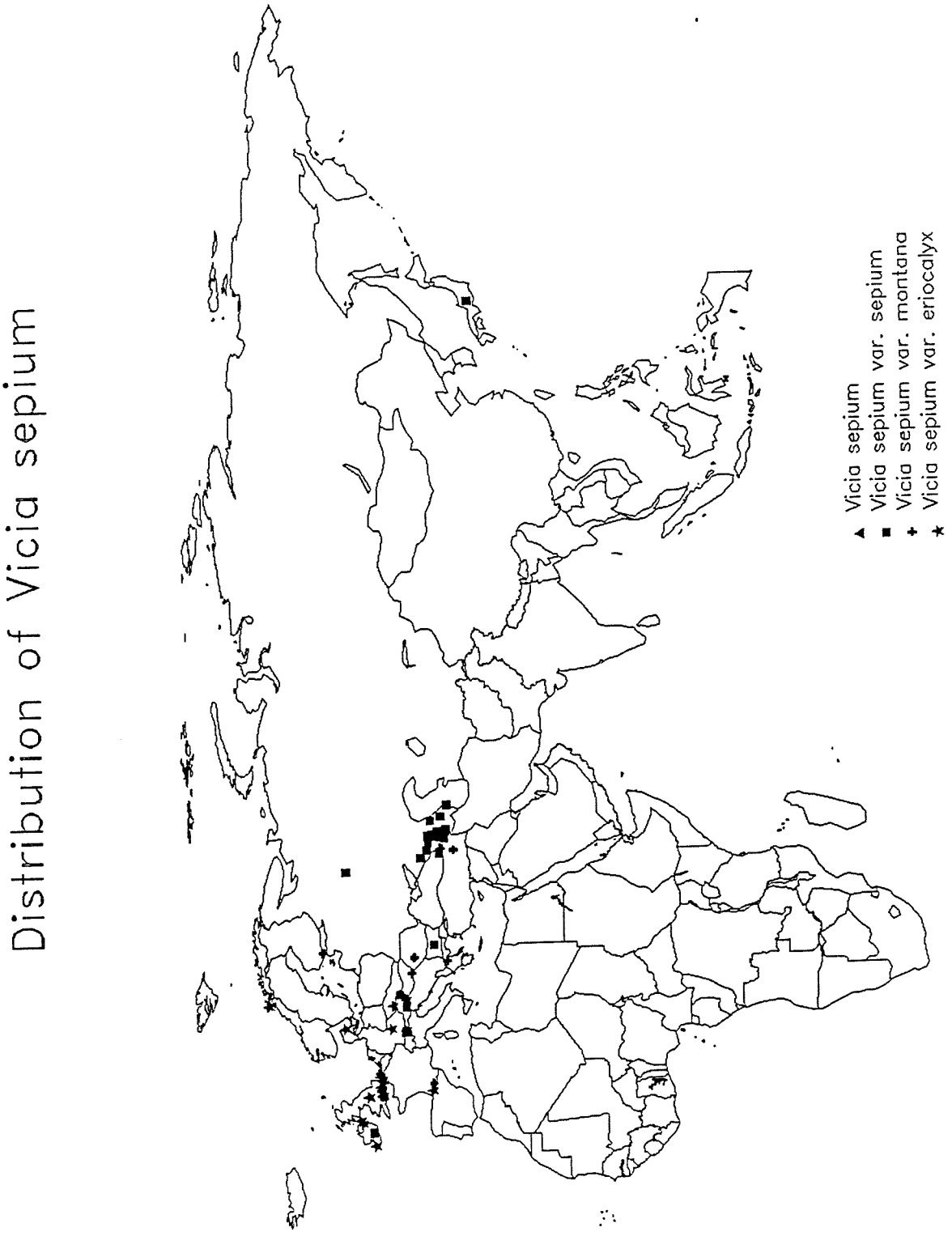
Phenology: May - October **Chromosome number:** (12), 14, (16), 18.
Geographical distribution: AT, BG, CA(I), CS, CZ, DE, DK, FI, FR, GB, GR, HU, IE, JP, NO, RO, SE, SU, TR, US(I). See Map 4.

Taxonomic notes: Recent studies of V. sepium have been undertaken by Chrtkova-Zertova (1969) worldwide and by Hämet-Ahti (1970) for Finland. Both authors provide characters that can be used to distinguish infra-specific taxa. Chrtkova-Zertova, in a study of morphology (including uniform garden experiments), phytogeography and cytology, recognises three varieties, based on leaflet dimensions and calyx pubescence. Whereas Hämet-Ahti, following a morphological and cytological study, recognises two taxa from Finland. Which she distinguishes using plant habit, stipule size, leaflet size and flower colour characters. She considers these taxa distinct enough to warrant subspecific rank and acknowledge the existence of a third form, but was unable to locate any material of this taxon in Finland.

From my own field observations of this species, I have experienced no problem in identifying the three taxa, though I have not seen field material from throughout the species range. The study of herbarium material, however, suggests that the distinction between the three taxa is not sufficiently clear-cut to warrant subspecific status and it seems likely that introgression between the taxa occurs. Therefore I favour the use of varietal rank for the three taxa recognised.

Specimen citation: Barrs & Portman 1035 (SPN); Maxted 1193 (SPN).

Map 4.


Distribution of Vicia sepium
Vicia sepium
Vicia sepium var. sepium
Vicia sepium var. montana
Vicia sepium var. eriocalyx

Key to varieties of V. sepium:

1(0). Leaflets narrow lanceolate, length to width ratio of 2.9-7.0..... iii var. montana
Leaflets elliptic to broadly ovate, length to width ratio of 1.5-2.7..... 2

2(1). Plant glabrescent; leaflets broadly ovate; calyx with few, short, adpressed hairs..... i var. sepium
Plant pubescent; leaflets ovate; calyx with erect long hairs..... ii var. eriocalyx

i **Accepted taxon:** **V. sepium** var. **sepium** L. (1753) Sp. Pl. 2: 737.
Type: Lectotype, Linnaeus 906.32 (LINN!).
Synonymy: V. sepium var. vulgaris Gaudin (1829) Fl. Helv., 4: 510; V. sepium var. vulgaris Koch (1835) Syn. Fl. Germ. Helv., 1: 196; V. sepium var. ovata Schur (1866) Enum. Pl. Transs., 167.

Description: VEGETATIVE CHARACTERS: Perennial; erect or ascending; 25-75cm high. Stipule length 3.5-5.5(-17)mm; 1.5-6(-12)mm wide. Stipule entire or semi-hastate; without teeth on distal edge or 1-2 teeth on distal edge or 3-5 teeth on distal edge or more than 5 teeth on distal edge; without teeth on proximal edge or more than 5 teeth on proximal edge. Stipule edge form entire; edge not-translucent. Stipule colour (upper plant) green with purple; apex acute; glabrous or hairs located edge only. Leaf 45-83mm long. Petiole 2-13mm long. Average leaflet internode 9-17mm long. Leaflet 14-41mm long. Leaflet 8-15(-31)mm wide. Tendril or mucro 25-58mm long. Average leaf internode 28-63mm long. Petiolule 37-76mm long. Leaf apex tendrilous; tendril with 3 branches or tendril with more than 3 branches. Leaflet shape symmetric; smaller towards leaf apex; 10-16 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire. Leaflet linear elliptic or narrow elliptic or broad ovate; apex mucronate and emarginate or apex mucronate; base angustate or base truncate to angustate or base truncate; broadest in middle or broadest at base. Leaflet margin level. Leaflet distribution pattern unpaired or paired. Leaflet adaxial hairs absent or less than 10 per mm sq; hairs less than 0.5mm long. Leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long. Petiole hairs less than 10 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle longer than 2mm, but shorter than flower or Peduncle longer than flower. Peduncle lengthmm 4-10(-25). Rachis length 2-9(-22)mm. Pedicel length 1-2mm. Flower length 12-16mm. Ratio of peduncle to flower length 0.26-1.78. Peduncular cusp absent. Three or four flowers per inflorescence or More than four flowers per inflorescence. Pedicel with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 1.5-5mm long. Lateral teeth 1-4mm long. Upper tooth 0.5-4mm long. Tube 5-6mm long. Ratio of lower tooth to tube length 0.27-0.7. Calyx base slightly gibbous or strongly gibbous; tube mouth slightly oblique; teeth reflexing absent; tooth curvature absent; exterior nectaries absent. Calyx hairs covering calyx; hair density less than 10 per mm sq or hair density of 10-35 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; hairs adpressed. Calyx colour purple. Standard length 11-15mm. Limb length 5.5-9mm. Claw length 5.5-9.5mm. Limb width 8-11mm. Claw width 2.5-7.5mm; 0.66-1.63. Corolla petals concolorous. Standard face lilac; upper surface lilac. Standard shape stenonychioid; apex emarginate or apex emarginate with mucro; claw bowing absent; upper surface glabrous; no distinct face veins. Wing length 10.5-14.5mm. Limb length 4.5-8mm. Claw length 5-7.5mm. Limb width 3-5mm. Wing colour lilac; markings absent. Wing limb base without kinking or with weak kinking; pouching absent or pouching

present. Wing shape 2 or shape 3 or shape 4; spur shape 2 or spur shape 4. Wing to keel adhesion weak. Keel length 8.5-11.5mm. Hood length 2.5-4.5mm. Claw length 5-7mm. Hood width 3.5-4.5mm. Keel colour white; hood tip not differently coloured or hood tip differently coloured. Keel shape 3; base shape 2; pouching absent or pouching present. Staminal tube length 8-10mm. Filament length 1.5-2mm; all stamen approx. equal length. Staminal tube vein colouring absent. Ovary length 4.5-7mm. Style length 3.5-5mm. Supra-ovary extension 2-2.5mm. Ovary shape linear or intermediate; style apex cross section dorsi-ventral flattened; stigma shape globose. Ovary glabrous or with simple hairs on sutures only or entirely covered with simple hairs; style apex pubescence type 1. Number of ovules per ovary 8-14. Supra-ovary curvature absent or present.

LEGUME CHARACTERS: Legume 18-24mm; 6-7mm wide; 3-4mm deep. Ratio of legume length to width 2.85-3.42. Amphicarpic legumes absent. Legume colour black; uniform over legume. Legume shape oblong; curvature absent; rounded to flat in cross-section or laterally flat in cross-section; sutures unparallel or sutures straight; distal end unbeaked or distal end slightly beaked. Legume valve surface not torulose; surface smooth; venation inconspicuous or venation reticulate. Legume partitioning absent. Legume glabrous or hairs less than 10 per mm sq; hairs less than 0.5mm long; hairs on sutures only; sutures smooth or sutures ciliate, hairs less than 1mm long. Dehiscent legume twisting loose or tight or very tight. Number of seeds per legume 3-4.

SEED CHARACTERS: Seed 3-4(-7)mm long; 3.5-5mm wide; 2.5-3mm deep; 9.5-10mm circumference. Hilum 5-6.5mm long. Distance from hilum to lens 1mm. Seed length to width ratio of 0.85-1. Seed circumference to hilum length ratio of 0.52-0.65. Seed shape spherical to cubic or oblong; circular in side view. Seed colour yellow or brown; with mottling. Seed finish matt; with wrinkled surface. Hilum shape very elongated, more than third of circumference; coloured yellow or coloured red-brown; groove colour beige. Hilum positioned on seed end; with surface excess tissue absent. Lens position less than 1.6mm from hilum; not prominent. Aril absent.

Phenology: May - October **Chromosome number:** 14
Geographical distribution: AT, BG, CA(I), CZ, GB, IE, JP, SU, US(I).
Ecology: Alt. 70 - 2200m; Hab. Hedgerow and open woodland.

Specimen citation: Portman 39 (SPN); Ronniger s.n. (W); Jeft 284 (W); Drury 3 (SPN); Schneider & Bergmann 766 (K); De Wolf s.n. (E); Allkin 83/95 (SPN); Hiroe 69 (E); Davis 33059 (K); Campbell 162 (K); Popov & Chandjan s.n. (BM); Popov & Chandjan s.n. (E); Shiffers s.n. (LE); Busch & Busch s.n. (LE); Dmitriyeva s.n. (LE); Gabrielian s.n. (LE); Busch s.n. (LE); Savich s.n. (LE); Grigryev s.n. (LE); Mulkijanyan s.n. (LE); Endaurova s.n. (LE); Zedelmeyer s.n. (LE); Busch & Busch s.n. (LE); Zedelmeyer s.n. (LE); Krylov s.n. (LE); Dzevanovsky s.n. (LE); Steup s.n. (LE); Gordyagin s.n. (LE); Alexeyenko s.n. (LE); Pastukhov s.n. (LE); Kittredge s.n. (MO).

ii **Accepted taxon:** V. sepium var. eriocalyx Celak (1881) Prodr. Fl. Bohmen 4: 910.
Type: holotype, (PR).

Description: VEGETATIVE CHARACTERS: Perennial; erect or ascending; 25-75cm high. Stipule length 2.5-5.5mm; 1-5.5mm wide. Stipule entire or semi-hastate; without teeth on distal edge or 1-2 teeth on distal edge or 3-5 teeth on distal edge; without teeth on proximal edge. Stipule edge form entire; edge translucent or edge not-translucent. Stipule colour (upper plant) green or green with purple; apex acute; glabrous or hairs located edge only. Leaf 31-112mm long. Petiole 2-16mm long. Average leaflet internode 5-17mm long. Leaflet 11-23mm long. Leaflet 6-22mm wide. Tendril or mucro 15-49mm long. Average leaf internode 21-131mm long. Petiolule 27-97mm long. Leaf apex tendrilous; tendril with 3 branches or tendril with more than 3

branches. Leaflet shape symmetric; smaller towards leaf apex; 10-19 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire. Leaflet linear elliptic or narrow ovate or broad ovate; apex mucronate and emarginate or apex mucronate; base truncate to angustate; broadest at base. Leaflet margin level. Leaflet distribution pattern unpaired or paired. Leaflet adaxial hairs less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long. Leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long or hairs more than 1.5mm long. Petiole hairs less than 10 per mm sq or 10-50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle longer than 2mm, but shorter than flower. Peduncle lengthmm 3-18. Rachis length 2-13mm. Pedicel length 1-2mm. Flower length 13-15mm. Ratio of peduncle to flower length 0.46-1.23. Peduncular cusp absent. Three or four flowers per inflorescence or More than four flowers per inflorescence. Pedicel less than 10 hairs per mm sq or with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 1.5-3.5mm long. Lateral teeth 1.5-3mm long. Upper tooth 1-2.5mm long. Tube 4.5-6mm long. Ratio of lower tooth to tube length 0.3-0.6. Calyx base slightly gibbous or strongly gibbous; tube mouth slightly oblique; teeth reflexing absent; tooth curvature present; exterior nectaries absent. Calyx hairs covering calyx; hair density of 10-35 per mm sq or hair density of 36-60 per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long; hairs erect. Calyx colour green or purple. Standard length 12-15mm. Limb length 6-9mm. Claw length 6-7mm. Limb width 7-11mm. Claw width 5.5-7mm; 0.84-1.5. Corolla petals concolorous. Standard face lilac; upper surface violet. Standard shape platonychioid or stenonychioid; apex emarginate with mucro; claw bowing absent; upper surface glabrous; no distinct face veins. Wing length 11-13.5mm. Limb length 5-7.5mm. Claw length 4-7mm. Limb width 3-4mm. Wing colour lilac; markings absent. Wing limb base with weak kinking; pouching absent or pouching present. Wing shape 2 or shape 3; spur shape 4. Wing to keel adhesion weak. Keel length 8-11mm. Hood length 3-4mm. Claw length 5.5-7mm. Hood width 4-5mm. Keel colour white; hood tip not differently coloured or hood tip differently coloured. Keel shape 3; base shape 2; pouching present. Staminal tube length 7.5-10.5mm. Filament length 1.5-2mm; all stamen approx. equal length. Staminal tube vein colouring absent. Ovary length 5.5-7.5mm. Style length 3.5-4.5mm. Supra-ovary extension 2-3mm. Ovary shape linear; style apex cross section dorsi-ventral flattened; stigma shape globose. Ovary glabrous or with simple hairs on sutures only; style apex pubescence type 1. Number of ovules per ovary 8-14. Supra-ovary curvature absent or present.

LEGUME CHARACTERS: Legume 16-22mm; 6-7mm wide; 3-4mm deep. Ratio of legume length to width 2.28-3.5. Amphicarpic legumes absent. Legume colour black; uniform over legume. Legume shape oblong; curvature absent; laterally flat in cross-section; sutures unparallel or sutures straight; distal end unbeaked or distal end slightly beaked. Legume valve surface not torulose; surface smooth; venation inconspicuous or venation reticulate. Legume partitioning absent. Legume glabrous or hairs less than 10 per mm sq; hairs less than 0.5mm long; hairs on sutures only; sutures smooth or sutures ciliate, hairs less than 1mm long; tubercles absent. Dehiscent legume twisting tight or very tight. Number of seeds per legume 2-4(-7).

SEED CHARACTERS: Seed 3-4mm long; 3-5mm wide; 2mm deep; 9-13mm circumference. Hilum 5.5-8.5mm long. Distance from hilum to lens 0.5-1mm. Seed length to width ratio of 0.66-1.33. Seed circumference to hilum length ratio of 0.61-0.65. Seed shape oblong; circular in side view. Seed colour yellow or red-brown; with mottling. Seed finish matt; with wrinkled surface. Hilum shape very elongated, more than third of circumference; coloured yellow or coloured red-brown; groove colour beige. Hilum positioned on seed end; with surface excess tissue absent. Lens position less than 1.6mm from hilum; not prominent. Aril absent.

Phenology: May - September **Chromosome number:** 14

Geographical distribution: AT, CS, DE, DK, FR, GB, IE, NO, SE, US(I).
Ecology: Alt. 2 - 1015m; Hab. open woodland and shaded disturbed land.

Specimen citation: Gaetting 782 (E); Portman 20 (SPN); Maxted 1184 (SPN); Allkin 83/44 (SPN); Anon. s.n. (SPN); Whitmore 981 (SPN); Lewis 11 (K); Britton 4080 (K); Marsden-Jones & Turrill s.n. (K); Lowne 399 (K); Lester-Garland s.n. (K); Maxted 1089 (SPN); Allkin 84/45 (SPN); Maxted 1090 (SPN); Wiesbaur s.n. (W); Jeppesen & Holm-Nielsen 608 (SPN); Goyder 1302 (SPN); Bisby 1710 (SPN); Ross-Craig & Sealy 1681 (K); Ross-Craig & Sealy 1706 (K); Hopkin 66 (SPN); Hopkin 17 (SPN); Smith 4383 (E); Churchill s.n. (MO).

iii **Accepted taxon:** **V. sepium** var. **montana** Koch, D.G.D.J. (1835) Syn. Fl. Germ. Helv., 1: 196.
Type: neotype, Germania, prope Kaiserslautern (L).
Synonymy: V. sepium var. montana ; V. montana Froelich ex Koch (1835) Syn. Fl. Germ. 2: 215; V. sepium var. angustifolia Koch (1843) Syn. Fl. Germ. Helv., 2: 215. V. sepium subsp. montana (Koch, D.G.D.J.) Hämet-Ahti (1970) Ann. Bot. Fenniei 7: 173.

Description: VEGETATIVE CHARACTERS: Perennial; erect or ascending; 25-75cm high. Stipule length 3.5-5.5mm; 1.5-5.5mm wide. Stipule entire or semi-hastate; without teeth on distal edge or 1-2 teeth on distal edge or 3-5 teeth on distal edge; without teeth on proximal edge or 1-2 teeth on proximal edge. Stipule edge form entire; edge not-translucent. Stipule colour (upper plant) green or green with purple; apex acute; glabrous. Leaf 45-95mm long. Petiole 3-16mm long. Average leaflet internode 10-17mm long. Leaflet 17-30mm long. Leaflet 6-11mm wide. Tendril or mucro 25-85mm long. Average leaf internode 30-82mm long. Petiolule 49-86mm long. Leaf apex tendrilous; tendril with 3 branches or tendril with more than 3 branches. Leaflet shape symmetric; smaller towards leaf apex; 10-12 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire. Leaflet linear elliptic or narrow ovate; apex mucronate and emarginate or apex mucronate or apex acute; base truncate to angustate or base truncate; broadest in middle or broadest at base. Leaflet margin level. Leaflet distribution pattern unpaired or paired. Leaflet adaxial hairs absent or less than 10 per mm sq; hairs less than 0.5mm long. Leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long. Petiole hairs less than 10 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle longer than 2mm, but shorter than flower. Peduncle lengthmm 4-11. Rachis length 2-9mm. Pedicel length 1-2mm. Flower length 12-15mm. Ratio of peduncle to flower length 0.13-0.78. Peduncular cusp absent. Two flowers per inflorescence or Three or four flowers per inflorescence or More than four flowers per inflorescence. Pedicel with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long or hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 1.5-5mm long. Lateral teeth 1-5mm long. Upper tooth 1-3.5mm long. Tube 5-7mm long. Ratio of lower tooth to tube length 0.3-0.9. Calyx base slightly gibbous or strongly gibbous; tube mouth slightly oblique; teeth reflexing absent; tooth curvature present; exterior nectaries absent. Calyx hairs covering calyx; hair density less than 10 per mm sq or hair density of 10-35 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; hairs adpressed. Calyx colour green or purple. Standard length 12.5-16mm. Limb length 6-9.5mm. Claw length 5-8mm. Limb width 9-11mm. Claw width 5-7mm; 0.75-1.6. Corolla petals concolorous. Standard face lilac; upper surface violet. Standard shape stenonychioid; apex emarginate with mucro; claw bowing absent; upper surface glabrous; no distinct face veins. Wing length 11-14.5mm. Limb length 6-8mm. Claw length 5-7mm. Limb width 3.5-4.5mm. Wing colour lilac; markings absent. Wing limb base without kinking or with weak kinking; pouching absent or pouching present. Wing shape 3; spur shape 2 or spur shape 4. Wing to keel adhesion weak. Keel length 9-11mm. Hood length 3-4.5mm. Claw length 5.5-6.5mm. Hood width 3.5-5mm. Keel colour white; hood tip differently coloured. Keel shape 3; base shape 2; pouching present. Staminal tube length 9-10mm. Filament length 1.5-2mm; all stamen approx. equal length.

Staminal tube vein colouring absent. Ovary length 5.5-7mm. Style length 3.5-4.5mm. Supra-ovary extension 2-3mm. Ovary shape linear; style apex cross section dorsi-ventral flattened; stigma shape globose. Ovary glabrous or with simple hairs on sutures only or entirely covered with simple hairs; style apex pubescence type 1. Number of ovules per ovary 8-14. Supra-ovary curvature present.

LEGUME CHARACTERS: Legume 21-23mm; 6-7mm wide; 3mm deep. Ratio of legume length to width 3-3.66. Amphicarpic legumes absent. Legume colour black; uniform over legume. Legume shape oblong; curvature absent; laterally flat in cross-section; sutures unparallel; distal end unbeaked or distal end slightly beaked. Legume valve surface not torulose; surface smooth; venation inconspicuous or venation reticulate. Legume partitioning absent. Legume glabrous; sutures smooth. Dehiscent legume twisting tight. Number of seeds per legume 3-5(-7).

SEED CHARACTERS: Seed 3.5-4mm long; 3.5-4.5mm wide; 2-2.5mm deep; 10.5-13mm circumference. Hilum 7-9mm long. Distance from hilum to lens 0.5-1mm. Seed length to width ratio of 0.85-1. Seed circumference to hilum length ratio of 0.67-0.69. Seed shape oblong; circular in side view. Seed colour yellow or red-brown; without mottling. Seed finish matt; with wrinkled surface. Hilum shape very elongated, more than third of circumference; coloured yellow or coloured red-brown; groove colour beige. Hilum positioned on seed end; with surface excess tissue absent. Lens position less than 1.6mm from hilum; not prominent. Aril absent.

Phenology: June - September **Chromosome number:** 14
Geographical distribution: CS, FI, FR, GB, GR, HU, NO, RO, TR.
Ecology: Alt. 75 - 1600m; Hab. Hedgerow and open woodland.

Specimen citation: Anon. s.n. (SPN); Jokela s.n. (W); Goyder 1305 (SPN); Krendl s.n. (W); Julio s.n. (E); Nyarady & Bujorean 805 (K); Nyarady & Bujorean 805 (MO); Davis 46327 (E); Davis & Hedge 30132 (E).

II **Section Microcarenae** sect. nov. Maxted.
Carina quam alae vexillumque valde brevior. Hilum seminis minus quam quadrantem circumferentis occupante et lens hilo opposita. Planta annua. Folium apice in cirrhum extenso et in plus quam 4 paribus foliolorum divisum. Inflorecentia uniflora ad quadriflora, pedunculo plus quam 6 mm longo. Calyx ad orem rectum dentibus subaequalibus nec ad basin gibbosus. Flores cremei vexillo stenonychioideo. Legumen oblongum et in sectione transversa rotundatum; sutures curvatae; valvae glabrae.
Type: holotype V. dionysiensis Mout. (1953) Flore du Djebel Druze, 140.

Description: Annual; climbing or scrambling; stem slender. Stipules entire or semi-hastate; length less than 3.5mm; edge entire or with 1-2 teeth. Leaf apex tendrilous; leaflet less than 20mm; with more than 4 pairs. Leaflets symmetric; margins entire. Number of flowers per inflorescence 1 to 2 or 3 to 4; peduncle longer than 6mm. Calyx mouth straight; teeth subequal; base not gibbous. Pedicel shorter or equal to 3mm. Flowers shorter than 15mm or 15 to 20mm; standard cream; shape stenonychioid; claw bowing absent; upper standard surface glabrous. Keel markedly shorter than wings. Wing marking absent; wing limb with slight kinking. Legume length less than 30mm; width 5 to 10mm wide; oblong; round in cross section; sutures curved; valve hairs absent; septa absent; number of seeds per legume less than 7. Seeds 3.5 to 6.0mm; round; not laterally flattened; hilum less than quarter of seed circumference; lens positioned opposite to hilum; testa surface smooth.

Number of taxa: one. **Chromosome number:** 2n = 12
Geographical distribution: one known species is endemic to the Djebel Druse, Syria.

Taxonomic notes: Mouterde (1953) allies V. dionysiensis distantly to V. cypria Kotschy ex Unger & Kotschy and V. singarensis Boiss. & Hausskn., as they each are glabrescent, have few leaflets per leaf and individual leaflets are relatively long. The resemblance with these subg. Vicilla sect. Trigonellopsis species is superficial. V. dionysiensis is a member of subg. Vicia because it shows the diagnostic features of the subgenus: presence of the nectariferous gland on the abaxial stipule surface, peduncle shorter than the subtending leaf and one to few flowers per inflorescence. Within the subgenus, V. dionysiensis is distinguished by the marked reduction in size of the keel, stamen, ovary and stigma compared to the standard and wing lengths. These characters make it a distinct, peripheral member of the subgenus. The lens position, opposite the hilum on the seed circumference, links the species to section Hypechusa, which shares this characteristic. More particularly the stenonychioid standard, suggests an allegiance with the species the series Hyrcanicae, most specifically V. assyriaca Boiss.

5 **Accepted taxon:** **V. dionysiensis** Mout. (1953) Flore du Djebel Druze, 140.
Type: Holotype, Mouterde 23/4/42, Jebel Druse, Syria (G!).
Iconography: Fl. Syr., 2: 412-413.

Description: VEGETATIVE CHARACTERS: Annual; ascending; 10-35cm high. Stipule length 1.5-3.5mm; 1-1.5mm wide. Stipule entire or semi-hastate; apex acute; number of teeth on distal edge none or 1-2; number of teeth on proximal edge none; stipule edge form entire; translucent. Stipule colour (upper plant) green or green with purple; glabrous. Leaf 23-34mm long; petiole 1-3mm long; average leaflet internode 5-8mm long; leaflet 8-13mm long; leaflet 2-3mm wide; tendril or mucro 14-34mm long; average leaf internode 24-43mm long; petiolule 17-30mm long. Leaf apex tendrilous or with terminal leaflet; simple or with 2 branches or with 3 branches. Leaflet shape symmetric; 10-12 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet broad linear or narrow elliptic or broad elliptic; apex retuse; base angustate; broadest at apex or in middle. Leaflet adaxial hairs less than 10 per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long; leaflet abaxial hair 10-50 per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle longer than flower. Peduncle length 10-20mm; rachis 5-8mm long; pedicel 2-3mm long; flower 9-16mm long; ratio of peduncle to flower length of 0.68-2; peduncular cusp present and less than 2.1mm long or present and more than 2.0mm long. Number of flowers per inflorescence two or three or four. Pedicel with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs 0.5-1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 1.5-3mm long; lateral teeth 1.5-3mm long; upper tooth 1-2.5mm long; tube 2.5-3mm long; ratio of lower tooth to tube length of 0.6-1. Calyx base not gibbous; tube mouth truncate; teeth reflexing absent; tooth curvature absent or present; exterior nectaries absent. Calyx hairs covering calyx; hair density of 10-35 per mm sq or 36-60 per mm sq; hair length 0.5-1.5mm long; hairs adpressed. Calyx colour green. Standard length 8-10mm; limb length 6-8mm; claw length 1.5-2mm; limb width 6-9mm; claw width 2.5-3mm; ratio of limb length to claw length 3-5. Corolla petals concolorous; standard face cream; standard upper surface cream; face without distinct veining or face with distinct veins. Standard shape stenonychioid; apex emarginate; claw bowing absent; upper surface glabrous. Wing length 7-9mm; limb length 5-7.5mm; claw length 1-2mm; limb width 2-4mm. Wing colour cream; markings absent. Wing shape 3; spur shape 1; limb base kinking weak; limb pouch absent; wing to keel adhesion weak. Keel length 4-4.5mm; hood length 1.5-3mm; claw length 1.5-3mm; hood width 2.5-3mm. Keel colour white; hood apex distinctly coloured. Keel shape 1; base shape 2; pouch absent. Staminal tube length 3mm; filament length 1-2mm; 5th stamen distinctly extended; distinct tube vein colouring absent. Ovary length 2-2.5mm; style length 2-2.5mm; supra-ovary extension 0.5-1mm. Ovary shape oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary with simple hairs on sutures only; style apex pubescence type 3. Number of ovules per ovary 5-7.

LEGUME CHARACTERS: Legume 17-23mm long; 6-7mm wide; 4mm deep; ratio of legume length to width 2.6-3.5. Amphicarpic legumes absent. Legume colour yellow-brown; uniform over legume. Legume shape oblong; cross-sectional shape round; not falcate; suture unparallel; distal end unbeaked; valve surface not torulose; surface smooth; partitioning absent. Legume glabrous; suture surface smooth. Dehiscent legume twisting loose; number of seeds per legume 3-5.

SEED CHARACTERS: Seed 4mm long; 5mm wide; 3.5mm deep; 14mm circumference; hilum 1.5mm long; distance from hilum to lens 7mm; seed length to width ratio of 0.8; seed circumference to hilum length ratio of 0.11. Seed shape spherical; shape in side view circular; seed colour brown; mottling present; surface matt;

smooth. Hilum shape elongated, less than third of circumference; coloured brown; groove colour beige; hilum surface excess tissue present. Lens position opposite hilum; prominent. Aril absent.
See plates 27-28.

Phenology: March - May **Chromosome number:** 12.
Geographical distribution: SY (endemic). See Map 5.
Ecology: Alt. 1320 - 1380m; Soil heavy black; Hab. moist meadows.

Taxonomic notes: This species was initially described from the Jebel Druse, in Southern Syria, but Mouterde (1961) refers to the location of two population between Homs and Tartous in Western Syria. I have located four populations in the Jebel Druse, but found none in the Homs and Tartous area. It may now be extinct in the latter area. Mouterde comments that both the Jebel Druse and the area between Homs and Tartous have similar volcanic, basalt soils. These soils are relatively rare soils in Syria as a whole and a obligate requirement for these soils may explain the species limited distribution. The restriction of V. dionysiensis to these two areas suggests it is a relict species, dependent on these restricted edaphic enclaves for survival.

Specimen citation: Maxted, Ehrman & Khattab 2498 (SPN); Maxted, Ehrman & Khattab 2507 (SPN); Maxted, Ehrman & Khattab 2560 (SPN); Mouterde 6937 (G); Maxted, Ehrman & Khattab 2582 (SPN).

Plates 27-28. V. dionysiensis Mout.

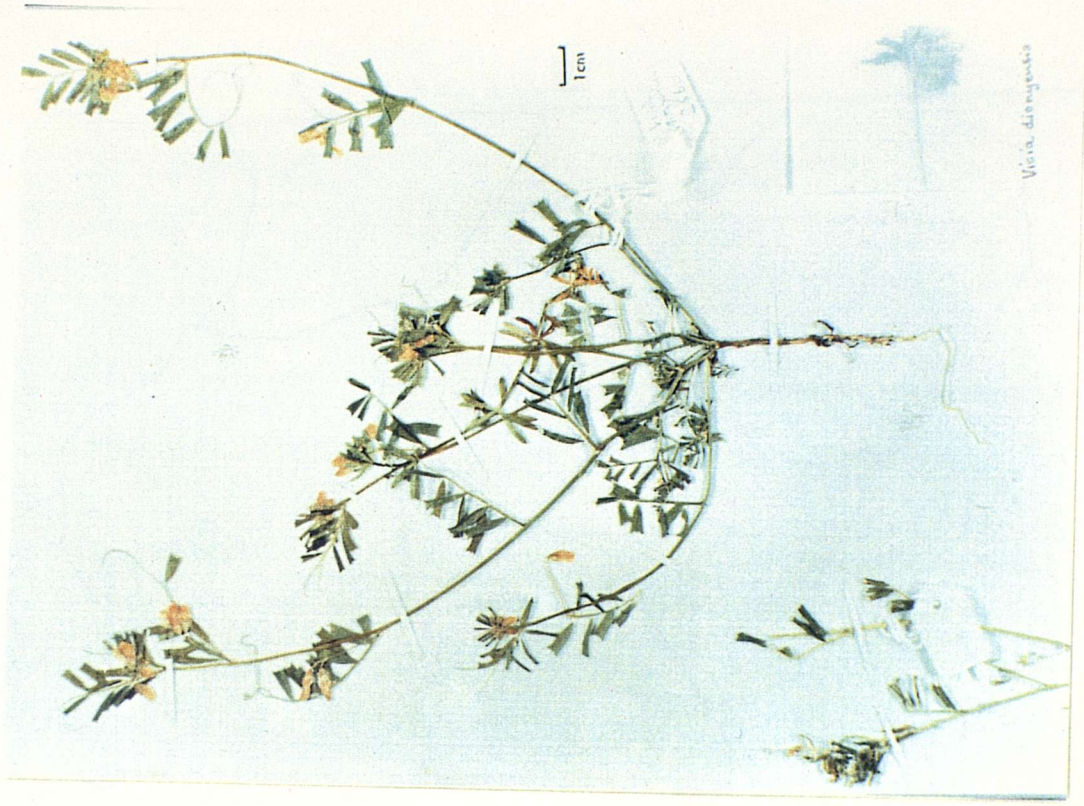
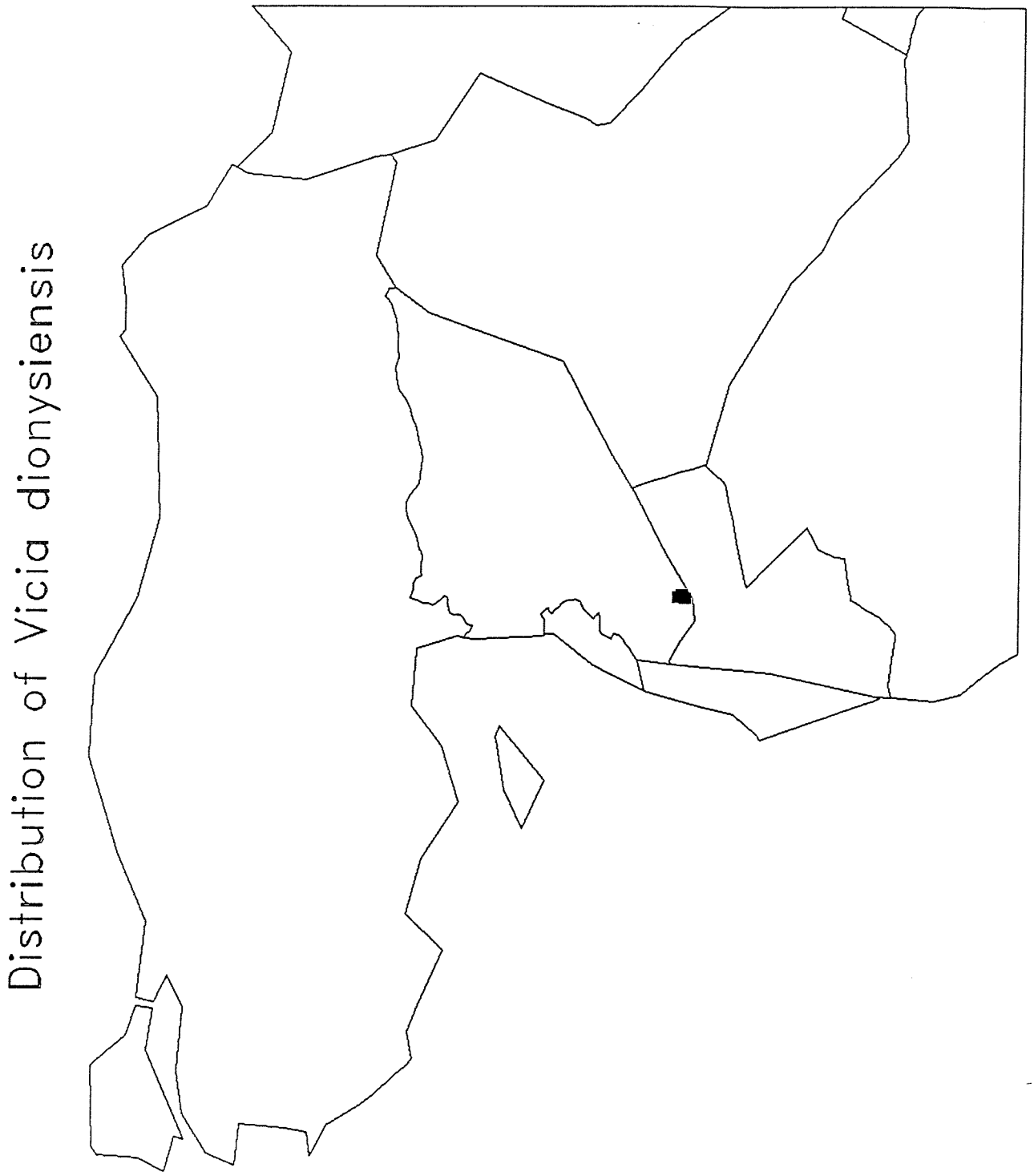


Plate 27. General habit, Maxted, Ehrman & Khattab 2560, x .5.

Plate 28. Detail of inflorescence and flowers, note comparative petal length.

Map 5.



Section Hypechusa

III **Section** Hypechusa (Alef.) Aschers & Graebner (1909) Syn. Mitteleur. Fl., 6,2: 957.
Type: V. lutea L. (1753) Sp. Pl., 2: 736.
Synonymy: Hypechusa Alef. (1860). Bot. Zeitung (Berlin), 18: 165; Vicia ser. Annuae Taubert (1894) Die Nat. Pl. III, 10: 351, nomen nudum; Vicia sect. Pedunculatae Rouy, (1899). Fl. Fr., 5: 221, pro parte excl. typ.; Vicia subsect. Brevicarpa Stankevich (1970) Tr. Prikl. Bot. Genet. Sel., 43: 113; Vicia subsection Hybridae Radzhi (1971) Novosti Sist. Vyssh. Rast., 17: 238.

Description: Annual; climbing; stem slender. Stipules entire or semi-hastate; length less than 3.5mm or 3.5 to 5.5mm; edge entire or with 1-2 teeth. Leaf apex tendrilous; leaflet less than 20mm or 20-30mm; with more than 4 pairs. Leaflets symmetric; margins entire. Number of flowers per inflorescence 1 or 1 to 2 or 3 to 4; peduncle 1-2mm or peduncle 3-6mm or peduncle longer than 6mm. Calyx mouth oblique; lower tooth longer than upper; base gibbous. Pedicel shorter or equal to 3mm or longer than 3mm. Flowers shorter than 15mm or 15 to 20mm or longer than 20mm; standard cream or yellow or blue or purple; shape platonychioid or stenonychioid; claw bowing absent; upper standard surface glabrous or pubescent. All petals approximately equal length. Wing marking absent or present; wing limb with slight kinking or strong kinking. Legume length less than 30mm or 30 to 50mm; width 5 to 10mm wide or greater than 10mm; oblong; round in cross section; sutures curved; valve hairs absent or present; hairs simple or tuberculate; septa absent; number of seeds per legume less than 7. Seeds 3.5 to 6.0mm; round or oblong; not laterally flattened; hilum less than quarter of seed circumference; lens positioned opposite to hilum; testa surface smooth.

Number of taxa: eighteen. **Chromosome number:** 10, 12, 14.
Geographical distribution: West, Central and Southern Europe, Mediterranean Basin and Transcaspia.

Taxonomic notes: The current conception of sect. Hypechusa is similar to that used by Alefeld (1860a) when erecting the genus. V. mollis was considered by Kupicha to belong to sect. Peregrinae, this grouping of V. mollis with V. peregrina and its allies was originally suggested by Boissier (1872). However, the fact that it possess a short peduncle suggests that this species is more naturally allied to sect. Hypechusa, to which it is transferred. This is the position adopted by Townsend (1967) and is supported by Plitmann (Pers. Comm.).

The sect. Hypechusa taxa are split into two series, Hyrcanicae and Hypechusa on the basis of peduncle length, corolla shape, corolla size, and standard pubescence. This division of the species into two major subgroups is indicated by the results of the phenetic study. It is likely that other subgroups could be recognised with each of these series. I have reframed from erecting these as I do not want to create an unjustifiably fine classification.

A Series Hyrcanicae B. Fedtsch. ex Radzhi (1971) Novosti Sist. Vyssh. Rast., 7: 238.
Type: V. hyrcanica Fischer & C. Meyer (1835) Ind. Sem. Hort. Petr. 2: 28.
Synonymy: Hypechusa subg. Euhypechusa Alef. (1860) Bonplandia 8: 68, pro parte; Vicia Ser. Hyrcanicae Radzhi (1971) Novosti Sist. Vyssh. Rast., 7: 238.

Description: Annual; climbing; stem slender. Stipules entire or semi-hastate; length less than 3.5mm; edge entire or with 1-2 teeth. Leaf apex tendrilous; leaflet less than 20mm or 20-30mm; with more than 4 pairs. Leaflets symmetric; margins entire. Number of flowers per inflorescence 1 or 1 to 2 or 3 to 4; peduncle 1-2mm or peduncle 3-6mm or peduncle longer than 6mm. Calyx mouth oblique; lower tooth longer than upper; base gibbous. Pedicel shorter or equal to 3mm or longer than 3mm. Flowers 15 to 20mm or longer than 20mm; standard cream or yellow or blue or purple; shape stenonychioid; claw bowing absent; upper standard surface glabrous. All petals approximately equal length. Wing marking absent; wing limb with slight kinking or strong kinking (common). Legume length less than 30mm or 30 to 50mm; width 5 to 10mm wide; oblong; round in cross section; sutures curved; valve hairs absent or present (rare). Hairs simple; septa absent; number of seeds per legume less than 7. Seeds 3.5 to 6.0mm; round or oblong; not laterally flattened; hilum less than quarter of seed circumference or quarter to half seed circumference; lens positioned opposite to hilum; testa surface smooth.

Number of taxa: seven. **Chromosome number:** 12, 14.
Geographical distribution: West Asia.

Taxonomic notes: The six species of ser. Hyrcanicae form a tight grouping and several authors Townsend (1967, 1974), Ponert (1973) and Meikle (1977) have suggested reducing some of the included species to subspecific rank. Plitmann (1967) notes the existence of intermediate forms between each of the ser. Hyrcanicae species, but ultimately retains their specific distinction. Ponert (1973) takes an even more extreme view and considers V. assyriaca, V. noeana subsp. noeana and subsp. megalodonta as subspecies of V. hyrcanica. Having noted these views, however all the specimens seen during the course of this revision have been easily attributed to one of these six species and specimens showing a degree of intermediacy remain rare. This view was also taken by Davis & Plitmann (1970), who drew similar conclusions. The ser. Hyrcanicae taxa do form a relatively closely related complex, but they are not considered close enough to warrant subspecific status. The specific distinction of these taxa is strengthened by a comparison to a more closely related complex, the V. narbonensis complex, where specific status is retained.

6 **Accepted taxon:** V. assyraica Boiss. (1849) Diagn. Pl. Or. Nov. ser. 1(9): 123.
Type: Holotype, Kotschy 213, 1841 Karadja Dagh, Diarbekir (K!, W!).
Iconography: Fl. Iran., 46-47; Fl. Iraq, 3: 530-532; Fl. Syr., 2: 401; Fl. Tur., 3: 304-305; Illust. Fl. Iran., Tab. 33, fig. 3.
Synonymy: V. hyrcanica var. brachyodonta Bornm. (1906) Beih. Bot. Central., 19: 248; V. brachyodonta Bornm. (1910) Beih. Bot. Central., 27(2): 346; V. hyrcanica subsp. assyriaca (Boiss.) Ponert (1973) Feddes Repert., 83(9-10): 633.

Description: VEGETATIVE CHARACTERS: Annual; erect or ascending; (10-)20-35(-40)cm high. Stipule length 2-3.5mm; 0.5-2.5mm wide. Stipule entire or semi-hastate; apex acute; number of teeth on distal edge none or 1-2; number of teeth on proximal edge none; stipule edge form entire; translucent. Stipule colour (upper plant) green; glabrous. Leaf 33-85mm long; petiole 4-10mm long; average leaflet internode 5-9mm long; leaflet 5-20(-26)mm long; leaflet 1-3mm wide; tendril or mucro 14-39mm long; average leaf internode 15-65mm long; petiolule 29-58mm long. Leaf apex tendrilous; simple or with 2 branches (rarely). Leaflet shape symmetric; 8-14 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet narrow linear or broad linear or narrow elliptic or broad elliptic; apex retuse; base angustate; broadest at apex or in middle or at base. Leaflet adaxial hairs less than 10 per mm sq or 10-50 per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long; leaflet abaxial hair 10-50 per mm sq; hairs more than 1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq. Stem node colour (upper plant) green or purple.

INFLORESCENCE CHARACTERS: Peduncle longer than 2mm, but shorter than flower. Peduncle length (5-)7-21mm; rachis 2-10(-14)mm long; pedicel 1-4mm long; flower 15-23(-27)mm long; ratio of peduncle to flower length of 0.36-1.05; peduncular cusp present and less than 2.1mm long or present and more than 2.0mm long. Number of flowers per inflorescence one or two or three or four. Pedicel with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 2-3.5mm long; lateral teeth 1-3mm long; upper tooth 0.5-2.5mm long; tube 4-7.5mm long; ratio of lower tooth to tube length of 0.36-0.7. Calyx base slightly gibbous or strongly gibbous; tube mouth slightly oblique or strongly oblique; teeth reflexing absent; tooth curvature absent or present; exterior nectaries absent. Calyx hairs covering calyx; hair density of 10-35 per mm sq or 36-60 per mm sq; hair length 0.5-1.5mm long or more than 1.5mm long; hairs adpressed. Calyx colour green or purple calyx teeth. Standard length 15-20(-28)mm; limb length 10-14mm; claw length 10-13mm; limb width 10-16.5mm; claw width 5-9mm; ratio of limb length to claw length 0.95-3.12. Corolla petals concolorous; standard face yellow (pale). Standard upper surface yellow; face without distinct veining or face with distinct veins. Standard shape stenonychioid; apex emarginate; claw bowing absent; upper surface glabrous. Wing length 15-23mm; limb length 8-13mm; claw length 5-12.5mm; limb width 4-8mm. Wing colour yellow (pale). Markings absent. Wing shape 3; spur shape 1; limb base kinking strong; limb pouch absent; wing to keel adhesion weak. Keel length 8-28(-38)mm; hood length 4-6mm; claw length 4.5-12.5mm; hood width 3.5-6mm. Keel colour white; hood apex not distinctly coloured. Keel shape 3; base shape 2 or 4; pouch absent. Staminal tube length 6-15mm; filament length 3-4mm; all stamen approx. equal length or 5th stamen distinctly extended; distinct tube vein colouring absent. Ovary length 4-7mm; style length 3-7.5mm; supra-ovary extension 2-5.5mm. Ovary shape intermediate or oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent or present. Ovary glabrous or with simple hairs on sutures only or entirely covered with simple hairs; style apex pubescence type 3 or 5. Number of ovules per ovary 4-8.

LEGUME CHARACTERS: Legume 14-23mm long; 6-8mm wide; 3-5mm deep; ratio of legume length to width 1.75-3.28. Amphicarpic legumes absent. Legume colour yellow-brown; uniform over legume. Legume shape

oblong; cross-sectional shape round or rounded to flat or laterally flat; not falcate; suture unparallel; distal end unbeaked; valve surface not torulose; surface ridged with veins; partitioning absent. Legume glabrous; suture surface smooth. Dehiscent legume twisting loose; number of seeds per legume 1-4.

SEED CHARACTERS: Seed 4.5-5mm long; 4.5-5.5mm wide; 2-3.5mm deep; 13.5-18mm circumference; hilum 1.5-2.5mm long; distance from hilum to lens 6-8mm; seed length to width ratio of 0.66-1; seed circumference to hilum length ratio of 0.09-0.1. Seed shape spherical or oblong; shape in side view circular or laterally compressed; seed colour red-brown or brown; mottling absent or present; surface matt; smooth or wrinkled. Hilum shape oval or elongated, less than third of circumference; coloured red-brown; groove colour beige; hilum surface excess tissue absent or present. Lens position opposite hilum; prominent. Aril absent.

Phenology: April - June **Chromosome number:** 12, 14.
Geographical distribution: CY, IQ, IR, JO, SY, TR. See Map 6.
Ecology: Alt. 600 - 2000m; Hab. pasture, agricultural and disturbed land.

Taxonomic notes: Townsend (1967, 1974) and Meikle (1977), based on observations of herbarium material, consider V. assyriaca to be a synonym of V. noeana. Plitmann (1967) retained the two species, but noted the existence of intermediate forms. Having collected fresh material of both species I do not concur with their conclusion. Fresh material can easily be distinguished by the differences in plant habit, corolla shape and colour. V. assyriaca is more erect, has a narrower standard and the corolla colour is pale yellow, as opposed to the yellow-pink seen in V. noeana.

Specimen citation: Low 194 (BM); Kotschy 78.98 (K); Davis & Hedge 28327 (E); Zohary & Plitmann 18603-61 (HUJ); Kotschy 213 (K); Kotschy 213 (K); Kotschy 10837 (BM); Davis & Hedge 28327 (BM); Balls 2147 (E); Kotschy 213a (W); Kotschy 213 (W); Noe s.n. (W); Haradjian 47 (W); Kotschy 213 (G); Maxted, Auricht & Ehrman 4840 (SPN); Maxted, Auricht & Ehrman 4933 (SPN); Maxted, Auricht & Ehrman 4961 (SPN); Maxted, Auricht & Ehrman 5041 (SPN); Maxted, Auricht & Ehrman 5150 (SPN); Maxted, Auricht & Ehrman 5165 (SPN); Maxted, Auricht & Ehrman 5684 (SPN).

7 **Accepted taxon:** **V. esdraelonensis** Warb. & Eig (1928) Repert. Sp. Nov. Reg. Veg. 25: 352.
Type: Holotype, Eig 8/4/1924, Balfuria, Esdraelon Plain, Israel (HUJ!).
Iconography: Fl. Pal., 2: 198; Fl. Syr., 2: 402; Fl. Tur., 3: 305-306; Illust. Fl. Pal., 2 (plates): 282.
Synonymy: V. esdralonica Warb. & Eig (1931) Fedde Repert. Sp. Nov. Reg. Veg., 63(1): 113.

Description: VEGETATIVE CHARACTERS: Annual; ascending; 30-40cm high. Stipule length 1-3mm; 1mm wide. Stipule semi-hastate; apex acute; number of teeth on distal edge 1-2; number of teeth on proximal edge none; stipule edge form entire; translucent. Stipule colour (upper plant) green with purple; glabrous. Leaf 57-61mm long; petiole 7-9mm long; average leaflet internode 12-13mm long; leaflet 12-20mm long; leaflet 2.5-4.5mm wide; tendril or mucro 19-35mm long; average leaf internode 41-62mm long; petiolule 50-52mm long. Leaf apex tendrilous; simple or with 3 branches. Leaflet shape symmetric; 8-10 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet narrow elliptic; apex retuse; base angustate; broadest in middle. Leaflet adaxial hairs absent; leaflet abaxial hair less than 10 per mm sq; hairs 0.5-1.5mm long; petiole hairs less than 10 per mm sq. Stem node colour (upper plant) green or purple.

Map 6.

Distribution of Vicia assyriaca

INFLORESCENCE CHARACTERS: Peduncle longer than 2mm, but shorter than flower. Peduncle length 2-10(-17)mm; rachis 4mm long; pedicel 2-3mm long; flower 15-25mm long; ratio of peduncle to flower length of 0.2-0.28; peduncular cusp present and less than 2.1mm long. Number of flowers per inflorescence one or two. Pedicel less than 10 hairs per mm sq; hairs 0.5-1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 3.5-4.5mm long; lateral teeth 3mm long; upper tooth 1.5-2mm long; tube 6-7mm long; ratio of lower tooth to tube length of 0.58-0.64. Calyx base strongly gibbous; tube mouth strongly oblique; teeth reflexing absent; tooth curvature present; exterior nectaries absent. Calyx hairs covering calyx; hair density less than 10 per mm sq or 10-35 per mm sq; hair length 0.5-1.5mm long; hairs adpressed. Calyx colour green. Standard length 21-22mm; limb length 10.5mm; claw length 10.5-11.5mm; limb width 12-12.5mm; claw width 7-7.5mm; ratio of limb length to claw length 0.91-1. Corolla petals concolorous; standard face violet; standard upper surface violet; face without distinct veining. Standard shape stenonychioid; apex emarginate; claw bowing absent; upper surface glabrous. Wing length 19.5-22mm; limb length 9-11mm; claw length 10.5-11mm; limb width 5.5-8mm. Wing colour violet; markings absent. Wing shape 3; spur shape 1; limb base kinking strong; limb pouch absent; wing to keel adhesion weak. Keel length 15-17mm; hood length 5mm; claw length 10-12mm; hood width 4.5-6mm. Keel colour white; hood apex not distinctly coloured. Keel shape 3; base shape 2; pouch absent. Staminal tube length 13-15mm; filament length 3.5mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 7mm; style length 5-7mm; supra-ovary extension 4-6mm. Ovary shape linear or intermediate; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature present. Ovary entirely covered with simple hairs; style apex pubescence type 3. Number of ovules per ovary 6-7.

LEGUME CHARACTERS: Legume 25-32mm long; 7-9mm wide; 4mm deep; ratio of legume length to width 3.75. Amphicarpic legumes absent. Legume colour yellow-brown; uniform over legume. Legume shape oblong; cross-sectional shape rounded to flat; not falcate; suture unparallel; distal end slightly beaked; valve surface not torulose; surface ridged with veins; partitioning absent. Legume glabrous; suture surface smooth; tubercles absent. Dehiscent legume twisting loose; number of seeds per legume 4-5.

SEED CHARACTERS: Seed 4-5mm long; 4mm wide; 3-4mm deep; 12-14mm circumference; hilum 3-4mm long; distance from hilum to lens 3-5mm; seed length to width ratio of 1-1.25; seed shape spherical; seed colour brown; smooth.

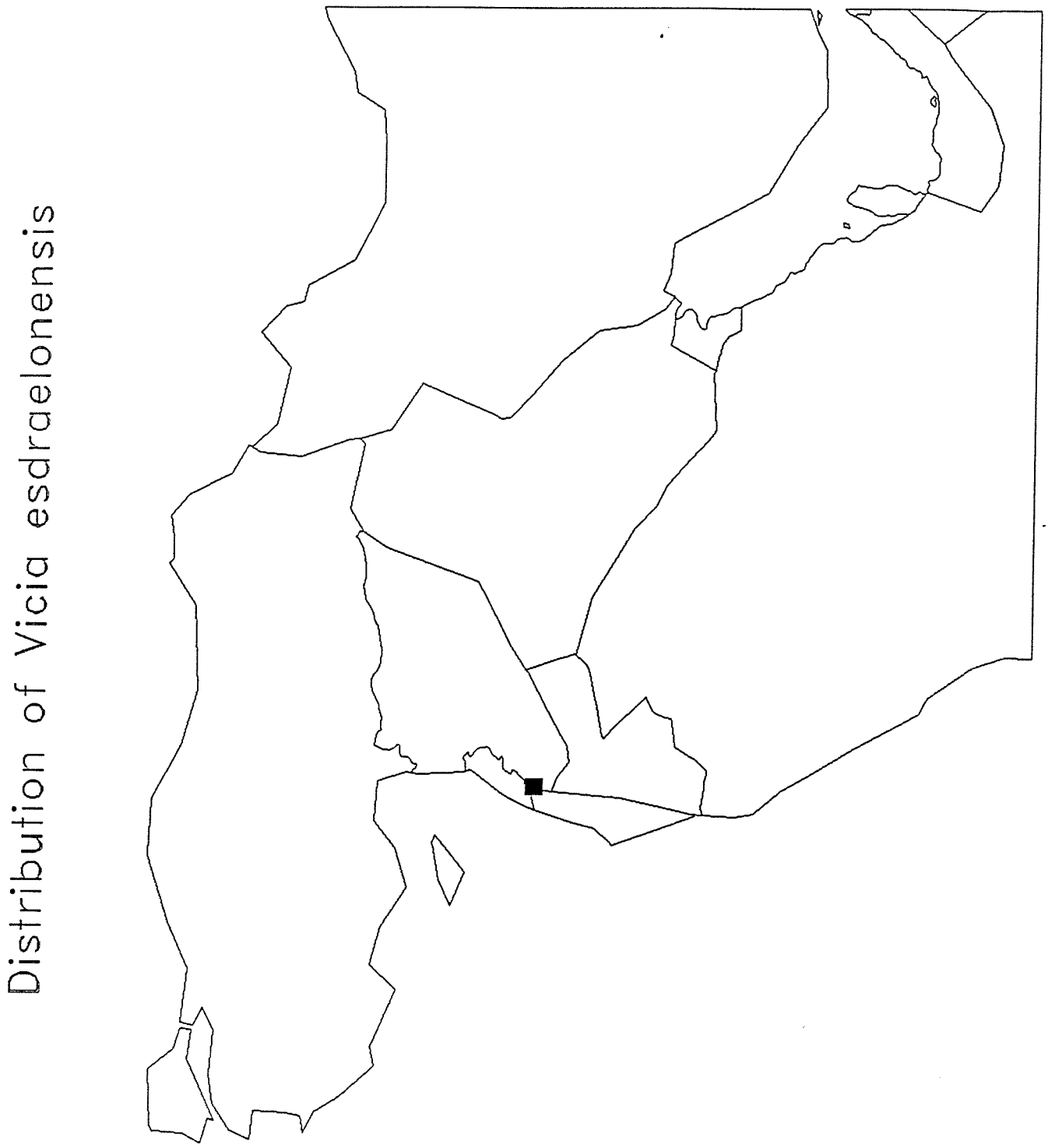
Phenology: April - May **Chromosome number:** 12.
Geographical distribution: IL, IQ, JO, SY, TR. See Map 7.
Ecology: Marshland.

Taxonomic notes: This is a rare taxon and I have seen only two herbarium specimens. The protologue links the species to either the sect. Peregrinae or sect. Hypechusa ser. Hyrcanicae groups. Plitmann (1967) suggests it is more naturally linked to sect. Cracca, particularly V. cretica or V. monantha on the basis of the relatively long peduncle (3-17mm), the flower colour being purple-violet, the pod being rhomboid and the particular style pubescence. However, Davis & Plitmann (1970) place V. esdraelonensis in the centre of the ser. Hyrcanicae taxa. The latter view is accepted here, though V. esdraelonensis does remain isolated as the only purple-violet flowered sect. Hypechusa taxon.

Specimen citation: Zohary & Plitmann 624511 (E); Zohary & Plitmann 62456 (HUJ).

8 **Accepted taxon:** **V. tigridis** Mout. (1969) Nouv. Fl. Liban et Syrie, 2: 402.
Type: Holotype, Mouterde 11387, bank of Tigris, Ayn Diwar, Syria (G!).

Map 7.



Iconography: Fl. Syr., 2: 402.

Description: VEGETATIVE CHARACTERS: Annual; ascending; 20-45cm high. Stipule length 2.5mm; 1mm wide. Stipule entire; apex acute; number of teeth on distal edge none or 1-2; number of teeth on proximal edge none; stipule edge form entire; translucent or not-translucent. Stipule colour (upper plant) green; glabrous. Leaf 77-93mm long; petiole 7-12mm long; average leaflet internode 9-11mm long; leaflet 15-23mm long; leaflet 2-4mm wide; tendril or mucro 36-45mm long; average leaf internode 38-47mm long; petiolule 65-80mm long. Leaf apex tendrilous; with 3 branches. Leaflet shape symmetric; 14 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet narrow linear or broad linear; apex retuse; base angustate; broadest at apex or in middle. Leaflet adaxial hairs absent; leaflet abaxial hair 10-50 per mm sq; hairs 0.5-1.5mm long; petiole hairs 10-50 per mm sq. Stem node colour (upper plant) green or purple.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm). Peduncle length 1mm; pedicel 2mm long; flower 16-20mm long; ratio of peduncle to flower length of 0.05-0.06; peduncular cusp present and less than 2.1mm long. Number of flowers per inflorescence one. Pedicel with 10-50 hairs per mm sq; hairs 0.5-1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 4-6mm long; lateral teeth 3.5-5.5mm long; upper tooth 1.5-3.5mm long; tube 6mm long; ratio of lower tooth to tube length of 0.66-1. Calyx base slightly gibbous or strongly gibbous; tube mouth slightly oblique or strongly oblique; teeth reflexing absent; tooth curvature present; exterior nectaries absent. Calyx hairs covering calyx; hair density less than 10 per mm sq; hair length 0.5-1.5mm long; hairs adpressed. Calyx colour green. Standard length 19-20mm; limb length 9.5-11mm; claw length 9-9.5mm; limb width 5-8mm; claw width 3-6mm; ratio of limb length to claw length 1-1.22. Corolla petals not concolorous; standard face yellow-pink; standard upper surface yellow-brown; face with distinct veins. Standard shape platonychioid or stenonychioid; apex emarginate; claw bowing absent; upper surface glabrous. Wing length 17-17.5mm; limb length 7-8mm; claw length 10-10.5mm; limb width 2.5-3.5mm. Wing colour cream; markings absent. Wing shape 3 or 4; spur shape 4; limb base kinking weak; limb pouch absent or present; wing to keel adhesion weak or strong. Keel length 8.5-14mm; hood length 3.5-4mm; claw length 5-10mm; hood width 4.5mm. Keel colour white; hood apex not distinctly coloured. Keel shape 3; base shape 2; pouch absent. Staminal tube length 13mm; filament length 2.5-3mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 8.5-10mm; style length 3.5-6mm; supra-ovary extension 3.5mm. Ovary shape oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary glabrous or with simple hairs on sutures only; style apex pubescence type 3. Number of ovules per ovary 6.

LEGUME CHARACTERS: Legume 33mm long; 10mm wide; 5mm deep; ratio of legume length to width 3.3. Amphicarpic legumes absent. Legume colour yellow; uniform over legume. Legume shape rhomboid; cross-sectional shape rounded to flat; not falcate; suture unparallel; distal end unbeaked; valve surface not torulose; surface ridged with veins; partitioning absent. Legume glabrous; suture surface smooth. Dehiscent legume twisting loose; number of seeds per legume 5.

SEED CHARACTERS: Seed 5mm long; 4mm wide; 4mm deep; 13mm circumference; hilum 3mm long; distance from hilum to lens 5mm; seed length to width ratio of 1.11; seed circumference to hilum length ratio of 0.23. Seed shape spherical to cubic; shape in side view circular; seed colour yellow; mottling present; surface matt; smooth. Hilum shape elongated, less than third of circumference; coloured red-brown; groove colour beige; hilum surface excess tissue absent. Lens position opposite hilum; prominent. Aril absent.

Phenology: April - May **Chromosome number:** 12.

Geographical distribution: SY, (endemic to Ayn Diwar, Syria). See Map 8.
Ecology: Alt. 400m; Soil, Alluvial; Hab. Riverbank meadow.

Taxonomic notes: A very rare taxon, restricted to one population. The species is only known from the type collection and one made by Maxted, Ehrman & Khattab in 1986. However, the combination of characters observed justify its specific status.

Specimen citation: Maxted, Ehrman & Khattab 3287 (SPN); Mouterde 11387 (G).

9 **Accepted taxon:** **V. galeata** Boiss. (1843) Diagn. ser. 1(2): 103.
Type: Lectotype, Aucher Eloy 971, 4/1846, ad rivlos plamitier esdraelonis, prope Scanderoun (Iskenderum) (K!, G!).
Iconography: Fl. Pal., 2: 202; Fl. Syr., 2: 400-401; Fl. Tur., 3: 305; Illust., Fl. Pal., 2 (plates): 289.
Synonymy: V. galeata var. linearifolia Zoh. (1963) Univ. of Jerusalem, Ann. Rep., A10-CR-11, 4.

Description: VEGETATIVE CHARACTERS: Annual; ascending; 30-70cm high. Stipule length 1.5-3.5mm; 0.5-2.5mm wide. Stipule entire or semi-hastate; apex acute; number of teeth on distal edge none or 1-2; number of teeth on proximal edge none; stipule edge form entire; translucent. Stipule colour (upper plant) green or green with purple; glabrous or less than 10 hairs per sqmm. Leaf 32-81mm long; petiole 1-12mm long; average leaflet internode 8-14mm long; leaflet 10-20(-30)mm long; leaflet 3-10(-15)mm wide; tendril or mucro 22-61mm long; average leaf internode 32-120mm long; petiolule 28-76mm long. Leaf apex tendrilous; with 3 branches or with more than 3 branches. Leaflet shape symmetric; 8-15 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet linear elliptic or narrow elliptic or broad elliptic or narrow ovate; apex mucronate and emarginate; base angustate or truncate to angustate; broadest at apex or in middle. Leaflet adaxial hairs absent or less than 10 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long or hairs more than 1.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long or hairs more than 1.5mm long; petiole hairs less than 10 per mm sq. Stem node colour (upper plant) green or purple.

INFLORESCENCE CHARACTERS: Peduncle longer than 2mm, but shorter than flower or longer than flower. Peduncle length 3-30mm; rachis 2-24mm long; pedicel 1-3mm long; flower (15-)18-30mm long; ratio of peduncle to flower length of 0.12-1.38; peduncular cusp absent or present and less than 2.1mm long. Number of flowers per inflorescence two or three or four or more than four. Pedicel less than 10 hairs per mm sq or with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs 0.5-1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 2-5.5mm long; lateral teeth 1-4.5mm long; upper tooth 1-2.5mm long; tube 4.5-6.5mm long; ratio of lower tooth to tube length of 0.33-1. Calyx base strongly gibbous; tube mouth slightly oblique or strongly oblique; teeth reflexing absent; tooth curvature present; exterior nectaries absent. Calyx hairs covering calyx; hair density less than 10 per mm sq or 10-35 per mm sq; hair length 0.5-1.5mm long or more than 1.5mm long; hairs adpressed. Calyx colour green or purple base. Standard length (15.5-)17-30mm; limb length 8.5-17mm; claw length 8.5-15mm; limb width 8-20mm; claw width 6-12mm; ratio of limb length to claw length 0.73-1.7. Corolla petals concolorous; standard face yellow (pale) or yellow-pink; standard upper surface yellow or lilac; face without distinct veining. Standard shape stenonychioid; apex emarginate; claw bowing absent; upper surface glabrous. Wing length 15-26.5mm; limb length 7-14.5mm; claw length 6.5-13.5mm; limb width 4.5-10mm. Wing colour yellow (pale) or yellow-pink; markings absent. Wing shape 3; spur shape 1; limb base kinking

Map 8.

strong; limb pouch absent or present; wing to keel adhesion weak. Keel length 10.5-19mm; hood length 3.5-6mm; claw length 6.5-13.5mm; hood width 4-6mm. Keel colour white; hood apex distinctly coloured. Keel shape 3; base shape 2; pouch absent. Staminal tube length 9-16.5mm; filament length 2.5-4mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 4.5-8mm; style length 4.5-8mm; supra-ovary extension 3.5-6mm. Ovary shape linear or intermediate; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent or present. Ovary with simple hairs on sutures only or entirely covered with simple hairs; style apex pubescence type 3 or 5. Number of ovules per ovary 6-11.

LEGUME CHARACTERS: Legume 17-28(-40)mm long; 7-10mm wide; 5-7mm deep; ratio of legume length to width 2.1-3.14. Amphicarpic legumes absent. Legume colour yellow-brown or brown; uniform over legume or with brown or black veins. Legume shape oblong; cross-sectional shape round or rounded to flat; not falcate; suture unparallel; distal end slightly beaked; valve surface not torulose; surface smooth; partitioning absent. Legume hairs 10 - 35 per mm sq; hairs less than 0.5mm long; hairs covering entire legume; suture surface ciliate, hairs less than 1mm long; tubercles absent. Dehiscent legume twisting medium or tight; number of seeds per legume 2-6.

SEED CHARACTERS: Seed 4.5-5.5mm long; 4-6.5mm wide; 2.5-5mm deep; 10-16mm circumference; hilum 4.5-7mm long; distance from hilum to lens 4-6mm; seed length to width ratio of 0.81-1.25; seed circumference to hilum length ratio of 0.43-0.45. Seed shape spherical; shape in side view circular (rarely) or laterally compressed; seed colour brown; mottling absent or present; surface matt; smooth. Hilum shape very elongated, more than third of circumference; coloured red-brown or coloured brown; groove colour same as hilum; hilum surface excess tissue absent or present. Lens position opposite hilum; prominent. Aril absent.

Phenology: March - July **Chromosome number:** 12, 14.
Geographical distribution: IL, IQ, IR, JO, LB, SY, TR. See Map 9.
Ecology: Alt. 20 - 1400m; Hab. moist roadside banks, disturbed or cultivated land.

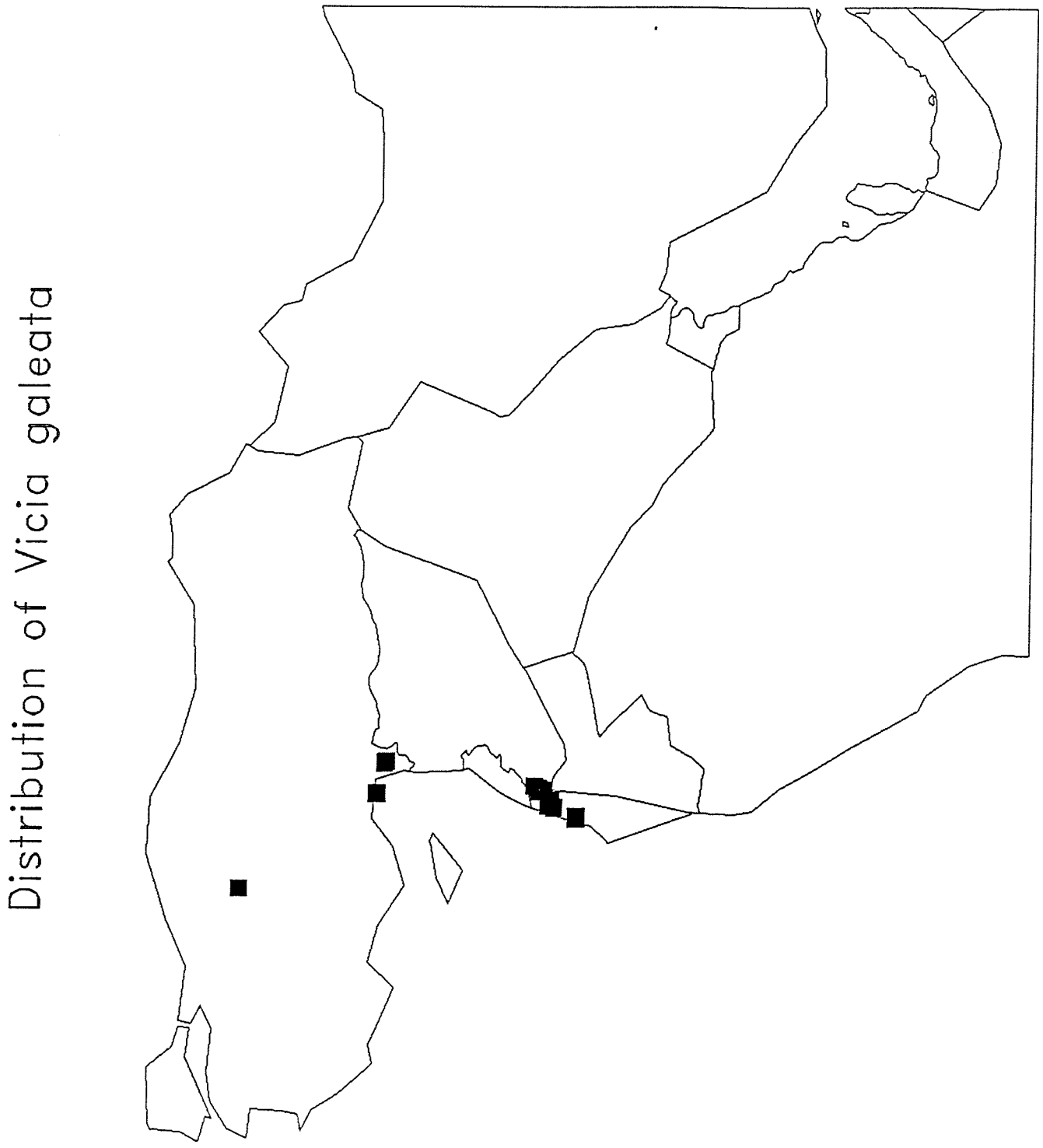
Taxonomic notes: Plitmann (1967) notes the existence of transitional forms between V. galeata and other ser. Hyrcanicae taxa, but I have not seen specimens that I could not attribute to an existing taxon.

Specimen citation: Dinsmore 1370 (E); Plitmann 1/15 (E); Pirard 1846 (K); Feinbrun & Grizi 660 (K); Ball s.n. (K); Norris s.n. (BM); Zohary & Plitmann s.n. (E); Feinbrun & Grizi 660 (MO); Bornmuller 516 (W); Zohary 1146 (HUJ); Eig, Zohary & Feinbrun 1145 (HUJ); Zohary & Plitmann 42455 (HUJ); Boissier 4/1846 (K); Lowne 1863 (E); Kotschy s.n. (W); Boissier 51 (W); Bornmuller 1717 (BM); Aucher-Eloy 971 (K); Maxted, Kitiki & Allkin 4133 (SPN); Aucher-Eloy 971 (G).

10 **Accepted taxon:** V. hyrcanica Fischer & C. Meyer (1835) Ind. Sem. Hort. Petr. 2: 28.
Type: Holotype, Hoenacker 280, Tatumi, Caucasus (LE!).
Iconography: Fl. Iran., 44; Fl. Tur., 3: 306; Fl. USSR., 13: 465-466; Illust. Fl. Iran., 32, fig. 4.
Synonymy: V. biebersteinii C. Meyer non Besser ex M. Bieb. (1831) Verz. Pfl. Caucas. 147; V. jaubertii Boiss. & Buhse (1860) Nou. Mem. Soc. Imp. Nat. Moscou 12: 71; Hypechusa hircania Alef. (1860) Bot. Zeitung, 18(19): 166; V. hyrcanica var. brachyodonta Bornm. (1906) B. B. C., 19: 248; V. brachyodonta Bornm. (1910) B. B. C., 27: 346; V. iberica Grossh. in Grossh. & Schischkin (1924) Plantae Orientales Exsiccatae, 30; V. formosa Schischkin (1928) Trans. Tomsk. St. Univ., 81: 486.

Description: VEGETATIVE CHARACTERS: Annual; erect or ascending; 20-90cm high. Stipule length 2-4mm; 1-2mm wide. Stipule entire or semi-hastate; apex acute; number of teeth on distal edge none or 1-2;

Map 9.



number of teeth on proximal edge none; stipule edge form entire; translucent. Stipule colour (upper plant) green; glabrous. Leaf 28-92mm long; petiole 4-13mm long; average leaflet internode 6-16mm long; leaflet 8-28(-35)mm long; leaflet 3-12mm wide; tendril or mucro 22-75mm long; average leaf internode 20-67mm long; petiolule 24-82mm long. Leaf apex tendrilous; with 3 branches or with more than 3 branches. Leaflet shape symmetric; (8-)10-16 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet linear elliptic or narrow elliptic or broad elliptic; apex retuse or mucronate and emarginate; base angustate or truncate to angustate; broadest at apex or in middle or at base. Leaflet adaxial hairs absent or less than 10 per mm sq or 10-50 per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long; petiole hairs less than 10 per mm sq. Stem node colour (upper plant) purple.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm) or longer than 2mm, but shorter than flower. Peduncle length 2-9(-18)mm; rachis 1-6(-9)mm long; pedicel 2-3mm long; flower 15-22(-25)mm long; ratio of peduncle to flower length of 0.1-1; peduncular cusp present and less than 2.1mm long. Number of flowers per inflorescence one or two or three or four (rarely). Pedicel less than 10 hairs per mm sq or with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs 0.5-1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 2.5-6(-8)mm long; lateral teeth 1.5-4.5(-7)mm long; upper tooth 0.5-2.5mm long; tube 4-6mm long; ratio of lower tooth to tube length of 0.41-1.33. Calyx base strongly gibbous; tube mouth slightly oblique or strongly oblique; teeth reflexing absent; tooth curvature absent; exterior nectaries absent. Calyx hairs covering calyx; hair density less than 10 per mm sq or 10-35 per mm sq; hair length 0.5-1.5mm long; hairs adpressed. Calyx colour green. Standard length 17-24mm; limb length 8-12mm; claw length 8-12mm; limb width 8-14mm; claw width 6-9mm; ratio of limb length to claw length 0.81-1.18. Corolla petals concolorous; standard face yellow (pale). Standard upper surface yellow-brown (pale). Face with distinct veins. Standard shape stenonychioid; apex emarginate; claw bowing absent; upper surface glabrous. Wing length 14-23mm; limb length 6.5-11.5mm; claw length 7.5-11.5mm; limb width 3-7.5mm. Wing colour yellow (pale). Markings absent. Wing shape 2 or 3; spur shape 1; limb base kinking weak or strong; limb pouch present; wing to keel adhesion weak. Keel length 12.5-16mm; hood length 4-5.5mm; claw length 8.5-10.5mm; hood width 4.5-6mm. Keel colour white; hood apex not distinctly coloured. Keel shape 3; base shape 2 or 4; pouch absent. Staminal tube length 11-14mm; filament length 2-3mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 5-7.5mm; style length 5.5-7mm; supra-ovary extension 3-5mm. Ovary shape intermediate or oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature present. Ovary entirely covered with simple hairs; style apex pubescence type 3. Number of ovules per ovary 5-7.

LEGUME CHARACTERS: Legume 17-33(-40)mm long; 9-12mm wide; 4-6mm deep; ratio of legume length to width 1.88-3.22. Amphicarpic legumes absent. Legume colour yellow or yellow-brown; uniform over legume. Legume shape oblong; cross-sectional shape round or rounded to flat; not falcate; suture unparallel; distal end unbeaked or slightly beaked; valve surface not torulose; surface smooth or ridged with veins; partitioning absent. Legume glabrous; suture surface smooth. Dehiscent legume twisting loose or medium; number of seeds per legume 3-5.

SEED CHARACTERS: Seed (2-)3.5-6mm long; 4.5-6mm wide; 3-4mm deep; 12-17.5mm circumference; hilum 2-2.5mm long; distance from hilum to lens 5-7.5mm; seed length to width ratio of 0.76-1.1; seed circumference to hilum length ratio of 0.14-0.16. Seed shape spherical or spherical to cubic; shape in side view circular; seed colour red-brown or brown; mottling absent or present; surface matt; smooth or wrinkled. Hilum shape elongated, less than third of circumference; coloured red-brown; groove colour beige; hilum surface excess tissue present. Lens position opposite hilum; prominent. Aril absent.

Phenology: May - August **Chromosome number:** 12, (14).
Geographical distribution: AF, AL, IR, SA, SU, TR. See Map 10.
Ecology: Alt. 1150 - 1910m; Hab. mountain pasture, agricultural and disturbed land.

Taxonomic notes: Plitmann (1967) notes the existence of transitional forms, between V. hyrcanica and V. noeana from Southeast Turkey, and with V. galeata from Southern Turkey, Eastern Iraq and Western Iran. However, field identification of populations from the Caucasus and Soviet Central Asia has presented no problem and so the species is retained as a distinct entity.

Specimen citation: Bornmuller 6682 (BM); Furse 6621 (K); Aitchison 604 (K); Pichler 1882 (K); Hedge & Wendelbo 3252 (E); Alnford 1861 (W); Archibald 1982 (E); Pichler s.n. (W); Bornmuller & Bornmuller 6682 (W); Danin, Baum & Plitmann 65-650 (HUJ); Danin, Baum & Plitmann 236623 (HUJ); Bungeanum s.n. (G); Jakivoma 269 (E); Androsov 2880 (W); Jakivoma 269 (W); Anon. s.n. (MO); Jakivoma 269 (MO); Stankevich 807 (WIR); Vlassov 32 (WIR); Ulyanova s.n. (WIR); Zhilenko s.n. (WIR); Stankevich s.n. (WIR); Stankevich s.n. (WIR); Gudkova s.n. (WIR); Leokene s.n. (WIR); Shcherbakov s.n. (WIR); Gudkova s.n. (WIR); Frantskevich 42806 (WIR); Frantskevich s.n. (WIR); Muratova 6205 (WIR); Stankevich & Legotina 1374 (WIR); Stankevich & Legotina 1384 (WIR); Stankevich 4589 (WIR); Novikov 280 (LE); Tong 259 (E); Maunsell s.n. (BM); Zohary 5711024 (HUJ); Androsov 2880 (MO).

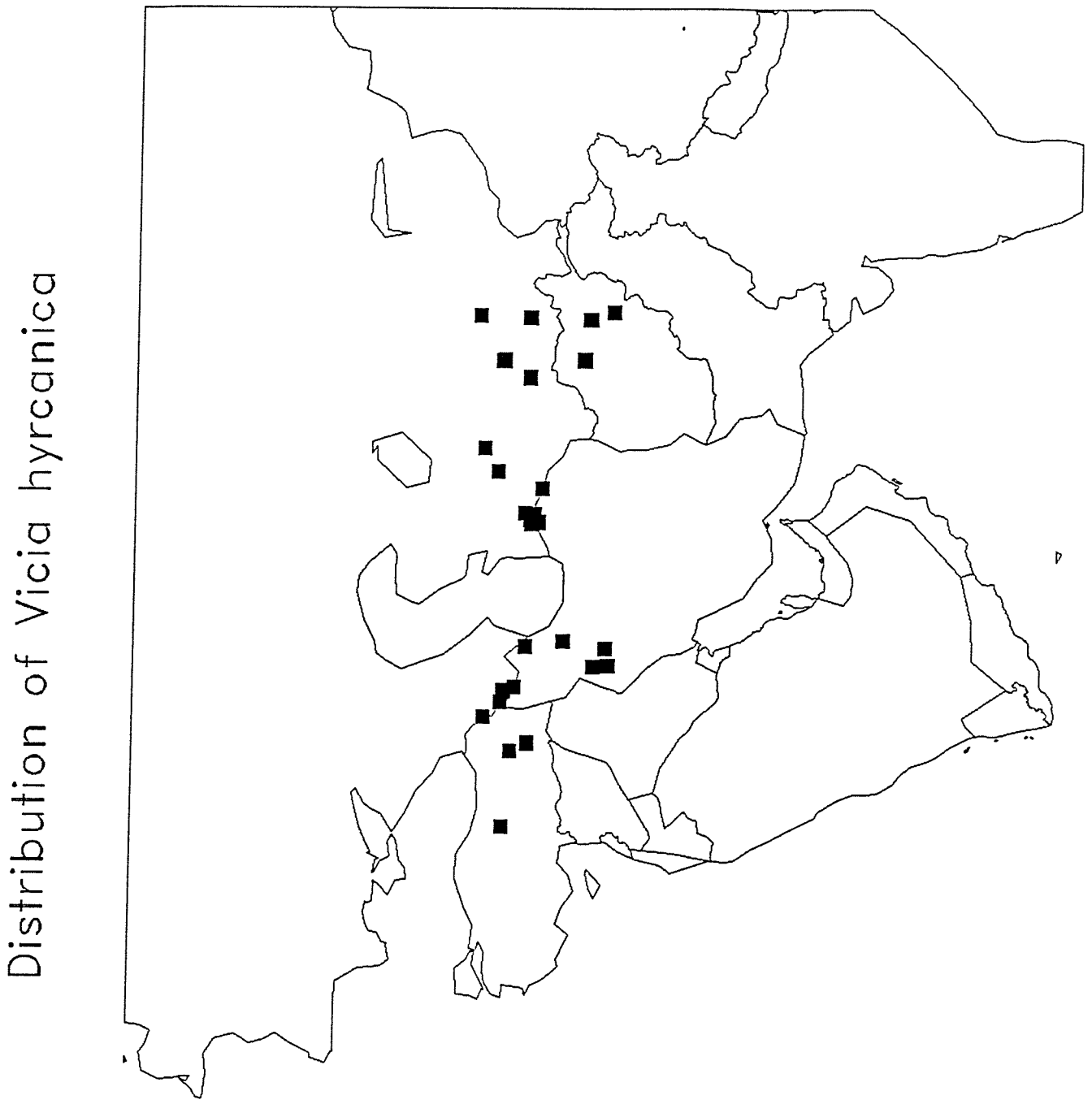
11 **Accepted taxon:** V. noeana Reuter ex Boiss. (1872) Fl. Or. 2: 572.
Iconography: Fl. Syr., 2: 401; Fl. Tur., 3: 306-307.

Description: VEGETATIVE CHARACTERS: Annual; erect or ascending; 20-65cm high. Stipule length 2-4mm; 1-2.5mm wide. Stipule entire or semi-hastate; apex acute; number of teeth on distal edge none or 1-2; number of teeth on proximal edge none; stipule edge form entire; translucent. Stipule colour (upper plant) green or green with purple; glabrous. Leaf 38-87mm long; petiole 3-17mm long; average leaflet internode 7-17mm long; leaflet (7-)10-30(-40)mm long; leaflet 3-7mm wide; tendril or mucro 12-54mm long; average leaf internode 26-95mm long; petiolule 40-77mm long. Leaf apex tendrilous; with 2 branches or with 3 branches or with more than 3 branches. Leaflet shape symmetric; 9-14 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet linear elliptic or narrow elliptic or broad elliptic; apex retuse or mucronate and emarginate or mucronate; base angustate or truncate to angustate; broadest at apex or in middle or at base. Leaflet adaxial hairs absent or less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq; hairs 0.5-1.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq. Stem node colour (upper plant) green or purple.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm) or longer than 2mm, but shorter than flower or longer than flower. Peduncle length 3-28mm; rachis 2-11mm long; pedicel 1-2mm long; flower 15-25mm long; ratio of peduncle to flower length of 0.14-1.16; peduncular cusp absent or present and less than 2.1mm long or present and more than 2.0mm long. Number of flowers per inflorescence one (rarely) or two or three or four. Pedicel with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 1.5-9.5mm long; lateral teeth 1.5-7.5mm long; upper tooth 1-3mm long; tube 4-7.5mm long; ratio of lower tooth to tube length of 0.21-1.58. Calyx base strongly gibbous; tube mouth slightly oblique or strongly oblique; teeth reflexing absent; tooth curvature absent or present; exterior nectaries absent. Calyx hairs covering calyx; hair density of 10-35 per mm sq or 36-60 per mm sq; hair length 0.5-1.5mm long or more than 1.5mm long; hairs adpressed. Calyx colour green

Map 10.



or purple base or purple calyx teeth or purple. Standard length 16-26.5mm; limb length 7.5-15mm; claw length 7.5-12.5mm; limb width 8-16mm; claw width 6-10mm; ratio of limb length to claw length 0.72-1.3. Corolla petals concolorous; standard face cream or yellow-pink; standard upper surface cream or yellow-brown; face without distinct veining or face with distinct veins. Standard shape stenonychioid; apex emarginate; claw bowing absent; upper surface glabrous. Wing length 16-26mm; limb length 7-14mm; claw length 8-12mm; limb width 3.5-8mm. Wing colour yellow-pink; markings absent. Wing shape 2 or 3; spur shape 1; limb base kinking weak or strong; limb pouch absent or present; wing to keel adhesion weak. Keel length 11-17mm; hood length 3.5-5.5mm; claw length 8-12.5mm; hood width 4-5.5mm. Keel colour white; hood apex not distinctly coloured or distinctly coloured. Keel shape 2 or 3; base shape 2 or 4; pouch absent or present. Staminal tube length 10-15mm; filament length 2.5-3.5mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 4.5-7.5mm; style length 4.5-8mm; supra-ovary extension 3-5mm. Ovary shape linear or intermediate or oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature present. Ovary glabrous or with simple hairs on sutures only; style apex pubescence type 3 or 5. Number of ovules per ovary 4-7.

LEGUME CHARACTERS: Legume 20-30mm long; 8-10mm wide; 5-6mm deep; ratio of legume length to width 2.33-2.87. Amphicarpic legumes absent. Legume colour yellow-brown; uniform over legume. Legume shape oblong; cross-sectional shape rounded to flat; not falcate; suture unparallel; distal end unbeaked; valve surface not torulose; surface ridged with veins; partitioning absent. Legume glabrous or hairs less than 10 per mm sq; hairs 0.5 - 1.5mm long; hairs on sutures only; suture surface smooth or ciliate, hairs less than 1mm long; tubercles absent. Dehiscent legume twisting medium; number of seeds per legume (2-)3-4(-5).

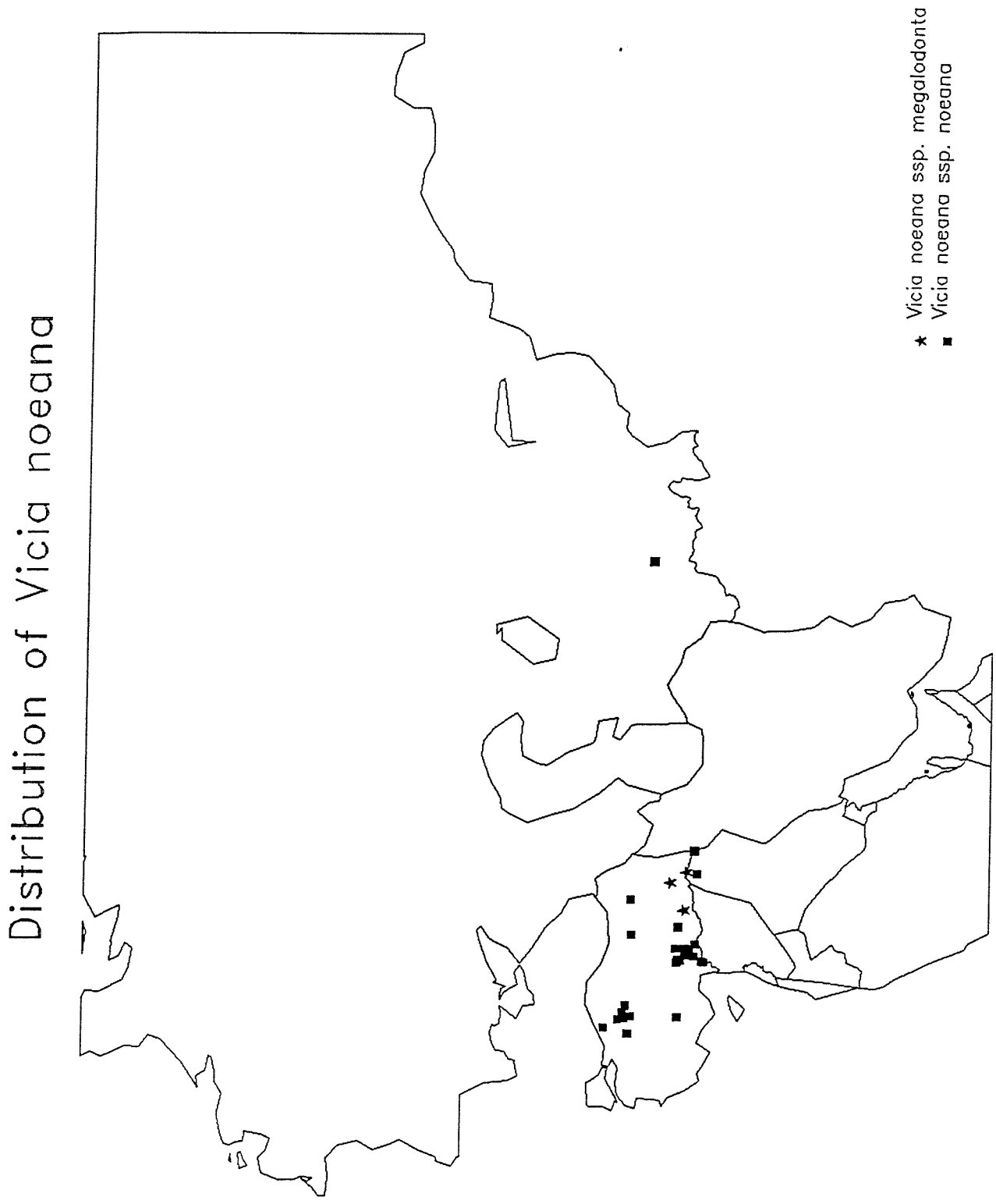
SEED CHARACTERS: Seed 4-6mm long; 4.5-6mm wide; 3-4.5mm deep; 14.5-17mm circumference; hilum 1.5-2.5mm long; distance from hilum to lens 6.5-9.5mm; seed length to width ratio of 0.8-1.05; seed circumference to hilum length ratio of 0.1-0.15. Seed shape spherical or spherical to cubic; shape in side view circular or laterally compressed; seed colour red-brown or brown or black; mottling absent or present; surface matt; smooth or pitted. Hilum shape oval or elongated, less than third of circumference; coloured red-brown or coloured brown; groove colour beige; hilum surface excess tissue present. Lens position opposite hilum; prominent. Aril absent.

Phenology: April - July **Chromosome number:** 12.
Geographical distribution: CY, IQ, IR, SU, SY, TR. See Map 11.
Ecology: Alt. 500 - 2000m; Hab. localised minor cultivated crop in Turkey and Syria, weed of Disturbed and agricultural land.

Taxonomic notes: The specific distinction of V. noeana from other ser. Hyrcanicae taxa, with which it supposedly shares transitional forms is questioned by Plitmann (1967), Ponert (1973) and Townsend (1974). However, observation of fresh material has presented no identification problems, no transitional forms have been seen and there are consistently correlated characters which distinguish this species from other members of ser. Hyrcanicae.

The two subsp. of V. noeana are distinguished on the basis of calyx dimension and colour, and leaflet shape. A combination of these characters provides easy distinction of the two subspecies.

Map 11.


Distribution of Vicia noeana
★ Vicia noeana ssp. megalodonta
■ Vicia noeana ssp. noeana

Key to subspecies of V. noeana

1(0). Calyx 14-16mm, pale green, at least the lowest tooth longer than tube; leaflets linear, acutish to truncate; hilum shape oval.. ..... i V. noeana subsp. megalodonta

Calyx 7-10mm, usually violet, all teeth shorter than tube; leaflets obtuse or retuse to notched or tridenticulate; hilum shape elongated..... ii V. noeana subsp. noeana

i **Accepted taxon: V. noeana** subsp. **megalodonta** Rech. f. (1959) Zur. Fl. Syr. Lib., Ark. Bot. 5(1): 262.
Type: syntype Haradjian, in montibus Amanus et Sir ad Marache (Maras), (P).
Iconography: Fl. Tur., 3: 307.
Synonymy: V. hyrcanica subsp. megalodonta (Rech. f.) Ponert (1973) Feddes Repert., 83(9-10): 633.

Description: VEGETATIVE CHARACTERS: Annual; erect or ascending; 20-65cm high. Stipule length 2.5-4mm; 1-2.5mm wide. Stipule entire or semi-hastate; apex acute; number of teeth on distal edge none or 1-2; number of teeth on proximal edge none; stipule edge form entire; translucent. Stipule colour (upper plant) green; glabrous. Leaf 52-87mm long; petiole 7-11mm long; average leaflet internode 13-15mm long; leaflet 18-26mm long; leaflet 5-7mm wide; tendril or mucro 34-54mm long; average leaf internode 35-61mm long; petiolule 45-74mm long. Leaf apex tendrilous; with 2 branches or with more than 3 branches. Leaflet shape symmetric; 12-14 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet linear elliptic or narrow elliptic; apex mucronate and emarginate; base angustate or truncate to angustate; broadest in middle or at base. Leaflet adaxial hairs absent or less than 10 per mm sq; hairs 0.5-1.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq; hairs 0.5-1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq. Stem node colour (upper plant) purple.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm) or longer than 2mm, but shorter than flower. Peduncle length 8-14mm; rachis 10-11mm long; pedicel 1-2mm long; flower 22-28mm long; ratio of peduncle to flower length of 0.36-0.7; peduncular cusp absent or present and less than 2.1mm long or present and more than 2.0mm long. Number of flowers per inflorescence one (rarely) or three or four. Pedicel with 10-50 hairs per mm sq; hairs 0.5-1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 5.5-9.5mm long; lateral teeth 4.5-7.5mm long; upper tooth 2-3mm long; tube 6-6.5mm long; ratio of lower tooth to tube length of 0.75-1.58. Calyx base strongly gibbous; tube mouth strongly oblique; teeth reflexing absent; tooth curvature present; exterior nectaries absent. Calyx hairs covering calyx; hair density less than 10 per mm sq or 10-35 per mm sq; hair length 0.5-1.5mm long; hairs adpressed. Calyx colour green. Standard length 21.5-26.5mm; limb length 10-15mm; claw length 10.5-12mm; limb width 11-16mm; claw width 7-10mm; ratio of limb length to claw length 0.83-1.3. Corolla petals concolorous; standard face cream or yellow-pink; standard upper surface cream or yellow-brown; face without distinct veining or face with distinct veins. Standard shape stenonychioid; apex emarginate; claw bowing absent; upper surface glabrous. Wing length 20-26mm; limb length 10-14mm; claw length 10-12mm; limb width 5-8mm. Wing colour cream or yellow-pink; markings absent. Wing shape 3; spur shape 1; limb base kinking strong; limb pouch present; wing to keel adhesion weak. Keel length 15-16mm; hood length 5-5.5mm; claw length 9.5-10.5mm; hood width 5-5.5mm. Keel colour white; hood apex not distinctly coloured or distinctly coloured. Keel shape 3; base shape 2 or 4; pouch present. Staminal tube length 13-14mm; filament length 2.5-3.5mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 5-7mm; style length 6.5-8mm; supra-ovary extension 3.5-5mm. Ovary shape intermediate or oblong; style apex cross sectional dorsi-ventrally flattened;

supra-ovary curvature present. Ovary glabrous or with simple hairs on sutures only; style apex pubescence type 3. Number of ovules per ovary 4-7.

LEGUME CHARACTERS: Legume 20-30mm long; 8-10mm wide; 5-6mm deep; ratio of legume length to width 2.33-2.87. Amphicarpic legumes absent. Legume colour yellow-brown; uniform over legume. Legume shape oblong; cross-sectional shape rounded to flat; not falcate; suture unparallel; distal end unbeaked; valve surface not torulose; surface ridged with veins; partitioning absent. Legume glabrous or hairs less than 10 per mm sq; hairs 0.5 - 1.5mm long; hairs on sutures only; suture surface smooth or ciliate, hairs less than 1mm long; tubercles absent. Dehiscent legume twisting medium; number of seeds per legume 3-4.

SEED CHARACTERS: Seed 4-5mm long; 4.5-5.5mm wide; 3-4.5mm deep; 14.5-15.5mm circumference; hilum 2.5mm long; distance from hilum to lens 6.5-7.5mm; seed length to width ratio of 0.8-1.05; seed circumference to hilum length ratio of 0.16-0.17. Seed shape spherical; shape in side view circular or laterally compressed; seed colour red-brown; mottling present; surface matt; smooth. Hilum shape oval; coloured brown; groove colour beige; hilum surface excess tissue present. Lens position opposite hilum; prominent. Aril absent.

Phenology: May - June **Chromosome number:** 12.
Geographical distribution: TR.
Ecology: Hab. disturbed and agricultural land.

Specimen citation: Frodin 308 (W); Davis 44942 (E); Davis et Hedge 28702 (E).

ii **Accepted taxon: V. noeana** subsp. **noeana** (Reuter in Boiss.) Boiss. (1872) Fl. Or., 2: 572-573.
Type: Syntype, Haussknecht 25/4/1865, inter segetes prope Aintab (Gaziantep) alt 2000' (K!, W! & G!).
Iconography: Fl. Tur., 3: 306.
Synonymy: V. hyrcanica subsp. noeana (Reuter ex Boiss.) Ponert (1973) Feddes Repert., 83(9-10): 633.

Description: VEGETATIVE CHARACTERS: Annual; erect or ascending; 20-65cm high. Stipule length 2-4mm; 1-2mm wide. Stipule entire or semi-hastate; apex acute; number of teeth on distal edge none or 1-2; number of teeth on proximal edge none; stipule edge form entire; translucent. Stipule colour (upper plant) green or green with purple; glabrous. Leaf 38-85mm long; petiole 3-17mm long; average leaflet internode 7-17mm long; leaflet 10-30mm long; leaflet 3-6mm wide; tendril or mucro 12-38mm long; average leaf internode 26-95mm long; petiolule 40-77mm long. Leaf apex tendrilous; with 2 branches or with 3 branches or with more than 3 branches. Leaflet shape symmetric; 9-14 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet linear elliptic or narrow elliptic or broad elliptic; apex retuse or mucronate and emarginate or mucronate; base angustate or truncate to angustate; broadest at apex or in middle or at base. Leaflet adaxial hairs less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq; hairs 0.5-1.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq. Stem node colour (upper plant) green or purple.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm) or longer than 2mm, but shorter than flower or longer than flower. Peduncle length 3-28mm; rachis 2-11mm long; pedicel 1-2mm long; flower 15-25mm long; ratio of peduncle to flower length of 0.14-1.16; peduncular cusp absent or present and less than 2.1mm long or present and more than 2.0mm long. Number of flowers per inflorescence two or

three or four. Pedicel with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 1.5-5mm long; lateral teeth 1.5-4mm long; upper tooth 1-2mm long; tube 4-6.5mm long; ratio of lower tooth to tube length of 0.21-1.09. Calyx base strongly gibbous; tube mouth slightly oblique or strongly oblique; teeth reflexing absent; tooth curvature absent or present; exterior nectaries absent. Calyx hairs covering calyx; hair density of 10-35 per mm sq or 36-60 per mm sq; hair length 0.5-1.5mm long or more than 1.5mm long; hairs adpressed. Calyx colour green (rarely) or purple base or purple calyx teeth or purple. Standard length 16-24mm; limb length 7.5-12mm; claw length 7.5-12.5mm; limb width 8-14mm; claw width 6-8mm; ratio of limb length to claw length 0.72-1.21. Corolla petals concolorous; standard face yellow-pink; standard upper surface yellow-brown; face without distinct veining or face with distinct veins. Standard shape stenonychioid; apex emarginate; claw bowing absent; upper surface glabrous. Wing length 16-22mm; limb length 7-11mm; claw length 8-11.5mm; limb width 3.5-7mm. Wing colour yellow-pink; markings absent. Wing shape 2 or 3; spur shape 1; limb base kinking weak or strong; limb pouch absent or present; wing to keel adhesion weak. Keel length 11-17mm; hood length 3.5-5.5mm; claw length 8-12.5mm; hood width 4-5.5mm. Keel colour white; hood apex not distinctly coloured or distinctly coloured. Keel shape 2 or 3; base shape 2 or 4; pouch absent or present. Staminal tube length 10-15mm; filament length 2.5-3.5mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 4.5-7.5mm; style length 4.5-7mm; supra-ovary extension 3-5mm. Ovary shape linear or intermediate or oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature present. Ovary glabrous or with simple hairs on sutures only; style apex pubescence type 5. Number of ovules per ovary 4-7.

LEGUME CHARACTERS: Legume 20-30mm long; 8-10mm wide; 5-6mm deep; ratio of legume length to width 2.33-2.87. Amphicarpic legumes absent. Legume colour yellow-brown; uniform over legume. Legume shape oblong; cross-sectional shape rounded to flat; not falcate; suture unparallel; distal end unbeaked; valve surface not torulose; surface ridged with veins; partitioning absent. Legume glabrous or hairs less than 10 per mm sq; hairs 0.5 - 1.5mm long; hairs on sutures only; suture surface smooth or ciliate, hairs less than 1mm long; tubercles absent. Dehiscent legume twisting medium; number of seeds per legume 3-5.

SEED CHARACTERS: Seed 5.5-6mm long; 5.5-6mm wide; 3-4.5mm deep; 15.5-17mm circumference; hilum 1.5-2.5mm long; distance from hilum to lens 7.5-9.5mm; seed length to width ratio of 0.91-1; seed circumference to hilum length ratio of 0.1-0.15. Seed shape spherical or spherical to cubic; shape in side view circular or laterally compressed; seed colour brown or black; mottling absent or present; surface matt; smooth or pitted. Hilum shape elongated, less than third of circumference; coloured red-brown or coloured brown; groove colour beige; hilum surface excess tissue present. Lens position opposite hilum; prominent. Aril absent.

Phenology: April - July **Chromosome number:** 12.
Geographical distribution: IQ, SU, SY, TR.
Ecology: Alt. 500 - 2000m; Hab. localised minor cultivated crop in Turkey and Syria, weed of disturbed and agricultural land.

Specimen citation: Haussknecht s.n. (K); Sintenis 3660 (BM); Davis 21754 (BM); Haussknecht s.n. (BM); Polunin 5149 (K); Polunin 5149 (E), specimen has small terminal leaflet on some leaves; Davis et Hedge 27746 (E); Kotschy 98 (W); Haussknecht s.n. (W); Bornmuller et Bornmuller 14046 (W); Haradjian 1149 (W); Bozakman et Fitz 859 (W); Bozakman et Fitz 794 (W); Zohary 87167 (HUJ); Zohary 67102 (W); Kotschy s.n. (G); Tarman et Elci 1956 (E); Coode et Jones 2205 (E); Kotte 251 (K); Ledingham, Ekim et Yutdakul 4362 (E); Maxted, Ehrman et Auricht 5035 (SPN); Maxted, Ehrman et Auricht 5207 (SPN); Maxted, Ehrman et

Auricht 5276 (SPN); Maxted, Ehrman et Khattab 2422 (SPN); Maxted, Ehrman et Khattab 2352 (SPN); Maxted, Ehrman et Auricht 5261 (SPN); Maxted, Ehrman et Auricht 5081 (SPN); Maxted, Ehrman et Auricht 5287 (SPN); Maxted, Ehrman et Auricht 5293 (SPN); Maxted, Ehrman et Auricht 5424 (SPN); Maxted 1167 (SPN); Maxted 1168 (SPN); Maxted 1269 (SPN); Macfarlane 473 (SPN).

B **Series** Hypechusa (Alef.) Aschers & Graebner (1909) Syn. Mitteleur. Fl., 6,2: 957.
Type: V. lutea L. (1753) Sp. Pl., 2: 736.
Synonymy: Vicioides Moench (1794) Meth., 135, pro parte; Vicia sect. Euvicia Vis. (1852) Fl. Dalmatica 1: 317, pro parte; Hypechusa subg. Masarunia Alef. (1860) Bonplandia 8: 68; Hypechusa subg. Euhypechusa Alef. (1860) Bonplandia 8: 68, pro parte; Vicia subser. Ochroleucae Taubert (1894) Die Nat. Pl. III, 10: 351, nomen nudum; Vicia subser. Platycarpae Taubert (1894) Die Nat. Pl. III, 10: 351, nomen nudum; Vicia sect. subsessiles Rouy in Rouy & Fouc. (1899) Fl. Fr., 5: 208, pro parte excl. typ.; Vicia sect. Pedunculatae Rouy in Rouy & Fouc. (1899) Fl. Fr., 5: 221, pro parte excl. typ.; Vicia ser. Luteae B. Fedtsch. (1948) Fl. URSS., 13: 468; Vicia ser. Hybridae B. Fedtsch. (1948) Fl. URSS., 13: 469; Vicia ser. Luteae Radzhi (1971) Novosti Sist. Vyssh. Rast., 7: 238; Vicia subsect Hybridae Radzhi (1971) Novosti Sist. Vyssh. Rast., 7: 238; Vicia ser. Hybridae Radzhi (1971) Novosti Sist. Vyssh. Rast., 7: 239.

Description: Annual; climbing; stem slender. Stipules entire or semi-hastate; length less than 3.5mm or 3.5 to 5.5mm; edge entire or with 1-2 teeth. Leaf apex tendrilous; leaflet less than 20mm or 20-30mm; with more than 4 pairs. Leaflets symmetric; margins entire. Number of flowers per inflorescence 1 or 1 to 2 or 3 to 4; peduncle 1-2mm or peduncle 3-6mm. Calyx mouth oblique; lower tooth longer than upper; base gibbous. Pedicel shorter or equal to 3mm or longer than 3mm. Flowers shorter than 15mm or 15 to 20mm or longer than 20mm; standard cream or yellow or blue or purple; shape platonychioid or stenonychioid; claw bowing absent; upper standard surface glabrous or pubescent. All petals approximately equal length. Wing marking absent or present; wing limb with slight kinking or strong kinking (rare). Legume length less than 30mm or 30 to 50mm; width 5 to 10mm wide or greater than 10mm; oblong; round in cross section; sutures curved; valve hairs absent or present; hairs simple or tuberculate (rare). Septa absent; number of seeds per legume less than 7. Seeds 3.5 to 6.0mm; round; not laterally flattened; hilum less than quarter of seed circumference; lens positioned opposite to hilum; testa surface smooth.

Number of taxa: eleven. **Chromosome number:** 10, 12, 14.
Geographical distribution: Europe, West Asia and North Africa.

Taxonomic notes: This series is more internally variable than ser. Hyrcanicae and with more detailed study may warrant further subdivision. However, I have chosen to retain the group entire to avoid producing too dissected a scheme.

12 **Accepted taxon:** V. melanops Sibth. & Smith (1813) Fl. Graec. Prodr., 2: 72.
Iconography: Fl. Eur., 2: 135; Fl. Tur., 3: 307.
Synonymy: V. tricolor Sebast. & Mauri (1818) Florae Romanae Prodromus, 245; V. bicolor Willd. (1813) Enum. Pl. Hort. Berolinensis Supp., 51; V. triflora Reichenb. (1832) Fl. Germ. Excur., 2: 531; V. melanops Sibth. & Lindley (1833) Fl. Graeca, 8: 701; Hypechusa tricolor Alef. (1860) Bot. Zeitung, 18(19): 166; V. pichleri Huter (1905) Ostr. Bot. Zeitschrift, 55(2): 82; V. melanops var. tricuspis Bornm. (1940) Symb. Fl. Anat., 208.

Description: VEGETATIVE CHARACTERS: Annual; ascending; (15-)20-90(-100)cm high. Stipule length 1.5-3.5mm; 0.5-3mm wide. Stipule entire or semi-hastate; apex acute; number of teeth on distal edge none or 1-2; number of teeth on proximal edge none; stipule edge form entire; translucent. Stipule colour (upper plant) green or green with purple or purple; glabrous. Leaf (26-)40-92(-115)mm long; petiole 2-14mm long; average leaflet internode 4-13mm long; leaflet (5-)8-23(-30)mm long; leaflet 2-7(-10)mm wide; tendril or mucro (8-)15-55mm long; average leaf internode 22-85mm long; petiolule 21-100mm long. Leaf apex tendrilous; simple or with 2 branches or with 3 branches or with more than 3 branches. Leaflet shape symmetric; (4-)6-20 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet broad linear or linear elliptic or narrow elliptic or broad elliptic; apex retuse or mucronate and emarginate or mucronate; base angustate or truncate to angustate; broadest at apex or in middle or at base. Leaflet adaxial hairs absent or less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long; leaflet abaxial hair 10-50 per mm sq or more than 50 per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm) or longer than 2mm, but shorter than flower. Peduncle length 2-9mm; rachis 1-7mm long; pedicel 1-2mm long; flower 13-23mm long; ratio of peduncle to flower length of 0.11-0.52; peduncular cusp absent. Number of flowers per inflorescence one (rarely) or two or three or four. Pedicel with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 2.5-5.5mm long; lateral teeth 1.5-5mm long; upper tooth 1.5-4.5mm long; tube 4-6.5mm long; ratio of lower tooth to tube length of 0.45-1. Calyx base slightly gibbous or strongly gibbous; tube mouth slightly oblique or strongly oblique; teeth reflexing absent; tooth curvature absent or present; exterior nectaries absent. Calyx hairs covering calyx; hair density of 10-35 per mm sq or 36-60 per mm sq; hair length 0.5-1.5mm long or more than 1.5mm long; hairs adpressed. Calyx colour green or purple base or purple calyx teeth or purple. Standard length 14-23mm; limb length 5-12mm; claw length 7-12mm; limb width 6-14mm; claw width 6-10mm; ratio of limb length to claw length 0.55-1.37. Corolla petals concolorous or not concolorous; standard face yellow or yellow-green; standard upper surface yellow or yellow-brown; face without distinct veining or face with distinct veins. Standard shape platonychioid or stenonychioid; apex emarginate; claw bowing absent; upper surface glabrous. Wing length 12.5-21mm; limb length 5-10mm; claw length 6.5-12mm; limb width 2.5-8mm. Wing colour yellow or yellow-green; apex with round spot or entire apex tip coloured; marking brown or black. Wing shape 2 or 3; spur shape 1 or 2 or 4; limb base kinking weak or strong; limb pouch present; wing to keel adhesion weak. Keel length 11-17mm; hood length 3-5.5mm; claw length 6.5-12.5mm; hood width 3.5-5.5mm. Keel colour white; hood apex not distinctly coloured. Keel shape 4 or 5; base shape 2 or 4; pouch absent. Staminal tube length 9.5-14mm; filament length 1.5-2.5mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 5-9mm; style length 3.5-7mm; supra-ovary extension 1.5-4.5mm. Ovary shape linear or intermediate or oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent or present. Ovary with simple hairs on sutures only or entirely covered with simple hairs; style apex pubescence type 3 or 5. Number of ovules per ovary 4-9.

LEGUME CHARACTERS: Legume 17-32mm long; 7-11mm wide; 4-6mm deep; ratio of legume length to width 2.3-3.42. Amphicarpic legumes absent. Legume colour yellow or yellow-brown or brown; uniform over legume or with brown or black veins. Legume shape rhomboid or oblong; cross-sectional shape round or rounded to flat; not falcate; suture unparallel; distal end slightly beaked; valve surface not torulose; surface ridged with veins; partitioning absent or present. Legume glabrous or hairs less than 10 per mm sq; hairs less than 0.5mm long or hairs 0.5 - 1.5mm long; hairs on sutures only; suture surface ciliate,

hairs less than 1mm long; tubercles absent. Dehiscent legume twisting loose or medium; number of seeds per legume 2-6.

SEED CHARACTERS: Seed 3.5-5.5mm long; 3.5-6mm wide; 2.5-4mm deep; 10-16.5mm circumference; hilum 1.5-3.5mm long; distance from hilum to lens 3.5-8mm; seed length to width ratio of 0.87-1.33; seed circumference to hilum length ratio of 0.15-0.21. Seed shape spherical or spherical to cubic; shape in side view circular; seed colour red-brown or brown or black; mottling absent or present; surface matt; smooth. Hilum shape oval or elongated, less than third of circumference; coloured red-brown or coloured brown or coloured black; groove colour beige or same as hilum or red-brown; hilum surface excess tissue present. Lens position opposite hilum; prominent. Aril absent.

Phenology: April - June **Chromosome number:** 10.
Geographical distribution: AL, BG, ES, FR, GR, IT, TR, YU. See Map 12.
Ecology: Alt. 150 - 1300m; Hab. woodland and more rarely an agricultural weed.

Taxonomic notes: The distinction of a rare variant from South-east France and North-west Italy by D'Alleizette (1958) was supported by the results of the phenetic study. The characters he used to distinguish var. loiseaui are incorporated in the key provided.

Key to varieties of V. melanops

1(0) Calyx approx. 1/5 of corolla length; standard yellow-green, wing more yellow; wings blackened at apex; keel slightly shorter than wing, prominently coloured apex; legume bredth 8-10mm; seed ovoid, slightly compressed..... ..... i V. melanops var. melanops

Calyx approx. 1/4 of corolla length; standard and wings yellow green; wings reddsih brown at apex; keel distinctly shorter than wing, slightly coloured apex; legume bredth 7mm; seed round, strongly compressed..... ii V. melanops var. loiseaui

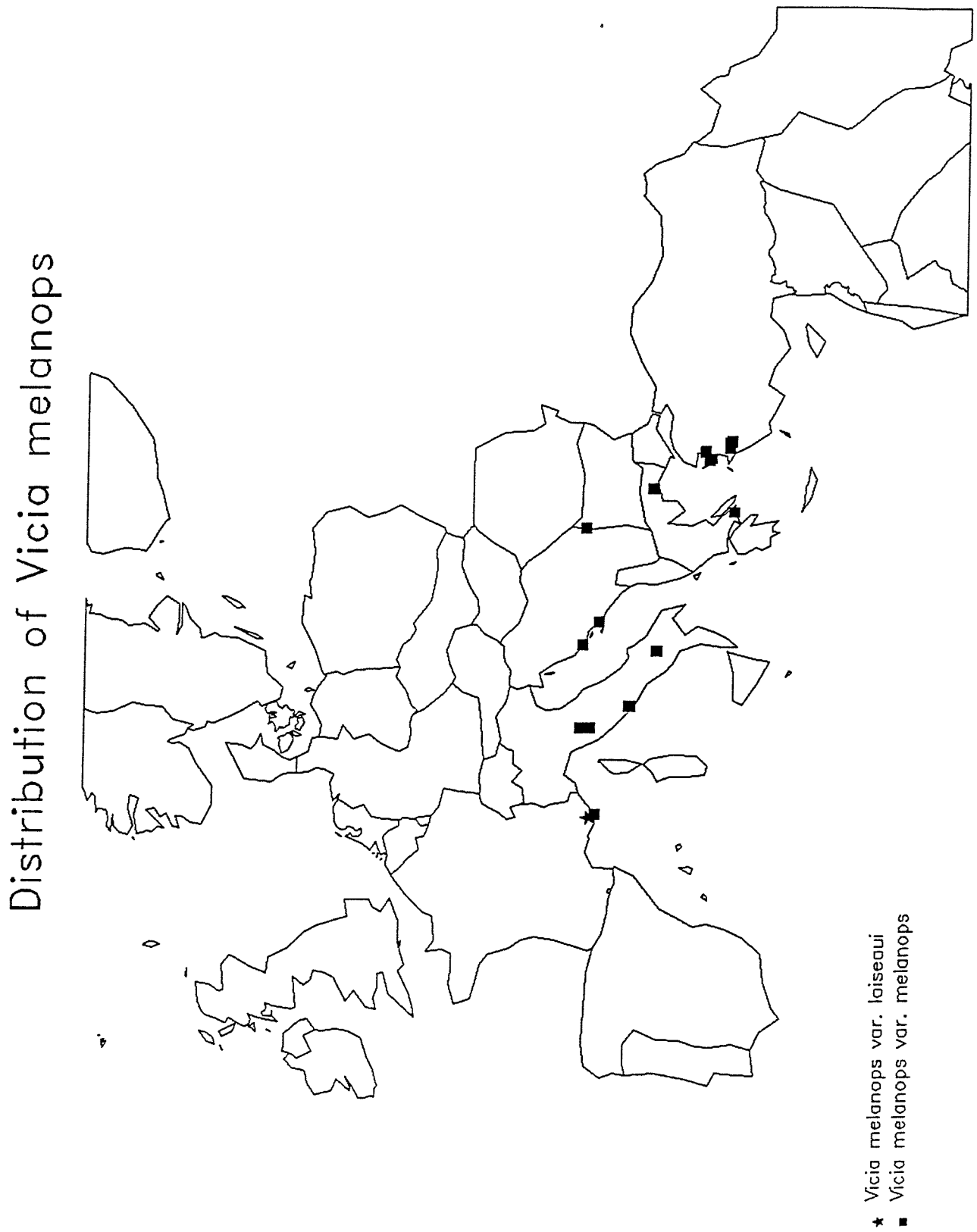
(key translated from D'Alleizette, 1958)

i **Accepted taxon:** **V. melanops** var. **melanops** Sibth. & Smith (1813) Fl. Graec. Prodr., 2: 72.
Type: Holotype, Sibthorp 1711, Greece (OXF!).

Description: VEGETATIVE CHARACTERS: Annual; ascending; (15-)20-90(-100)cm high. Stipule length 1.5-3.5mm; 0.5-3mm wide. Stipule entire or semi-hastate; apex acute; number of teeth on distal edge none or 1-2; number of teeth on proximal edge none; stipule edge form entire; translucent. Stipule colour (upper plant) green or green with purple or purple; glabrous. Leaf (26-)40-92(-115)mm long; petiole 2-14mm long; average leaflet internode 4-13mm long; leaflet 8-23mm long; leaflet 2-7mm wide; tendril or mucro (8-)15-55mm long; average leaf internode 22-85mm long; petiolule 21-100mm long. Leaf apex tendrilous; simple or with 2 branches or with 3 branches or with more than 3 branches. Leaflet shape symmetric; 10-20 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet broad linear or linear elliptic or narrow elliptic or broad elliptic; apex retuse or mucronate and emarginate or mucronate; base angustate or truncate to angustate; broadest at apex or in middle or at base. Leaflet adaxial hairs absent or less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long; leaflet abaxial hair 10-50 per mm sq or more than 50 per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm) or longer than 2mm, but shorter than flower. Peduncle length 2-9mm; rachis 1-7mm long; pedicel 1-2mm long; flower 17-23mm long; ratio of

Map 12.


Distribution of Vicia melanops
★ Vicia melanops var. laiseaui
■ Vicia melanops var. melanops

peduncle to flower length of 0.11-0.52; peduncular cusp absent. Number of flowers per inflorescence one or two or three or four. Pedicel with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 2.5-5.5mm long; lateral teeth 1.5-5mm long; upper tooth 1.5-4.5mm long; tube 4.5-6.5mm long; ratio of lower tooth to tube length of 0.45-1. Calyx base strongly gibbous; tube mouth slightly oblique or strongly oblique; teeth reflexing absent; tooth curvature absent or present; exterior nectaries absent. Calyx hairs covering calyx; hair density of 10-35 per mm sq or 36-60 per mm sq; hair length 0.5-1.5mm long or more than 1.5mm long; hairs adpressed. Calyx colour green or purple base or purple calyx teeth or purple. Standard length 17-23mm; limb length 6-12mm; claw length 8-12mm; limb width 8-14mm; claw width 6-10mm; ratio of limb length to claw length 0.6-1.37. Corolla petals concolorous or not concolorous; standard face yellow or yellow-green; standard upper surface yellow or yellow-brown; face without distinct veining or face with distinct veins. Standard shape platonychioid or stenonychioid; apex emarginate; claw bowing absent; upper surface glabrous. Wing length 16-21mm; limb length 6-10mm; claw length 9-12mm; limb width 3-8mm. Wing colour yellow or yellow-green; apex with round spot or entire apex tip coloured; marking brown or black. Wing shape 2 or 3; spur shape 1 or 4; limb base kinking weak or strong; limb pouch present; wing to keel adhesion weak. Keel length 13-17mm; hood length 3-5.5mm; claw length 6.5-12.5mm; hood width 4-5.5mm. Keel colour white; hood apex not distinctly coloured. Keel shape 5; base shape 2 or 4; pouch absent. Staminal tube length 10-14mm; filament length 2-2.5mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 5-9mm; style length 3.5-7mm; supra-ovary extension 1.5-4.5mm. Ovary shape linear or intermediate or oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent or present. Ovary with simple hairs on sutures only or entirely covered with simple hairs; style apex pubescence type 3 or 5. Number of ovules per ovary 4-9.

LEGUME CHARACTERS: Legume 17-32mm long; 7-11mm wide; 4-6mm deep; ratio of legume length to width 2.3-3.2. Amphicarpic legumes absent. Legume colour yellow or yellow-brown or brown; uniform over legume. Legume shape rhomboid or oblong; cross-sectional shape round or rounded to flat; not falcate; suture unparallel; distal end slightly beaked; valve surface not torulose; surface ridged with veins; partitioning absent or present. Legume glabrous or hairs less than 10 per mm sq; hairs less than 0.5mm long or hairs 0.5 - 1.5mm long; hairs on sutures only; suture surface ciliate, hairs less than 1mm long; tubercles absent. Dehiscent legume twisting loose or medium; number of seeds per legume 2-6.

SEED CHARACTERS: Seed 3.5-5.5mm long; 3.5-6mm wide; 2.5-4mm deep; 10-16.5mm circumference; hilum 1.5-3.5mm long; distance from hilum to lens 4.5-8mm; seed length to width ratio of 0.87-1.33; seed circumference to hilum length ratio of 0.15-0.21. Seed shape spherical or spherical to cubic; shape in side view circular; seed colour red-brown or brown; mottling absent or present; surface matt; smooth. Hilum shape oval or elongated, less than third of circumference; coloured red-brown or coloured brown; groove colour beige; hilum surface excess tissue present. Lens position opposite hilum; prominent. Aril absent.

Phenology: April - June **Chromosome number:** 10.
Geographical distribution: BG, FR, GR, IT, RO, TR, YU.
Ecology: Alt. 150 - 1300m; Hab. woodland and more rarely agricultural weed.

Specimen citation: Rogers 639 (K); Maly s.n. (K); Fenzl 1835 (K); Rechinger 5865 (BM); Virot s.n. (MPU); Bierbach s.n. (MPU); Costa-Reghini s.n. (MPU); Guiol 6613 (MPU); Fluet 1873 (MPU); Hudriczka 4/1876 (MPU); Le Brun s.n. (MPU); Katz 1908 (E); Fenzl 1869 (W); Caruel 5/1867 (W); Anon. 1022 (W); Krendl et Krendl s.n. (W); Burri et Krendl s.n. (W); Ronniger s.n. (W); Maxted, Kitiki et Allkin 4321 (SPN); Maxted, Kitiki et Allkin 4413 (SPN); Maxted, Kitiki et Allkin 4420 (SPN); Maxted, Kitiki et

Allkin 4454 (SPN); Maxted, Kitiki et Allkin 4440 (SPN); Maxted 1098 (SPN); Maxted 1122 (SPN); Macfarlane 596 (SPN); Sibthorp s.n. (OXF); Shibing 695 (E); Orphanides 3316 (E).

ii **Accepted taxon:** **V. melanops** var. **loiseaui** Alleiz. (1958) Bull. Soc. Bot. Fr., 105: 360.
Type: Loiseau, (P?).

Description: VEGETATIVE CHARACTERS: Annual; ascending; 15-75cm high. Stipule length 2.5-3mm; 1-2.5mm wide. Stipule entire or semi-hastate; apex acute; number of teeth on distal edge none or 1-2; number of teeth on proximal edge none; stipule edge form entire; translucent. Stipule colour (upper plant) green or green with purple; glabrous. Leaf 42-85mm long; petiole 4-12mm long; average leaflet internode 5-13mm long; leaflet 13-22mm long; leaflet 3-4mm wide; tendril or mucro 16-45mm long; average leaf internode 30-74mm long; petiolule 37-77mm long. Leaf apex tendrilous; with 3 branches or with more than 3 branches. Leaflet shape symmetric; 12-16 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet narrow elliptic; apex retuse or mucronate and emarginate or mucronate; base angustate or truncate to angustate; broadest in middle. Leaflet adaxial hairs less than 10 per mm sq or 10-50 per mm sq; hairs 0.5-1.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq; hairs 0.5-1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle longer than 2mm, but shorter than flower. Peduncle length 3-5mm; rachis 2-3mm long; pedicel 1-2mm long; flower 13-16mm long; ratio of peduncle to flower length of 0.2-0.38; peduncular cusp absent. Number of flowers per inflorescence two. Pedicel with 10-50 hairs per mm sq; hairs 0.5-1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 3-4.5mm long; lateral teeth 2.5-3mm long; upper tooth 1.5-2.5mm long; tube 4-5mm long; ratio of lower tooth to tube length of 0.66-1. Calyx base slightly gibbous or strongly gibbous; tube mouth slightly oblique or strongly oblique; teeth reflexing absent; tooth curvature absent; exterior nectaries absent. Calyx hairs covering calyx; hair density of 10-35 per mm sq or 36-60 per mm sq; hair length 0.5-1.5mm long; hairs adpressed. Calyx colour green or purple calyx teeth. Standard length 14-17mm; limb length 5-8mm; claw length 7-9.5mm; limb width 6-10.5mm; claw width 6.5-7.5mm; ratio of limb length to claw length 0.55-1.14. Corolla petals concolorous or not concolorous; standard face yellow-green; standard upper surface yellow-brown; face without distinct veining or face with distinct veins. Standard shape platonychioid or stenonychioid; apex emarginate; claw bowing absent; upper surface glabrous. Wing length 12.5-16mm; limb length 5-6.5mm; claw length 6.5-8.5mm; limb width 2.5-4mm. Wing colour yellow-green; entire apex tip coloured; marking brown or black. Wing shape 2 or 3; spur shape 1 or 2; limb base kinking strong; limb pouch present; wing to keel adhesion weak. Keel length 11-11.5mm; hood length 4mm; claw length 7-7.5mm; hood width 3.5-4.5mm. Keel colour white; hood apex not distinctly coloured. Keel shape 4 or 5; base shape 2 or 4; pouch absent. Staminal tube length 9.5-10.5mm; filament length 1.5-2mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 5.5-6.5mm; style length 3.5-5.5mm; supra-ovary extension 1.5-2mm. Ovary shape intermediate or oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature present. Ovary with simple hairs on sutures only; style apex pubescence type 3 or 5. Number of ovules per ovary 4-7.

LEGUME CHARACTERS: Legume 17-27mm long; 7-9mm wide; 5mm deep; ratio of legume length to width 2.42-3.42. Amphicarpic legumes absent. Legume colour yellow-brown or brown; uniform over legume or with brown or black veins. Legume shape oblong; cross-sectional shape round; not falcate; suture unparallel; distal end slightly beaked; valve surface not torulose; surface smooth or ridged with veins; partitioning absent. Legume hairs less than 10 per mm sq; hairs 0.5 - 1.5mm long; hairs on sutures only;

suture surface ciliate, hairs less than 1mm long; tubercles absent. Dehiscent legume twisting medium; number of seeds per legume 2-6.

SEED CHARACTERS: Seed 3.5-4.5mm long; 3.5-4.5mm wide; 3-3.5mm deep; 9.5-14.5mm circumference; hilum 2-3mm long; distance from hilum to lens 3.5-5.5mm; seed length to width ratio of 0.87-1; seed circumference to hilum length ratio of 0.21. Seed shape spherical; shape in side view circular; seed colour red-brown or black; mottling absent; surface matt; smooth. Hilum shape elongated, less than third of circumference; coloured red-brown or coloured black; groove colour beige or same as hilum or red-brown; hilum surface excess tissue present. Lens position opposite hilum; prominent. Aril absent.

Phenology: March - may **Chromosome number:** N.A.
Geographical distribution: FR, IT.
Ecology: Woodland and as a weed in shaded areas of cultivation.

Specimen citation: Levier 2162 (MPU); Maxted 1262 (SPN); Maxted 1256 (SPN); Maxted 1239 (SPN); Maxted 1236 (SPN); Maxted 1180 (SPN).

13 **Accepted taxon:** V. ciliatula Lipsky (1891) Mem. de la Soc. des Natur. de Kiew 6(2):46-47.

Type: syntype, Lipsky 12/5/1889, Armavir, Kuban, Krasnodar (LE!).
Iconography: Fl. Tur., 3: 307-308; Fl. USSR., 13: 471-472.
Synonymy: V. ciliata Lipsky non Schur (1899) Fl. Caucasus 4: 289.

Description: VEGETATIVE CHARACTERS: Annual; erect or ascending; 20-50cm high. Stipule length 2.5-3mm; 1-1.5mm wide. Stipule entire or semi-hastate (rarely). Apex acute; number of teeth on distal edge none; number of teeth on proximal edge none; stipule edge form entire; translucent. Stipule colour (upper plant) green with purple; glabrous. Leaf 54-77mm long; petiole 2-7mm long; average leaflet internode 8-11mm long; leaflet (7-)10-20mm long; leaflet 2.5-5mm wide; tendril or mucro 26-56mm long; average leaf internode 28-65mm long; petiolule 45-69mm long. Leaf apex tendrilous; with 3 branches or with more than 3 branches. Leaflet shape symmetric; (2-)12-16(-20) leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet narrow elliptic; apex retuse; base angustate or truncate to angustate; broadest in middle or at base. Leaflet adaxial hairs less than 10 per mm sq; hairs more than 1.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq; hairs more than 1.5mm long; petiole hairs less than 10 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle longer than 2mm, but shorter than flower. Peduncle length 2-3mm; rachis 1-2mm long; pedicel 1mm long; flower 12-18.5mm long; ratio of peduncle to flower length of 0.13-0.21; peduncular cusp absent. Number of flowers per inflorescence one or two. Pedicel with 10-50 hairs per mm sq; hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 3-5mm long; lateral teeth 2.5-4.5mm long; upper tooth 2-3.5mm long; tube 4-6mm long; ratio of lower tooth to tube length of 0.6-1. Calyx base strongly gibbous; tube mouth strongly oblique; teeth reflexing absent; tooth curvature absent; exterior nectaries absent. Calyx hairs covering calyx; hair density of 10-35 per mm sq; hair length more than 1.5mm long; hairs adpressed. Calyx colour green. Standard length 14.5-17.5mm; limb length 5-7mm; claw length 9-10.5mm; limb width 7-9mm; claw width 6-7.5mm; ratio of limb length to claw length 0.52-0.7. Corolla petals concolorous; standard face yellow-green; standard upper surface yellow-brown; face without

distinct veining. Standard shape platonychioid; apex emarginate; claw bowing absent; upper surface glabrous. Wing length 13-16mm; limb length 4-6mm; claw length 8-10.5mm; limb width 2.5-3.5mm. Wing colour yellow-green; markings absent. Wing shape 2; spur shape 1; limb base kinking strong; limb pouch absent; wing to keel adhesion weak. Keel length 11.5-14mm; hood length 3-4mm; claw length 8-10.5mm; hood width 3-4mm. Keel colour purple or brown; hood apex not distinctly coloured. Keel shape 3; base shape 2; pouch absent. Staminal tube length 6.5-12mm; filament length 1.5mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 5-6.5mm; style length 4-6mm; supra-ovary extension 2-3.5mm. Ovary shape intermediate or oblong; style apex cross sectional round or dorsi-ventrally flattened; supra-ovary curvature present. Ovary with simple hairs on sutures only; style apex pubescence type 5. Number of ovules per ovary 6-8.

LEGUME CHARACTERS: Legume 28-30mm long; 8-9mm wide; 3mm deep; ratio of legume length to width 3.3-3.7. Amphicarpic legumes absent. Legume colour yellow-brown; uniform over legume. Legume shape rhomboid or oblong; cross-sectional shape rounded to flat; not falcate; suture unparallel or parallel; distal end slightly beaked; valve surface not torulose; surface smooth; partitioning absent. Legume glabrous or hairs less than 10 per mm sq; hairs 0.5 - 1.5mm long; hairs on sutures only; suture surface ciliate, hairs less than 1mm long or ciliate, hairs tubercular; tubercles absent or tubercles short. Dehiscent legume twisting loose; number of seeds per legume 3-5.

SEED CHARACTERS: Seed 3.5mm long; 3.5mm wide; 2mm deep; 11.5mm circumference; hilum 2.5mm long; distance from hilum to lens 4mm; seed length to width ratio of 1; seed circumference to hilum length ratio of 0.21. Seed shape spherical or spherical to cubic; shape in side view circular; seed colour red-brown; mottling present; surface matt; smooth. Hilum shape oval; coloured yellow; groove colour beige; hilum surface excess tissue absent. Lens position opposite hilum; prominent. Aril absent.

Phenology: May - July **Chromosome number:** 10.
Geographical distribution: SU, TR. See Map 13.
Ecology: Alt. 15 - 2000m; Hab. Cultivated fields, meadows and the edges of woodland.

Taxonomic notes: An endemic of the Caucasus and Eastern Turkey. Plitmann, in Davis & Plitmann (1970), comments that Lipsky allied the species to V. pannonica, but he believed it is more naturally allied to V. melanops, an opinion which I share.

Specimen citation: Lipsky 4/70.2 (K); Grossheim & Schischkin 289 (K); Stankevich 723 (E); Gadreenyan s.n. (E); Stankevich 723 (W); Stankevich 723 (MO); Voluznyova & Semyonova 43517 (WIR); Stankevich 10 (WIR); Sinskaya 9620 (WIR); Khinchuk 5942 (WIR); Stankevich & Vlasson s.n. (WIR); Stankevich s.n. (WIR); Stankevich s.n. (WIR); Stankevich & Legotina 954 (WIR); Stankevich & Vlassov 496a (WIR); Stankevich & Dorofeyev 2828 (WIR); Stankevich & Dorofeyev 2498 (WIR); Stankevich s.n. (WIR); Stankevich & Vlassov 114 (WIR); Teplyakova & Seferova 500351 (WIR); Stankevich & Dorofeyev 2901 (WIR); Lipsky s.n. (LE); Tobey 157 (E); Furse & Synge 158 (K); Bozakman & Fitz 764 (W).

14 **Accepted taxon:** **V. anatolica** Turrill (1927) Kew Bull., 1: 8.

Type: holotype, Lindsay 51, 10 May 1926, Chankaga, Angora, Anatolia (K!).
Iconography: Fl. Iran., 43; Fl. Tur., 3: 313; Fl. USSR., 13: 470; Illust. Fl. Iran., Tab. 32, fig. 2.
Synonymy: V. hajastana Grossh. (1930) Beih, Bot. Centralbl., 44(2): 224.

Description: VEGETATIVE CHARACTERS: Annual; ascending or decumbent; 12-40cm high. Stipule length 1-3mm; 0.5-2mm wide. Stipule entire or semi-hastate; apex acute; number of teeth on distal edge none or

Map 13.

Distribution of Vicia ciliatula

1-2; number of teeth on proximal edge none; stipule edge form entire; translucent or not-translucent. Stipule colour (upper plant) green or green with purple; glabrous or less than 10 hairs per sqmm. Leaf 32-67mm long; petiole 2-6mm long; average leaflet internode 6-10(-13)mm long; leaflet 5-22mm long; leaflet 1-3mm wide; tendril or mucro 15-38(-50)mm long; average leaf internode 18-60mm long; petiolule 32-63mm long. Leaf apex tendrilous; simple or with 2 branches. Leaflet shape symmetric; 8-16 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet narrow linear or broad linear or linear elliptic; apex retuse or mucronate; base angustate or truncate to angustate; broadest at apex or in middle or at base. Leaflet adaxial hairs less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; leaflet abaxial hair 10-50 per mm sq or more than 50 per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long; petiole hairs 10-50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm). Peduncle length 1-3mm; pedicel 1-2mm long; flower 13-17mm long; ratio of peduncle to flower length of 0.06-0.2; peduncular cusp absent. Number of flowers per inflorescence one or two (rarely). Pedicel with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long or hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 2-4mm long; lateral teeth 1-4.5mm long; upper tooth 1.5-4mm long; tube 4-5.5mm long; ratio of lower tooth to tube length of 0.44-1. Calyx base strongly gibbous; tube mouth slightly oblique or strongly oblique; teeth reflexing absent; tooth curvature absent; exterior nectaries absent. Calyx hairs covering calyx; hair density of 10-35 per mm sq or 36-60 per mm sq; hair length 0.5-1.5mm long or more than 1.5mm long; hairs adpressed. Calyx colour green. Standard length 9-20mm; limb length 4-14.5mm; claw length 5-13mm; limb width 4-10mm; claw width 4-9mm; ratio of limb length to claw length 0.47-0.92. Corolla petals concolorous; standard face yellow-green; standard upper surface yellow-brown; face with distinct veins. Standard shape platonychioid; apex obtuse; claw bowing absent; upper surface subadpressed pubescent. Wing length 12-17mm; limb length 5-6mm; claw length 7-11mm; limb width 2.5-3.5mm. Wing colour yellow-green; entire apex tip coloured; marking brown or black. Wing shape 1; spur shape 1; limb base kinking weak; limb pouch absent; wing to keel adhesion weak. Keel length 10.5-14mm; hood length 3-4.5mm; claw length 6.5-10mm; hood width 3-4.5mm. Keel colour white; hood apex not distinctly coloured. Keel shape 4; base shape 2; pouch absent or present. Staminal tube length 8.5-13mm; filament length 1-2mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 4.5-8mm; style length 3.5-6.5mm; supra-ovary extension 1.5-3.5mm. Ovary shape oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent or present. Ovary entirely covered with simple hairs; style apex pubescence type 3 or 5. Number of ovules per ovary 4-7.

LEGUME CHARACTERS: Legume 15-25(-30)mm long; 6-8mm wide; 4-5mm deep; ratio of legume length to width 2.12-3.12. Amphicarpic legumes absent. Legume colour yellow-brown; uniform over legume. Legume shape oblong; cross-sectional shape round or rounded to flat; not falcate; suture unparallel; distal end unbeaked; valve surface not torulose; surface smooth; partitioning absent. Legume hairs 36 - 60 per mm sq; hairs less than 0.5mm long or hairs 0.5 - 1.5mm long or hairs more than 1.5mm long; hairs covering entire legume; suture surface ciliate, hairs less than 1mm long or ciliate, hairs more than 1mm long; tubercles absent. Dehiscent legume twisting loose or medium; number of seeds per legume 3-6.

SEED CHARACTERS: Seed 3.5-4.5mm long; 3.5-4.5mm wide; 2.5-3.5mm deep; 11.5-12.5mm circumference; hilum 1-1.5mm long; distance from hilum to lens 4.5-6mm; seed length to width ratio of 0.87-1.12; seed circumference to hilum length ratio of 0.07-0.11. Seed shape spherical; shape in side view circular or laterally compressed; seed colour brown; mottling present; surface matt; smooth. Hilum shape oval;

coloured yellow or coloured red-brown; groove colour beige or same as hilum; hilum surface excess tissue absent. Lens position opposite hilum; prominent. Aril absent.

Phenology: April - July **Chromosome number:** 10.
Geographical distribution: IR, SU, TR. See Map 14.
Ecology: Alt. 800 - 2000m; Hab. disturbed land, orchard and mountain pasture.

Specimen citation: Mulkeupeanyan et Manakyan s.n. (E); Coode et Jones 1730 (E); Komarovii s.n. (E); Lindsay 51 (K); Mulkeupeanyan et Manakyan s.n. (BM); Cheese et Watson 1361 (K); Cheese et Watson 1316 (K); Maxted 1074 (SPN); Maxted 1091 (SPN); Allkin 83/13 (SPN); Akman 6091 (E); Bozakman et Fitz 260 (W); Maxted 1242 (SPN); Maxted 1243 (SPN); Maxted 1247 (SPN); Maxted 1252 (SPN); Maxted, Kitiki et Allkin 4498 (SPN); Stankevich et Dorofeyev 2678 (WIR); Pyankova s.n. (WIR); Frantskevich 42805 (WIR); Nikitina 380 (WIR); Zaktreger s.n. (WIR); Pyankova 430 (WIR); Ulyanova s.n. (WIR); Stankevich s.n. (WIR); Ulyanova s.n. (WIR); Ulyanova s.n. (WIR); Stankevich et Legotina 1184 (WIR); Stankevich 1240 (WIR); Stankevich et Legotina 1218 (WIR); Mroubern s.n. (LE); Anon. s.n. (LE); Puring s.n. (LE); Chernova s.n. (LE); Chernova s.n. (LE); Mroubern s.n. (LE); Gabrielian et al s.n. (ERE).

15 **Accepted taxon:** V. mollis Boiss. & Hausskn. ex Boiss. (1872) Fl. Or. 2: 576.
Type: holotype, Hassknecht 17/3/1865 (W!).
Iconography: Fl. Iran., 46; Fl. Iraq, 3: 530; Fl. Syr., 2: 405; Fl. Tur., 3: 312; Illust. Fl. Iran., Tab. 33, fig. 2; Fl. Iraq, 3: 531.
Synonymy: V. camptopoda C. Towns. (1967) Kew Bull., 21: 452; V. benthamiana Ali (1967) Bot. Notiser., 120: 51; V. sericocarpa subsp. mardinica Ponert (1973) Feddes Repert., 83: 634; V. sericocarpa subsp. mollis (Boiss. & Hausskn.) Ponert (1973) Feddes Repert., 83: 634; V. sericocarpa subsp. urfae Ponert (1973) Feddes Repert., 83: 634.

Description: VEGETATIVE CHARACTERS: Annual; ascending or decumbent; (5-)10-35(-40)cm high. Stipule length 2-3.5mm; 1-2.5mm wide. Stipule entire (rarely) or semi-hastate; apex acute; number of teeth on distal edge 1-2; number of teeth on proximal edge none; stipule edge form entire; translucent. Stipule colour (upper plant) green; hairs located edge only or less than 10 hairs per sqmm or = or more than 10 hairs per sqmm. Leaf 17-47mm long; petiole 2-10mm long; average leaflet internode 4-8mm long; leaflet 4-12mm long; leaflet 2-5mm wide; tendril or mucro 5-10(-18)mm long; average leaf internode 15-62mm long; petiolule 14-34mm long. Leaf apex tendrilous; simple or with 2 branches. Leaflet shape symmetric; 8-14 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet narrow elliptic or broad elliptic; apex retuse; base angustate; broadest at apex. Leaflet adaxial hairs 10-50 per mm sq or more than 50 per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long; leaflet abaxial hair 10-50 per mm sq or more than 50 per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm) or longer than 2mm, but shorter than flower. Peduncle length 1-3mm; rachis 1mm long; pedicel 1-4mm long; flower 13-15(-18)mm long; ratio of peduncle to flower length of 0.06-0.2; peduncular cusp absent. Number of flowers per inflorescence one or two. Pedicel with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 1.5-4mm long; lateral teeth 1.5-4mm long; upper tooth 1-3.5mm long; tube 4-7mm long; ratio of lower tooth to tube length of 0.27-0.66. Calyx base slightly gibbous or strongly gibbous; tube mouth slightly oblique; teeth reflexing absent; tooth curvature

Map 14.

absent; exterior nectaries absent. Calyx hairs covering calyx; hair density of 36-60 per mm sq or more than 61 per mm sq; hair length more than 1.5mm long; hairs adpressed. Calyx colour green or purple base. Standard length 13-17mm; limb length 6-9.5mm; claw length 6-8mm; limb width 6-10mm; claw width 6-9mm; ratio of limb length to claw length 0.93-1.26. Corolla petals concolorous; standard face yellow (pale). Standard upper surface cream or yellow or yellow-brown; face with distinct veins. Standard shape platonychioid; apex emarginate; claw bowing absent or present; upper surface glabrous. Wing length 10-15mm; limb length 4.5-8mm; claw length 6-7.5mm; limb width 2.5-4.5mm. Wing colour yellow (pale). Markings absent or apex with round spot; marking brown or black. Wing shape 1 or 2; spur shape 1 or 2; limb base kinking weak; limb pouch absent; wing to keel adhesion weak. Keel length 9-11mm; hood length 2.5-3.5mm; claw length 5-7mm; hood width 3-3.5mm. Keel colour white or purple or brown; hood apex distinctly coloured. Keel shape 1; base shape 2 or 4; pouch absent. Staminal tube length 8-9mm; filament length 1.5-2mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 5-6mm; style length 3-4.5mm; supra-ovary extension 1.5-2.5mm. Ovary shape oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent or present. Ovary entirely covered with simple hairs; style apex pubescence type 3. Number of ovules per ovary 5-8.

LEGUME CHARACTERS: Legume 14-25mm long; 6-8mm wide; 4-5mm deep; ratio of legume length to width 2-2.85. Amphicarpic legumes absent. Legume colour yellow or yellow-brown; uniform over legume. Legume shape oblong; cross-sectional shape round or rounded to flat; not falcate; suture unparallel; distal end unbeaked; valve surface not torulose; surface smooth or ridged with veins; partitioning absent. Legume hairs 36 - 60 per mm sq; hairs 0.5 - 1.5mm long or hairs more than 1.5mm long; hairs covering entire legume; suture surface denticulate or ciliate, hairs less than 1mm long or ciliate, hairs more than 1mm long; tubercles absent. Dehiscent legume twisting loose or medium; number of seeds per legume 2-4(-5).

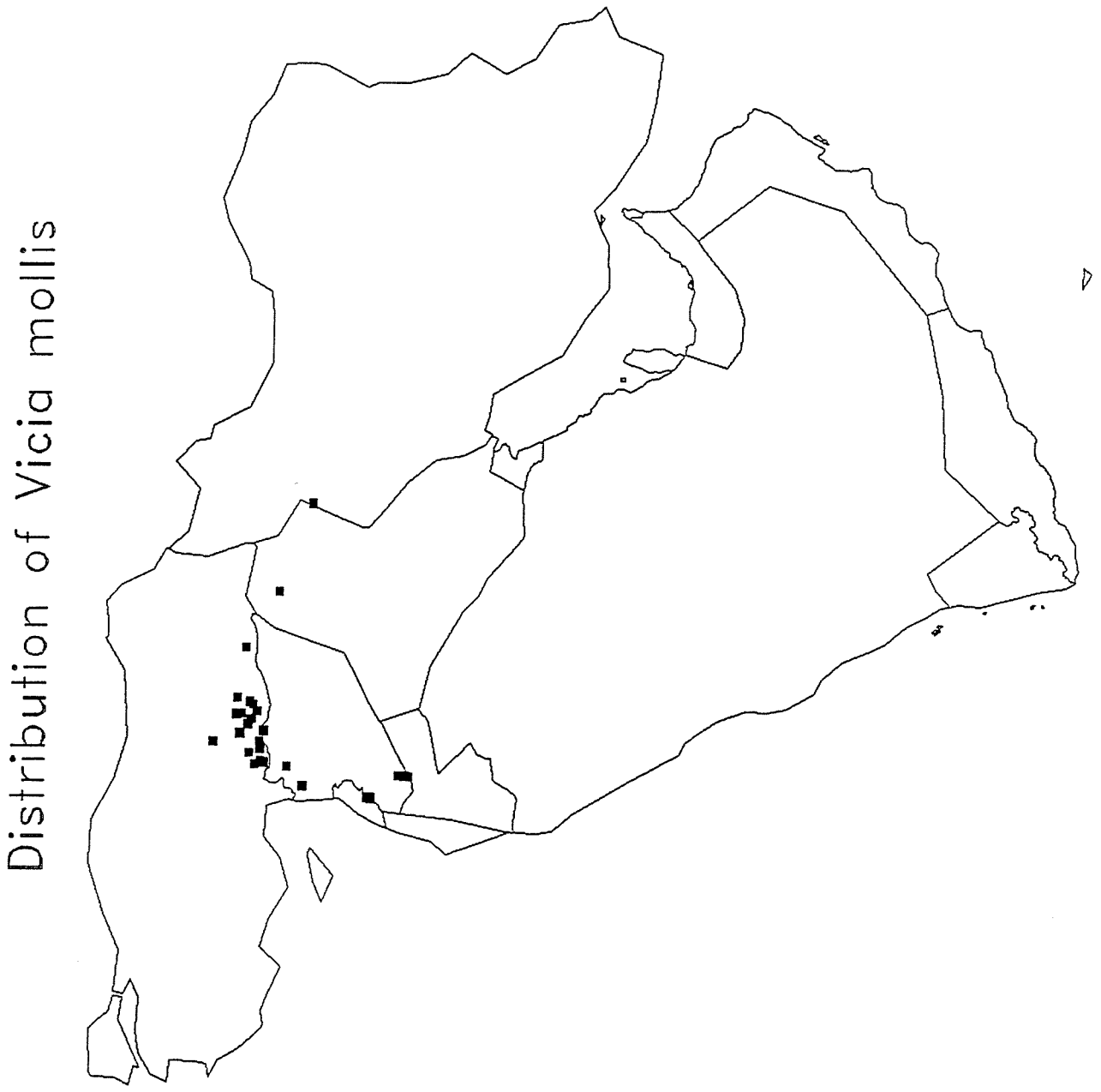
SEED CHARACTERS: Seed 4.5mm long; 4-6mm wide; 2.5-4mm deep; 12.5-15.5mm circumference; hilum 1.5-2mm long; distance from hilum to lens 5.5-7mm; seed length to width ratio of 0.75-1.12; seed circumference to hilum length ratio of 0.12-0.13. Seed shape spherical or oblong; shape in side view circular; seed colour red-brown; mottling present; surface matt; smooth. Hilum shape oval or elongated, less than third of circumference; coloured red-brown; groove colour beige; hilum surface excess tissue present. Lens position opposite hilum; prominent. Aril absent.

Phenology: March - May **Chromosome number:** 10, (14).
Geographical distribution: IQ, IR, JO, LB, SY, TR. See Map 15.
Ecology: Alt. 400 - 1430m; Hab. Agricultural and disturbed land.

Taxonomic notes: V. mollis was considered by Kupicha to belong to sect. Peregrinae, the grouping of V. mollis with V. peregrina and its allies being originally suggested by Boissier (1872). However, this species has a closer natural affinity for sect. Hypechusa. Kupicha (1976) comments that the species of her sect. Peregrinae have no peduncle. V. mollis does in fact posses a much reduced peduncle and so cannot be considered a natural member of sect. Peregrinae. This view was also adopted by Townsend (1967) and is supported by Plitmann (Pers. Comm.). The latter allies V. mollis to V. sericocarpa. Ponert (1973) regards V. mollis as a subspecies of V. sericocarpa, which appears unjustified. Both in the field and in the herbarium these two taxa are sufficiently distinct to warrant individual specific status.

Specimen citation: Davis et Hedge 28226 (E); Davis 42889 (E); Sintenis 753 (K); Davis et Hedge 27696 (K); Davis et Hedge 28226 (BM); Davis et Hedge 27917 (BM); Davis et Hedge 27917 (E); Jacobs 6501 (E); Haussknecht s.n. (W); Davis et Hedge 27917 (HUJ); Haussknecht s.n. (G); Maxted, Ehrman et Auricht 4807 (SPN); Maxted, Ehrman et Khattab 2277 (SPN); Maxted, Ehrman et Khattab 2589 (SPN); Maxted, Ehrman et

Map 15.



Khattab 2648 (SPN); Maxted, Ehrman et Khattab 2653 (SPN); Maxted, Ehrman et Khattab 2670 (SPN); Maxted, Ehrman et Khattab 2697 (SPN); Maxted, Ehrman et Khattab 2706 (SPN); Maxted, Auricht et Ehrman 4807 (SPN); Maxted, Auricht et Ehrman 4936 (SPN); Maxted, Auricht et Ehrman 5031 (SPN); Maxted, Auricht et Ehrman 5092 (SPN); Maxted, Auricht et Ehrman 5125 (SPN); Maxted, Auricht et Ehrman 5131 (SPN); Maxted, Auricht et Ehrman 5145 (SPN); Maxted, Auricht et Ehrman 5168 (SPN); Maxted, Auricht et Ehrman 5204 (SPN); Maxted, Auricht et Ehrman 5236 (SPN); Maxted, Auricht et Ehrman 5255 (SPN); Eig et Zohary s.n. (HUJ).

16 **Accepted taxon:** V. pannonica Crantz (1769) Strip. Austr. 2(5): 393.

Iconography: Fl. Eur., 2: 134; Fl. Iran., 33-34; Fl. Tur., 3: 314; Fl. USSR., 13: 470-471; Illust. Fl. Iran., Tab. 27, fig. 2.

Synonymy: V. sylvestris Tournefort (1705) Flore du Suaverubente; V. nissoliana L. (1753) Sp. Pl. 2: 735; V. nissoliana Gouan (1796) Herbor. Envir. Montpellier 51; V. hybrida Georgi (1800) Besch. des Russis. Reichs, 3(5): 1169; V. pannonica Willd. (1802) Sp. Pl., 3(2): 1107; V. lineata M. Bieb. (1819) Fl. Taurico-Caucasica, 3: 473.

Description: VEGETATIVE CHARACTERS: Annual; ascending or decumbent; 20-80(-110)cm high. Stipule length 2-3.5mm; 1-2mm wide. Stipule entire or semi-hastate; apex acute; number of teeth on distal edge none or 1-2 teeth (rarely). Number of teeth on proximal edge none; stipule edge form entire; translucent. Stipule colour (upper plant) green or green with purple; glabrous or less than 10 hairs per sqmm (rarely). Leaf 27-104mm long; petiole 2-12mm long; average leaflet internode 4-59mm long; leaflet (6-)10-23(-35)mm long; leaflet 2-6(-8)mm wide; tendril or mucro 12-45mm long; average leaf internode 17-66mm long; petiolule 23-86mm long. Leaf apex tendrilous; simple or with 2 branches or with 3 branches or with more than 3 branches. Leaflet shape symmetric; 12-20 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet broad linear or linear elliptic or narrow elliptic or broad elliptic; apex mucronate and emarginate or mucronate; base angustate or truncate to angustate; broadest at apex or in middle. Leaflet adaxial hairs less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long; leaflet abaxial hair 10-50 per mm sq or more than 50 per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq. Stem node colour (upper plant) green or purple.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm) or longer than 2mm, but shorter than flower. Peduncle length 2-9mm; rachis 1-6mm long; pedicel 1-3mm long; flower 15-23mm long; ratio of peduncle to flower length of 0.22-0.5; peduncular cusp absent or present and less than 2.1mm long. Number of flowers per inflorescence one (rarely) or two or three or four. Pedicel with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 3.5-9.5mm long; lateral teeth 2.5-9mm long; upper tooth 1.5-8mm long; tube 4.5-7mm long; ratio of lower tooth to tube length of 0.5-1.58. Calyx base strongly gibbous; tube mouth slightly oblique or strongly oblique; teeth reflexing absent; tooth curvature absent; exterior nectaries absent. Calyx hairs covering calyx; hair density of 10-35 per mm sq or 36-60 per mm sq; hair length 0.5-1.5mm long or more than 1.5mm long; hairs adpressed. Calyx colour green or purple calyx teeth (rarely). Standard length 16-22mm; limb length 7.5-12mm; claw length 7-11.5mm; limb width 8-14mm; claw width 6-10mm; ratio of limb length to claw length 0.73-1.41. Corolla petals concolorous; standard face cream or yellow (brownish) or purple; standard upper surface cream or yellow or lilac or violet; face without distinct veining or face with distinct veins. Standard shape platonychioid or stenonychioid; apex emarginate or emarginate with mucro; claw bowing absent; upper surface subadpressed pubescent. Wing length 15-21mm; limb length 7-10mm; claw length 7.5-10mm; limb width 3-6.5mm. Wing colour cream or yellow (brownish) or purple; markings absent. Wing shape 2 or 3; spur shape 1 or 4; limb base kinking weak or strong; limb pouch absent or present; wing to keel adhesion weak. Keel length 11.5-15mm; hood length 4-5mm; claw length 7.5-10.5mm; hood width 3.5-5mm. Keel colour white or purple or brown; hood apex not distinctly coloured or distinctly coloured. Keel shape 3 or 5; base shape 2 or 3 or 4; pouch absent or present. Staminal tube length 9-12.5mm; filament length 1.5-2.5mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 4-8mm; style length 4.5-6.5mm; supra-ovary extension 2.5-4mm. Ovary shape linear or intermediate or oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature present. Ovary entirely

covered with simple hairs; style apex pubescence type 3 or 5. Number of ovules per ovary 4-10(-17).

LEGUME CHARACTERS: Legume 14-24(-30)mm long; 7-8(-10)mm wide; 4-6mm deep; ratio of legume length to width 1.75-3.42. Amphicarpic legumes absent. Legume colour yellow or yellow-brown or brown or black; uniform over legume. Legume shape oblong; cross-sectional shape round or rounded to flat; not falcate; suture unparallel; distal end unbeaked; valve surface not torulose; surface smooth or ridged with veins; partitioning absent or present. Legume hairs 36 - 60 per mm sq; hairs 0.5 - 1.5mm long or hairs more than 1.5mm long; hairs covering entire legume; suture surface ciliate, hairs less than 1mm long or ciliate, hairs more than 1mm long; tubercles absent. Dehiscent legume twisting loose or medium or tight; number of seeds per legume 2-4.

SEED CHARACTERS: Seed 4-5mm long; 4-7mm wide; 3-4mm deep; 10-17mm circumference; hilum 2-3mm long; distance from hilum to lens 5-7mm; seed length to width ratio of 0.71-1.11; seed circumference to hilum length ratio of 0.18-0.2. Seed shape spherical or oblong; shape in side view circular; seed colour brown; mottling present; surface matt; smooth. Hilum shape elongated, less than third of circumference; coloured red-brown or coloured brown; groove colour beige; hilum surface excess tissue present. Lens position opposite hilum; prominent. Aril absent.

Phenology: May - July **Chromosome number:** 12.
Geographical distribution: AL, AT, BE, BG, BU, CH, CS, CY, DD, DE, DZ, ES, FR, GR, HU, IR, IT, MA, RO, SU, TR, YU. See Map 16.
Ecology: Alt. 15 - 2200m; Hab. disturbed and agricultural land.

Taxonomic notes: Trautvetter (1871) regards the two subsp. of V. pannonica as varieties of V. hybrida. Superficially the species are allied, as they both posses a pubescent adaxial standard surface. However, the difference in number of flowers per inflorescence, corolla colour and corolla size suggests V. pannonica and V. hybrida are quite distinct.

I have used two subspecies to describe the intra-specific variation within V. pannonica. Plitmann (1967) notes that these two taxa, he recognises as varieties, "occur side by side in many localities;". For the two taxa to remain distinct, if they are sympatric, there must be a strong reproductive barrier. So this, considered with the degree of morphological distinction between the two taxa, warrants the use of subspecific status.

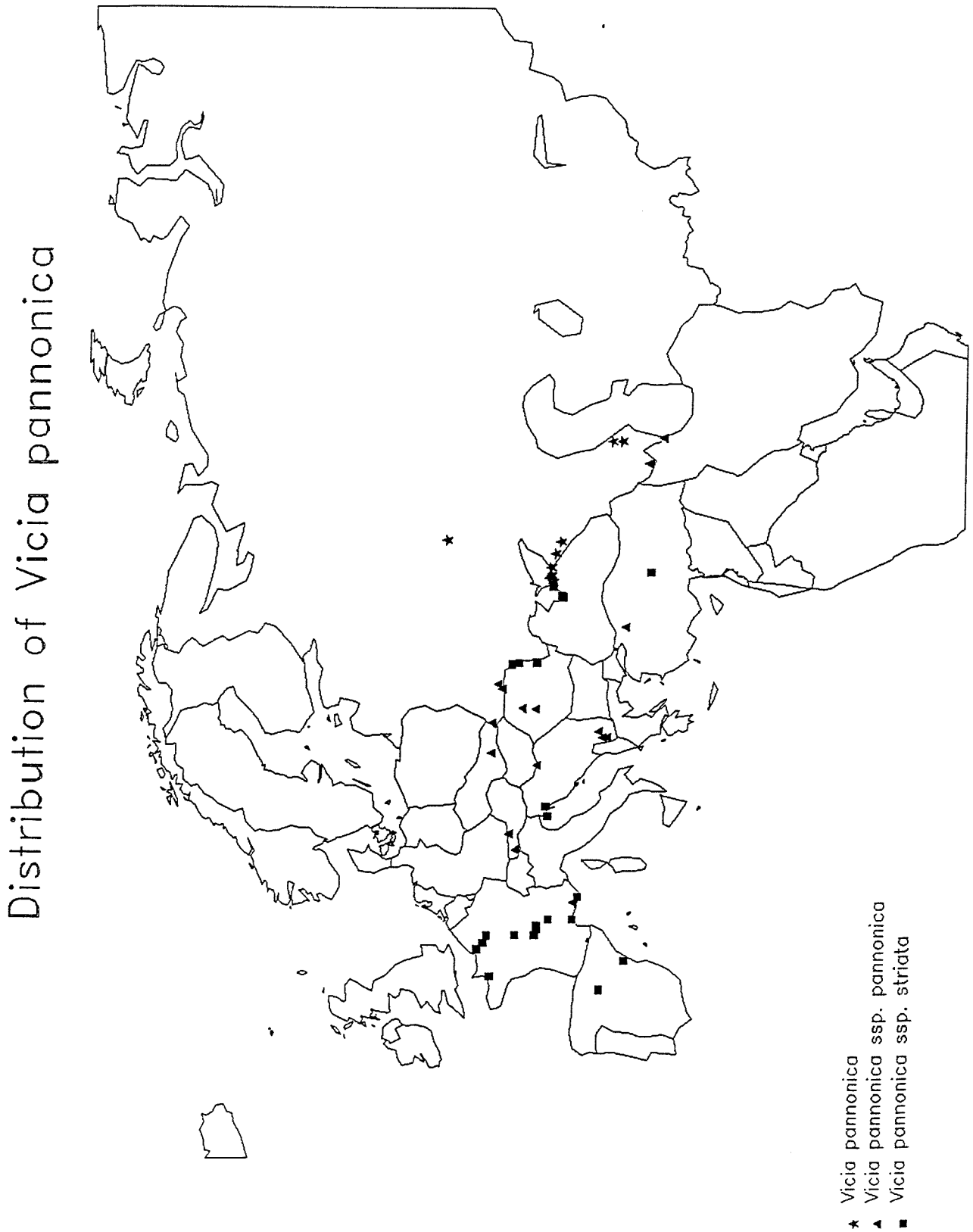
Specimen citation: Stankevich 2392 (WIR); Stankevich et Dorofeyev 2401 (WIR); Stankevich et Dorofeyev 2402 (WIR); Stankevich et Dorofeyev 2413 (WIR); Voluznyova et Semyonova 43541 (WIR); Voluznyova et Semyonova 43539 (WIR); Zhilenko s.n. (WIR); Zhilenko s.n. (WIR); Khinchuk 6461 (WIR); Khinchuk 6463 (WIR); Barulina 6365 (WIR); Kiselyova 9940 (WIR).

Key to subspecies of V. pannonica

1(0). Corolla dusky violet, standard face without distinct veining;
flowers 15-20mm..... i V. pannonica subsp. striata
Corolla yellow or cream brown; standard face with
distinct veins; flowers 17-23mm ii V. pannonica subsp. pannonica

i **Accepted taxon:** **V. pannonica** subsp. **striata** (M. Bieb.) Nyman (1878) Consp. Fl. Europaea, 209.
Type: in segetibus et cultis circa Monspelium, (MPU).
Iconography: Fl. Eur., 2: 134; Fl. Tur., 3: 314.

Map 16.


Distribution of Vicia pannonica
Vicia pannonica
Vicia pannonica ssp. pannonica
Vicia pannonica ssp. striata

Synonymy: Vicioides striata Moench (1794) Meth. Pl. Hort. Bot. Marburgensis, 137; V. striata M. Bieb. (1808) Fl. Taur.-cauc. 2: 162; V. purpurascens DC. (1813) Cat. Hort. Monsp. 155; V. pannonica var. purpurascens (DC.) Seringe (1825) Prodr. 2: 364; V. pannonica var. striata (M. Bieb.) Griseb. (1843) Spic. Fl. Rum. Bith 1: 79; Hypechusa purpurescens Alef. (1860) Bot. Zeitung, 18(19): 166; V. pannonica subsp. purpurascens (DC.) Arc. (1882) Comp. Fl. Ital., 119; V. pannonica subsp. striata (M. Bieb) Nyman (1926) Prodr. Fl. Penins. Balc., 802.

Description: VEGETATIVE CHARACTERS: Annual; ascending or decumbent; 20-80(-110)cm high. Stipule length 2-3mm; 1-2mm wide. Stipule entire or semi-hastate; apex acute; number of teeth on distal edge none or 1-2; number of teeth on proximal edge none; stipule edge form entire; translucent. Stipule colour (upper plant) green or green with purple; glabrous or less than 10 hairs per sqmm (rarely). Leaf 43-104mm long; petiole 2-12mm long; average leaflet internode 5-12mm long; leaflet 8-23mm long; leaflet 2-6mm wide; tendril or mucro 13-45mm long; average leaf internode 26-66mm long; petiolule 36-86mm long. Leaf apex tendrilous; simple or with 3 branches or with more than 3 branches. Leaflet shape symmetric; 8-20 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet broad linear or linear elliptic or narrow elliptic or broad elliptic; apex mucronate and emarginate or mucronate; base angustate or truncate to angustate; broadest at apex or in middle. Leaflet adaxial hairs less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq. Stem node colour (upper plant) green or purple.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm) or longer than 2mm, but shorter than flower. Peduncle length 2-9mm; rachis 1-6mm long; pedicel 1-3mm long; flower 15-20mm long; ratio of peduncle to flower length of 0.11-0.5; peduncular cusp absent or present and less than 2.1mm long. Number of flowers per inflorescence one or two or three or four. Pedicel with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 3-6.5mm long; lateral teeth 2-7mm long; upper tooth 1.5-6mm long; tube 4.5-7mm long; ratio of lower tooth to tube length of 0.54-1.45. Calyx base strongly gibbous; tube mouth slightly oblique or strongly oblique; teeth reflexing absent; tooth curvature absent or present; exterior nectaries absent. Calyx hairs covering calyx; hair density of 10-35 per mm sq or 36-60 per mm sq; hair length 0.5-1.5mm long or more than 1.5mm long; hairs adpressed. Calyx colour green or purple base or purple calyx teeth or purple. Standard length 16-20mm; limb length 7.5-12mm; claw length 7-11.5mm; limb width 8-12mm; claw width 6-10mm; ratio of limb length to claw length 0.73-1.41. Corolla petals concolorous; standard face purple; standard upper surface lilac or violet; face without distinct veining. Standard shape platonychioid or stenonychioid; apex emarginate or emarginate with mucro; claw bowing absent; upper surface subadpressed pubescent. Wing length 15-20mm; limb length 7-10mm; claw length 7.5-10mm; limb width 3.5-6.5mm. Wing colour purple; markings absent. Wing shape 2 or 3; spur shape 1 or 4; limb base kinking weak or strong; limb pouch absent or present; wing to keel adhesion weak. Keel length 11.5-15mm; hood length 4-5mm; claw length 7.5-10.5mm; hood width 3.5-5mm. Keel colour white or purple or brown; hood apex not distinctly coloured or distinctly coloured. Keel shape 3 or 5; base shape 2 or 3 or 4; pouch absent or present. Staminal tube length 9-12.5mm; filament length 1.5-2.5mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 4-8mm; style length 4.5-6.5mm; supra-ovary extension 2.5-4mm. Ovary shape linear or intermediate or oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature present. Ovary entirely covered with simple hairs; style apex pubescence type 3 or 5. Number of ovules per ovary 4-9.

LEGUME CHARACTERS: Legume 14-19mm long; 7-8mm wide; 4-6mm deep; ratio of legume length to width 1.75-2.57. Amphicarpic legumes absent. Legume colour yellow or yellow-brown; uniform over legume. Legume

shape oblong; cross-sectional shape round or rounded to flat; not falcate; suture unparallel; distal end unbeaked; valve surface not torulose; surface smooth or ridged with veins; partitioning absent or present. Legume hairs 36 - 60 per mm sq; hairs 0.5 - 1.5mm long or hairs more than 1.5mm long; hairs covering entire legume; suture surface ciliate, hairs less than 1mm long or ciliate, hairs more than 1mm long; tubercles absent. Dehiscent legume twisting loose or tight; number of seeds per legume 2-4.

SEED CHARACTERS: Seed 4-5mm long; 4-7mm wide; 3-4mm deep; 11.5-17mm circumference; hilum 2-2.5mm long; distance from hilum to lens 5-6.5mm; seed length to width ratio of 0.71-1.11; seed circumference to hilum length ratio of 0.15-0.17. Seed shape spherical or oblong; shape in side view circular; seed colour brown; mottling present; surface matt; smooth. Hilum shape elongated, less than third of circumference; coloured red-brown; groove colour beige; hilum surface excess tissue present. Lens position opposite hilum; prominent. Aril absent.

Phenology: April - July **Chromosome number:** 12.
Geographical distribution: AL, AT, BE, BG, CH, CS, CY, DD, DE, DZ, ES, FR, FR, GB, GR, HU, IR, IT, RO, SE, SU, SY, TR, YU.
Ecology: Alt. 350 - 1250m; Hab. Disturbed and agricultural land.

Specimen citation: Liendon 52 (E); Chelsea Physick 98 (BM); Heribaud et Gasilide 2026 (MPU); Cartier 1182 (MPU); Andre s.n. (MPU); Cartier 1182b (MPU); Le Grand 3634 (MPU); Breton 16/7/1903 (MPU); Chevalier 1907 (MPU); Renaud 1150 (MPU); Gardner et Gardner 794 (RNG); Maxted 1238 (SPN); Maxted 1246 (SPN); Maxted 1250 (SPN); Maxted 1254 (SPN); Maxted 1255 (SPN); Muck 27 (W); Verdcourt 4660 (E); Edmondson et McClintock 2375 (E); Reverchon 741 (E); Smith et Glennie s.n. (E); Nannfeldt 6037 (E); Krendl et Krendl s.n. (W); Macfarlane 595 (SPN); Maxted 1075 (SPN); Maxted 1181 (SPN); Maxted 1268 (SPN); Maxted, Ehrman et Khattab 1762 (SPN); Yarovaya s.n. (LE); Arkhip s.n. (LE); Borissova s.n. (LE); Gelde s.n. (LE); Vankov s.n. (LE); Ganeshin s.n. (LE).

ii **Accepted taxon:** V. pannonica subsp. pannonica Crantz (1769) Strip. Austr. 2 (5):393-394.
Type: holotype, Smith (BM!).
Iconography: Fl. Eur., 2: 134; Fl. Tur., 3: 314.
Synonymy: Vicioides uninata Moench (1794) Meth. Pl. Hort. Bot. Marburgensis, 136; Vicioides hirsuta Moench (1794) Meth. Pl. Hort. Bot. Marburgensis, 137; V. uncinata Reichb. (1832) Fl. Germ. Excur., 2: 530; Hypechusa pannonica Alef. (1860) Bot. Zeitung, 18(19): 166; V. pannonica subsp. eupannonica Hayek (1926) Prodr. Fl. Penins. Balc., 802.

Description: VEGETATIVE CHARACTERS: Annual; ascending or decumbent; 20-80(-110)cm high. Stipule length 2-3.5mm; 1-2mm wide. Stipule entire or semi-hastate; apex acute; number of teeth on distal edge none or 1-2 teeth (rarely). Number of teeth on proximal edge none; stipule edge form entire; translucent. Stipule colour (upper plant) green or green with purple; glabrous. Leaf 27-78mm long; petiole 3-8mm long; average leaflet internode 4-59mm long; leaflet 10-21mm long; leaflet 2-5mm wide; tendril or mucro 12-35mm long; average leaf internode 17-51mm long; petiolule 23-67mm long. Leaf apex tendrilous; with 2 branches or with 3 branches. Leaflet shape symmetric; 12-16 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet narrow elliptic; apex mucronate and emarginate or mucronate; base angustate or truncate to angustate; broadest in middle. Leaflet adaxial hairs less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq; hairs more than 1.5mm long; leaflet abaxial hair 10-50 per mm sq or more than 50 per mm sq; hairs more than 1.5mm long; petiole hairs 10-50 per mm sq or more than 50 per mm sq. Stem node colour (upper plant) green or purple.

INFLORESCENCE CHARACTERS: Peduncle longer than 2mm, but shorter than flower. Peduncle length 4-8mm; rachis 2-6mm long; pedicel 1-3mm long; flower 17-23mm long; ratio of peduncle to flower length of 0.22-0.5; peduncular cusp absent or present and less than 2.1mm long. Number of flowers per inflorescence two or three or four. Pedicel with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 3.5-9.5mm long; lateral teeth 2.5-9mm long; upper tooth 2-8mm long; tube 5.5-7mm long; ratio of lower tooth to tube length of 0.5-1.58. Calyx base strongly gibbous; tube mouth strongly oblique; teeth reflexing absent; tooth curvature absent; exterior nectaries absent. Calyx hairs covering calyx; hair density of 10-35 per mm sq or 36-60 per mm sq; hair length 0.5-1.5mm long or more than 1.5mm long; hairs adpressed. Calyx colour green or purple calyx teeth (rarely). Standard length 18-22mm; limb length 8-12mm; claw length 9-10.5mm; limb width 8-14mm; claw width 7-9mm; ratio of limb length to claw length 0.8-1.2. Corolla petals concolorous; standard face cream or yellow (brownish). Standard upper surface cream or yellow; face with distinct veins. Standard shape platonychioid or stenonychioid; apex emarginate; claw bowing absent; upper surface subadpressed pubescent. Wing length 15-20mm; limb length 7-10mm; claw length 8-10mm; limb width 3-6.5mm. Wing colour cream or yellow (brownish). Markings absent. Wing shape 2 or 3; spur shape 1; limb base kinking strong; limb pouch present; wing to keel adhesion weak. Keel length 12.5-15mm; hood length 4-5mm; claw length 8.5-10mm; hood width 4-5mm. Keel colour white; hood apex not distinctly coloured. Keel shape 3 or 5; base shape 2 or 4; pouch absent or present. Staminal tube length 10-12mm; filament length 1.5-2.5mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 4.5-7mm; style length 5-6.5mm; supra-ovary extension 2-3.5mm. Ovary shape intermediate or oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature present. Ovary entirely covered with simple hairs; style apex pubescence type 3 or 5. Number of ovules per ovary 6-10(-17).

LEGUME CHARACTERS: Legume 17-24mm long; 7-8mm wide; 5-6mm deep; ratio of legume length to width 2.42-3.42. Amphicarpic legumes absent. Legume colour yellow-brown or brown or black; uniform over legume. Legume shape oblong; cross-sectional shape round; not falcate; suture unparallel; distal end unbeaked; valve surface not torulose; surface smooth or ridged with veins; partitioning absent. Legume hairs 36 - 60 per mm sq; hairs 0.5 - 1.5mm long or hairs more than 1.5mm long; hairs covering entire legume; suture surface ciliate, hairs less than 1mm long or ciliate, hairs more than 1mm long; tubercles absent. Dehiscent legume twisting loose or medium; number of seeds per legume 2-4.

SEED CHARACTERS: Seed 4-4.5mm long; 4-5mm wide; 4mm deep; 10-13.5mm circumference; hilum 2.5-3mm long; distance from hilum to lens 5.5-7mm; seed length to width ratio of 0.9-1; seed circumference to hilum length ratio of 0.22-0.25. Seed shape spherical; shape in side view circular; seed colour brown; mottling present; surface matt; smooth. Hilum shape elongated, less than third of circumference; coloured red-brown or coloured brown; groove colour beige; hilum surface excess tissue present. Lens position opposite hilum; prominent. Aril absent.

Phenology: May - July **Chromosome number:** 12.
Geographical distribution: CS, DD, DE, DZ, GR, HU, IR, IT, RO, SU, TR, YU.
Ecology: Alt. 15 - 2200m; Hab. disturbed and agricultural land.

Specimen citation: De Valon s.n. (E); Parquet s.n. (BM); Gregoryan s.n. (BM); Andre 4/1879 (MPU); Edmondson 231 (E); Edmondson 231 (RNG); Davis et Coode 37084 (E); Lamond 3049 (E); Seipka s.n. (W); Karapetyan s.n. (W); Krendl et Krendl s.n. (W); Krendl s.n. (W); Polatschek s.n. (W); Wittmer s.n. (W); Ronniger s.n. (W); Wittmer s.n. (W); Bujorean 808 (MO); Macfarlane 588 (SPN); Anon. s.n. (LE); Smirnova s.n. (LE); Popov s.n. (LE); Karapetyan et Aslanian s.n. (ERE); Maxted 1179 (SPN).

17 **Accepted taxon:** V. hybrida L. (1753) Sp. Pl. 2: 737.

Type: Lectotype, Linneus 906.27 (LINN!).

Iconography: Fl. Eur., 2: 135; Fl. Iran., 42; Fl. Iraq, 3: 528-529; Fl. Pal., 2: 204-205; Fl. Syr., 2: 399; Fl. Tur., 3: 314-315; Fl. USSR., 13: 469-470; Illust. Fl. Iran., Tab.32, fig. 1; Fl. Pal., 2 (plates): 293.

Synonymy: Vicioides hybrida Moench (1794) Meth. Pl. Hort. Bot. Marburgensis, 136; V. spuria Raf. (1810) Car. Nuo. Gen. Nuo. Sp. Ani. & Pl. Sicilia, 72; Hypechusa hybrida Alef. (1860) Bot. Zeitung 18(19): 166; V. hybrida var. spuria (Raf.) Strobl. (1887) Obz., 37: 288; V. linnaei Rouy in Rouy & Foucault (1899) Fl. Fr., 5: 220; V. agerii Bubani (1899) Fl. Pyrenaea Ord. Nat. Grad. Digest., 2: 541; V. tollenda E.H. Krause (1901) Fl. von Deutschland, 2(9): 31; V. hybrida var. linearifolia Popov (1948) Fl. U.S.S.R., 13: 460.

Description: VEGETATIVE CHARACTERS: Annual; ascending or decumbent; 15-80cm high. Stipule length 1-5mm; 1-2mm wide. Stipule entire or semi-hastate; apex acute; number of teeth on distal edge none or 1-2; number of teeth on proximal edge none; stipule edge form entire; translucent. Stipule colour (upper plant) green; glabrous or hairs located edge only or less than 10 hairs per sqmm or = or more than 10 hairs per sqmm. Leaf 18-78mm long; petiole 1-11mm long; average leaflet internode 2-14mm long; leaflet 5-18(-25)mm long; leaflet 2-9mm wide; tendril or mucro 5-53mm long; average leaf internode 15-95mm long; petiolule 13-67mm long. Leaf apex tendrilous; simple or with 2 branches or with 3 branches or with more than 3 branches. Leaflet shape symmetric; 8-16 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet narrow elliptic or broad elliptic; apex retuse or mucronate and emarginate; base angustate or truncate to angustate; broadest at apex or in middle. Leaflet adaxial hairs less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm). Peduncle length 1-2mm; pedicel 2-4mm long; flower 18-31(-35)mm long; ratio of peduncle to flower length of 0.03-0.1; peduncular cusp absent. Number of flowers per inflorescence one. Pedicel with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 2.5-5.5mm long; lateral teeth 1.5-4mm long; upper tooth 1-4mm long; tube 4.5-10mm long; ratio of lower tooth to tube length of 0.27-0.91. Calyx base strongly gibbous; tube mouth strongly oblique; teeth reflexing absent; tooth curvature absent; exterior nectaries absent. Calyx hairs covering calyx; hair density of 10-35 per mm sq or 36-60 per mm sq; hair length 0.5-1.5mm long or more than 1.5mm long; hairs adpressed. Calyx colour green or purple base or purple calyx teeth. Standard length 18-32mm; limb length 9-20mm; claw length 9-16mm; limb width 9-19mm; claw width 6-11mm; ratio of limb length to claw length 0.73-2. Corolla petals concolorous; standard face yellow (sulphur). Standard upper surface yellow or yellow-brown; face without distinct veining. Standard shape stenonychioid; apex emarginate; claw bowing absent; upper surface subadpressed pubescent. Wing length 16.5-26mm; limb length 7-13.5mm; claw length 8-14.5mm; limb width 4-9.5mm. Wing colour yellow (sulphur). Markings absent. Wing shape 3; spur shape 1; limb base kinking weak or strong; limb pouch present; wing to keel adhesion weak. Keel length 11-20mm; hood length 3.5-6mm; claw length 7.5-14.5mm; hood width 4-6mm. Keel colour white; hood apex not distinctly coloured. Keel shape 2 or 4; base shape 2 or 4; pouch absent. Staminal tube length 10.5-17mm; filament length 1.5-2.5mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 4.5-9.5mm; style length 4-8mm; supra-ovary extension 2.5-6mm. Ovary shape intermediate or oblong; style apex cross sectional round or dorsi-ventrally flattened; supra-ovary curvature absent or present. Ovary entirely covered with simple hairs; style apex pubescence type 3. Number of ovules per ovary 5-10.

LEGUME CHARACTERS: Legume 17-28(-35)mm long; 6-12mm wide; 5-6mm deep; ratio of legume length to width 2.1-3. Amphicarpic legumes absent. Legume colour yellow-brown; uniform over legume or with brown or black veins. Legume shape oblong; cross-sectional shape round; not falcate; suture unparallel; distal end unbeaked; valve surface not torulose; surface smooth; partitioning absent. Legume hairs 10 - 35 per mm sq or hairs 36 - 60 per mm sq; hairs 0.5 - 1.5mm long or hairs more than 1.5mm long; hairs covering entire legume; suture surface ciliate, hairs less than 1mm long or ciliate, hairs more than 1mm long; tubercles absent. Dehiscent legume twisting loose or medium; number of seeds per legume 3-5.

SEED CHARACTERS: Seed 2-6mm long; 2-6mm wide; 2-4.5mm deep; 12.5-17mm circumference; hilum 1.5-2.5mm long; distance from hilum to lens 6-8mm; seed length to width ratio of 1-1.11; seed circumference to hilum length ratio of 0.12-0.15. Seed shape spherical; shape in side view circular; seed colour red-brown or brown; mottling absent or present; surface matt; smooth. Hilum shape elongated, less than third of circumference; coloured red-brown or coloured black; groove colour beige or same as hilum; hilum surface excess tissue present. Lens position opposite hilum; prominent. Aril absent.

Phenology: March - August **Chromosome number:** 12.
Geographical distribution: AF, AL, BG, CY, DZ, ES, FR, GR, IL, IQ, IR, IS, IT, JO, LB, LY, RO, SU, SY, TR, YU. See Map 17.
Ecology: Alt. 2 - 1500m; Hab. disturbed and undisturbed land, and open woodland.

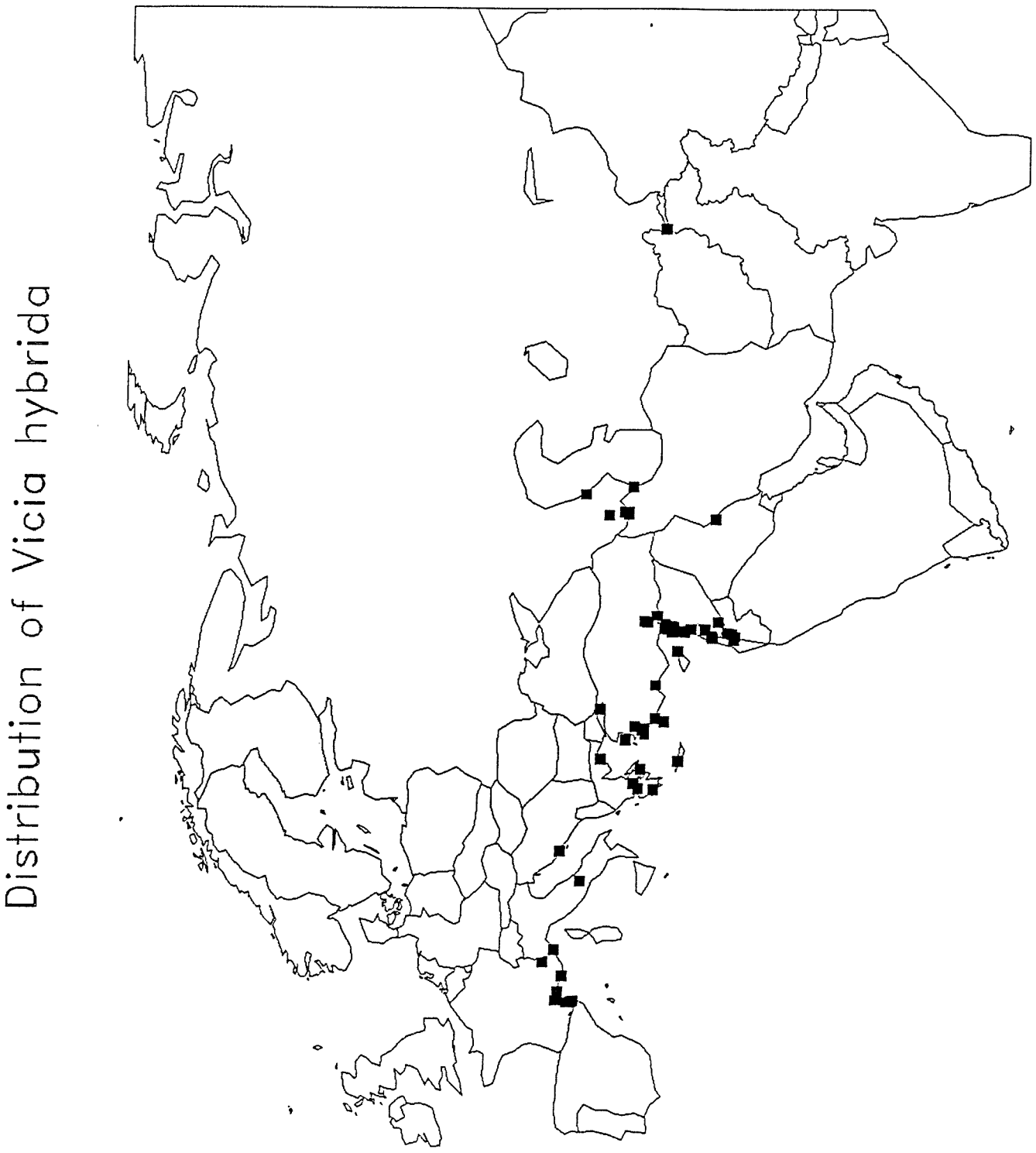
Taxonomic notes: In a detailed morphological, micro-morphological and cytological study Roti-Michelozzi & Caffaro (1984) studied the specific distinction between V. hybrida and V. lutea in wild populations from Northern Italy. They found the two species closely allied, but found in each area of study there were clear distinctions that warranted the specific distinction of these two taxa.

V. hybrida is a common species of Europe and the Middle-east, with variation in vegetative, floral and legume characteristics. This variation has lead to the description of many varieties, but the variation pattern does not suggest discrete forms and thus no infra-specific taxa are here accepted.

Specimen citation: Podlech 10756 (E); Zohary & Orshan 01501-21 (HUJ); Meikle 2453 (W); Lombardelly s.n. (K); De Valsines s.n. (MPU); Billot 3056 (MPU); St.Hilaire s.n. (MPU); Magnol s.n. (MPU); Khattab & Maxted 1041 (SPN); Maxted 1022 (SPN); Khattab, Bisby & Maxted 1032 (SPN); Maxted 1002 (SPN); Krendl & Krendl s.n. (W); Facom 273 (E); Stebbing 29 (E); Rechinger 4554 (BM); Edmondson & McClintock 2185 (E); Gathorne-Hardy 627 (E); Krendl s.n. (W); Krendl & Krendl s.n. (W); Krendl s.n. (W); Millward 5 (BM); Plitmann 1268 (HUJ); Gillett 6600 (K); Eig, Zohary & Feinbrun 1249 (HUJ); Feinbrun, Grizi & Jacobovitch346 (CAI); Bicknell & Pollini 1877 (K); Burri & Krendl s.n. (W); Hepper 3165 (K); Boulos & Al-Eisawi 5314 (BM); Korb s.n. (W); Polunin 5298 (E); Muller s.n. (BM); Popov & Vvedensky 268 (E); Kazn s.n. (LE); Grossheim s.n. (LE); Grossheim s.n. (LE); Grigoryan s.n. (LE); Popov s.n. (LE); Vasilyev s.n. (LE); Maxted, Ehrman & Khattab 2637 (SPN); Maxted, Ehrman & Khattab 2714 (SPN); Maxted, Ehrman & Khattab 2691 (SPN); Maxted, Ehrman & Khattab 2679 (SPN); Maxted, Ehrman & Khattab 2405 (SPN); Maxted, Ehrman & Khattab 2387 (SPN); Maxted, Ehrman & Khattab 2051 (SPN); Maxted, Ehrman & Khattab 1955 (SPN); Maxted, Ehrman & Khattab 1900 (SPN); Maxted, Ehrman & Khattab 2290 (SPN); Maxted, Ehrman & Khattab 2224 (SPN); Maxted, Ehrman & Khattab 1803 (SPN); Davis & Polunin 25199 (BM); Davis & Hedge 26226 (BM); Maxted, Ehrman & Auricht 4835 (SPN); Maxted, Ehrman & Auricht 5308 (SPN); Maxted, Ehrman & Auricht 5273 (SPN); Maxted, Kitiki & Allkin 4226 (SPN); Maxted, Kitiki & Allkin 4089 (SPN); Maxted, Kitiki & Allkin 4011 (SPN); Maxted, Kitiki & Allkin 4487 (SPN); Maxted, Kitiki & Allkin 4381 (SPN); Maxted, Kitiki & Allkin 4427 (SPN); Maxted, Kitiki & Allkin 4335 (SPN).

18 **Accepted taxon:** V. sericocarpa Fenzl (1842) Pug. Pl. Sy. Tauri Occid., 4.

Map 17.



Type: lectotype, Kotschy 151, Tauri Cilicici circa Gulek, 1836 (W!).
Iconography: Fl. Iran., 47-48; Fl. Iraq, 3: 529-530; Fl. Pal., 2: 204; Fl. Syr., 2: 400; Fl. Tur., 3: 312-313; Illust. Fl. Iran., Tab. 33, fig. 5; Fl. Pal., 2 (plates): 292.
Synonymy: Hypechusa sericocarpa Alef. (1860) Bot. Zeit., 18(19): 166; V. sericocarpa var. microphylla Boiss. (1872) Fl. Or. 2: 571; V. podocarpa Boiss. & Hausskn. ex Boiss. (1872) Fl Or., 2: 571; V. sericocarpa subsp. mardinica Ponert (1973) Feddes repert., 83(9-10): 634.

Description: VEGETATIVE CHARACTERS: Annual; ascending; 6-80cm high. Stipule length 2-4mm; 1-2.5mm wide. Stipule entire or semi-hastate; apex acute; number of teeth on distal edge none or 1-2 teeth or 3-5; number of teeth on proximal edge none; stipule edge form entire; translucent. Stipule colour (upper plant) green or green with purple; glabrous or less than 10 hairs per sqmm. Leaf 14-63mm long; petiole 1-8mm long; average leaflet internode 3-12mm long; leaflet 6-21mm long; leaflet 1-6mm wide; tendril or mucro 8-48mm long; average leaf internode 17-65mm long; petiolule 18-75mm long. Leaf apex tendrilous; with 2 branches or with 3 branches or with more than 3 branches. Leaflet shape symmetric; (6-)10-18 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet narrow linear or broad linear or linear elliptic or narrow elliptic or broad elliptic or narrow ovate; apex retuse or mucronate and emarginate or mucronate or acute; base angustate; broadest at apex or in middle. Leaflet adaxial hairs absent or less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long or hairs more than 1.5mm long; leaflet abaxial hair 10-50 per mm sq or more than 50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long or hairs more than 1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq. Stem node colour (upper plant) green or purple.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm) or longer than 2mm, but shorter than flower. Peduncle length 1-6(-11)mm; rachis 1-2mm long; pedicel 1-4mm long; flower (15-)18-26(-29)mm long; ratio of peduncle to flower length of 0.04-1.3; peduncular cusp absent or present and less than 2.1mm long. Number of flowers per inflorescence one or two. Pedicel with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long or hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 2.5-6mm long; lateral teeth 2-5mm long; upper tooth 1.5-4mm long; tube 5-8.5mm long; ratio of lower tooth to tube length of 0.35-2. Calyx base strongly gibbous; tube mouth slightly oblique or strongly oblique; teeth reflexing absent; tooth curvature absent; exterior nectaries absent. Calyx hairs absent or covering calyx; hair density of 10-35 per mm sq or 36-60 per mm sq; hair length 0.5-1.5mm long or more than 1.5mm long; hairs adpressed. Calyx colour green or purple base or purple calyx teeth or purple (apex of teeth occationally black). Standard length 12.5-27 mm; limb length 6-15mm; claw length 6-13.5mm; limb width 6-16mm; claw width 5-11mm; ratio of limb length to claw length 0.85-1.57. Corolla petals concolorous; standard face cream or yellow (sulphur). Standard upper surface yellow or yellow-brown; face without distinct veining or face with distinct veins. Standard shape stenonychioid; apex emarginate; claw bowing absent; upper surface glabrous. Wing length 12.5-26mm; limb length 6.5-13mm; claw length 6-15.5mm; limb width 2.5-7mm. Wing colour cream or yellow (sulphur). Markings absent. Wing shape 1 or 2 or 3 or 4; spur shape 1; limb base kinking absent or weak or strong; limb pouch present; wing to keel adhesion weak. Keel length 8.5-18mm; hood length 3-6mm; claw length 5.5-13mm; hood width 3-6mm. Keel colour white or purple or brown; hood apex not distinctly coloured. Keel shape 2 or 3 or 5; base shape 2 or 4; pouch absent. Staminal tube length 6.5-15.5mm; filament length 1-3mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 4-8mm; style length 4-8mm; supra-ovary extension 2-6.5mm. Ovary shape intermediate or oblong; style apex cross sectional round or dorsi-ventrally flattened; supra-ovary curvature absent or present. Ovary glabrous or entirely covered with simple hairs; style apex pubescence type 2 or 3 or 5. Number of ovules per ovary 5-8.

LEGUME CHARACTERS: Legume 15-27(-30)mm long; 7-10mm wide; 4-6mm deep; ratio of legume length to width 2.17-2.77. Amphicarpic legumes absent. Legume colour yellow-brown or brown; uniform over legume. Legume shape oblong; cross-sectional shape round or rounded to flat; not falcate; suture unparallel; distal end unbeaked or slightly beaked; valve surface not torulose; surface smooth or ridged with veins; partitioning absent. Legume hairs 36 - 60 per mm sq; hairs 0.5 - 1.5mm long or hairs more than 1.5mm long; hairs covering entire legume; suture surface ciliate, hairs less than 1mm long or ciliate, hairs more than 1mm long; tubercles absent. Dehiscent legume twisting medium; number of seeds per legume 2-6.

SEED CHARACTERS: Seed 4-5mm long; 4-6.5mm wide; 2.5-3.5mm deep; 12-17.5mm circumference; hilum 2mm long; distance from hilum to lens 4.5-7mm; seed length to width ratio of 0.76-1.11; seed circumference to hilum length ratio of 0.11-0.17. Seed shape spherical or oblong; shape in side view circular or laterally compressed; seed colour red-brown or brown; mottling absent or present; surface matt; smooth. Hilum shape elongated, less than third of circumference; coloured yellow or coloured red-brown; groove colour beige; hilum surface excess tissue present. Lens position opposite hilum; prominent. Aril absent.

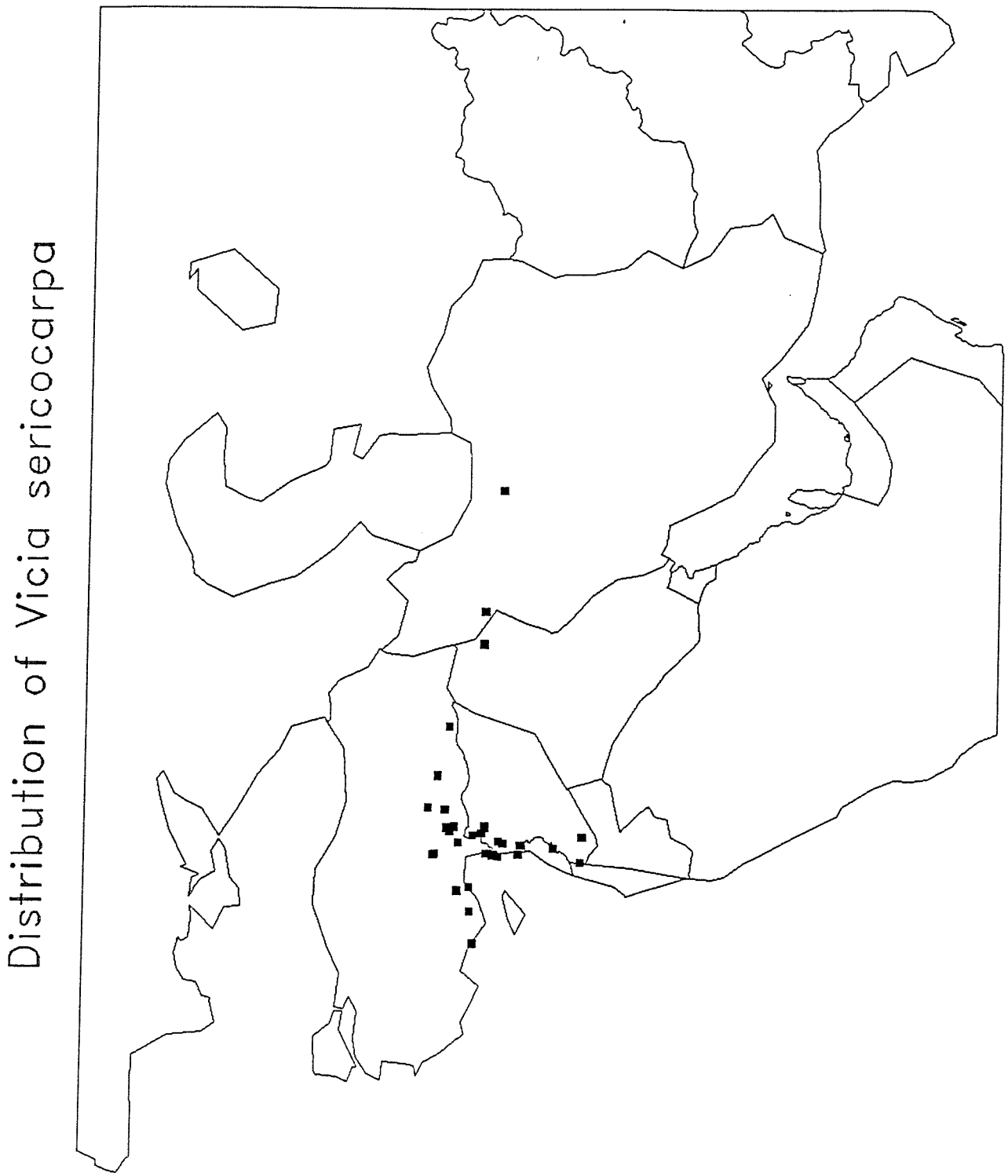
Phenology: March - July **Chromosome number:** 12.
Geographical distribution: CY, IL, IQ, IR, JO, LB, SY, TR. See Map 18.
Ecology: Alt. 20 - 2000m; Hab. disturbed and undisturbed land, limestone pavement.

Taxonomic notes: Ponert (1973, 1975) provides a detailed intra-specific classification for V. sericocarpa, using six subspecies. He resurrected four taxa regarded as synonyms of V. sericocarpa, described one new taxon, as well as incorporating V. mollis as a V. sericocarpa subspecies. The inclusion of V. mollis within V. sericocarpa requires the adoption of a very broad species concept. However, the resurrection and description of the forms based largely on leaflet shape and flower per inflorescence number seems unwarranted. Evidence from uniform garden experiments to see if this variation was fixed genetically would need to be undertaken for these forms regarded here as synonyms to be accepted.

Plitmann (1967) includes two varieties of V. sericocarpa, var. microphylla and var. sericocarpa based on leaflet dimensions and relative calyx tube to teeth length. Though Plitmann notes that intermediate forms between the two varieties are found in Lebanon and Palestine. The differences between the two varieties seem slight and the existence of intermediate forms is widespread. The V. sericocarpa material I have seen does not easily fall into these two varieties and so I consider there use unjustified.

Specimen citation: Meyers & Dinsmore 904b (E); Zohary & Plitmann 114/55 (HUJ); Rawi, Nuri & Koas 28874 (K); Kotschy 71 (K); Kotschy 99 (K); Furse 2135 (E); Davis 5947A (E); Haussknecht 20/3/1865 (K); Haussknecht s.n. (W); Haradjian 417 (W); Haussknecht s.n. (G); Maxted, Ehrman & Khattab 1897 (SPN); Maxted, Ehrman & Khattab 1996 (SPN); Maxted, Ehrman & Khattab 2196 (SPN); Maxted, Ehrman & Khattab 2262 (SPN); Maxted, Ehrman & Khattab 2316 (SPN); Maxted, Ehrman & Khattab 2470 (SPN); Maxted, Ehrman & Khattab 2602 (SPN); Maxted, Ehrman & Khattab 2683 (SPN); Maxted, Ehrman & Khattab 2713 (SPN); Maxted, Ehrman & Khattab 3165 (SPN); Coode & Jones 1000 (E); Davis 19421 (E); Davis & Polunin 25994 (E); Davis & Dodds 19421 (K); Townsend 640422/14 (K); Davis & Polunin 25858 (BM); Davis & Hedge 27711 (E); Davis & Polunin 25858 (E); Davis 42869 (E); Davis 42933 (E); Kotschy 151 (W); Bozakman & Fitz 567 (W); Maxted, Ehrman & Auricht 4926 (SPN); Maxted, Ehrman & Auricht 5012 (SPN); Maxted, Ehrman & Auricht 5162 (SPN); Maxted, Ehrman & Auricht 5298 (SPN); Maxted, Kitiki & Allkin 4038 (SPN); Maxted, Kitiki & Allkin 4152 (SPN); Maxted, Kitiki & Allkin 4693 (SPN); Maxted, Kitiki & Allkin 4700 (SPN).

Map 18.



19 **Accepted taxon:** V. lutea L. (1753) Sp. Pl., 2: 736.

Type: Both specimens of V. lutea in the Linnaean herbarium (LINN) are clearly referable to subsp. vestita. Specimen 906.25 has vegetative, flowers and legumes material, while 906.26 vegetative and legumes material only, but both specimens posses the distinctive tubercular hairs of subsp. vestita. This obviously leads to a problem over the lectotypification of this species. Further examination of Linnaean material for a representative of subsp. lutea is required to avoid name changes. The microfiche of the Burser material indicates the specimen XIX.88 may possibly be a better lectotype candidate, though it is difficult to see from the microfiche if this specimen lacks tubercular hairs.

Iconography: Fl. Eur., 2: 135; Fl. Iran., 48; Fl. Pal., 2: 203; Fl. Tur., 3: 311-312; Fl. USSR., 13: 468-469; Illust. Fl. Iran., Tab. 34, fig. 1.

Synonymy: V. tridentata Gaterau (1789) Desc. Pl. Montauban, 129; Vicioides lutea Moench (1794) Meth. Pl. Hort. Bot. Marburgensis, 136; V. hybrida Hudson (1798) Fl. Anglica, 3: 319; Wiggersia lutea Gaertner, Meyer & Scherber (1801) Fl. der Wetterau, 3(1): 36; V. lutea var. pallidiflora Ser. in DC. (1825) Prodr., 2: 363; V. ciliata Schur (1853) Sertum Florae Transsilvaniae, 4(8): 20; V. flavida Schur (1853) Sertum Florae Transsilvaniae, 4(8): 20; Hypechusa lutea Alef. (1860) Bot. Zeitung, 18(19): 166; V. lentiformis Schur (1866) Enum. Pl. Transs., 168; V. lerchenfeldiana Schur (1866) Enum. Pl. Transs., 168; V. baetica Schousboe ex Willk. & Lange (1880) Prodr. Fl. Hisp., 3: 298; V. cavanillesii Martinez (1929) Bol. Soc. Esp. Hist. Nat., 29: 410; V. lutea subsp. cavanillesii (Martinez) Romero 1986 Lagascalia, 14: 141.

Description: VEGETATIVE CHARACTERS: Annual; erect or ascending; 14-80(-100)cm high. Stipule length 1.5-5.5mm; 1-4mm wide. Stipule entire or semi-hastate; apex acute; number of teeth on distal edge none or 1-2; number of teeth on proximal edge none or 1-2 teeth (rarely). Stipule edge form entire; translucent or not-translucent. Stipule colour (upper plant) green or green with purple or purple; glabrous or less than 10 hairs per sqmm. Leaf 19-71mm long; petiole 1-4mm long; average leaflet internode 2-12mm long; leaflet 7-28mm long; leaflet 2-7mm wide; tendril or mucro 7-42mm long; average leaf internode 12-82mm long; petiolule 13-69mm long. Leaf apex mucronate (seen on one specimen) or tendrilous; with 2 branches or with 3 branches or with more than 3 branches. Leaflet shape symmetric; 8-18 leaflets per leaf or 2 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet linear elliptic or narrow elliptic; apex mucronate; base angustate or truncate to angustate; broadest in middle or at base. Leaflet adaxial hairs absent or less than 10 per mm sq or 10-50 per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq. Stem node colour (upper plant) green or purple.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm). Peduncle length 1-2mm; pedicel 1-3mm long; flower 15-30mm long; ratio of peduncle to flower length of 0.03-0.13; peduncular cusp absent. Number of flowers per inflorescence one or two (rarely). Pedicel less than 10 hairs per mm sq or with 10-50 hairs per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long or hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 3-9mm long; lateral teeth 2-7mm long; upper tooth 1.5-4.5mm long; tube 4-7mm long; ratio of lower tooth to tube length of 0.54-1.5. Calyx base slightly gibbous or strongly gibbous; tube mouth slightly oblique or strongly oblique; teeth reflexing absent; tooth curvature absent or present; exterior nectaries absent. Calyx hairs covering calyx; hair density less than 10 per mm sq or 10-35 per mm sq; hair length 0.5-1.5mm long or more than 1.5mm long; hairs adpressed. Calyx colour green or purple base or purple calyx teeth or purple. Standard length 13.5-29mm; limb length 5-17.5mm; claw length 7-13mm; limb width 6-16mm; claw width 5-11mm; ratio of limb length to claw length 0.43-1.52. Corolla petals concolorous; standard face cream or yellow (pale) or violet or purple; standard upper surface cream or yellow or lilac or violet; face without distinct veining or face

with distinct veins. Standard shape stenonychioid; apex emarginate; claw bowing absent; upper surface glabrous. Wing length 14.5-29mm; limb length 6-14.5mm; claw length 7.5-14mm; limb width 3.5-7mm. Wing colour cream or yellow (pale) or purple; markings absent. Wing shape 2 or 3; spur shape 1; limb base kinking strong; limb pouch present; wing to keel adhesion weak. Keel length 12-19mm; hood length 3-6mm; claw length 7-14mm; hood width 3-6mm. Keel colour white; hood apex not distinctly coloured or distinctly coloured. Keel shape 3; base shape 2 or 4; pouch absent or present. Staminal tube length 10-17mm; filament length 2-3mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 6-10mm; style length 5-8mm; supra-ovary extension 2-4.5mm. Ovary shape intermediate or oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent or present. Ovary with simple hairs on sutures only or entirely covered with simple hairs or covered with tubercle based hairs; style apex pubescence type 3 or 5. Number of ovules per ovary 4-9.

LEGUME CHARACTERS: Legume 17-33mm long; 6-12mm wide; 4-7mm deep; ratio of legume length to width 2.3-4. Amphicarpic legumes absent. Legume colour yellow-brown or brown or black; uniform over legume. Legume shape rhomboid or oblong; cross-sectional shape round or rounded to flat; not falcate; suture unparallel or parallel; distal end slightly beaked; valve surface not torulose; surface smooth; partitioning absent. Legume glabrous or hairs less than 10 per mm sq or hairs 10 - 35 per mm sq or hairs 36 - 60 per mm sq or hairs more than 61 per mm sq; hairs 0.5 - 1.5mm long or hairs more than 1.5mm long; hairs covering entire legume or tubercle hairs covering entire legume; suture surface ciliate, hairs less than 1mm long or ciliate, hairs tubercular; tubercles absent or tubercles short or tubercles long. Dehiscent legume twisting loose or medium; number of seeds per legume 2-6.

SEED CHARACTERS: Seed 4-5.5mm long; 5-6.5mm wide; 3-4.5mm deep; 12-17.5mm circumference; hilum 2.5-4mm long; distance from hilum to lens 6-8mm; seed length to width ratio of 0.76-0.91; seed circumference to hilum length ratio of 0.2-0.25. Seed shape spherical or oblong (rarely). Shape in side view circular or laterally compressed; seed colour brown or black; mottling present; surface matt; smooth. Hilum shape elongated, less than third of circumference; coloured red-brown or coloured brown; groove colour beige or same as hilum; hilum surface excess tissue present. Lens position opposite hilum; prominent. Aril absent.

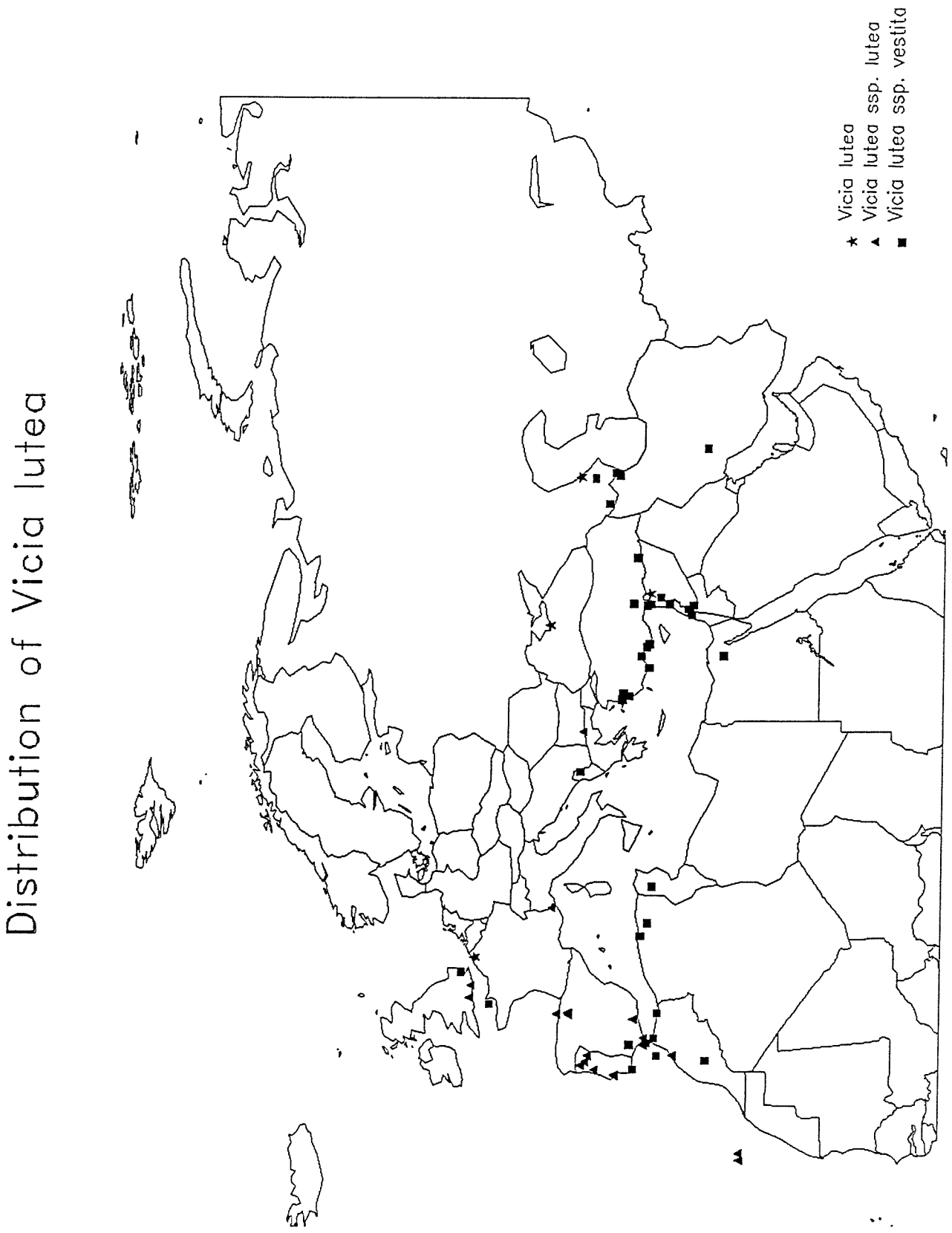
Phenology: March - June **Chromosome number:** 14.
Geographical distribution: AL, BG, CH, DZ, EG, ES, FR, GB, GR, HU, IL, IR IT, JO, LB, LY, MA, PT, RO, SY, SU, TN, TR, UG, YU. See Map 19.
Ecology: Alt. 5 - 2180m; Hab. disturbed and agricultural land, and open woodland.

Taxonomic notes: V. lutea is a morphologically variable species. It is particularly variable in leaflet dimension, leaflet number and flower colour. Raynaud (1976) used two subspecies and four varieties to describe the intra-taxon variation in V. lutea from Morocco alone. He used overall pubescence, legume and corolla colour characters to distinguish taxa. There does appear to be a lot of variation in the Moroccan material I have seen, which included the rarer purple flowered form. However, I do not believe this warrants the use of six subspecific taxa, the material I have seen easily falls into two groups, representing subsp. lutea and subsp. vestita.

The existence of a corolla colour variant within a species has justified the use of subspecific status for other taxa included in the conspectus. The purple flowered form may deserve similar treatment. This is not, however, the accepted view of Vicieae taxonomists. As I have not seen this taxon in the field or in cultivation, I am reluctant to take this step myself.

Likewise I do not recognise the glabrous form, V. laevigata Sm. as being distinct from subsp. lutea. Smith (1798) refers to this species found on the beach at Weymouth, Dorset, U.K., but Boswell

Map 19.


Distribution of Vicia lutea
Vicia lutea
Vicia lutea ssp. lutea
Vicia lutea ssp. vestita

Syme (1873) subsequently refers to the extinction of this population. I have searched this area and have been unable to relocate the population. It seems likely that this form was a local mutant that is now extinct.

Specimen citation: Russell s.n. (K); Stankevich et Legotina 840 (WIR); Maxted 1498 (SPN); Stankevich et Dorofeyev 2678 (WIR).

Key to subspecies of V. lutea

1(0). Subglabrous or sparsely pubescent; corolla yellow legume glabrous or with simple hairs..... i V. lutea subsp. lutea

Pubescent with long tubercular hairs; corolla pale yellow or purple-violet; legume hairs tubercular.... ii V. lutea subsp. vestita

i **Accepted taxon:** **V. lutea** subsp. **lutea** L. (1753) Sp. Pl., 2: 736. Lectotype, Burser XIX.88 (UPS).
Iconography: Fl. Eur., 2: 135; Fl. Iran., 48; Fl. Pal., 2: 203; Fl. Tur., 3: 311; Illust. Fl. Iran., Tab. 34, fig. 1.
Synonymy: V. laevigata Smith (1798) English Botany, 7: 483; V. lutea subsp. lutea var. laevigata (Smith) Boiss. (1838) Voy. bot. Esp., 194.

Description: VEGETATIVE CHARACTERS: Annual; erect or ascending; 14-80(-100)cm high. Stipule length 1.5-3mm; 1-2.5mm wide. Stipule entire or semi-hastate; apex acute; number of teeth on distal edge none or 1-2; number of teeth on proximal edge none; stipule edge form entire; translucent. Stipule colour (upper plant) green with purple or purple; glabrous or less than 10 hairs per sqmm. Leaf 19-51mm long; petiole 1-3mm long; average leaflet internode 4-12mm long; leaflet 7-24mm long; leaflet 2-6mm wide; tendril or mucro 9-42mm long; average leaf internode 12-82mm long; petiolule 17-59mm long. Leaf apex tendrilous; with 3 branches or with more than 3 branches. Leaflet shape symmetric; 8-14 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet linear elliptic or narrow elliptic; apex mucronate; base angustate or truncate to angustate; broadest in middle. Leaflet adaxial hairs absent or less than 10 per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long; petiole hairs less than 10 per mm sq. Stem node colour (upper plant) green or purple.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm). Peduncle length 1-2mm; pedicel 1-3mm long; flower 15-30mm long; ratio of peduncle to flower length of 0.03-0.1; peduncular cusp absent. Number of flowers per inflorescence one. Pedicel less than 10 hairs per mm sq or with 10-50 hairs per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 3-7mm long; lateral teeth 2-5.5mm long; upper tooth 1.5-3.5mm long; tube 4-6mm long; ratio of lower tooth to tube length of 0.6-1.44. Calyx base slightly gibbous; tube mouth slightly oblique or strongly oblique; teeth reflexing absent; tooth curvature absent or present; exterior nectaries absent. Calyx hairs covering calyx; hair density less than 10 per mm sq; hair length 0.5-1.5mm long; hairs adpressed. Calyx colour green or purple base or purple calyx teeth or purple. Standard length 16-29mm; limb length 5-17.5mm; claw length 7-13mm; limb width 8-16mm; claw width 6-9mm; ratio of limb length to claw length 0.43-1.52. Corolla petals concolorous; standard face cream or yellow (pale). Standard upper surface cream or yellow or lilac; face without distinct veining or face with distinct veins. Standard shape stenonychioid; apex emarginate; claw bowing absent; upper surface glabrous. Wing length 15.5-25mm; limb length 7-12mm; claw length 7.5-14mm; limb width 3.5-6.5mm. Wing colour cream or yellow (pale). Markings absent. Wing shape 2 or 3; spur shape 1; limb base kinking

strong; limb pouch present; wing to keel adhesion weak. Keel length 13-19mm; hood length 3-6mm; claw length 7.5-13mm; hood width 4-5.5mm. Keel colour white; hood apex distinctly coloured. Keel shape 3; base shape 2 or 4; pouch present. Staminal tube length 11-17mm; filament length 2-2.5mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 6-8mm; style length 5.5-8mm; supra-ovary extension 2-4.5mm. Ovary shape intermediate or oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent or present. Ovary with simple hairs on sutures only or entirely covered with simple hairs or covered with tubercle based hairs; style apex pubescence type 3 or 5. Number of ovules per ovary 4-9.

LEGUME CHARACTERS: Legume 22-33mm long; 7-12mm wide; 5-7mm deep; ratio of legume length to width 2.75-3.85. Amphicarpic legumes absent. Legume colour yellow-brown or brown or black; uniform over legume. Legume shape rhomboid or oblong; cross-sectional shape round; not falcate; suture unparallel; distal end slightly beaked; valve surface not torulose; surface smooth; partitioning absent. Legume glabrous or hairs less than 10 per mm sq; hairs 0.5 - 1.5mm long or hairs more than 1.5mm long; hairs covering entire legume or tubercle hairs covering entire legume; suture surface ciliate, hairs less than 1mm long or ciliate, hairs tubercular; tubercles absent. Dehiscent legume twisting medium; number of seeds per legume 3-6.

SEED CHARACTERS: Seed 4-5.5mm long; 5-6.5mm wide; 3-4.5mm deep; 12-17.5mm circumference; hilum 2.5-3mm long; distance from hilum to lens 6-8mm; seed length to width ratio of 0.76-0.91; seed circumference to hilum length ratio of 0.17-0.21. Seed shape spherical or oblong (rarely). Shape in side view circular or laterally compressed (rarely). Seed colour brown; mottling present; surface matt; smooth. Hilum shape elongated, less than third of circumference; coloured red-brown or coloured brown; groove colour beige or same as hilum; hilum surface excess tissue present. Lens position opposite hilum; prominent. Aril absent.

Phenology: March - June **Chromosome number:** 14.
Geographical distribution: AL, BG, CH, DZ, EG, ES, FR, GB, GR, HU, IR IT, LB, LY, MA, PT, RO, SY, SU, TN, TR, UG, YU.
Ecology: Alt. 5 - 1100m; Hab. disturbed and agricultural land, and open woodland.

Specimen citation: Lewalie 8975 (BM); Anon. s.n. (E); Cannon et Cannon 4716 (BM); Aldridge 1191 (BM); Bisby et Birch 1670 (SPN); Cole 49/22/8 (SPN); Kerr s.n. (SPN); Allkin 83/1 (SPN); Maxted 1006 (SPN); Wilson 1009 (SPN); Maxted 1027 (SPN); Maxted 1026 (SPN); Krendl et Krendl s.n. (W); Velcev, Gancev, Bondev et Kocev 827 (W); Khattab et Maxted 1028 (SPN); Maxted 1045 (SPN); Maxted 1051 (SPN); Maxted 1063 (SPN); Maxted 1175 (SPN); Maxted 1175 (SPN); Maxted 1175 (SPN); Babac 11 (SPN); Babac 10 (SPN); Bisby 1814 (SPN); Bisby 1804 (SPN); Bisby 1813 (SPN); Bisby 1869 (SPN); Bisby 1972 (SPN); Bisby 1839 (SPN); Bisby 1938 (SPN); Maxted 1131 (SPN); Maxted 1129 (SPN); Maxted 1124 (SPN); De Witte 17186 (MO).

ii **Accepted taxon:** V. lutea subsp. **vestita** (Boiss.) Rouy (1899) Fl. Fr. 5: 219.

Type: (TO).

Iconography: Fl. Eur., 2: 135; Fl. Iran., 48-49; Fl. Pal., 2: 203; Fl. Syr., 2: 399-400; Fl. Tur., 3: 311; Illust. Draw. Brit. Pl. 3: 65; Fl. Iran., Tab. 34, fig. 2; Fl. Pal., 2 (plates): 291.

Synonymy: V. hirta Balbis ex Pers. (1806) Synopsis Plantarum 2: 308; V. hirta Balbis ex DC. (1806) Syn. Pl. Fl. Gall. 360; V. lutea var. hirta (Balbis ex DC.) Loisel. (1807) Fl. Gall., 462; V. lutea var. muricata Ser. in DC. (1825) Prodr., 2: 263; V. vestita Boiss. (1838) Elench. Pl. Nov., 39; V. vestita D. Clos (1847) Hist. Chile Bot. Ser. 2: 134; V. vestita var. tuberculata Willd. (1877); V. boetica Schousboe ex Nyman (1878) Consp. Fl. Europ., 1: 209; V. lutea subsp. muricata (Ser.) Guinea (1953) Est. Bot. Vezas Esp. 57.

Description: VEGETATIVE CHARACTERS: Annual; erect or ascending; 14-80(-100)cm high. Stipule length 2-5.5mm; 1-4mm wide. Stipule entire or semi-hastate; apex acute; number of teeth on distal edge none or 1-2; number of teeth on proximal edge none or 1-2 teeth (rarely). Stipule edge form entire; translucent or not-translucent. Stipule colour (upper plant) green or green with purple or purple; glabrous or less than 10 hairs per sqmm. Leaf 21-71mm long; petiole 1-4mm long; average leaflet internode 2-11mm long; leaflet 7-28mm long; leaflet 2-7mm wide; tendril or mucro 7-39mm long; average leaf internode 12-59mm long; petiolule 13-69mm long. Leaf apex mucronate (seen on one specimen) or tendrilous; with 2 branches or with 3 branches or with more than 3 branches. Leaflet shape symmetric; 12-18(-22) leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet linear elliptic or narrow elliptic; apex mucronate; base angustate or truncate to angustate; broadest in middle or at base. Leaflet adaxial hairs less than 10 per mm sq or 10-50 per mm sq; hairs more than 1.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq; hairs more than 1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm). Peduncle length 1mm; pedicel 1-3mm long; flower 16-26mm long; ratio of peduncle to flower length of 0.04-0.05; peduncular cusp absent. Number of flowers per inflorescence one. Pedicel less than 10 hairs per mm sq or with 10-50 hairs per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 3-9mm long; lateral teeth 2.5-7mm long; upper tooth 1.5-4.5mm long; tube 4-7mm long; ratio of lower tooth to tube length of 0.54-1.5. Calyx base slightly gibbous or strongly gibbous; tube mouth slightly oblique or strongly oblique; teeth reflexing absent; tooth curvature absent or present; exterior nectaries absent. Calyx hairs covering calyx; hair density less than 10 per mm sq or 10-35 per mm sq; hair length 0.5-1.5mm long or more than 1.5mm long; hairs adpressed. Calyx colour green or purple. Standard length 13.5-29mm; limb length 5.5-17.5mm; claw length 8-12.5mm; limb width 6-14mm; claw width 5-11mm; ratio of limb length to claw length 0.68-1.41. Corolla petals concolorous; standard face cream or yellow (pale) or violet or purple; standard upper surface cream or yellow or lilac or violet; face without distinct veining or face with distinct veins. Standard shape stenonychioid; apex emarginate; claw bowing absent; upper surface glabrous. Wing length 14.5-29mm; limb length 6-14.5mm; claw length 8-14mm; limb width 3.5-7mm. Wing colour cream or yellow (pale) or purple; markings absent. Wing shape 2 or 3; spur shape 1; limb base kinking strong; limb pouch present; wing to keel adhesion weak. Keel length 12-18.5mm; hood length 3.5-5.5mm; claw length 7-14mm; hood width 3-6mm. Keel colour white; hood apex not distinctly coloured or distinctly coloured. Keel shape 3; base shape 2 or 4; pouch absent or present. Staminal tube length 10-15mm; filament length 2-3mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 6-10mm; style length 5-8mm; supra-ovary extension 2-4mm. Ovary shape oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent or present. Ovary entirely covered with simple hairs or covered with tubercle based hairs; style apex pubescence type 3 or 5. Number of ovules per ovary 4-9.

LEGUME CHARACTERS: Legume 17-30mm long; 6-11mm wide; 4-7mm deep; ratio of legume length to width 2.3-4. Amphicarpic legumes absent. Legume colour brown or black; uniform over legume. Legume shape rhomboid or oblong; cross-sectional shape round or rounded to flat; not falcate; suture unparallel or parallel; distal end slightly beaked; valve surface not torulose; surface smooth; partitioning absent. Legume hairs 10 - 35 per mm sq or hairs 36 - 60 per mm sq or hairs more than 61 per mm sq; hairs more than 1.5mm long; tubercle hairs covering entire legume; suture surface ciliate, hairs tubercular; tubercles short. Dehiscent legume twisting loose or medium; number of seeds per legume 2-6.

SEED CHARACTERS: Seed 4.5-5.5mm long; 5.5-6mm wide; 3.5mm deep; 15-17mm circumference; hilum 3-4mm long; distance from hilum to lens 7-7.5mm; seed length to width ratio of 0.81-0.91; seed circumference to hilum length ratio of 0.2-0.24. Seed shape spherical or oblong (rarely). Shape in side view laterally compressed; seed colour brown or black; mottling present; surface matt; smooth. Hilum shape elongated, less than third of circumference; coloured brown; groove colour beige; hilum surface excess tissue present. Lens position opposite hilum; prominent. Aril absent.

Phenology: March - June **Chromosome number:** 14.
Geographical distribution: AL, DZ, EG, ES, FR, GB, IL, IR JO, LB, LY, MA, PT, SU, SY, TN, TR, UG, US(I).
Ecology: Alt. 10 - 2180m; disturbed and agricultural land, and open woodland.

Specimen citation: Chelsea Physick 2599 (BM); Alexander et Kupicha 481 (BM); Davis et Bokhari 56495 (E); Brown s.n. (K); Brown 408 (K); Guiton s.n. (K); Davis et Bokhari 56495 (K); Keller 246 (K); Radde 3/80 (K); Balls 8733 (BM); Haussknecht 291 (BM); Bisby, Nicholls et Polhill 10 (SPN); Bisby, Nicholls et Grainger 1376 (SPN); Maxted 1148 (SPN); Bourgeau 1855 (E); Boissier s.n. (E); Sennen et Mauricio s.n. (BM); Font Quer 377 (BM); Fleischer s.n. (E); Zohary 8/5/1931 (HUJ); Liston 6421 (HUJ); Zohary 224424 (HUJ); Krendl s.n. (W); Maxted, Ehrman et Auricht 5318 (SPN); Maxted, Ehrman et Khattab 2740 (SPN); Maxted, Ehrman et Khattab 1795 (SPN); Maxted, Kitiki et Allkin 4100 (SPN); Maxted, Kitiki et Allkin 4125 (SPN); Maxted, Kitiki et Allkin 4174 (SPN); Maxted, Kitiki et Allkin 4188 (SPN); Maxted, Kitiki et Allkin 4197 (SPN); Maxted, Kitiki et Allkin 4200 (SPN); Maxted, Allkin et Khattab 4260 (SPN); Maxted, Kitiki et Allkin 4310 (SPN); Maxted, Kitiki et Allkin 4329 (SPN); Maxted, Kitiki et Allkin 4339 (SPN); Maxted 1234 (SPN); Maxted 1232 (SPN); Maxted, Ehrman et Auricht 6166 (SPN); Allkin 82/3 (SPN); Stankevich et Vlassov 542 (WIR); Stankevich et Vlassov 496b (WIR); Stankevich et Vlassov 770 (WIR); Emmerikh 157 (WIR); Davis et Lamond 57256 (BM); Davis 61741 (E).

Section Peregrinae

IV **Section** Peregrinae (B. Fedtsch. ex Radzhi) Kupicha (1976) Notes R.B.G. Edinb., 34: 323.
Type: Lectotype, V. peregrina L. (1753) Sp. Pl., 2: 737.
Iconography: Kupicha (1976) Notes R.B.G. Edinb., 34: 323.
Synonymy: Vicia sect. Euvicia Vis. (1852) Fl. Dalmatica 1: 317, pro parte; Vicia subgen. Alangula Alef. (1860) Bonplandia 8: 72; Tuamina Alef. (1861). Bonplandia, 9: 102; Vicia section Subsessiles Rouy in Rouy & Fouc., (1899). Fl. Fr., 5: 208, pro parte excl. typ.; Vicia ser. Peregrinae B. Fedtsch. (1948) Fl. URSS., 13: 466; Vicia subsect. Brevicarpa Stankevich (1970) Tr. Prikl. Bot. Genet. Sel., 43: 113; Vicia subsect. Peregrinae Radzhi (1971) Novosti Sist. Vyssh. Rast., 7: 238.

Description: Annual; climbing or scrambling; stem slender. Stipules entire or semi-hastate; length less than 3.5mm or 3.5 to 5.5mm; edge entire or with 1-2 teeth. Leaf apex tendrilous; leaflet less than 20mm or 20-30mm; with 1-4 pairs or more than 4 pairs. Leaflets symmetric; margins entire. Number of flowers per inflorescence 1; flowers sessile. Calyx mouth oblique; lower tooth longer than upper; base gibbous. Pedicel shorter or equal to 3mm or longer than 3mm. Flowers shorter than 15mm or 15 to 20mm or longer than 20mm; standard cream or blue or purple; shape platonychioid or stenonychioid; claw bowing present; upper standard surface glabrous. All petals approximately equal length. Wing marking absent; wing limb with slight kinking. Legume length less than 30mm or 30 to 50mm; width 5 to 10mm wide or greater than 10mm; oblong; round in cross section; sutures curved; valve hairs present; hairs simple; septa absent; number of seeds per legume less than 7. Seeds 3.5 to 6.0mm; round or oblong; not laterally flattened or laterally flattened; hilum less than quarter of seed circumference; lens positioned near hilum; testa surface smooth.
Number of taxa: three. **Chromosome number:** 12, 14
Geographical distribution: Mediterranean Basin, Crimea, south west Asia eastwards to Afghanistan.

Taxonomic notes: Ponert (1973) used five subspecies to describe the variation seen in sect. Peregrinae. He included V. aintabensis and V. michauxii as subspecies of V. peregrina and resurrected two taxa I regard as synonyms of these species. The three species accepted here are closely related and specific identification would be difficult if the few good diagnostic characters are unscorable. Plitmann (1967) states that intermediate forms between the three species are found in Northern Iraq and Southern Turkey. I have not seen specimens that show intermediacy. Uniform garden experiments are suggested as a means of resolving the taxonomic problems associated with this group. The differences in flower colour, pod and seed shape and size, I considered sufficient to warrant specific status.

20 **Accepted taxon:** V. michauxii Sprengel (1807) Mant. Fl. Halens.: 48.
Type: lectotype, Haussknecht s.n., collected in Armenia (B & G!).
Iconography: Fl. Iran., 45-46; Fl. Iraq, 3: 539-540; Fl. Syr., 2: 405; Fl. Tur., 3: 310-311; Fl. USSR., 13: 468; Illust. Fl. Iran., Tab. 33, fig. 1.
Synonymy: V. persepolitana Boiss. (1846) Diagn. Ser. 1(6): 48; Tuamina michauxii Alef. (1861) Bonplandia, 9: 102; V. carnea Kotschy in Unger & Braumuller (1865) Die Insel Cypern, 386; V. michauxii var. stenophylla Boiss. (1872) Fl. Or., 2: 577; V. aintabensis (non Boiss. & Hausskn. ex Boiss.) Blakelock (1948) Kew Bull., 3: 424; V. peregrina subsp. michauxii (Sprengel) Ponert (1973) Feddes Repert., 83(9-10): 634; V. peregrina subsp. persepolitana (Boiss.) Ponert (1973) Feddes Repert., 83(9-10): 634.

Description: VEGETATIVE CHARACTERS: Annual; ascending or decumbent; 10-75cm high. Stipule length 1-3mm; 0.5-2mm wide. Stipule entire or semi-hastate; apex acute; number of teeth on distal edge none or 1-2; number of teeth on proximal edge none; stipule edge form entire; translucent or not-translucent. Stipule colour (upper plant) green or green with purple; less than 10 hairs per sqmm or = or more than 10 hairs per sqmm. Leaf 28-79mm long; petiole 1-8mm long; average leaflet internode 4-12mm long; leaflet (5-)8-24(-40)mm long; leaflet 1-6mm wide; tendril or mucro 10-44mm long; average leaf internode 11-48mm long; petiolule 25-64mm long. Leaf apex tendrilous; simple or with 2 branches or with 3 branches or with more than 3 branches. Leaflet shape symmetric; 6-14 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet narrow linear or broad linear or elliptic ovate; apex retuse or mucronate and emarginate or mucronate; base angustate; broadest at apex or in middle or at base. Leaflet adaxial hairs less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq; hairs 0.5-1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq. Stem node colour (upper plant) green or purple.

INFLORESCENCE CHARACTERS: Peduncle absent. Pedicel 3-5mm long; flower 9-16mm long. Number of flowers per inflorescence one. Pedicel less than 10 hairs per mm sq or with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs 0.5-1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 2-3.5mm long; lateral teeth 1-2.5mm long; upper tooth 0.5-2mm long; tube 3.5-5mm long; ratio of lower tooth to tube length of 0.57-0.75. Calyx base slightly gibbous or strongly gibbous; tube mouth slightly oblique; teeth reflexing absent; tooth curvature present; exterior nectaries absent. Calyx hairs covering calyx; hair density of 10-35 per mm sq; hair length 0.5-1.5mm long; hairs adpressed. Calyx colour green or purple base. Standard length 7-16mm; limb length 4-8mm; claw length 6-8.5mm; limb width 4-8mm; claw width 2-6mm; ratio of limb length to claw length 0.66-1.33. Corolla petals concolorous; standard face cream or yellow (pale). Standard upper surface cream or yellow; face without distinct veining or face with distinct veins (rarely). Standard shape platonychioid or stenonychioid; apex strongly emarginate; claw bowing present; upper surface glabrous. Wing length 10-14.5mm; limb length 4.5-7.5mm; claw length 5.5-7mm; limb width 2-4.5mm. Wing colour cream or yellow (pale). Markings absent. Wing shape 2 or 3 or 4; spur shape 1 or 2; limb base kinking weak; limb pouch present; wing to keel adhesion weak. Keel length 8-11.5mm; hood length 3-4mm; claw length 5-7.5mm; hood width 2.5-4mm. Keel colour white; hood apex distinctly coloured. Keel shape 1; base shape 2 or 3 or 4; pouch absent. Staminal tube length 6.5-10mm; filament length 1.5-2.5mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 5-7mm; style length 2.5-4.5mm; supra-ovary extension 1-2mm. Ovary shape intermediate or oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent or present. Ovary entirely covered with simple hairs; style apex pubescence type 2. Number of ovules per ovary 5-7.

LEGUME CHARACTERS: Legume (12-)23-30(-40)mm long; 7-15(-18)mm wide; 3-4mm deep; ratio of legume length to width 2.4-3.22. Amphicarpic legumes absent. Legume colour yellow or yellow-brown; uniform over legume or with purple patches. Legume shape oblong; cross-sectional shape laterally flat; not falcate; suture unparallel; distal end unbeaked or slightly beaked; valve surface not torulose; surface smooth; partitioning absent. Legume hairs 10 - 35 per mm sq; hairs less than 0.5mm long or hairs 0.5 - 1.5mm long; hairs on sutures only or hairs covering entire legume; suture surface ciliate, hairs less than 1mm long; tubercles absent. Dehiscent legume twisting loose or medium; number of seeds per legume 2-5.

SEED CHARACTERS: Seed 5.5mm long; 8-9.5mm wide; 2.5-3.5mm deep; 22-23mm circumference; hilum 1.5-2mm long; distance from hilum to lens 1-1.5mm; seed length to width ratio of 0.57-0.68; seed circumference to hilum length ratio of 0.07-0.09. Seed shape oblong; shape in side view laterally compressed; seed colour red-brown or brown; mottling present; surface matt; smooth. Hilum shape oval; coloured red-brown; groove colour beige; hilum surface excess tissue present. Lens position less than 1.6mm from hilum; prominent. Aril absent.

Phenology: March - September **Chromosome number:** (12), 14.
Geographical distribution: AF, IL, IQ, IR, JO, LB, PK, SU, SY, TR. See Map 20
Ecology: Alt. 500 - 2650m; Hab. dry agricultural and disturbed land.

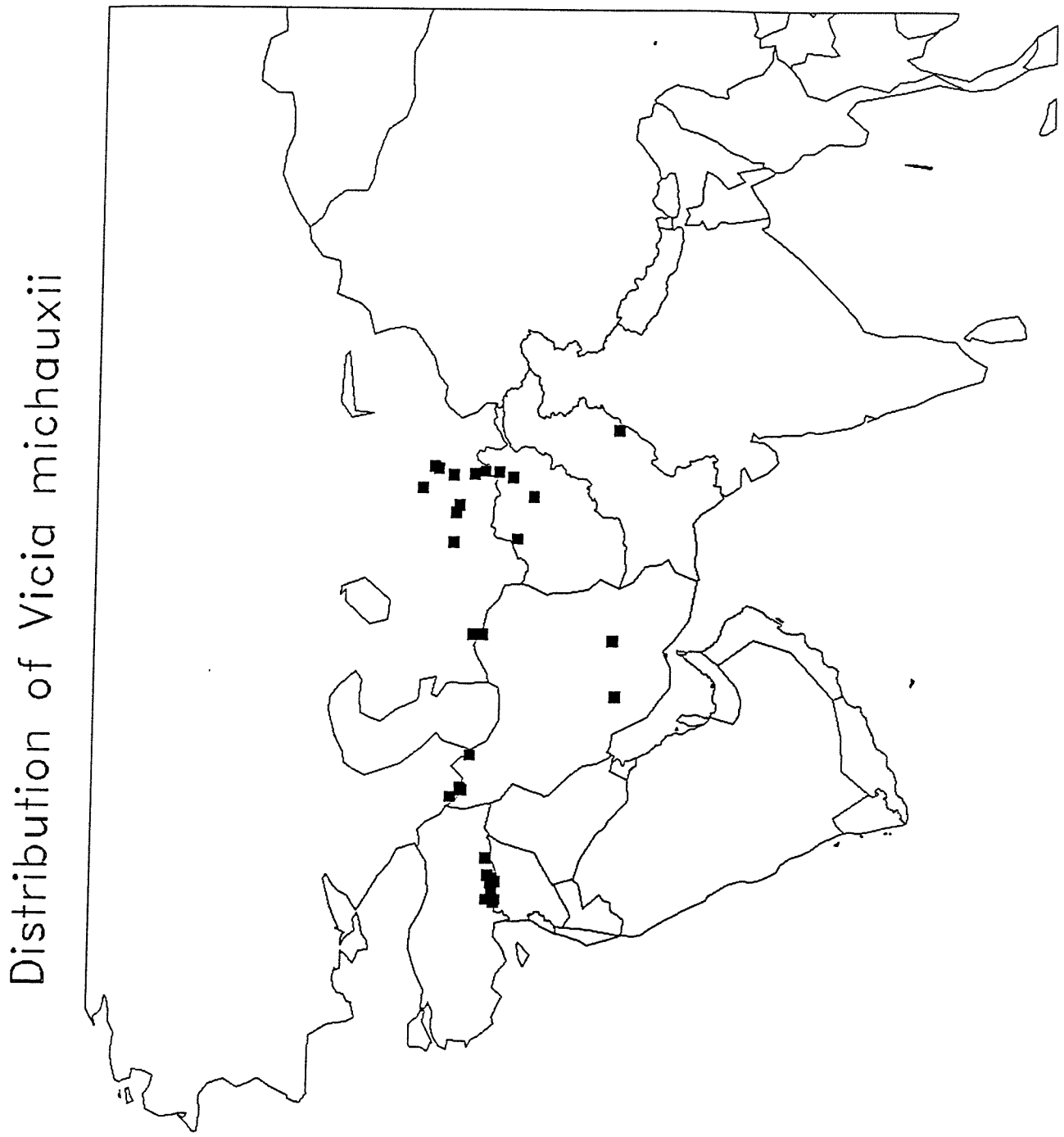
Taxonomic notes: V. michauxii is very similar to V. aintabensis, the major difference between them is legume and seed, shape and size.

Specimen citation: Koelz 14484 (E); Davis et Hedge 28374 (E); Podlech 10364 (E); Ekberg W 9116 (E); Willdenow s.n. (K); Gowan 2419 (K); Hedge, Wendelbo et Ekberg W8276 (E); Hedge et Wendelbo W3638 (E); Kotschy 238 (W); Portenchley 1366 (W); Pichler s.n. (W); Stankevich et Legotina 1504 (WIR); Gudkova s.n. (WIR); Popov 9419 (WIR); Shcherbakov s.n. (WIR); Stankevich et Legotina 1525 (WIR); Stankevich 4588 (WIR); Stankevich D45 (WIR); Nikitina s.n. (WIR); Stankevich s.n. (WIR); Krivenko s.n. (LE); Von Knorring s.n. (LE); Linchevsky s.n. (LE); Von Minkwitz s.n. (LE); Butkov s.n. (LE); Lipsky s.n. (LE); Aidarova s.n. (LE).

21 **Accepted taxon:** **V. aintabensis** Boiss. & Hausskn. ex Boiss. 1872 Fl. Orient. 2: 577.
Type: syntype, Hausshnecht 24/4/1865, Aleppo, Syria (W! & G!)
Iconography: Fl. Iran., 47; Fl. Syr., 2: 405; Fl. Tur., 3: 308; Illust. Fl. Iran., Tab. 33, fig. 4.
Synonymy: V. peregrina subsp. aintabensis (Boiss. & Hausskn. ex Boiss.) Ponert (1973) Feddes Repert., 83(9-10): 634.

Description: VEGETATIVE CHARACTERS: Annual; ascending; 20-50(-80)cm high. Stipule length 1-3mm; 1-4mm wide. Stipule semi-hastate; apex acute; number of teeth on distal edge 1-2; number of teeth on proximal edge none; stipule edge form entire; translucent or not-translucent. Stipule colour (upper plant) green or green with purple; less than 10 hairs per sqmm or = or more than 10 hairs per sqmm. Leaf 32-60mm long; petiole 2-6mm long; average leaflet internode 6-13mm long; leaflet 6-26mm long; leaflet 1-4mm wide; tendril or mucro 20-39mm long; average leaf internode 20-56mm long; petiolule 10-61mm long. Leaf apex tendrilous; simple or with 3 branches. Leaflet shape symmetric; 8-14 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet narrow linear or broad linear or linear elliptic or narrow elliptic or broad elliptic; apex retuse; base angustate; broadest at apex or in middle or at base. Leaflet adaxial hairs absent or less than 10 per mm sq or 10-50 per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long; leaflet abaxial hair less than 10

Map 20.



per mm sq or 10-50 per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long; petiole hairs 10-50 per mm sq. Stem node colour (upper plant) green or purple (rarely).

INFLORESCENCE CHARACTERS: Peduncle absent. Pedicel 2-6mm long; flower 10-24mm long; number of flowers per inflorescence one. Pedicel less than 10 hairs per mm sq or with 10-50 hairs per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long or hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 2-4mm long; lateral teeth 1-4mm long; upper tooth 1-3mm long; tube 3-6mm long; ratio of lower tooth to tube length of 0.5-0.88. Calyx base slightly gibbous; tube mouth slightly oblique; teeth reflexing absent; tooth curvature present; exterior nectaries absent. Calyx hairs covering calyx; hair density less than 10 per mm sq or 10-35 per mm sq; hair length less than 0.5mm long or 0.5-1.5mm long or more than 1.5mm long; hairs adpressed. Calyx colour green or purple base. Standard length 9-18mm; limb length 4-11mm; claw length 3-8mm; limb width 5-10mm; claw width 3-7mm; ratio of limb length to claw length 1-2.33. Corolla petals concolorous; standard face cream (or pale yellow). Standard upper surface cream; face with distinct veins. Standard shape platonychioid or stenonychioid; apex strongly emarginate; claw bowing present; upper surface glabrous. Wing length 8-16mm; limb length 3.5-9mm; claw length 3.5-7mm; limb width 1.5-5mm. Wing colour cream; markings absent. Wing shape 2 or 3; spur shape 2 or 4; limb base kinking weak; limb pouch present; wing to keel adhesion weak. Keel length 6-11mm; hood length 2-4.5mm; claw length 3.5-7mm; hood width 2.5-3.5mm. Keel colour white; hood apex distinctly coloured. Keel shape 1; base shape 2 (rarely) or 4; pouch absent. Staminal tube length 4.5-9.5mm; filament length 1-2mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 4-6.5mm; style length 2.5-4.5mm; supra-ovary extension 1-2mm. Ovary shape oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent or present. Ovary entirely covered with simple hairs; style apex pubescence type 2. Number of ovules per ovary 4-8.

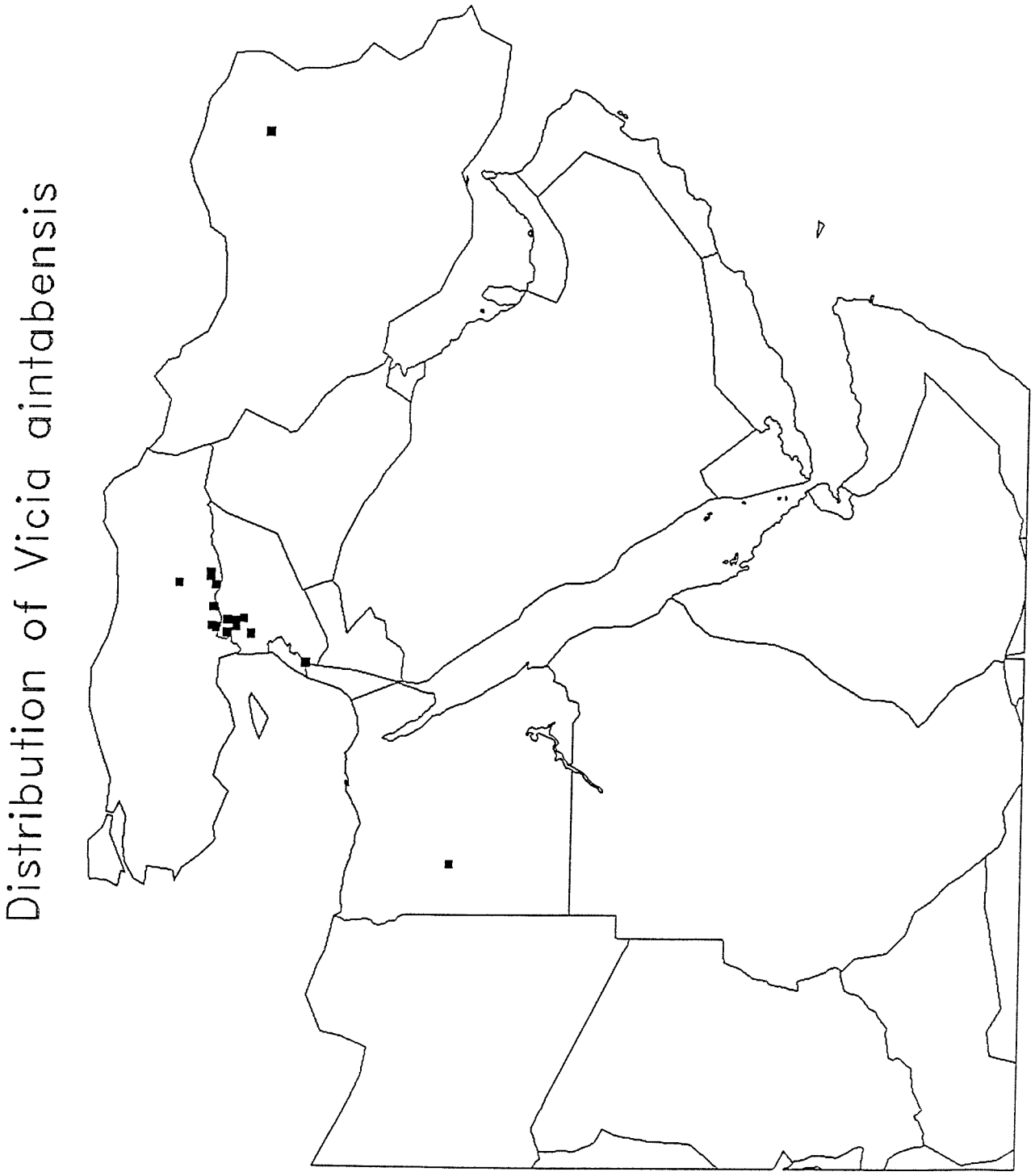
LEGUME CHARACTERS: Legume 18-26(-40)mm long; 7-10mm wide; 3-5mm deep; ratio of legume length to width 2.3-4.12. Amphicarpic legumes absent. Legume colour yellow; uniform over legume. Legume shape oblong; cross-sectional shape rounded to flat; not falcate; suture unparallel; distal end slightly beaked; valve surface not torulose; surface smooth or ridged with veins; partitioning absent. Legume hairs less than 10 per mm sq or hairs 10 - 35 per mm sq or hairs 36 - 60 per mm sq; hairs less than 0.5mm long or hairs 0.5 - 1.5mm long; hairs on sutures only or hairs covering entire legume; suture surface ciliate, hairs less than 1mm long; tubercles absent. Dehiscent legume twisting loose; number of seeds per legume 2-6.

SEED CHARACTERS: Seed 4-5.5mm long; 4-5.5mm wide; 3-4.5mm deep; 12-17mm circumference; hilum 1-2mm long; distance from hilum to lens 1mm; seed length to width ratio of 0.9-1; seed circumference to hilum length ratio of 0.07-0.1. Seed shape spherical to cubic; shape in side view circular; seed colour brown; mottling present; surface matt; smooth. Hilum shape oval; coloured red-brown; groove colour beige or red-brown; hilum surface excess tissue absent. Lens position less than 1.6mm from hilum; prominent. Aril absent.

Phenology: April - July **Chromosome number:** 14.
Geographical distribution: EG, IL, IQ, IR, JO, LB, SY, TR. See Map 21.
Ecology: Alt. 170 - 1600m; Hab. dry agricultural and disturbed land, more rarely woodland edges.

Taxonomic notes: V. aintabensis is very similar to V. michauxii, the major difference between the species is the difference in legume and seed, shape and size.

Map 21.



Specimen citation: Davies 42294 (E); Haussknecht s.n. (K); Samuelsson 3671 (K); Davis et Hedge 28087 (BM); Davis et Hedge 27919 (BM); Davis et Hedge 28087 (E); Haussknecht s.n. (W); Liston et Lev-Ari 7-85-371/24 (HUJ); Davis et Hedge 28087 (HUJ); Haussknecht s.n. (G); Cowan et Darlington 463 (K); Kotschy 238 (K); Bornmuller 6682 (E); Kotschy 993 (W); Zohary 3752 (HUJ); Maxted, Ehrman et Khattab 2214 (SPN); Maxted, Ehrman et Khattab 2110 (SPN); Maxted, Ehrman et Khattab 2158 (SPN); Maxted, Ehrman et Khattab 2148 (SPN); Maxted, Ehrman et Khattab 2182 (SPN); Maxted, Ehrman et Auricht 4825 (SPN); Maxted, Ehrman et Auricht 5252 (SPN); Maxted, Auricht et Ehrman 4825 (SPN); Maxted, Auricht et Ehrman 4889 (SPN); Maxted, Auricht et Ehrman 4982 (SPN); Maxted, Auricht et Ehrman 5060 (SPN); Maxted, Auricht et Ehrman 5079 (SPN); Maxted, Auricht et Ehrman 5106 (SPN); Maxted, Auricht et Ehrman 5216 (SPN); Maxted, Auricht et Ehrman 5252 (SPN).

22 **Accepted taxon:** V. peregrina L. (1753) Sp. Pl., 2: 737.

Type: lectotype, Linneus 906.28 (LINN!). This specimen is pinned together with 906.29 and 906.30 in the LINN, 906.29 is not V. peregrina but is V. articulata Hornem.

Iconography: Fl. Eur., 2: 135; Fl. Iran., 49-50; Fl. Iraq, 3: 538-539; Fl. Pal., 2: 202-203; Fl. Syr., 2: 405-406; Fl. Tur., 3: 308-310; Fl. USSR., 13: 466-467; Illust. Fl. Iran., Tab. 34, fig. 3; Fl. Pal., 2 (plates): 290.

Synonymy: V. megalosperma M. Bieb. (1808) Fl. Taur. Cauc. 2: 161; V. leptophylla Raf. (1810) Car. Nuo. Gen. Nuo. Sp. Ani. Pl. Sicilia, 71; V. monanthos Viv. (1824) Fl. Lib. Spec., 42; V. peregrina var. pallida Boiss. (1859) Diag. Pl. Or. Nov. Ser. 2; V. peregrina var. glabrescens Post (1896) Fl. Syr. Pal. and Sin., 1: 288; V. peregrina var. parviflora Post (1896) Fl. Syr. Pal. and Sin., 1: 288; V. peregrina var. angustifolia Rouy in Rouy & Fouc. (1899) Fl. Fr., 5: 218; V. peregrina var. latifolia Rouy in Rouy & Fouc. (1899) Fl. Fr., 5: 218; V. peregrina var. leptophylla (Raf.) Hal. (1901) Consp. Fl. Graec., 1: 481; V. peregrina var. gracilior Popov in Sched. (1927) Ad. Herb. Fl. As. Med., 11: 271; V. gracilior (Popov) Popov (1948) Fl. U.S.S.R. 13: 467; V. peregrina var. carnea (Kotschy) Plitm. (1968) Bio. Ann. Vicia, U.S.D.A., Rep. 10-CR-11, 75; V. peregrina subsp. megalosperma (M. Bieb.) Ponert (1973) Feddes Repert., 83(9-10): 634.

Description: VEGETATIVE CHARACTERS: Annual; ascending or decumbent; 10-70(-95)cm high. Stipule length 1-4mm; 1-3.5mm wide. Stipule semi-hastate; apex acute; number of teeth on distal edge none; number of teeth on proximal edge 1-2; stipule edge form entire; translucent. Stipule colour (upper plant) green or green with purple; less than 10 hairs per sqmm. Leaf 22-57mm long; petiole 1-6mm long; average leaflet internode 5-11mm long; leaflet 6-22(-40)mm long; leaflet 1-3(-6)mm wide; tendril or mucro 15-45mm long; average leaf internode 18-76mm long; petiolule 17-57mm long. Leaf apex tendrilous; simple or with 2 branches or with 3 branches or with more than 3 branches. Leaflet shape symmetric; (4-)8-14 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet narrow linear or linear elliptic; apex retuse; base angustate; broadest at apex or in middle. Leaflet adaxial hairs absent or less than 10 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle absent. Pedicel 2-9mm long; flower 9-23mm long. Number of flowers per inflorescence one. Pedicel with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs 0.5-1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 2-5mm long; lateral teeth 1.5-4mm long; upper tooth 1-3.5mm long; tube 3-6.5mm long; ratio of lower tooth to tube length of 0.55-1.12. Calyx base not gibbous or slightly gibbous; tube mouth slightly oblique; teeth reflexing absent; tooth curvature present; exterior

nectaries absent. Calyx hairs covering calyx; hair density of 10-35 per mm sq or 36-60 per mm sq; hair length 0.5-1.5mm long or more than 1.5mm long; hairs adpressed. Calyx colour green or purple base. Standard length 10-25mm; limb length 5.5-19mm; claw length 4-10mm; limb width 4.5-17mm; claw width 3-8mm; ratio of limb length to claw length 1-3.16. Corolla petals concolorous; standard face cream (rarely) or purple; standard upper surface cream (rarely) or lilac; face without distinct veining. Standard shape stenonychioid; apex strongly emarginate; claw bowing present; upper surface glabrous. Wing length 7-15mm; limb length 3.5-10.5mm; claw length 3.5-7.5mm; limb width 2-7mm. Wing colour cream (rarely) or purple; markings absent. Wing shape 1 or 2 or 3; spur shape 1; limb base kinking weak; limb pouch absent; wing to keel adhesion weak. Keel length 5.5-11.5mm; hood length 1.5-4.5mm; claw length 3.5-10mm; hood width 2.5-4.5mm. Keel colour white; hood apex distinctly coloured. Keel shape 1; base shape 4; pouch absent. Staminal tube length 5-9.5mm; filament length 1.5-2.5mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 4-6mm; style length 2.5-3.5mm; supra-ovary extension 1-2.5mm. Ovary shape oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent or present. Ovary entirely covered with simple hairs; style apex pubescence type 2. Number of ovules per ovary 5-8.

LEGUME CHARACTERS: Legume (15-)17-40mm long; (4-)6-11(-12)mm wide; 3-6mm deep; ratio of legume length to width 2.42-4. Amphicarpic legumes absent. Legume colour yellow or yellow-brown; uniform over legume or with purple patches. Legume shape rhomboid or oblong; cross-sectional shape rounded to flat; not falcate; suture unparallel or parallel; distal end slightly beaked; valve surface not torulose; surface smooth or ridged with veins; partitioning absent or present. Legume hairs less than 10 per mm sq or hairs 10 - 35 per mm sq or hairs 36 - 60 per mm sq; hairs less than 0.5mm long or hairs 0.5 - 1.5mm long; hairs on sutures only or hairs covering entire legume; suture surface denticulate or ciliate, hairs less than 1mm long; tubercles absent. Dehiscent legume twisting medium or tight; number of seeds per legume (2-)3-5(-7).

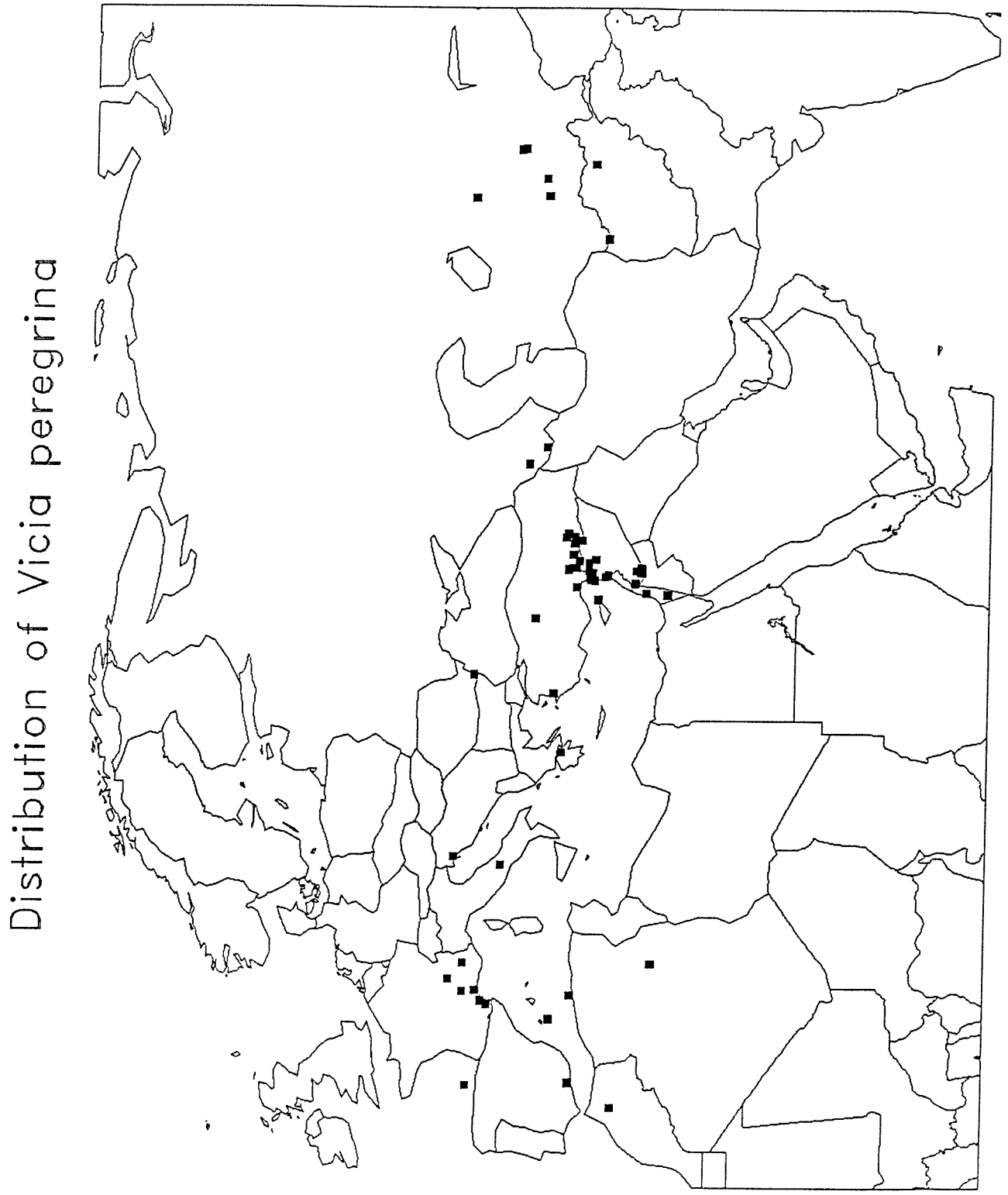
SEED CHARACTERS: Seed 3.5-6.5mm long; 3.5-6.5mm wide; 2.5-5.5mm deep; 8-16mm circumference; hilum 1-3mm long; distance from hilum to lens 0.5-2mm; seed length to width ratio of 1-1.28; seed circumference to hilum length ratio of 0.13-0.19. Seed shape spherical or spherical to cubic; shape in side view circular or laterally compressed; seed colour yellow or red-brown; mottling absent or present; surface matt; smooth. Hilum shape oval or elongated, less than third of circumference; coloured red-brown; groove colour beige; hilum surface excess tissue absent or present. Lens position less than 1.6mm from hilum; prominent. Aril absent.

Phenology: February - July **Chromosome number:** (12), 14.
Geographical distribution: AF, AL, BG, CH, CY, DZ, EG, ES, FR, GR, HU, IL, IQ, IR, IT, JO, LB, LY, MA, PK, PT, RO, SA, SU, SY, TR, YU. See Map 22.
Ecology: Alt. 10 - 1450m; Hab. Dry agricultural and disturbed land.

Taxonomic notes: V. peregrina is a polymorphic taxon, with much variation associated with local environmental conditions. Plitmann (1967) recognised three varieties (var. gracilior, var. carnea and var. peregrina), distinguished on the basis of leaflet dimensions, calyx teeth lengths, corolla colour and size. Field observations have shown these characters to be variable within populations and they do not appear to form distinct taxonomic units, but merge one into another. Without the experience of a more detailed study in uniform garden conditions it seems premature to accept these taxa as distinct varieties.

Specimen citation: Davis 2235 (E); Reverchon s.n. (K); Saurage 5863 (MPU); Albaille s.n. (MPU); Foures 983 (MPU); Blanchet s.n. (MPU); Blanchet s.n. (MPU); Maxted & Khattab 1033 (SPN); Maxted & Khattab 1042 (SPN); Heldreich 24/3/1895 (E); Kupicha 197 (E); Krendl & Krendl s.n. (W); Bourgeau 979 (K); Thompson 1869 (E); Plitmann 17854 (HUJ); Baldinger 17966 (HUJ); Jaffe 17962 (HUJ); Burri & Krendl s.n. (W); Smith

Map 22.



s.n. (K); Sennen & Mauricio s.n. (BM); Gandoger s.n. (MO); Krendl & Krendl s.n. (W); Popov 271 (E); Popov 271 (MO); Bochantsev 128 (LE); Lipsky s.n. (LE); Regel s.n. (LE); Yarmolenko 65 (LE); Mikhelson s.n. (LE); Popov 271 (LE); Anon. s.n. (ERE); Gabrielian s.n. (ERE); Maxted, Ehrman & Khattab 2031 (SPN); Maxted, Ehrman & Khattab 2095 (SPN); Maxted, Ehrman & Khattab 2147 (SPN); Maxted, Ehrman & Khattab 2164 (SPN); Maxted, Ehrman & Khattab 2370 (SPN); Maxted, Ehrman & Khattab 2460 (SPN); Maxted, Ehrman & Khattab 2503 (SPN); Maxted, Ehrman & Khattab 2559 (SPN); Maxted, Ehrman & Khattab 2607 (SPN); Maxted, Ehrman & Khattab 2652 (SPN); Maxted, Ehrman & Khattab 2735 (SPN); Zohary & Orshan 2718 (HUJ); Maxted, Ehrman & Auricht 5205 (SPN); Maxted, Kitiki & Allkin 4294 (SPN); Maxted, Kitiki & Allkin 4150 (SPN); Maxted, Kitiki & Allkin 4137 (SPN); Maxted, Kitiki & Allkin 4053 (SPN); Maxted, Kitiki & Allkin 4045 (SPN); Maxted, Kitiki & Allkin 4029 (SPN); Maxted, Kitiki & Allkin 4001 (SPN); Maxted, Auricht & Ehrman 4833 (SPN); Maxted, Auricht & Ehrman 4950 (SPN); Maxted, Auricht & Ehrman 5022 (SPN); Maxted, Auricht & Ehrman 5068 (SPN); Maxted, Auricht & Ehrman 5120 (SPN); Maxted, Auricht & Ehrman 5166 (SPN); Maxted, Auricht & Ehrman 5240 (SPN); Maxted, Auricht & Ehrman 5268 (SPN).

Section Wiggersia

V **Section** Wiggersia (Alef.) Maxted stat. nov.
Type: V. lathyroides L. (1753) Sp. Pl., 2: 736.
Synonymy: Ervum L. (1753) Sp. Pl., 738. pro parte excl. typ.; Wiggersia Gaertner, Meyer & Scherb. (1801) Fl. Wetterau 3(6): 33, nomina nudum; Vicia sect. Euvicia Vis. (1852) Fl. Dalmatica 1: 317, pro parte; Wiggersia Alef., (1861) Bonplandia, 9: 69; Vicia sect. Lathyroides Buchenau (1894) Fl. Nordwest. d. Tiefeb., 324; Vicia sect. subsessiles Rouy in Rouy & Fouc. (1899) Fl. Fr., 5: 208, pro parte; Vicia ser. Lathyroides (Buchenau) B. Fedtsch (1948) Fl. USSR., 13: 457 nomina nudum; Vicia sect. Lathyroides (Buchenau) Tsvelev (1980) Novosti Sist. Vyssh. Rast., 17: 203.

Description: Annual; scrambling; stem slender. Stipules entire or semi-hastate; length less than 3.5mm or 3.5 to 5.5mm; edge entire or with 1-2 teeth. Leaf apex tendrilous; leaflet less than 20mm; with 1-4 pairs or more than 4 pairs. Leaflets symmetric; margins entire. Number of flowers per inflorescence 1; peduncle 1-2mm. Calyx mouth straight; teeth subequal; base not gibbous. Pedicel shorter or equal to 3mm. Flowers shorter than 15mm; standard cream or blue or purple; shape stenonychioid; claw bowing absent; upper standard surface glabrous. All petals approximately equal length. Wing marking absent; wing limb kinking absent. Legume length less than 30mm; width less than 5mm; linear; round in cross section or laterally flattened; sutures parallel or curved; valve hairs absent or present; hairs simple; septa absent; number of seeds per legume less than 7 or 7 to 10. Seeds less than 3.4mm; round; not laterally flattened or laterally flattened; hilum less than quarter of seed circumference; lens positioned near hilum; testa surface sculptured.

Number of taxa: two. **Chromosome number:** 10, 12.
Geographical distribution: Europe, West Asia and Algeria.

Taxonomic notes: These two species have been considered closely allied by numerous authors (Alefeld, 1861; Boissier, 1872; Boulomov, 1930; Plitmann, 1967; Ball, 1968; Kupicha, 1976; Chrtkova-Zertova, 1979). They were included with V. lutea, V. sepium and V. sylvatica in the genus Wiggersia by Gaertner et al. (1801), but the name was not validly published. Alefeld (1861) took up the name, but used a different conception that included V. lathyroides and V. cuspidata alone and thus the name is used here to encompass the same group. The two species are united by their small habit, much reduced peduncle, linear legume and seed testa surface being sculptured. V. lathyroides bears some resemblance to V. sativa subsp. nigra, but it is clearly distinguishable form the latter by the characters listed above. The distinction of these two species from their closest allies in sect. Vicia warrants sectional rank.

23 **Accepted taxon:** V. cuspidata Boiss. (1843) Diagn. Ser. 1(2): 104.
Type: Syntype, Aucher Eloy 981, Umbrosis, Lydia, Asia Minor (K!, G!).
Iconography: Fl. Eur., 2: 135; Fl. Iran., 55; Fl. Pal., 2: 205; Fl. Syr., 2: 404; Fl. Tur., 3: 317; Illust. Fl. Iran., Tab. 35, fig. 5; Fl. Pal., 2 (plates): 294.
Synonymy: Wiggersia cuspidata Alef. (1861) Bonplandia, 9: 69; Ervum cuspidatum (Boiss.) Stankevich (1982) Trudy Prikl. Bot. Genet. Selek., 72(1): 25.

Description: VEGETATIVE CHARACTERS: Annual; ascending or decumbent; 8-50cm high. Stipule length 2.5-4.5mm; 1-3mm wide. Stipule entire or semi-hastate; apex acute; number of teeth on distal edge none or 1-2; number of teeth on proximal edge none; stipule edge form entire or uneven with swollen hairs; translucent. Stipule colour (upper plant) green; hairs located edge only or = or more than 10 hairs per sqmm. Leaf 12-48mm long; petiole 2-8mm long; average leaflet internode 3-11mm long; leaflet 5-18(-23)mm long; leaflet 1-5(-9)mm wide; tendril or mucro 1-35mm long; average leaf internode 7-49mm long; petiolule 9-43mm long. Leaf apex tendrilous; simple or with 2 branches (rarely). Leaflet shape symmetric; 2-12 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet narrow elliptic or broad elliptic; apex mucronate and emarginate or mucronate; base angustate; broadest at apex or in middle. Leaflet adaxial hairs absent or less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long or hairs more than 1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm). Peduncle length 0.5mm; pedicel 1-2mm long; flower 7-14mm long; peduncular cusp absent. Number of flowers per inflorescence one. Pedicel less than 10 hairs per mm sq or with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long or hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 2-4.5mm long; lateral teeth 2-4.5mm long; upper tooth 2-4.5mm long; tube 2.5-4mm long; ratio of lower tooth to tube length of 0.66-1.28. Calyx base not gibbous; tube mouth truncate; teeth reflexing absent; tooth curvature absent; exterior nectaries absent. Calyx hairs covering calyx; hair density less than 10 per mm sq or 10-35 per mm sq; hair length less than 0.5mm long or 0.5-1.5mm long; hairs adpressed. Calyx colour green or purple base. Standard length 7-14mm; limb length 4.5-10.5mm; claw length 2-6mm; limb width 3.5-9mm; claw width 2-4mm; ratio of limb length to claw length 1.16-3.33. Corolla petals concolorous or not concolorous; standard face cream (rarely) or lilac or violet or purple; standard upper surface cream (rarely) or violet or lilac or purple; face without distinct veining or face with distinct veins. Standard shape stenonychioid; apex emarginate with mucro; claw bowing absent or present; upper surface glabrous. Wing length 6.5-12mm; limb length 4.5-9.5mm; claw length 2-5.5mm; limb width 1.5-5mm. Wing colour cream or lilac or violet or purple; markings absent. Wing shape 2; spur shape 3 or 4; limb base kinking absent; limb pouch absent; wing to keel adhesion weak. Keel length 4-6.5mm; hood length 1.5-2.5mm; claw length 2.5-4mm; hood width 1.5-2mm. Keel colour white; hood apex distinctly coloured. Keel shape 1; base shape 2; pouch absent. Staminal tube length 3-5mm; filament length 0.5-1mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 2.5-4mm; style length 1.5-3mm; supra-ovary extension 0.5mm. Ovary shape intermediate or oblong; style apex cross sectional round; supra-ovary curvature absent. Ovary glabrous; style apex pubescence type 1. Number of ovules per ovary 4-10.

LEGUME CHARACTERS: Legume 14-27mm long; 3-5(-8)mm wide; 2-5mm deep; ratio of legume length to width 2.37-6.25. Amphicarpic legumes absent. Legume colour yellow-brown or brown; uniform over legume. Legume shape linear; cross-sectional shape rounded to flat or laterally flat; falcate; suture straight; distal end strongly beaked; valve surface not torulose; surface smooth; partitioning absent. Legume

glabrous; suture surface smooth. Dehiscent legume twisting medium or tight; number of seeds per legume 4-8.

SEED CHARACTERS: Seed 2.5-3.5mm long; 2-3mm wide; 0.5-2.5mm deep; 7-9mm circumference; hilum 0.5-1mm long; distance from hilum to lens 0.5-1mm; seed length to width ratio of 0.83-1.5; seed circumference to hilum length ratio of 0.07-0.1. Seed shape spherical or spherical to cubic; shape in side view circular or laterally compressed; seed colour red-brown or brown; mottling absent or present; surface matt; tuberculate. Hilum shape round or oval; coloured yellow or coloured red-brown; groove colour beige or same as hilum; hilum surface excess tissue absent or present. Lens position less than 1.6mm from hilum; prominent or not prominent. Aril absent.

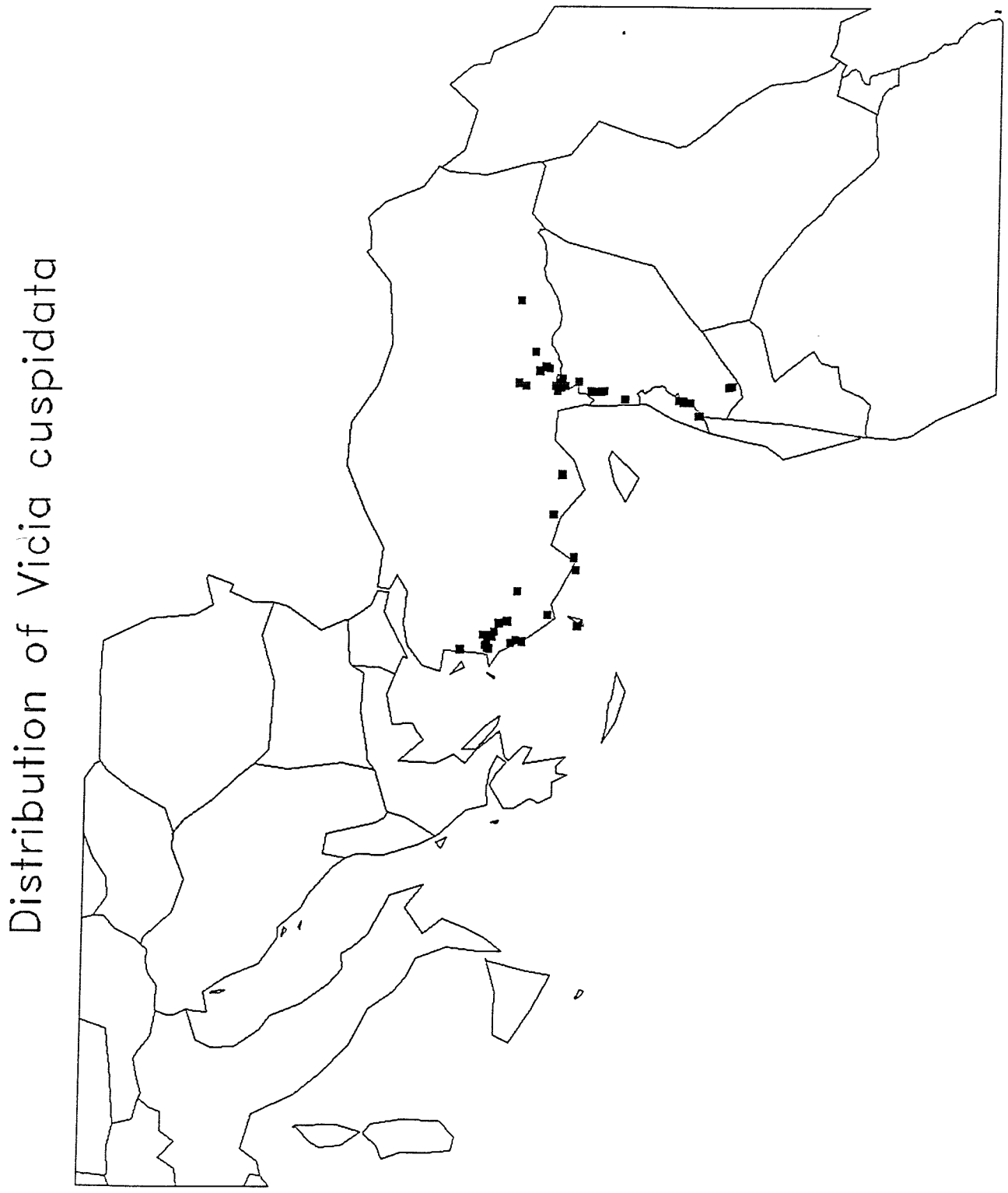
Phenology: April - June **Chromosome number:** 12.
Geographical distribution: CY, GR, IL, IR, JO, LB, SY, TR. See Map 23.
Ecology: Alt. 120 - 1550m Hab. disturbed and undisturbed land, and open woodland.

Taxonomic notes: Plitmann (1967) notes that a few specimens of V. cuspidata from Turkey (Thracia and Lydia) show some degree of intermediacy with V. lathyroides. No such intermediate specimens were noted during the current study.

Specimen citation: Davis 3121K (E); Brenan 11028 (E); Liston & Lev-Ari 7-85-366/14 (HUJ); Maxted, Ehrman & Khattab 2197 (SPN); Maxted, Ehrman & Khattab 2271 (SPN); Maxted, Ehrman & Khattab 2286 (SPN); Maxted, Ehrman & Khattab 2338 (SPN); Maxted, Ehrman & Khattab 2339 (SPN); Maxted, Ehrman & Khattab 2380 (SPN); Maxted, Ehrman & Khattab 2388 (SPN); Maxted, Ehrman & Khattab 2415 (SPN); Maxted, Ehrman & Khattab 2425 (SPN); Maxted, Ehrman & Khattab 2428 (SPN); Maxted, Ehrman & Khattab 2440 (SPN); Maxted, Ehrman & Khattab 2448 (SPN); Maxted, Ehrman & Khattab 2547 (SPN); Maxted, Ehrman & Khattab 2664 (SPN); Maxted, Ehrman & Khattab 2672 (SPN); Maxted, Ehrman & Khattab 2687 (SPN); Maxted, Ehrman & Khattab 2690 (SPN); Maxted, Ehrman & Khattab 2711 (SPN); Maxted, Ehrman & Khattab 2734 (SPN); Postian s.n. (BM); Balansa 204 (K); Boissier 6/1842 (K); Bornmuller 9441 (K); Townsend 69/87 (K); Bornmuller 9443 (BM); Balansa 204 (BM); Kupicha C9599 (E); Bornmuller 9443 (E); Davis 41733 (E); Bornmuller 9440 (W); Balansa 204 (W); Montbret s.n. (W); Bozakman & Fitz 264 (W); Fitz & Spitzenburger 246 (W); Boissier s.n. (G); Maxted, Kitiki & Allkin 4080 (SPN); Maxted, Kitiki & Allkin 4268 (SPN); Maxted, Kitiki & Allkin 4297 (SPN); Maxted, Kitiki & Allkin 4305 (SPN); Maxted, Kitiki & Allkin 4315 (SPN); Maxted, Kitiki & Allkin 4354 (SPN); Maxted, Kitiki & Allkin 4362 (SPN); Maxted, Kitiki & Allkin 4398 (SPN); Maxted, Kitiki & Allkin 4447 (SPN); Maxted, Kitiki & Allkin 4483 (SPN); Maxted, Kitiki & Allkin 4500 (SPN); Maxted, Auricht & Ehrman 4804 (SPN); Maxted, Auricht & Ehrman 4874 (SPN); Maxted, Auricht & Ehrman 4915 (SPN); Maxted, Auricht & Ehrman 4922 (SPN); Maxted, Auricht & Ehrman 5020 (SPN); Maxted, Auricht & Ehrman 5160 (SPN); Maxted, Auricht & Ehrman 5274 (SPN); Maxted, Auricht & Ehrman 5305 (SPN).

24 **Accepted taxon:** **V. lathyroides** L. (1753) Sp. Pl., 2: 736.
Type: lectotype, Linneus 906/22 (LINN!).
Iconography: Fl. Eur., 2: 135; Fl. Iran., 54-55; Fl. Iraq, 3: 538; Fl. Syr., 2: 404; Fl. Tur., 3: 317-318; Fl. USSR., 13: 457-458; Illust. Draw. Brit. Pl., 3: 67; Fl. Iran., Tab. 35, fig. 4.
Synonymy: Ervum soloniense L. in Torner (1756) Cent. Pl. 2: 28; V. minima Gilib. (1782) Fl. Lithuan., 2: 106; Wiggersia lathyroides Gaertner, Meyer & Schreber (1801) Fl. Wetterau, 3(1): 34; Wiggersia minima Alef. (1861) Bonplandia, 9: 69.; V. olbiensis Reuter ex Timb.-Lagr. (1866) Bull. Soc. Bot. Fr., 13: 151.; V. arenivaga Lamotte (1877) Prod. Fl. Plat. Cent. Fr., 1: 214.; V. praecox Jacquem. ex Arcang. (1894) Comp. Fl. It., 2: 525; V. olbiensis Reuter & Shuttlew. ex Rouy (1899) Fl. France, 5: 216; V. lathyroides subsp. olbensis (Reuter & Shuttlew.) Rouy in Rouy & Fouc. (1900) Flore France, 5: 216; V. lathyroides var. olbiensis Steudel ex Asch. & Graebner (1909) Syn. Mittleurop. Fl., 6(2): 960; V.

Map 23.



lathyroides var. typica Asch. & Graebner (1909) Syn. Mittle. Fl., 6(2): 960; V. guyoti Beauverd (1919) Bull. Soc. Bot. Geneve Ser. 2, 11: 133; V. lathyroides subsp. olbiensis (Reuter) Bujor. (1929) Bul. Grad. Bot. Univ. Cluj, 8: 119; Ervum lathyroides (L.) Stankevich (1982) Trudy Prikl. Bot. genet. Selek., 72(1): 25.

Description: VEGETATIVE CHARACTERS: Annual; ascending or decumbent; (5-)8-40(-70)cm high. Stipule length 2-6.5mm; 1-3mm wide. Stipule semi-hastate; apex acute; number of teeth on distal edge 1-2; number of teeth on proximal edge none; stipule edge form entire or uneven with swollen hairs; translucent or not-translucent. Stipule colour (upper plant) green; less than 10 hairs per sqmm or = or more than 10 hairs per sqmm. Leaf (3-)7-43mm long; petiole (1-)3-8mm long; average leaflet internode 2-10mm long; leaflet (2-)5-17(-20)mm long; leaflet 1-5mm wide; tendril or mucro 2-34mm long; average leaf internode 5-74mm long; petiolule 2-36mm long. Leaf apex tendrilous; simple. Leaflet shape symmetric; (2-)4-6(-12) leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet narrow elliptic or broad elliptic; apex mucronate and emarginate or mucronate or acute; base angustate; broadest at apex or in middle. Leaflet adaxial hairs absent or less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long or hairs more than 1.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long or hairs more than 1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm). Peduncle length 1mm; pedicel 1-2mm long; flower 5-12(-15)mm long; peduncular cusp absent. Number of flowers per inflorescence one. Pedicel with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 1.5-3.5mm long; lateral teeth 1.5-3.5mm long; upper tooth 1.5-3.5mm long; tube 2-4.5mm long; ratio of lower tooth to tube length of 0.6-1. Calyx base not gibbous; tube mouth truncate; teeth reflexing absent; tooth curvature absent; exterior nectaries absent. Calyx hairs covering calyx; hair density less than 10 per mm sq or 10-35 per mm sq or 36-60 per mm sq; hair length 0.5-1.5mm long or more than 1.5mm long; hairs adpressed. Calyx colour green. Standard length 5.5-10(-12)mm; limb length 3-8mm; claw length 2.5-6mm; limb width 2.5-10mm; claw width 1.5-6mm; ratio of limb length to claw length 0.85-3. Corolla petals concolorous; standard face purple (rarely bluish or white). Standard upper surface lilac; face without distinct veining. Standard shape stenonychioid; apex emarginate with mucro; claw bowing absent or present; upper surface glabrous. Wing length 5-8mm; limb length 3-5mm; claw length 2-3mm; limb width 1.5-3mm. Wing colour purple (rarely bluish or white). Markings absent. Wing shape 2; spur shape 2 or 3 or 4; limb base kinking absent; limb pouch absent; wing to keel adhesion weak. Keel length 3.5-4.5mm; hood length 1.5-2.5mm; claw length 2-2.5mm; hood width 1.5-2mm. Keel colour white; hood apex distinctly coloured. Keel shape 1; base shape 1; pouch absent. Staminal tube length 2-4mm; filament length 0.5mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 2-4mm; style length 1.5-2.5mm; supra-ovary extension 0.5mm. Ovary shape intermediate or oblong; style apex cross sectional round; supra-ovary curvature absent. Ovary entirely covered with simple hairs; style apex pubescence type 1. Number of ovules per ovary 5-12.

LEGUME CHARACTERS: Legume 13-25(-35)mm long; 3-5mm wide; 2-3mm deep; ratio of legume length to width 3.5-6.25. Amphicarpic legumes absent. Legume colour yellow-brown or brown or black; uniform over legume. Legume shape linear; cross-sectional shape round or rounded to flat or laterally flat; not falcate; suture straight; distal end slightly beaked; valve surface not torulose; surface smooth; partitioning absent. Legume glabrous or hairs 10 - 35 per mm sq; hairs less than 0.5mm long or hairs 0.5 - 1.5mm long; hairs covering entire legume; suture surface smooth or ciliate, hairs less than 1mm long;

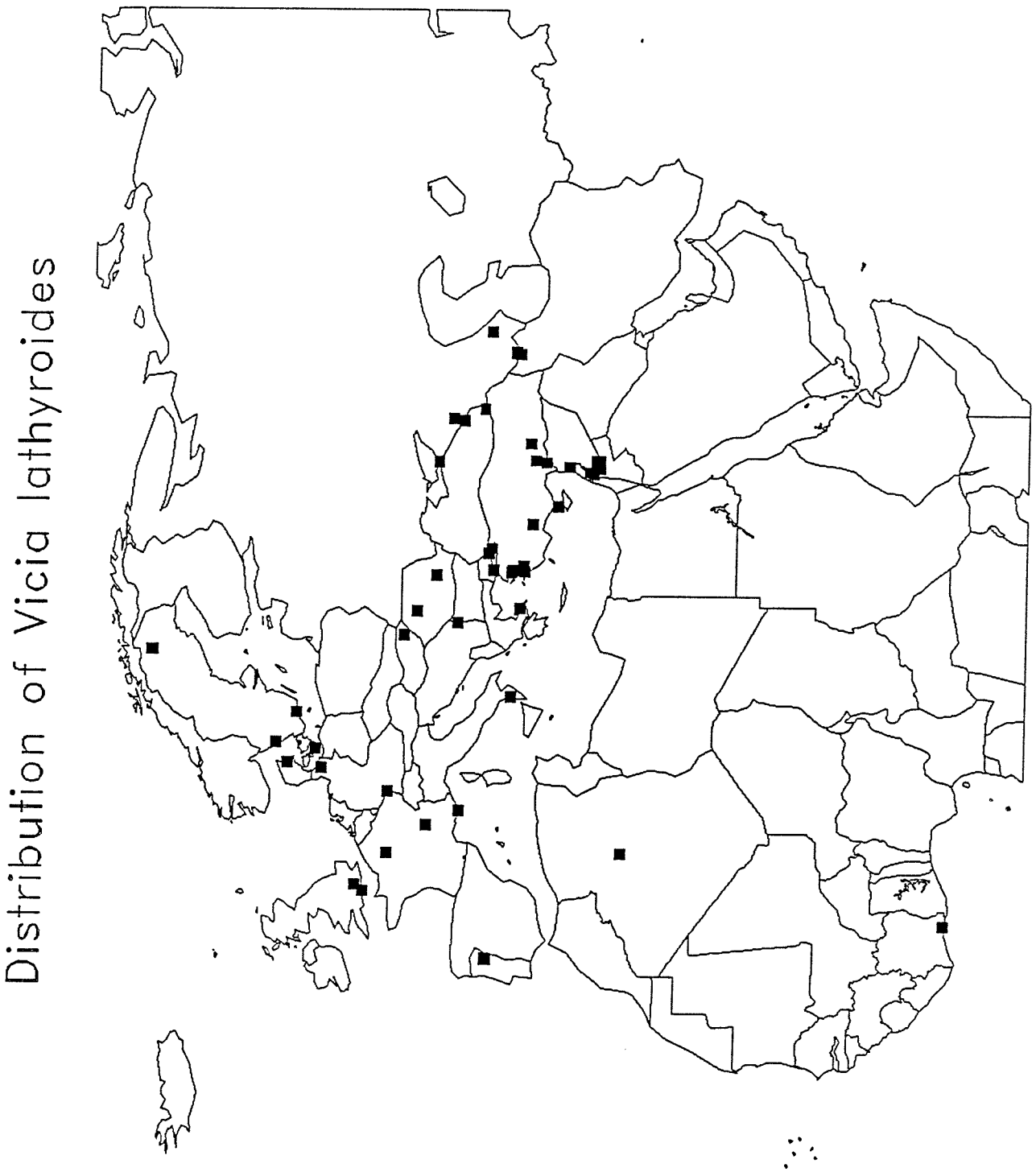
tubercles absent. Dehiscent legume twisting medium or tight; number of seeds per legume 4-8(-12).

SEED CHARACTERS: Seed 1.5-2.5mm long; 1-2mm wide; 1-1.5mm deep; 4.5-5.5mm circumference; hilum 0.5mm long; distance from hilum to lens 0.5mm; seed length to width ratio of 1-2; seed circumference to hilum length ratio of 0.09-0.1. Seed shape spherical to cubic; shape in side view circular or laterally compressed; seed colour yellow or red-brown or brown; mottling absent; surface matt; tuberculate. Hilum shape oval; coloured yellow or coloured red-brown; groove colour beige or same as hilum or red-brown; hilum surface excess tissue absent. Lens position less than 1.6mm from hilum; prominent or not prominent. Aril absent.

Phenology: March - August **Chromosome number:** (10), 12.
Geographical distribution: AL, AT, BE, BG, CA(I), CH, CS, CY, DE, DD, DE, DK, DZ, ES, FI, FR, GB, GR, HU, IE, IL, IQ, IR, IT, JO, LB, MA, NL, NO, PL, PT, RO, SE, SU, SY, TR, US(I), YU. See Map 24.
Ecology: Alt. 10 - 1500m; Hab. Lawn and grazed pasture weed, open woodland and disturbed land.

Specimen citation: Danin s.n. (HUJ); Anon. s.n. (SPN); Bromfield s.n. (SPN); Zeljazova 665 (W); Macoun 79688 (MO); Kennedy 585 (K); Holm-Nielsen & Jeppesen 666 (SPN); Andersen s.n. (W); Billot 174 (E); Ball s.n. (E); Cosson 18 (E); Raine 1004 (K); Ball s.n. (HUJ); Larsen, Larsen & Neilsen 279 (W); Krendl s.n. (W); Rapaics 849 (E); Shmida 1303 (HUJ); Camperio 1084 (E); Bisby 1879 (SPN); Bisby 1884 (SPN); Bisby 1895 (SPN); Krendl 5/5/1976 (W); Bujorean 801 (MO); Teplyakova & Seferova 500352 (WIR); Grossheim s.n. (LE); Popov s.n. (LE); Lipsky s.n. (LE); Tsvelev s.n. (LE); Grigoryan s.n. (LE); Lipsky s.n. (LE); Oganesian s.n. (ERE); Samuelsson 1094 (K); Johansson s.n. (K); Wahlstedt s.n. (CAIM); Maxted, Ehrman & Khattab 2427 (SPN); Maxted, Ehrman & Khattab 2487 (SPN); Maxted, Ehrman & Khattab 2493 (SPN); Maxted, Ehrman & Khattab 2527 (SPN); Maxted, Ehrman & Khattab 2531 (SPN); Maxted, Ehrman & Khattab 2555 (SPN); Maxted, Ehrman & Khattab 2556 (SPN); Maxted, Ehrman & Khattab 2572 (SPN); Maxted, Ehrman & Khattab 2599 (SPN); Uluocak 22 (W); Maxted, Kitiki & Allkin 4408 (SPN); A., C. & W. 1320 (K); Balansa 203 (BM); Parquet & Coumany s.n. (BM); Davis & Hedge 26233 (E); Maxted, Kitiki & Allkin 4140 (SPN); Maxted, Kitiki & Allkin 4184 (SPN); Maxted, Kitiki & Allkin 4301 (SPN); Maxted, Kitiki & Allkin 4409 (SPN); Maxted, Kitiki & Allkin 4421 (SPN); Maxted, Kitiki & Allkin 4435 (SPN); Maxted, Kitiki & Allkin 4446 (SPN); Maxted, Kitiki & Allkin 4304 (SPN); Maxted, Ehrman & Auricht 5552 (SPN); Maxted, Ehrman & Auricht 6248 (SPN); MacKeever 945 (BM); Boufford 15929 (E); Ahles & Jackson 53154 (E); Boufford 15929 (MO).

Map 24.



Section Vicia

VI **Section** Vicia L. 1753 Sp. Pl. 736.
Type: V. sativa L.
Iconography: Fl. Eur., 2: 134; Fl. Iran., 41; Fl. Iraq, 3: 528; Fl. Pal., 2: 202; Fl. Tur., 3: 303; Fl. USSR., 13: 453.
Synonymy: Vicia sect. Euvicia Vis. (1852) Fl. Dalmatica 1: 317, pro parte.

Description: Annual or perennial; climbing; stem slender. Stipules entire or semi-hastate or semi-sagittate; length less than 3.5mm or 3.5 to 5.5mm; edge entire or with 1-2 teeth or with 3-5 teeth or with more than 5 teeth. Leaf apex tendrilous; leaflet less than 20mm or 20-30mm or longer than 30mm; with 1-4 pairs or more than 4 pairs. Leaflets symmetric; margins entire or serrate or incised. Number of flowers per inflorescence 1 or 1 to 2 or 3 to 4; peduncle 1-2mm or peduncle 3-6mm or peduncle longer than 6mm. Calyx mouth straight; teeth subequal; base not gibbous. Pedicel shorter or equal to 3mm or longer than 3mm. Flowers shorter than 15mm or 15 to 20mm or longer than 20mm; standard cream or yellow or blue or purple; shape stenonychioid; claw bowing absent; upper standard surface glabrous. All petals approximately equal length. Wing marking absent; wing limb with slight kinking or strong kinking. Legume length less than 30mm or 30 to 50mm; width less than 5mm or 5 to 10mm wide or greater than 10mm; linear or rectangular; round in cross section or laterally flattened; sutures straight; valve hairs absent or present; hairs simple; septa absent or present; number of seeds per legume less than 7 or 7 to 10 or more than 10. Seeds less than 3.4mm or 3.5 to 6.0mm or 6.1 to 10mm; round; not laterally flattened or laterally flattened; hilum less than quarter of seed circumference or quarter to half seed circumference or over half seed circumference; lens positioned near hilum; testa surface smooth.

Number of taxa: twelve. **Chromosome number:** 10, 12, 14.
Geographical distribution: Europe, North Africa and West Asia.

Taxonomic notes: Section Vicia sensu Kupicha (1976) has been split into three groupings, V. lathyroides and V. cuspidata are separated into a distinct section, Wiggersia, from the Vicia sensu stricto. The remaining species are subdivided into two distinct groups. However, the division between the two latter groups is not as distinct as between sect. Wiggersia and sect. Vicia sensu stricto. So the two groups within Vicia sensu stricto are given series status as; ser. Vicia which contains V. pyrenaica, V. barbazitae and V. sativa, and ser. Grandiflorae Radzhi, which contains V. grandiflora and V. qatmensis. V. grandiflora was first distinguished from the V. sativa aggregate by Alefeld (1861a), who created the monospecific genus Cujunia. The need for a discrete taxon for V. grandiflora was also seen by Fedtschenko (1948). He referred to the unit as ser. Grandiflorae, but he did not validly publish the name. Radzhi (1971) finally published ser. Grandiflorae. The two series are distinguished by corolla colour, corolla size, legume shape, legume size and the relative lengths of the seed hilum to its circumference.

A **Series** Vicia L. 1753 Sp. Pl. 736.
Type: V. sativa L.
Iconography: Fl. Eur., 2: 134; Fl. Iran., 41; Fl. Iraq, 3: 528; Fl. Pal., 2: 202; Fl. Tur., 3: 303; Fl. USSR., 13: 453.
Synonymy: Vicia ser. Perennes Taubert (1894) Die Nat. Pl. III, 10: 351, nomen nudum; Vicia ser. Annuae Taubert (1894) Die Nat. Pl. III, 10: 351, nomen nudum; Vicia subser. Purpurascentes Taubert (1894) Die Nat. Pl. III, 10: 351, nomen nudum; Vicia sect. Sativae Buchenau (1894) Fl. Nordwest d. Tiefebene 323; Vicia sect. Subsessiles Rouy in Rouy & Fouc. (1899) Fl. Fr., 5: 208, pro parte.; Vicia ser. Sativae B. Fedtsch. (1948) Fl. URSS., 13: 460 nomen nudum.

Description: Annual or perennial; climbing; stem slender. Stipules entire or semi-hastate or semi-sagittate; length less than 3.5mm or 3.5 to 5.5mm; edge entire or with 1-2 teeth or with 3-5 teeth or with more than 5 teeth. Leaf apex tendrilous; leaflet less than 20mm or 20-30mm or longer than 30mm; with 1-4 pairs or more than 4 pairs. Leaflets symmetric; margins entire or serrate or incised. Number of flowers per inflorescence 1 or 1 to 2 or 3 to 4; peduncle 1-2mm or peduncle 3-6mm or peduncle longer than 6mm. Calyx mouth straight; teeth subequal; base not gibbous. Pedicel shorter or equal to 3mm. Flowers shorter than 15mm or 15 to 20mm or longer than 20mm; standard yellow or blue or purple; shape stenonychioid; claw bowing absent; upper standard surface glabrous. All petals approximately equal length. Wing marking absent; wing limb with slight kinking or strong kinking. Legume length less than 30mm or 30 to 50mm; width less than 5mm or 5 to 10mm wide or greater than 10mm; linear or rectangular; round in cross section or laterally flattened; sutures straight; valve hairs absent or present; hairs simple; septa absent or present; number of seeds per legume less than 7 or 7 to 10 or more than 10. Seeds less than 3.4mm or 3.5 to 6.0mm or 6.1 to 10mm; round; not laterally flattened or laterally flattened; hilum less than quarter of seed circumference or quarter to half seed circumference; lens positioned near hilum; testa surface smooth.

Number of taxa: nine. **Chromosome number:** 10, 12, 14.
Geographical distribution: Europe, North Africa and West Asia.

Taxonomic notes: The series is dominated by the polmorphic, pan-temperate V. sativa and the other two species, V. pyrenaica and V. barbazitae can be seen as extreme forms of V. sativa.

25 **Accepted taxon:** V. pyrenaica Pourret (1788) Act. Tolouse Mem. 3: 333.
Type: Holotype, Pourret de Figeac s.n., Eynes, France (P).
Iconography: Fl. Eur., 2: 134.
Synonymy: V. talpa Raym. ex Poiret (1808) Encyc. Meth. Bot. 8: 563; V. fagonii Lapeyr. (1813) Hist. Abr. Pl. Pyr. 2, 419.

Description: VEGETATIVE CHARACTERS: Perennial; ascending or decumbent; 20-50cm high. Stipule length 3-6mm; 1-3.5mm wide. Stipule entire or semi-hastate or semi-saggitate; apex acute; number of teeth on distal edge none or 1-2 teeth or 3-5; number of teeth on proximal edge none; stipule edge form entire; translucent. Stipule colour (upper plant) green or green with purple; glabrous or less than 10 hairs per sqmm. Leaf 13-47mm long; petiole 1-12mm long; average leaflet internode 3-10mm long; leaflet 5-15mm long; leaflet 2-10mm wide; tendril or mucro 3-26mm long; average leaf internode 6-41mm long; petiolule 11-42mm long. Leaf apex tendrilous; simple or with 2 branches or with 3 branches. Leaflet shape symmetric; 6-12 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet broad elliptic or narrow ovate; apex mucronate and emarginate; base angustate or truncate to angustate; broadest at apex or in middle. Leaflet adaxial hairs absent or less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm) or longer than 2mm, but shorter than flower. Peduncle length 1-2mm; rachis 1mm long; pedicel 1-3mm long; flower 15-25mm long; ratio of peduncle to flower length of 0.04-0.1; peduncular cusp absent or present and less than 2.1mm long. Number of flowers per inflorescence one or two. Pedicel less than 10 hairs per mm sq or with 10-50 hairs per mm sq; hairs 0.5-1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 1.5-4.5mm long; lateral teeth 1.5-4.5mm long; upper tooth 1.5-4.5mm long; tube 5.5-7mm long; ratio of lower tooth to tube length of 0.27-0.69. Calyx base not gibbous or slightly gibbous; tube mouth truncate or slightly oblique; teeth reflexing absent; tooth curvature absent or present; exterior nectaries absent or seen on lateral teeth. Calyx hairs covering calyx; hair density less than 10 per mm sq or 10-35 per mm sq; hair length less than 0.5mm long or 0.5-1.5mm long; hairs adpressed. Calyx colour green or purple. Standard length 16-25mm; limb length 7.5-15mm; claw length 6.5-10mm; limb width 10-18mm; claw width 5-8mm; ratio of limb length to claw length 0.88-1.76. Corolla petals concolorous; standard face purple; standard upper surface lilac; face without distinct veining. Standard shape stenonychioid; apex emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 13.5-20mm; limb length 7-11mm; claw length 6.5-10mm; limb width 4-8mm. Wing colour purple; markings absent. Wing shape 3; spur shape 4; limb base kinking weak; limb pouch absent; wing to keel adhesion weak. Keel length 11-15.5mm; hood length 3-5.5mm; claw length 7-10mm; hood width 4-6mm. Keel colour white; hood apex distinctly coloured. Keel shape 2; base shape 2; pouch absent. Staminal tube length 10-12.5mm; filament length 1.5-2mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 6-9mm; style length 4.5-6.5mm; supra-ovary extension 1.5-3mm. Ovary shape intermediate; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary glabrous; style apex pubescence type 1. Number of ovules per ovary 11-15.

LEGUME CHARACTERS: Legume 22-33(-50)mm long; 4-6mm wide; 4mm deep; ratio of legume length to width 4.4-5.6. Amphicarpic legumes absent. Legume colour brown or black; uniform over legume. Legume shape linear; cross-sectional shape rounded to flat; not falcate; suture straight; distal end unbeaked; valve surface not torulose; surface smooth; partitioning absent. Legume glabrous; suture surface smooth. Dehiscent legume twisting medium or tight; number of seeds per legume 6-8(-12).

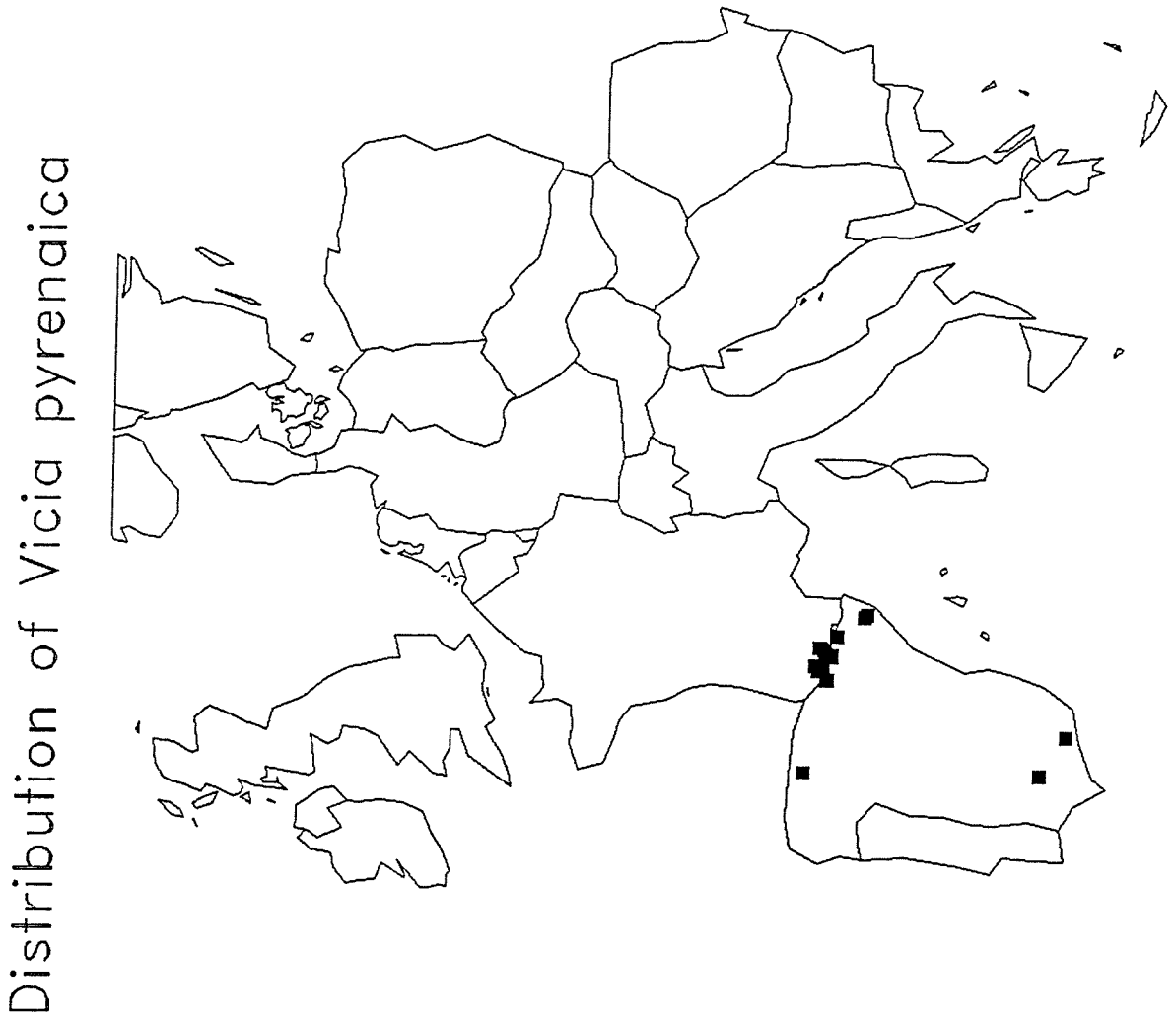
SEED CHARACTERS: Seed 3-4mm long; 3.5mm wide; 2-2.5mm deep; 8.5-9.5mm circumference; hilum 3mm long; distance from hilum to lens 0.5-1mm; seed length to width ratio of 0.85-1.14; seed circumference to hilum length ratio of 0.32-0.35. Seed shape spherical or spherical to cubic; shape in side view circular or laterally compressed; seed colour red-brown; mottling absent or present; surface matt; smooth. Hilum shape very elongated, more than third of circumference; coloured red-brown; groove colour beige; hilum surface excess tissue absent. Lens position less than 1.6mm from hilum; not prominent. Aril absent.

Phenology: June - August **Chromosome number:** 14.
Geographical distribution: ES, FR. See Map 25.
Ecology: Alt. 1100 - 2400m; Hab. Alpine pasture.

Taxonomic notes: A restricted alpine form of V. sativa, the character differences between it and V. sativa, that warrent the specific distinction, are associated with its adaptation to the alpine environment.

Specimen citation: Sequra Zubizarreta 16968 (RNG); Gardner & Gardner 829 (RNG); Coultas, Lester & Longton 281 (RNG); Smythies 120 (E); Wolfe 1854 (K); Charpin & Jacquemond 15565 (E); Endrefs s.n. (E); Schultz 464 (W); Krendl 1315 (W); Bordere 6/7 (MO); Huter s.n. (OXF); Neyraut 00/07/1902 (OXF); Franqueville 28/06/1849 (OXF); Dresser P/428 (E); Brummitt 12835 (K); Boissier s.n. (W); Spitzenberger 232 (W); Polatschek s.n. (W); Bourgeau 263 (MO); Boissier 7/1837 (MO); Warburg 17/08/1954 (OXF); Burgeau 10/07/1854 (OXF); Bordere 464 (OXF).

Map 25.



26 **Accepted taxon:** V. sativa L. (1753) Sp. Pl. 2: 736.

Iconography: Fl. Eur., 2: 134; Fl. Iran., 50-51; Fl. Iraq, 3: 534-535; Fl. Pal., 2: 205; Fl. Syr., 2: 403; Fl. Tur., 3: 318-321; Fl. USSR., 13: 460-463.

Synonymy: Faba angustifolia Miller (1755) Gard. Dict. Abr., 4; V. lathyroides All. (1785) Fl. Pedemontana, 1: 326; V. alba Medikus (1787) Vorles. Churpf. Gen. 2: 359; V. alba Moench (1794) Meth. Pl. Hort. Bot. Marburgensis, 148; V. bacla Moench (1794) Methn. 148; V. luganensis Schleicher (1815) Cat. Omni. Pl. Helv., 4: 31; V. nemoralis Steudel (1821) Nomen. Bot., Ed. 1. 882; V. sativa var. leucosperma Ser. in DC. (1825) Prodr., 2: 361; V. obovata Ser. in DC (1825) Prodr. 2: 361; V. helvetica Ser. in DC. (1825) Prodr. 2: 361; V. cosentinii Guss. (1828) Fl. Siculae Prodr., 2: 426; V. pygmaea Link (1829) Hand. zur Erkennung, 2: 191; V. obocordata Reichenb. (1832) Fl. Germ. Excurs., 2: 530; V. vulgaris Uspensky (1834) Bull. Soc. Nat. Mosc., 7: 378; V. remrevillensis Hussenot (1835) Prodr. de la Lorraine, 2(1): 196; V. pallida Turcz. (1842) Bull. Soc. Imp. Nat. Moscow, 15(4): 789; V. mowsiana Jordan (1857) Fl. Cent. Fr., 3(2): 172; V. sativa var. variifolia Neilr. (1859) Fl. Nieder-Oesterr. 962; Orobus japonicus Alef. (1861) Bonplandia 9: 143; V. campestris Schur (1866) Enum. Pl. Transs., 169; V. longifolia Schur (1866) Enum. Pl. Transs., 169; V. stenophylla Schur (1866) Enum. Pl. Transs., 169; V. excisa Schur (1866) Enum. Pl. Transs., 169; V. maculata Pomel (1874) Nou. Mat. Fl. Atlan., 192; V. consobrina Pomel (1874) Bull. Soc. Sci. Phys. Algerie, 11: 192; V. pallida Jacquem. ex Baker in Hook. (1876) Fl. Brit. Ind., 2: 178; V. diomedis Gren. ex Nyman (1878) Consp. Fl. Eur., 1: 210; V. martini Gren. ex Nyman (1878) Consp. Fl. Eur., 1: 210; V. communis Rouy in Rouy & Fouc. (1899) Fl. Fr., 5: 208; V. leganiana Rapaics & Lengn. (1919) Mag. Bot. Lapok., 18: 55; V. terana Losa (1950) Anales Inst. Bot. Cavanilles, 9: 493; V. sativa subsp. terana (Losa) Benedi & Molero (1986) Bol. Soc. Brot. ser., 2, 59: 64; V. sativa subsp. consobrina (Pomel) Greuter & Burdet (1989) Willdenowia, 19: 34..

Description: VEGETATIVE CHARACTERS: Annual; erect or ascending or decumbent; 20-80(-100)cm high. Stipule length 2.5-12mm; 1-11mm wide. Stipule entire or semi-hastate; apex acute; number of teeth on distal edge none or 1-2 teeth or 3-5 teeth or more than 5; number of teeth on proximal edge none or 1-2 teeth or 3-5 teeth or more than 5; stipule edge form entire or uneven with swollen hairs; translucent. Stipule colour (upper plant) green or green with purple; less than 10 hairs per sqmm or = or more than 10 hairs per sqmm. Leaf 12-84mm long; petiole 1-11mm long; average leaflet internode 3-32mm long; leaflet 7-38mm long; leaflet 1-15mm wide; tendril or mucro 2-109mm long; average leaf internode 4-105mm long; petiolule 7-76mm long. Leaf apex tendrilous; simple or with 2 branches or with 3 branches or with more than 3 branches. Leaflet shape symmetric; 4-14(-18) leaflets per leaf. Upper leaflet margin entire or less than 7 serrations; lower leaflet margin entire or serrate; leaflet margins level. Leaflet narrow linear or broad linear or linear elliptic or narrow elliptic or broad elliptic or elliptic ovate or narrow ovate; apex mucronate and emarginate or mucronate; base angustate or truncate to angustate; broadest at apex or in middle or at base. Leaflet adaxial hairs absent or less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long or hairs more than 1.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long or hairs more than 1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm) or longer than 2mm, but shorter than flower. Peduncle length 1-13mm; rachis 1-10mm long; pedicel 1-3mm long; flower 10-28mm long; ratio of peduncle to flower length of 0.03-0.64; peduncular cusp absent or present and less than 2.1mm long. Number of flowers per inflorescence one or two or three or four (rarely). Pedicel less than 10 hairs per mm sq or with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 2-20.5mm long; lateral teeth 2-20.5mm long; upper tooth 2-20.5mm long; tube 3.5-7.5mm long; ratio of lower tooth to tube length of 0.44-1.77. Calyx base not gibbous; tube mouth truncate; teeth reflexing absent; tooth curvature absent; exterior nectaries seen on lateral teeth or seen on all teeth. Calyx hairs covering calyx; hair density less than 10 per mm sq or 10-35 per mm sq or 36-60 per mm sq; hair length less than 0.5mm long or 0.5-1.5mm long or more than 1.5mm long; hairs adpressed. Calyx colour green or purple base. Standard length 11-31mm; limb length 6-20mm; claw length 3-13mm; limb width 5-20mm; claw width 2.5-10mm; ratio of limb length to claw length 0.68-2.33. Corolla petals concolorous or not concolorous; standard face cream or purple; standard upper surface cream or lilac; face without distinct veining. Standard shape stenonychioid; apex emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 8.5-24mm; limb length 4.5-13.5mm; claw length 4-11mm; limb width 2-9mm. Wing colour cream or violet or purple; markings absent. Wing shape 2 or 3; spur shape 4; limb base kinking weak or strong; limb pouch absent; wing to keel adhesion weak. Keel length 7.5-16mm; hood length 2-6mm; claw length 4-10.5mm; hood width 3-6.5mm. Keel colour white; hood apex distinctly coloured. Keel shape 2; base shape 2; pouch absent or present. Staminal tube length 6.5-15mm; filament length 1-2.5mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 3.5-10mm; style length 3.5-7.5mm; supra-ovary extension 0.5-2mm. Ovary shape oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary entirely covered with simple hairs; style apex pubescence type 1 or 3. Number of ovules per ovary 6-14.

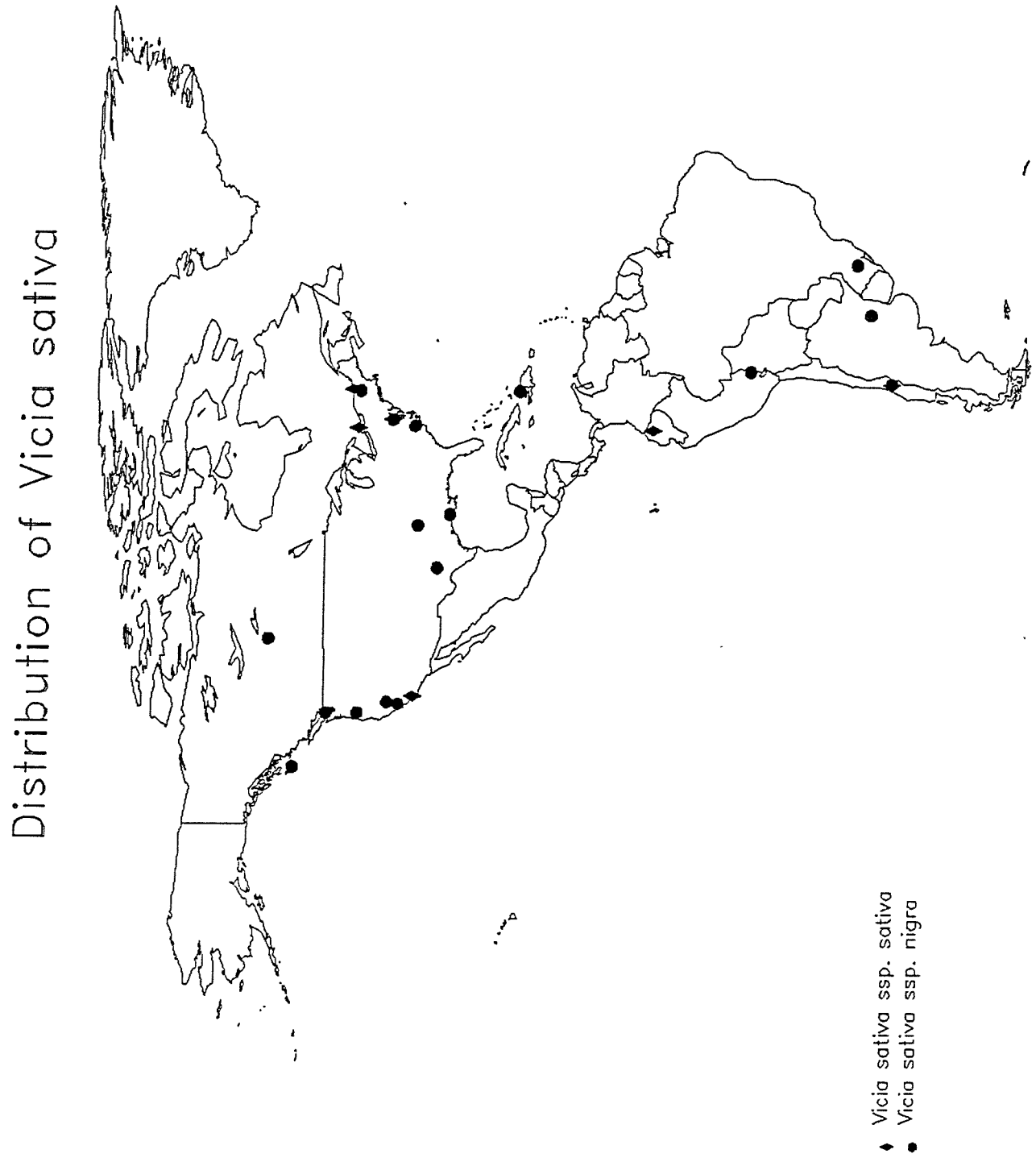
LEGUME CHARACTERS: Legume (6-)20-50(-70)mm long; 4-10(-12)mm wide; 3-7mm deep; ratio of legume length to width 1.4-8. Amphicarpic legumes absent or present. Legume colour yellow or yellow-brown or brown or black; uniform over legume. Legume shape linear or oblong; cross-sectional shape round or rounded to flat; not falcate or falcate; suture unparallel or straight; distal end unbeaked or slightly beaked; valve surface not torulose or torulose; surface smooth or ridged with veins; partitioning absent or present. Legume hairs less than 10 per mm sq or hairs 10 - 35 per mm sq or hairs 36 - 60 per mm sq; hairs less than 0.5mm long or hairs 0.5 - 1.5mm long; hairs covering entire legume; suture surface ciliate, hairs less than 1mm long; tubercles absent. Dehiscent legume twisting loose or medium or tight; number of seeds per legume (1-)6-13.

SEED CHARACTERS: Seed 2-7mm long; 2-7mm wide; 1.5-4.5mm deep; 6.5-17mm circumference; hilum 1.5-3mm long; distance from hilum to lens 0.5-1mm; seed length to width ratio of 0.8-1.33; seed circumference to hilum length ratio of 0.18-0.23. Seed shape spherical or spherical to cubic or oblong; shape in side view circular or laterally compressed; seed colour yellow or red-brown or brown or black; mottling absent or present; surface matt; smooth or wrinkled. Hilum shape oval or elongated, less than third of circumference; coloured yellow or coloured red-brown or coloured black; groove colour beige or same as hilum or red-brown; hilum surface excess tissue absent or present. Lens position less than 1.6mm from hilum; prominent or not prominent. Aril absent.

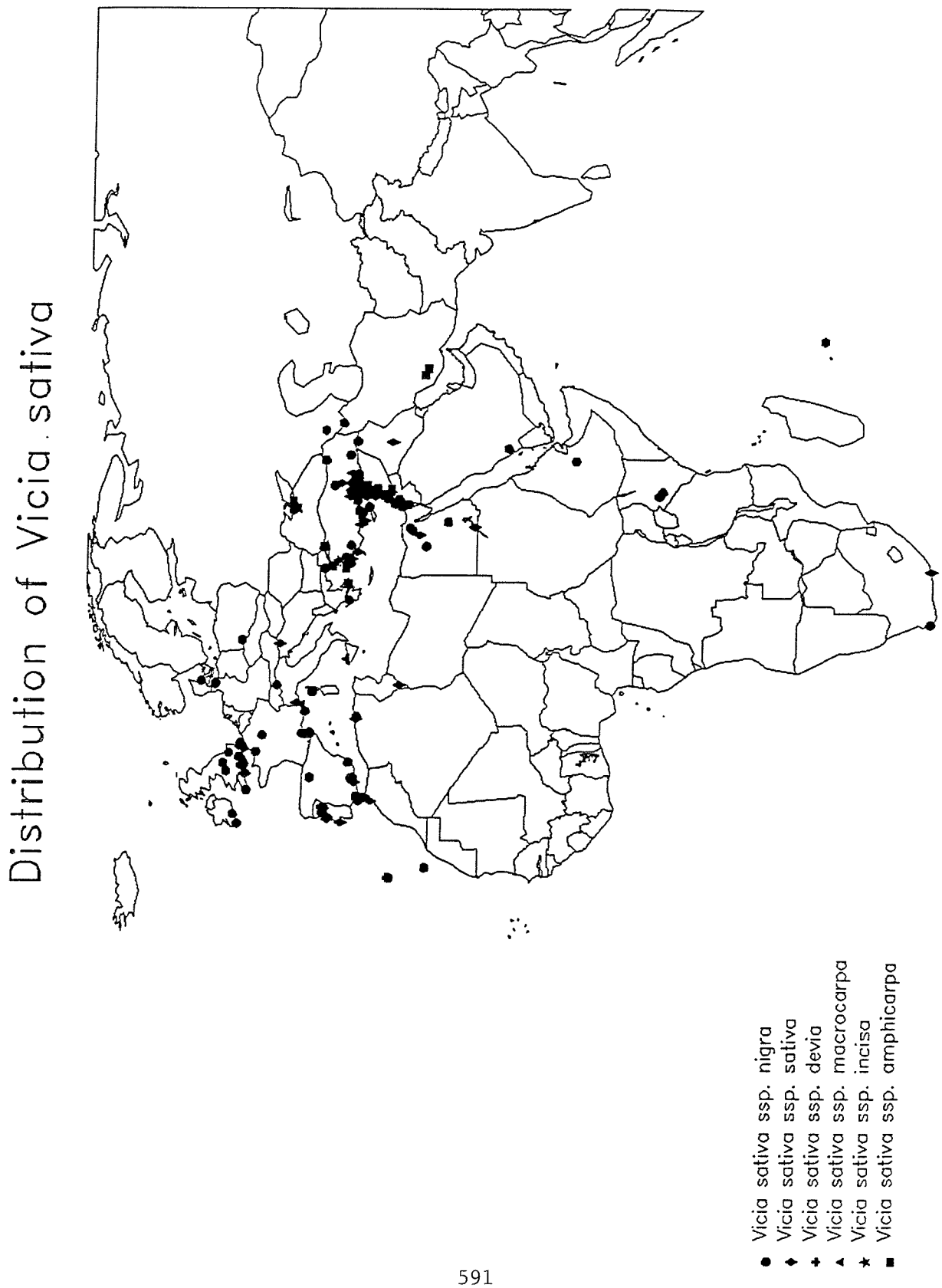
Phenology: February - November **Chromosome number:** (10), 12, (14).
Geographical distribution: AF, AL, AR(I), AT(I), AU, BE, BG, BR(I), CA(I), CH, CL(I), CN, CS, CY, CU(I), DD, DE, DK, DZ, EC, EG, ES, ET, FI, FR, GB, GR, HU, IE, IL, IN, IQ, IR, IT, JP, JO, KE(I), LB, LE, LY, MA, MR, MU(I), MX(I), NL, NO, NP, NZ(I), PL, PK, PT, RO, SA, SE, SO, SU, SY, TN, TR, US(I), YU. See Map 26a, b, and c.
Ecology: Alt. 1 - 2900m; Hab. common pan-temperate and semi-tropical weed, agricultural and disturbed land, margins of woodland.

Taxonomic notes: V. sativa is undoubtably the most ubiquitous and polymorphic species of Vicia. These characteristics have resulted in the description of numerous forms, which have, in turn, lead to an abundant synonymy. My conception is based on the material I cite and I have restricted my circumscription to include six basic intra-specific forms of V. sativa (I discuss the existence of a

Map 26a.


Distribution of Vicia sativa
Vicia sativa ssp. sativa
Vicia sativa ssp. nigra

Map 26b.


Distribution of Vicia sativa
Vicia sativa ssp. nigra
Vicia sativa ssp. sativa
Vicia sativa ssp. devia
Vicia sativa ssp. macrocarpa
Vicia sativa ssp. incisa
Vicia sativa ssp. amphicarpa

Map 26c.


Distribution of Vicia sativa
Vicia sativa ssp. sativa
Vicia sativa ssp. nigra

seventh form below). The investigation could not be focused on V. sativa, due to the scope of this project and a definitive view of V. sativa infra-specific taxonomy has not been proposed.

Numerous recent workers e.g. Hanelt & Mettin (1966), Plitmann (1967), Davis & Plitmann (1970), Hollings & Stace (1974, 1978) and Stankevich (1978) have reported detailed morphological studies of the V. sativa aggregate and the complex has also been extensively investigated for non-morphological data. Virtually each study has yielded a novel classification. A detailed review of the existing knowledge, complimented by targeted research to fill existing knowledge gaps is required to provide a clear statement about V. sativa infra-specific taxonomy. Most immediately a key to the infra-specific taxa is needed.

Y. Potokina, at the N.I. Vavilov Institute of Plant Industry, Leningrad, U.S.S.R., is undertaking such a study. The project has included morphological, cytological and phytochemical (isozyme polymorphism) studies of the V. sativa aggregate. Her study is incomplete, but she currently recognises six species and four subspecies:

1.a V. sativa subsp. sativa L.
b V. sativa subsp. linearifolia Stankev.

2. V. incisa Bieb.

3. V. macrocarpa (Moris) Bertol.

4. V. amphicarpa Dorth.

5. V. cordata Wulf. ex Hoppe in Sturm

6.a V. angustifolia subsp. angustifolia L.
b V. angustifolia subsp. segetalis (Thuill.) Gaud.

Like many Soviet botanists she gives specific rank to taxa that in the West would generally be regarded as subspecies or varieties. She recognises, both V. cordata and V. angustifolia subsp. segetalis, which I reduce to synonyms of V. sativa L. subsp. sativa and V. sativa subsp. nigra (L.) Ehrh. respectively. Potokina and I have discussed the position of these taxa and she considers the difference in leaf characters sufficient to warrant their status as distinct taxa. Although I accepted these two taxa at the beginning of my project, I have found no clear character combination to distinguish these taxa from the taxa I recognise. Potokina was unable to suggest such a character combination. Her position is, however, supported by the findings of Calamosia (pers. comm.), who is undertaking a biosystematic and cytogenetic study of the V. sativa agg. She accepts both taxa and believes there are clear differences in karyotype between these two taxa and other members of the aggregate. Calamosia was also unable to suggest a set of reliable morphological characters to distinguish these taxa. So I am reluctant to accept them in my circumscription. My position, however, may need to be revised, when their studies are completed.

Hanelt & Mettin (1989) comment that, though morphological differences between the forms of the aggregate are not striking, the level of karyotypic differentiation is astonishing. They emphasis the lack of a consistent taxonomy for this group and rather than support any existing classification, raise each form to specific rank. They do not justified this on the basis of consistent evidence from taxonomic studies. This may be expedient, but is not an optimal solution to the problem. The

contradictory views of so many authors highlights the need for further study of this species aggregate before a stable classification can be produced.

Potokina also recognises V. sativa subsp. linearifolia Stankev., which is not recognised in this conspectus. This taxon is distinguished from subsp. sativa on the basis of leaf shape. The results of the current study do not indicate a clear separation of V. sativa subsp. sativa into two specimen cluster on the basis of leaf width. I do not, therefore, accept this taxon. One reason for the different views of the variation pattern in the V. sativa aggregate, between myself and Potokina may be Potokina's lack of access to material of the aggregate throughout its range. For results of a revision to be truly conclusive the aggregate must be sampled throughout its range.

As well as the six subspecies I recognise, the existence of a another V. sativa form seems likely. A 'lentil' seeded form has been drawn to my attention by Dr. A. Butler (Institute of Archaeology, University of London). I have traced three names that appear to be linked to this taxon. Burulina (1930) refers to V. sativa subsp. platysperma, but there is no evidence that she validly published this name. The second name is V. sativa var. eu-leganyana (Rapaics & Lengyel) Kiffm. As with the previous name, this name does not appear to have been validly published. Kiffmann (1952) provides a brief discussion of the mimicry of this taxon for Lens culinaris. The third name is V. sativa subsp. obovata var. lentisperma, but I have been unable to trace either an author or the publication details for this name.

I have not seen specimens of this taxon, but the existence of a V. sativa subsp. nigra form, which has evolved to mimic Lens culinaris seeds seems plausible and is discussed in detail by Barulina (1930) and Rowlands (1959).

Key to subspecies of V. sativa

1(0). Peduncle 9-15mm; calyx base slightly gibbose; ovary shape linear; stipule edge not-translucent.... iv V. sativa subsp. devia
Peduncle much shorter; calyx base not gibbose; ovary shape oblong; stipule edge translucent..... 2

2(1). Flowers and fruits dimorphic; stems aerial and subterranean, the latter bearing rudimentary flowers producing 1-2-seeded fruits below ground..... ii V. sativa subsp. amphicarpa
Flowers and fruits monomorphic, all borne on aerial stems..... 3

3(2). Legumes 8-12 broad, thick valves with prominent veins, dark brown to blackish; corolla 20-30mm..... ..... vi V. sativa subsp. macrocarpa
Legumes 4-8 broad, thinner valves without prominent veins; corolla 13-27mm..... 4

4(3). Legumes torulose, 40-90 x 5-8mm; seeds 3-7mm; calyx teeth 3-9mm; corolla 20-27mm; leaflets (5-)6-8 paired, linear or oblong to obovate, truncate..... v V. sativa subsp. sativa
Legumes not torulose, 20-50 x 4-8mm; seeds 2.5-3.5mm; calyx teeth 2.5-8mm; corolla 10-24mm; leaflets 3-8 paired, acute to emarginate..... 5

5(4). leaflets 1-7 wide, lower leaflet margin entire; legume distal

end unbeaked..... i V. sativa subsp. nigra

Leaflets 5-14, lower leaflet margin incised dentate; legume distal end slightly beaked..... iii V. sativa subsp. incisa

i **Accepted taxon:** V. sativa subsp. nigra (L.) Ehrh. (1780) Hannover. Mag. 15: 229.

Type: lectotype, Linneus (LINN!).

Iconography: Fl. Eur., 2: 134; Fl. Iran., 52-53; Fl. Iraq, 3: 536-537; Fl. Pal., 2: 206-207; Fl. Syr., 2: 403; Fl. Tur., 3: 319-320; Fl. USSR., 13: 464; Illust. Draw. Brit. Pl., 3: 66; Fl. Iran., Tab. 35, fig. 1.

Synonymy: V. angustifolia Grufb. (1754) Fl. Angl., 21; V. angustifolia L. (1759) Amoen. Acad., 4: 105; V. sativa var. nigra L. (1763) Sp. Pl., ed. 2: 1037; V. angustifolia Roth (1788) Tent. Fl. Germ. 1: 310; V. sativa var. angustifolia Roth (1800) Cat. Bot., 2: 96; Faba angustifolia Bernhardi (1800) Sys. Cer. Pfl. Gegend um Erfurt, 1: 250; V. segetalis Thuill. (1800) Fl. Env. Paris, 2: 367; V. canadensis Zuccagni (1806) Roem. Collect. 151; V. pilosa M. Bieb. (1808) Fl. Taur. Cauc., 2: 161; V. cordata Hoppe (1811) Fl. Deutschlands, 8: 31; V. cordata Wulfen ex Hoppe (1812) Fl. Dtschld., 32: 497; V. sativa var. angustifolia (Grufb.) Wahlb. (1814) Fl. Carp., 218; V. nigra var. angustifolia Steudel (1821) Nomencl. Bot., 1: 882; V. heterophylla C. Presl in J. Presl & C. Presl (1822) Del. Prage. Hist. Nat. Spect., 1: 37; V. intermedia Viv. (1824) Fl. Lib. Spec., 42. V. sativa subsp. nigra var. segatalis (Thuill.) Ser. ex DC. (1825) Prodr. 2: 361; V. cordifolia Wulfen in Sprengel (1826) Syst., 3: 264; V. maculata C. Presl (1826) Fl. Sicula, 1: 23; (V. cuneata) Guss. (1828) Fl. Sic. Prod., 2: 428; V. sativa subsp. angustifolia (L.) Gaudin (1829) Fl. Helv., 4: 510; V. angustifolia subsp. segetalis (Thuill.) Gaud. (1829) Fl. Helv., 4: 510; V. acerosa var. angustifolia Reichenb. (1832) Fl. Germ. Excurs., 2: 530; V. bobartii E. Forster (1833) Trans. Linn. Soc. 16: 442; V. melanocarpa Hussenot (1835) Prodr. Cat. Pl. Lorraine, 1: 105; V. nemoralis Ten. (1835) Fl. Nap., 5: 118; V. angustifolia var. segetalis Koch (1835) Syn. Fl. Germ. & Helv., 3(1): 197; V. conspicua Lowe (1838) Trans. Camb. Phil. Soc., 6(3): 544; V. multicaulis Wallr. (1840) Linnaea 14: 625; V. polymorpha Godron (1843) Fl. Lorraine, 1: 179; V. angustifolia D. Clos (1847) Fl. Chilina, 2: 135; V. cuneata Gren. & Godron (1848) Fl. Fr., 1(2): 459; V. forsteri Jordan ex Boreau (1857) Fl. Cent. Fr., 3(1): 172; V. uncinata Boreau (1857) Fl. Centre France ed. 3, 2: 173; V. angustifolia (L.) Alef. (1860) Bonplandia, 9: 71; V. scepusiensis Kit. (1863) Linnaea, 32: 629; V. lanciformis Lange in Kjoeb. (1865) Vidensk. Meddle. Dansk Naturhist. ser. 2,7: 183; V. sativa subsp. cordata var. linearis Lange (1865) Vidensk. Meddel. Kjob. Aud. Aart., 7: 379; V. sallei Timb.-Lagr. (1866) Bull. Soc. Bot. Fr., 13: 149; V. ciliata Schur (1866) Enum. Pl. Transs., 168; V. angustifolia var. cordata (Wulfen) Boiss. (1872) Fl. Or., 2: 575; V. consobrina Pomel (1874) Nou. Mat. Fl. Atlan., 192; V. sativa subsp. segetalis (Thuill.) Celak. (1875) Prodr. Fl. Bohmen, 680; V. timbali Lorot in Lorot & Barr (1876) Fl. Montpellier, 2: 804; V. uncinata Desf. ex Nyman (1878) Consp., 210; V. imparipinnata Potonie (1881) Sepa. Monatsschrift Vereins Carte Nbaues, 9; V. closiana F. Philippi (1881) Cata. Pl. Vasc. Chilensium, 62; V. sativa subsp. cordata var. gigantea Freyn (1881) Verh. ZBG., 31: 364; V. debilis Perez Lara (1882) Anal. Soc. Esp. Hist. Nat. 11: 402; V. sativa subsp. incisa var. cordata (Wulfen ex Hoppe) Arcang. (1882) Comp. Fl. Ital., 1: 205; V. sativa subsp. angustifolia (L.) Batt. in Batt. & Trabut (1889) Fl. Algerie, 1: 268; V. sativa var. cordata (Wulfen) Arcang. (1894) Comp. Fl. It., 2: 524; V. angustifolia subsp. segetalis (Thuill.) Corb. (1894) Nouv. Fl. Normandie, 183; Ervilia bobartii (E. Forster) Burnat (1896) Fl. Alpes 2: 172; V. heterophylla Philippi (1898) Ann. Univ. Chile 84: 268; V. sativa subsp. angustifolia (L.) Asch. & Graebner (1898) Fl. Norddeutsch. Flachl. 451; V. angustifolia var. uncinata Reichard in Rouy (1899) Fl. Fr., 5: 212; V. sativa subsp. angustifolia (Grufb.) Asch. & Graebner (1909) Syn. Mitteleurop. Fl., 6(2): 971; V. sativa subsp. angustifolia var. albiflora (Lindb.) Asch. & Graebner (1909) Syn. Mittleurop. Fl., 6(2): 972; V. sativa subsp. cordata (Wulfen ex Hoppe) Asch. & Graebner (1909) Syn. Mitteleurop. Fl. 6(2): 698; V. sativa subsp. cordata var. flavida (Schur) Asch. (1909) Syn. Mittle. Fl., 6(2): 972; V. sativa subsp. cordata var. pulchella (Posp.) Asch. (1909) Syn. Mittle Fl., 6(2): 974; V. sativa subsp. cordata var. albiflora (Freyn) Asch. &

Graebner (1909) Syn. Mitteleurop. Fl., 6(2): 969; V. basilei Sennen & Mauricio in Sennen (1936) Diagn. Pl. Espagne Maroc, 246; V. sativa subsp. cuneata (Guss.) Maire in Emberger & Maire (1941) Cat. Pl. Maroc, 1053; V. angustifolia subsp. cordata (Wulfen) Janchen (1957) Catal. Fl. Austr., 2: 575; V. angustifolia subsp. segetalis (Thuill.) Mettin & Hanelt (1964) Kulturpflanze, 12: 214; V. sativa subsp. linearifolia Stankevich (1978) Byull. Vses. Ord. Lenina Inst. Rast. Vavilov 81: 6; V. sativa subsp. pilosa (M. Bieb.) Plitm. & Zoh. (1979) Pl. Syst. Evol., 131(1-2): 146; V. sativa subsp. heterophylla (C. Presl) J. Duvign (1979) Soc. Echange Pl. Vasc. Eur. Occid. Med. 17, Sup: 21; V. sativa subsp. segetalis (Thuill.) Dorstal (1984) Folia Mus. rere. Nat. Bohem. Occid. Bot., 21: 8.

Description: VEGETATIVE CHARACTERS: Annual; erect or ascending or decumbent; 25-80cm high. Stipule length 3-8mm; 1-10.5mm wide. Stipule semi-hastate; apex acute; number of teeth on distal edge none or 1-2 teeth or 3-5 teeth or more than 5; number of teeth on proximal edge none or 1-2 teeth or 3-5; stipule edge form entire or uneven with swollen hairs; translucent. Stipule colour (upper plant) green or green with purple; less than 10 hairs per sqmm or = or more than 10 hairs per sqmm. Leaf 17-84mm long; petiole 1-9mm long; average leaflet internode 4-32mm long; leaflet 7-32mm long; leaflet 1-8(-15)mm wide; tendril or mucro 11-109mm long; average leaf internode 16-105mm long; petiolule 14-75mm long. Leaf apex tendrilous; with 2 branches or with 3 branches or with more than 3 branches. Leaflet shape symmetric; 6-16 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet narrow linear or broad linear or linear elliptic or narrow elliptic or broad elliptic or narrow ovate; apex mucronate and emarginate or mucronate; base angustate or truncate to angustate; broadest at apex or in middle or at base. Leaflet adaxial hairs absent or less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long or hairs more than 1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm) or longer than 2mm, but shorter than flower. Peduncle length 1-13mm; rachis 1-10mm long; pedicel 1-3mm long; flower 10-24(-28)mm long; ratio of peduncle to flower length of 0.03-0.64; peduncular cusp absent or present and less than 2.1mm long. Number of flowers per inflorescence one or two or three or four. Pedicel less than 10 hairs per mm sq or with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 2.5-8(-10)mm long; lateral teeth 2.5-8(-10)mm long; upper tooth 2.5-8(-10)mm long; tube 3.5-7.5mm long; ratio of lower tooth to tube length of 0.5-1.23. Calyx base not gibbous; tube mouth truncate; teeth reflexing absent; tooth curvature absent; exterior nectaries seen on lateral teeth or seen on all teeth. Calyx hairs covering calyx; hair density less than 10 per mm sq or 10-35 per mm sq or 36-60 per mm sq; hair length 0.5-1.5mm long or more than 1.5mm long; hairs adpressed. Calyx colour green or purple base. Standard length 10-31mm; limb length 5.5-20mm; claw length 5-11mm; limb width 5-20mm; claw width 2.5-8mm; ratio of limb length to claw length 0.68-2.07. Corolla petals concolorous or not concolorous; standard face purple; standard upper surface lilac; face without distinct veining. Standard shape stenonychioid; apex emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 8.5-23mm; limb length 4.5-13.5mm; claw length 4.5-9.5mm; limb width 2-9mm. Wing colour violet or purple; markings absent. Wing shape 2 or 3; spur shape 4; limb base kinking weak; limb pouch absent; wing to keel adhesion weak. Keel length 7-15mm; hood length 2.5-5.5mm; claw length 4.5-9.5mm; hood width 2-5mm. Keel colour white; hood apex distinctly coloured. Keel shape 2; base shape 2; pouch absent or present. Staminal tube length 6.5-13mm; filament length 1-1.5mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 4.5-10mm; style length 3-6mm; supra-ovary extension 0.5-2mm. Ovary shape oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary entirely covered with simple hairs; style apex pubescence type 3. Number of ovules per ovary 7-14.

LEGUME CHARACTERS: Legume 20-50mm long; 4-8mm wide; 3-5mm deep; ratio of legume length to width 4-6. Amphicarpic legumes absent. Legume colour yellow-brown or brown or black; uniform over legume. Legume shape linear; cross-sectional shape round or rounded to flat; not falcate; suture straight; distal end unbeaked; valve surface not torulose; surface smooth or ridged with veins; partitioning absent. Legume hairs 10 - 35 per mm sq or hairs 36 - 60 per mm sq; hairs less than 0.5mm long; hairs covering entire legume; suture surface ciliate, hairs less than 1mm long; tubercles absent. Dehiscent legume twisting medium or tight; number of seeds per legume 4-13.

SEED CHARACTERS: Seed 2.5-3.5mm long; 2-4mm wide; 1.5-3.5mm deep; 6.5-10mm circumference; hilum 1.5-2.5mm long; distance from hilum to lens 0.5-1.5mm; seed length to width ratio of 0.83-1.25; seed circumference to hilum length ratio of 0.23-0.25. Seed shape spherical or spherical to cubic or oblong; shape in side view circular or laterally compressed; seed colour yellow or red-brown or black; mottling absent or present; surface matt; smooth. Hilum shape elongated, less than third of circumference; coloured yellow or coloured red-brown; groove colour beige or same as hilum or red-brown; hilum surface excess tissue absent. Lens position less than 1.6mm from hilum; prominent or not prominent. Aril absent.

Phenology: February - November **Chromosome number:** (10), 12, (14).
Geographical distribution: AF, AL, AR(I), AT(I), AU, BE, BG, BR(I), CA(I), CH, CL(I), CN, CS, CY, CU(I), DD, DE, DK, DZ, EC, EG, ES, ET, FI, FR, GB, GR, HU, IE, IL, IN, IQ, IR, IT, JP, JO, KE(I), LB, LE, LY, MA, MR, MU(I), MX(I), NL, NO, NP, NZ(I), PL, PK, PT, RO, SA, SE, SO, SU, SY, TN, TR, US(I), YU.
Ecology: Alt. 1 - 2900m; Hab. common pan-temperate and semi-tropical weed, agricultural and disturbed land, margins of woodland.

Taxonomic notes: The most widespread of all the V. sativa subspecies, the common weedy vetch.

Specimen citation: Clayton 738 (BM); Khattab 932 (CAI); Morrison s.n. (E); Morrison s.n. (E); Hatschbach 22280 (MO); Burri & Krendl s.n. (W); Polatschek s.n. (W); Leute 2139 (W); Croat 52701 (MO); Felix s.n. (W); Goncalves 3092 (BM); Allkin 83/43 (SPN); Puttick 49/22/10 (SPN); J.A.F. & J.V.P. s.n. (SPN); Portes 2/6/1929 (SPN); Watson s.n. (SPN); Hensler s.n. (SPN); Puttick s.n. (SPN); Portman 844 (SPN); Hensler s.n. (SPN); Wallace 6817 (SPN); Kerr 136 (SPN); Kerr s.n. (SPN); Whitmore 49/22/10 (SPN); Whitmore s.n. (SPN); Thurston s.n. (K); Crompton & Sell 67/227 (W); Maxted 1151 (SPN); Maxted 1165 (SPN); Maxted, Hollis & Goyder 1188 (SPN); Maxted, Hollis & Goyder 1133 (SPN); Maxted 1158 (SPN); Krapovickas & Vanni 36866 (MO); Carter-Cook 499 (MO); Reed s.n. (BM); Mexia 7854 (BM); Macoun s.n. (BM); Anon. s.n. (E); Calder & Taylor 35348 (MO); Reverchon 501 (E); Reverchon 497 (E); Reverchon 497 (W); Reverchon s.n. (E); Reverchon s.n. (E); Davis 2217 (E); Nielsen 414 (SPN); Chrtek, Kosinova & Slavikova s.n. (CAIM); Tackholm s.n. (CAIM); Simpson 4486 (CAI); Romee 492 (CAIM); De Wilde 10836 (MO); Albert 1658 (E); Ronniger s.n. (W); Maxted & Khattab 1016 (SPN); Maxted & Khattab 1030 (SPN); Maxted 1038 (SPN); Maxted, Khattab & Bisby 1037 (SPN); Maxted 1004 (SPN); Maxted 1065 (SPN); Maxted 1014 (SPN); Larsen, Larsen & Jeppesen 183 (SPN); Larsen, Larsen & Jeppesen 183 (CAIM); Krendl & Krendl s.n. (W); Krendl s.n. (W); Gathorne-Hardy 646 (E); Bisby 1471 (SPN); Bor 215 (K); Engelhardt 32 (W); Reverchon 21/5/1890 (E); Bisby & Birch 1656 (SPN); Bisby & Berktay 1397 (SPN); Allkin 83/4 (SPN); Kupicha 303 (E); Kupicha 268 (E); Allkin 82/3 (SPN); Allkin 82/5 (SPN); Allkin 83/4 (SPN); Bernhardi s.n. (MO); Dinsmore 1163 (E); Zohary s.n. (HUJ); Zohary s.n. (HUJ); Plitmann 21 (HUJ); Danin s.n. (HUJ); Polunin 5127 (E); Furse 7313 (K); Bisset 1042 (E); Ohashi s.n. (E); Untchj 53 (E); Maas Geesteranus 6110 (MO); Taylor 1391 (MO); Press & Short 71 (BM); Bisby 1867 (SPN); Bisby 1962 (SPN); Bisby 1934 (SPN); Bisby 1942 (SPN); Hinton 2456 (BM); Johnston s.n. (E); Johnston s.n. (E); Peck s.n. (BM); Anon. 2/5 (W); Lindsay s.n. (E); Krawiecowa 510 (W); Yamulkigjanyan & Karjyan s.n. (ERE); Khanjan s.n. (ERE); Jauzia s.n. (LE); Elliott s.n. (E); Anon. 292 (E); Lowne 1863/64 (K); Maxted, Ehrman & Khattab 1778 (SPN); Maxted, Ehrman & Khattab 1836 (SPN); Maxted, Ehrman & Khattab 2047 (SPN); Maxted, Ehrman & Khattab 2105 (SPN); Maxted, Ehrman & Khattab 2213

(SPN); Maxted, Ehrman & Khattab 2473 (SPN); Tengwall 703 (K); Davis & Hedge 26714 (E); Fitz & Spitzenberger 94 (W); Helbaek 2620 (E); Stainton 8250 (HUJ); Maxted, Kitiki & Allkin 4031 (SPN); Maxted, Kitiki & Allkin 4115 (SPN); Maxted, Kitiki & Allkin 4153 (SPN); Maxted, Kitiki & Allkin 4428 (SPN); Maxted, Kitiki & Allkin 4499 (SPN); Maxted, Auricht & Ehrman 4911 (SPN); Maxted, Auricht & Ehrman 5062 (SPN); Maxted, Auricht & Ehrman 5288 (SPN); Maxted, Auricht & Ehrman 5306 (SPN); Maxted, Auricht & Ehrman 5396 (SPN); Davis 42961 (E); Siehe 86 (BM); Siehe 139 (BM); Kearsney 535 (E); Demaree 47320 (W); Schallert 236 (MO); Stanford 1329 (MO); Ewan 17562 (MO); Edmonds & Price s.n. (MEXU); Fryxell 2966 (MEXU); Ertter, Ahart & Strachan 3275 (MEXU); Dougan s.n. (MO); Holdridge 876 (MO); Shulman 268098 (MO).

ii **Accepted taxon:** V. sativa subsp. **amphicarpa** (L.) Batt. in Batt. & Trabut 1889 Fl. Algerie, 1: 268.
Type: Holotype, Smith, (BM!).
Iconography: Fl. Eur., 2: 134; Fl. Iran., 53-54; Fl. Iraq, 3: 537-538; Fl. Pal., 2: 207; Fl. Syr., 2: 403-404; Fl. Tur., 3: 321; Fl. USSR., 13: 465; Fl. Iran., Tab. 35, fig. 2.
Synonymy: V. amphicarpa L. (1763) Sp. Pl. ed. 2: 1030; V. amphicarpa Lam. (1788) Encycl., 2: 711; V. amphicarpa Dorthes (1789) Obs. Phy. Hist. Nat. Arts 35: 131; V. subterranea Ger. ex Dorthes (1789) Obs. phys. hist. nat., 35: 131; V. angustifolia var. amphicarpa (Dorthes) Alef. (1872) Bot. Zeitung, 20: 362; V. sativa subsp. amphicarpa var. pseudosativa Rouy in Rouy & Fouc. (1899) Fl. Fr., 5: 214; V. sativa subsp. amphicarpa var. pseudoangustifolia Rouy in Rouy & Fouc. (1899) Fl. Fr., 5: 214; V. sativa subsp. amphicarpa (Dorthes) Asch. & Graebner (1909) Syn. Mitteleurop. Fl. 6(2): 974.

Description: VEGETATIVE CHARACTERS: Annual; ascending or decumbent; 20-50cm high. Stipule length 2.5-10mm; 1.5-5.5mm wide. Stipule semi-hastate; apex acute; number of teeth on distal edge 1-2 teeth or 3-5 teeth or more than 5; number of teeth on proximal edge none or 1-2; stipule edge form entire or uneven with swollen hairs; translucent. Stipule colour (upper plant) green or green with purple; = or more than 10 hairs per sqmm. Leaf 12-58mm long; petiole 1-11mm long; average leaflet internode 3-11mm long; leaflet 6-24mm long; leaflet 1-6mm wide; tendril or mucro 2-34mm long; average leaf internode 4-34mm long; petiolule 7-54mm long. Leaf apex tendrilous; simple or with 2 branches or with 3 branches. Leaflet shape symmetric; 4-14 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet narrow linear or broad linear or narrow elliptic or broad elliptic; apex mucronate and emarginate or mucronate; base angustate; broadest at apex. Leaflet adaxial hairs less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long or hairs more than 1.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm). Peduncle length 1mm; pedicel 1-2mm long; flower (11-)19-24mm long; ratio of peduncle to flower length of 0.04-0.09; peduncular cusp absent. Number of flowers per inflorescence one. Pedicel with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 2-6mm long; lateral teeth 2-6mm long; upper tooth 2-6mm long; tube 4.5-8.5mm long; ratio of lower tooth to tube length of 0.44-1. Calyx base not gibbous; tube mouth truncate; teeth reflexing absent; tooth curvature absent; exterior nectaries seen on lateral teeth or seen on all teeth. Calyx hairs covering calyx; hair density of 10-35 per mm sq or 36-60 per mm sq; hair length 0.5-1.5mm long or more than 1.5mm long; hairs adpressed. Calyx colour green or purple base. Standard length 11-23mm; limb length 6-13mm; claw length 5-11.5mm; limb width 6-14mm; claw width 4-8mm; ratio of limb length to claw length 0.94-1.62. Corolla petals concolorous; standard face purple; standard upper surface lilac; face without distinct veining. Standard shape stenonychioid; apex

emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 9-20.5mm; limb length 5-10mm; claw length 4-10.5mm; limb width 2.5-6mm. Wing colour purple; markings absent. Wing shape 2 or 3; spur shape 4; limb base kinking weak or strong; limb pouch absent; wing to keel adhesion weak. Keel length 7.5-14.5mm; hood length 2.5-5mm; claw length 5-10mm; hood width 2.5-4mm. Keel colour white; hood apex distinctly coloured. Keel shape 2; base shape 2; pouch absent or present. Staminal tube length 7-13mm; filament length 1-2.5mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 3.5-9mm; style length 3.5-7mm; supra-ovary extension 0.5-1.5mm. Ovary shape oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary entirely covered with simple hairs; style apex pubescence type 3. Number of ovules per ovary 6-12.

LEGUME CHARACTERS: Legume 6-23mm long; 5-8mm wide; 4-5mm deep; ratio of legume length to width 1.2-6.4. Amphicarpic legumes present (1 or 2 seeds per pod). Legume colour yellow or yellow-brown; uniform over legume. Legume shape linear or oblong; cross-sectional shape round or rounded to flat; not falcate; suture unparallel; distal end unbeaked; valve surface not torulose; surface smooth or ridged with veins; partitioning absent. Legume hairs less than 10 per mm sq or hairs 10 - 35 per mm sq or hairs 36 - 60 per mm sq; hairs less than 0.5mm long or hairs 0.5 - 1.5mm long; hairs covering entire legume; suture surface ciliate, hairs less than 1mm long; tubercles absent. Dehiscent legume twisting loose; number of seeds per legume 1-6.

SEED CHARACTERS: Seed 3-5mm long; 3.5-5mm wide; 2-3mm deep; 7-14mm circumference; hilum 1.5mm long; distance from hilum to lens 1mm; seed length to width ratio of 0.85-1; seed circumference to hilum length ratio of 0.11-0.21. Seed shape spherical; shape in side view circular or laterally compressed; seed colour yellow or brown or black; mottling absent; surface matt; smooth or wrinkled. Hilum shape oval or elongated, less than third of circumference; coloured yellow or coloured black; groove colour same as hilum or red-brown; hilum surface excess tissue absent or present. Lens position less than 1.6mm from hilum; not prominent. Aril absent.

Phenology: March - August **Chromosome number:** 10, 12, 14.
Geographical distribution: AF, AL, AU, BE, CS, CY, ES, FR, GR, IL, IQ, IR, IT, JO, LB, LY, MR, PT, RO, SU, SY, TR, YU.
Ecology: Alt. 20 - 2000m; Soils, calcic brown, calcic brown & terra rossa, chalky calcic brown, chalky white, heavy black, terra rossa; Hab. dry disturbed or agricultural land.

Taxonomic notes: This subspecies has potential as a forage plant for dry areas. The amphicarpic pods are resistant to grazing and so regeneration of pasture following grazing is high (Fabre, 1855; Ascherson, 1884; Plitmann, 1973; ICARDA, 1987).

Specimen citation: Guiol 1825 (BM); Krendl 27/3/1972 (W); Bourgeau 1729 (E); Zohary 1817 (HUJ); Davis & Bokhari 56392 (E); Koelz 14633 (E); Gmelin 662 (W); Junge s.n. (LE); Norris s.n. (BM); Maxted, Ehrman & Khattab 1718 (SPN); Maxted, Ehrman & Khattab 1741 (SPN); Maxted, Ehrman & Khattab 2111 (SPN); Maxted, Ehrman & Khattab 2119 (SPN); Maxted, Ehrman & Khattab 2149 (SPN); Maxted, Ehrman & Khattab 2159 (SPN); Maxted, Ehrman & Khattab 2208 (SPN); Maxted, Ehrman & Khattab 2223 (SPN); Maxted, Ehrman & Khattab 2229 (SPN); Maxted, Ehrman & Khattab 2256 (SPN); Maxted, Ehrman & Khattab 2431 (SPN); Maxted, Ehrman & Khattab 2454 (SPN); Maxted, Ehrman & Khattab 2356 (SPN); Maxted, Ehrman & Khattab 2399 (SPN); Maxted, Ehrman & Khattab 2408 (SPN); Maxted, Ehrman & Khattab 2613 (SPN); Maxted, Ehrman & Khattab 2629 (SPN); Maxted, Ehrman & Khattab 2640 (SPN); Maxted, Ehrman & Khattab 2658 (SPN); Maxted, Ehrman & Khattab 2685 (SPN); Maxted, Ehrman & Khattab 2716 (SPN); Maxted, Ehrman & Khattab 2700 (SPN); Maxted, Ehrman & Khattab 2305 (SPN); Ascherson 159 (E); Townsend 72/74 (K); Coode & Jones 1041 (E); Coode & Jones 1005 (E); Post s.n. (E); Maxted, Auricht & Ehrman 4815 (SPN); Maxted, Auricht & Ehrman 4830 (SPN); Maxted,

Auricht & Ehrman 4893 (SPN); Maxted, Auricht & Ehrman 5003 (SPN); Maxted, Auricht & Ehrman 5127 (SPN); Maxted, Auricht & Ehrman 5146 (SPN).

iii **Accepted taxon:** V. sativa subsp. **incisa** (M. Bieb.) Arcang. 1882 Comp. Fl. Italiana, 201.
Type: Holotype, Bieberstein 1816, (LE!).
Iconography: Fl. Eur., 2: 135; Fl. Tur., 3: 320; Fl. USSR., 13: 463.
Synonymy: V. incisa M. Bieb. (1819) Fl. Taur.-cauc., 3: 471; V. pimpinelloides Mauri (1820) Fl. Rom. Cent., 13: 35; V. sativa subsp. cordata var. incisa (M. Bieb.) Boiss. (1872) Fl. Or., 2: 574; V. sativa subsp. cordata var. incisa (Wulfen ex Hoppe) Asch. & Graebner (1909) Mitteleurop. Fl. 6(2): 968; V. incisiformis Stefanov (1966) Izv. Bot. Inst. Otd. Biol. Nauk., 16: 226.

Description: VEGETATIVE CHARACTERS: Annual; ascending; 35-80cm high. Stipule length 4.5-5.5mm; 2.5-5.5mm wide. Stipule semi-hastate; apex acute; number of teeth on distal edge 1-2 teeth or 3-5; number of teeth on proximal edge none; stipule edge form entire or uneven with swollen hairs; translucent. Stipule colour (upper plant) green or green with purple; less than 10 hairs per sqmm or = or more than 10 hairs per sqmm. Leaf 35-59mm long; petiole 3-7mm long; average leaflet internode 7-12mm long; leaflet 12-22mm long; leaflet 5-14mm wide; tendril or mucro 21-28mm long; average leaf internode 32-63mm long; petiolule 30-52mm long. Leaf apex tendrilous; with 3 branches or with more than 3 branches. Leaflet shape symmetric; 8-10 leaflets per leaf. Upper leaflet margin entire or incised dentate; lower leaflet margin incised dentate; leaflet margins level. Leaflet narrow elliptic or broad elliptic or elliptic ovate or narrow ovate; apex mucronate and emarginate; base angustate or truncate to angustate; broadest at apex or in middle or at base. Leaflet adaxial hairs less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; leaflet abaxial hair 10-50 per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long; petiole hairs 10-50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm). Peduncle length 1mm; pedicel 1-2mm long; flower 13-17(-20)mm long; ratio of peduncle to flower length of 0.05-0.07; peduncular cusp absent. Number of flowers per inflorescence one. Pedicel less than 10 hairs per mm sq or with 10-50 hairs per mm sq; hairs 0.5-1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 5.5-8mm long; lateral teeth 5.5-8mm long; upper tooth 5.5-8mm long; tube 4.5-6mm long; ratio of lower tooth to tube length of 1.16-1.77. Calyx base not gibbous; tube mouth truncate; teeth reflexing absent; tooth curvature absent; exterior nectaries seen on lateral teeth. Calyx hairs covering calyx; hair density of 10-35 per mm sq; hair length 0.5-1.5mm long; hairs adpressed. Calyx colour green. Standard length 14-17mm; limb length 7.5-9mm; claw length 6-8mm; limb width 6.5-8.5mm; claw width 4-5.5mm; ratio of limb length to claw length 1-1.38. Corolla petals concolorous; standard face purple; standard upper surface lilac; face without distinct veining. Standard shape stenonychioid; apex emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 11-12.5mm; limb length 5-6.5mm; claw length 5.5-6.5mm; limb width 2.5-4mm. Wing colour purple; markings absent. Wing shape 3; spur shape 4; limb base kinking weak; limb pouch absent; wing to keel adhesion weak. Keel length 8-11mm; hood length 3-4mm; claw length 5-7.5mm; hood width 3-3.5mm. Keel colour white; hood apex distinctly coloured. Keel shape 2; base shape 2; pouch absent. Staminal tube length 7.5-9mm; filament length 1-1.5mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 4.5-5.5mm; style length 4-6mm; supra-ovary extension 0.5-1mm. Ovary shape oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary entirely covered with simple hairs; style apex pubescence type 3. Number of ovules per ovary 6-10.

LEGUME CHARACTERS: Legume 28-33(-40)mm long; 6-8mm wide; 4-5mm deep; ratio of legume length to width 4-4.12. Amphicarpic legumes absent. Legume colour yellow-brown; uniform over legume. Legume shape rectangular; cross-sectional shape rounded to flat; not falcate; suture straight; distal end slightly beaked; valve surface not torulose; surface ridged with veins; partitioning absent. Legume hairs 10 - 35 per mm sq or hairs 36 - 60 per mm sq; hairs less than 0.5mm long; hairs covering entire legume; suture surface ciliate, hairs less than 1mm long; tubercles absent. Dehiscent legume twisting medium; number of seeds per legume 4-9.

SEED CHARACTERS: Seed 4mm long; 4mm wide; 2mm deep; 9mm circumference; hilum 2mm long; distance from hilum to lens 1mm; seed length to width ratio of 1; seed circumference to hilum length ratio of 0.22. Seed shape oblong; shape in side view circular; seed colour yellow; mottling present; surface matt; smooth. Hilum shape elongated, less than third of circumference; coloured yellow; groove colour same as hilum; hilum surface excess tissue present. Lens position less than 1.6mm from hilum; prominent. Aril absent.

Phenology: April - June **Chromosome number:** 14.

Geographical distribution: BG, DZ, GR, LY, MA, PT, SU, TR, YU.

Ecology: Alt. 10 - 510m; Hab. Disturbed land associated with woodland.

Specimen citation: Davies 33183 (E); Anon. s.n. (LE); Stankov s.n. (LE); Junge s.n. (LE); Anon. s.n. (LE); Utkin s.n. (LE); Bieberstein s.n. (LE); Maxted, Kitiki & Allkin 4414 (SPN).

iv **Accepted taxon:** V. sativa subsp. **devia** J.G. da Costa (1948) Boletim do Museu Municipal do Funchal, lll(7): 62.

Type: Holotype, (MADM).

Iconography: Fl. Madeira (in press).

Description:

VEGETATIVE CHARACTERS: Annual; ascending; 20-40cm high. Stipule length 3-6mm; 4-9mm wide. Stipule semi-hastate; apex acute; number of teeth on distal edge 3-5; number of teeth on proximal edge none; stipule edge form entire; not-translucent. Stipule colour (upper plant) green with purple; = or more than 10 hairs per sqmm. Leaf 38-68mm long; petiole 3-5mm long; average leaflet internode 7-13mm long; leaflet 10-17mm long; leaflet 4-7mm wide; tendril or mucro 38-55mm long; average leaf internode 38-80mm long; petiolule 32-62mm long. Leaf apex tendrilous; with 3 branches or with more than 3 branches. Leaflet shape symmetric; 10-16 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet narrow elliptic or broad elliptic; apex mucronate and emarginate; base angustate; broadest at apex. Leaflet adaxial hairs 10-50 per mm sq; hairs less than 0.5mm long; leaflet abaxial hair 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle longer than 2mm, but shorter than flower. Peduncle length 9-15mm; rachis 8-14mm long; pedicel 1-3mm long; flower 15-18mm long; ratio of peduncle to flower length of 0.6-0.83; peduncular cusp absent. Number of flowers per inflorescence three or four. Pedicel with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs 0.5-1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 4-5.5mm long; lateral teeth 3.5-5mm long; upper tooth 3.5-5mm long; tube 4.5-5mm long; ratio of lower tooth to tube length of 0.88-1.22. Calyx base slightly gibbous; tube mouth truncate or slightly oblique; teeth reflexing absent; tooth curvature absent; exterior nectaries seen on lateral teeth. Calyx hairs covering calyx; hair density of 10-35 per mm sq; hair length less than 0.5mm long or 0.5-1.5mm long; hairs adpressed. Calyx colour purple base. Standard

length 16-19mm; limb length 9-11.5mm; claw length 6-7.5mm; limb width 9-14mm; claw width 5-6mm; ratio of limb length to claw length 1.28-1.83. Corolla petals concolorous; standard face violet or purple; standard upper surface lilac or violet; face without distinct veining. Standard shape stenonychioid; apex emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 12.5-17mm; limb length 6-10.5mm; claw length 6-6.5mm; limb width 2.5-6mm. Wing colour violet or purple; markings absent. Wing shape 3; spur shape 4; limb base kinking weak; limb pouch absent; wing to keel adhesion weak. Keel length 9.5-10mm; hood length 3-3.5mm; claw length 6.5-7mm; hood width 3.5-4mm. Keel colour purple or brown; hood apex distinctly coloured. Keel shape 3; base shape 2; pouch absent or present. Staminal tube length 9.5-10mm; filament length 1-1.5mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 6.5-7.5mm; style length 3.5mm; supra-ovary extension 0.5-1mm. Ovary shape linear; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary entirely covered with simple hairs; style apex pubescence type 3. Number of ovules per ovary 13-15.

LEGUME CHARACTERS: Legume 28mm long; 4mm wide; 3mm deep; ratio of legume length to width 7. Amphicarpic legumes absent. Legume colour brown; uniform over legume. Legume shape linear; cross-sectional shape rounded to flat; not falcate; suture straight; distal end unbeaked; valve surface not torulose; surface ridged with veins; partitioning absent. Legume hairs 10 - 35 per mm sq; hairs less than 0.5mm long; hairs covering entire legume; suture surface ciliate, hairs less than 1mm long; tubercles absent. Dehiscent legume twisting loose; number of seeds per legume 9.

Phenology: N.A. **Chromosome number:** N.A.
Geographical distribution: PT (endemic to Madeira).
Ecology: N.A.

Taxonomic notes: A rare endemic of Madeira. The subspecies has a unique floral arrangement on the in florescence (see Plate 29), with flowers at the base and at the apex of the peduncle.

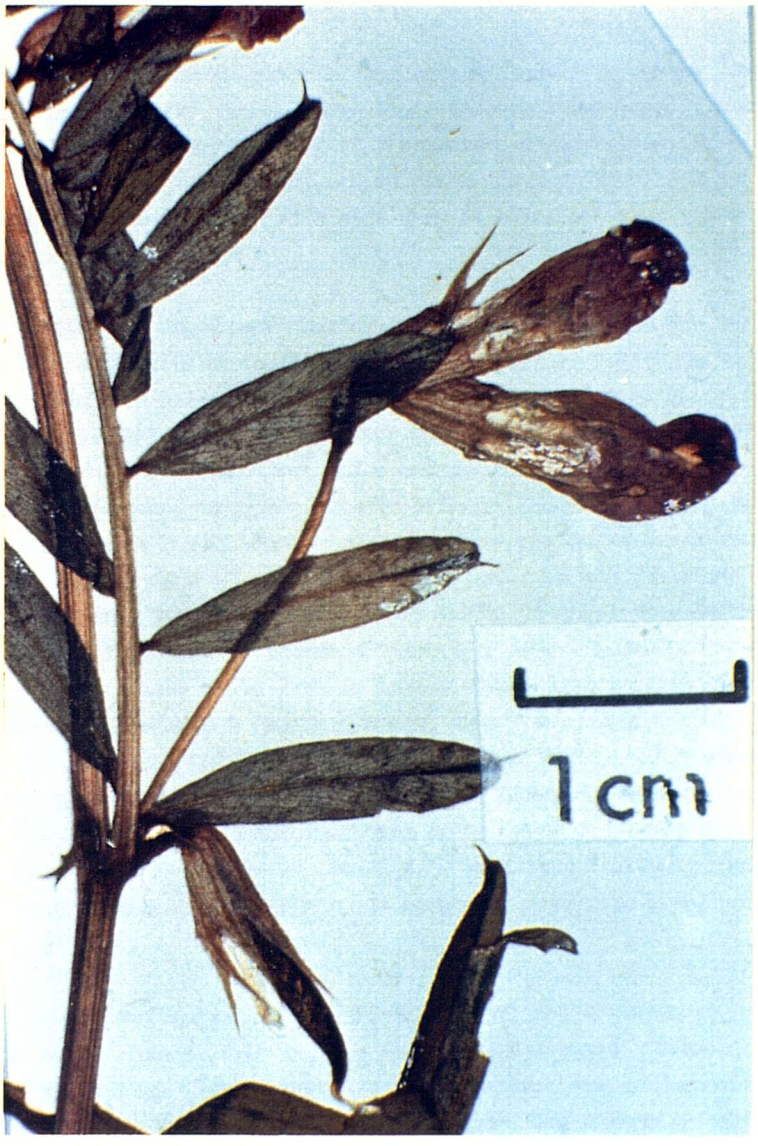
Specimen citation: Press & Short 305 (BM); Anon. s.n. (MADM); Anon. s.n. (MADM); Anon. s.n. (MADM).

v **Accepted taxon:** V. sativa L. (1753) Sp. Pl., 2: 736. subsp. **sativa**
Type: Lectotype, Linneus 906.20 (LINN!).
Iconography: Fl. Eur., 2: 135; Fl. Iran., 51; Fl. Iraq, 3: 535-536; Fl. Pal., 2: 206; Fl. Tur., 3: 319; Illust. Fl. Iran., Tab. 34, fig. 4; Fl. Pal., 2 (plates): 295.
Synonymy: V. notata Gilib. (1782) Fl. Lituan., 2: 105; V. globosa Retz. (1783) Fasc. Obs. Bot. Tert., 3: 39; V. leucosperma Moench (1794) Meth. Pl. Hort. Bot. Marburgensis, 148; V. nodosa Gaertner (1802) Fructibus Seminbus Plantarum, 2: 151; V. glabra Schleicher (1821) Cat. Omni. Pl. Helv., 4: 37; V. sativa var. obovata (Ser.) Gaudin (1829) Fl. Helv. 4: 510; V. torulosa Jordan ex Boreau (1857) Fl. Centr. Fr., 3(2): 173; V. nemoralis (Pers.) Boreau (1857) Fl. Cent. Fr., 3(1): 172; V. sativa subsp. sativa var. obcordata Neilr. (1859) Fl. Nieder-Oesterr. 962; V. sativa var. umbriflora Alef. (1860) Bot. Zeit., 9: 78; V. abyssinica Alef. (1861) Bonplandia, 9: 72; V. sativa var. imparipinnata Potonie (1883) Fl. Beobachtungen Priegnitz, 24: 165; V. sativa subsp. sativa var. alba (Moench) Beck in Reichb. (1903) Ic., 22: 181; V. sativa subsp. notata Asch. & Graebner (1909) Mitteleurop. Fl. 6(2): 963; V. sativa subsp. sativa var. cordifolia Asch. & Graebner (1909) Syn. Mittleurop. Fl., 6(2): 964; V. sativa subsp. sativa var. carnea (Beck) Asch. & Graebner (1909) Syn. Mittleurop. Fl., 6(2): 964; V. sativa subsp. notata Asch. & Graebner (1909) Syn. Mitteleur. Fl., 6(2): 963; V. sativa subsp. obovata (Ser.) Schinz & Thell. in Schinz & R. Keller (1914) Fl. Schweiz ed. 3, 2: 234.

Description: VEGETATIVE CHARACTERS: Annual; erect or ascending; 35-100cm high. Stipule length 3-12mm; 1.5-10mm wide. Stipule entire or semi-hastate or semi-saggitate (rarely). Apex acute; number of

Plate 29. V. sativa subsp. devia J.G. da Costa.

Detail of plant showing unusual flower attachment; flowers attached at the base and apex of the peduncle. Steudal s.n. x 3.



teeth on distal edge 1-2 teeth or 3-5 teeth or more than 5; number of teeth on proximal edge none or 1-2 teeth or 3-5; stipule edge form entire or uneven with swollen hairs; translucent. Stipule colour (upper plant) green or green with purple; less than 10 hairs per sqmm or = or more than 10 hairs per sqmm. Leaf 23-79mm long; petiole 1-7mm long; average leaflet internode 6-17mm long; leaflet 11-38mm long; leaflet 2-13mm wide; tendril or mucro 12-89mm long; average leaf internode 15-76mm long; petiolule 20-74mm long. Leaf apex tendrilous; with 2 branches or with 3 branches or with more than 3 branches. Leaflet shape symmetric; 8-16 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet linear elliptic or narrow elliptic or broad elliptic; apex mucronate and emarginate or mucronate; base angustate or truncate to angustate; broadest at apex or in middle or at base. Leaflet adaxial hairs absent or less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long or hairs more than 1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm) or longer than 2mm, but shorter than flower. Peduncle length 1-4mm; rachis 1-3mm long; pedicel 1-2mm long; flower (12-)20-27(-30)mm long; ratio of peduncle to flower length of 0.04-0.21; peduncular cusp absent or present and less than 2.1mm long. Number of flowers per inflorescence one or two or three or four. Pedicel less than 10 hairs per mm sq or with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 3-9mm long; lateral teeth 3-9.5mm long; upper tooth 3-9.5mm long; tube 4.5-7mm long; ratio of lower tooth to tube length of 0.58-1.58. Calyx base not gibbous; tube mouth truncate; teeth reflexing absent; tooth curvature absent; exterior nectaries seen on lateral teeth. Calyx hairs covering calyx; hair density less than 10 per mm sq or 10-35 per mm sq; hair length 0.5-1.5mm long or more than 1.5mm long; hairs adpressed. Calyx colour green or purple base. Standard length 10-27mm; limb length 7-16mm; claw length 3-13mm; limb width 7-17mm; claw width 3-10mm; ratio of limb length to claw length 1-2.33. Corolla petals concolorous or not concolorous; standard face cream or purple; standard upper surface cream or lilac; face without distinct veining. Standard shape stenonychioid; apex emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 11-24mm; limb length 7-13mm; claw length 4-11mm; limb width 3-8mm. Wing colour cream or violet or purple; markings absent. Wing shape 2 or 3; spur shape 4; limb base kinking weak; limb pouch absent; wing to keel adhesion weak. Keel length 7.5-16mm; hood length 3-6mm; claw length 4-10mm; hood width 3-6.5mm. Keel colour white; hood apex distinctly coloured. Keel shape 2; base shape 2; pouch absent or present. Staminal tube length 6.5-15mm; filament length 1-2mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 4.5-9mm; style length 3.5-7.5mm; supra-ovary extension 0.5-1mm. Ovary shape oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary entirely covered with simple hairs; style apex pubescence type 3. Number of ovules per ovary 6-13.

LEGUME CHARACTERS: Legume (23-)40-59(-70)mm long; 5-8(-10)mm wide; 4-5mm deep; ratio of legume length to width 4.16-8. Amphicarpic legumes absent. Legume colour yellow or yellow-brown or brown or black; uniform over legume. Legume shape linear; cross-sectional shape round or rounded to flat; not falcate; suture straight; distal end unbeaked; valve surface torulose; surface smooth or ridged with veins; partitioning absent. Legume hairs 10 - 35 per mm sq or hairs 36 - 60 per mm sq; hairs less than 0.5mm long; hairs covering entire legume; suture surface ciliate, hairs less than 1mm long; tubercles absent. Dehiscent legume twisting loose or medium or tight; number of seeds per legume 5-11.

SEED CHARACTERS: Seed 3-7mm long; 2.5-7mm wide; 2-5mm deep; 7-18.5mm circumference; hilum 1.5-2.5mm long; distance from hilum to lens 0.5-1mm; seed length to width ratio of 0.8-1.2; seed circumference to hilum length ratio of 0.16-0.21. Seed shape spherical to cubic or oblong; shape in side view spherical or laterally compressed; seed colour yellow or red-brown or brown; mottling absent or present; surface matt; smooth. Hilum shape elongated, less than third of circumference; coloured yellow or coloured red-brown; groove colour beige or same as hilum; hilum surface excess tissue absent or present. Lens position less than 1.6mm from hilum; prominent. Aril absent.

Phenology: January - December **Chromosome number:** 10, 12.
Geographical distribution: AF, AL, AU, BE, BG, CA(I), CH, CL(I), CN, CS, CY, CU(I), DD, DE, DZ, EC, EG, ES, ET, FR, GB, GR, HU, IE, IL, IN, IQ, IR, IT, JP, JO, KE(I), LB, LE, LY, MA, MR, MU(I), MX(I), NL, NZ(I), PL, PK, PT, RO, SA, SO, SU, SY, TN, TR, US(I), YU.
Ecology: Alt. 10 - 2100m; Hab. Minor forage crop of the Middle East. Agricultural and disturbed land, margins of woodland.

Taxonomic notes: This subspecies is extensive grown, both as a fodder and forage plant, in Europe, North Africa and West Asia. ICARDA are currently promoting the use of V. sativa subsp. sativa as a replacement for fallow in the traditional barley-fallow rotation of the Eastern Mediterranean (ICARDA, 1988).

Specimen citation: Collenette 3477 (E); Reverchon s.n. (E); Maxted, Hollis & Goyder 1135 (SPN); Maxted 1196 (SPN); Maxted 1162 (SPN); Stribruy s.n. (E); Brenchley s.n. (BM); Mexia 7854 (MO); Churchill s.n. (MO); White s.n. (MO); Padilla 1038 (MO); Sa'ad & Khattab s.n. (CAI); Boulos s.n. (CAIM); Malinvaud 186 (BM); Kupicha 159 (E); Allkin 82/7 (SPN); Maitland s.n. (K); Zohary, Plitmann & Baum s.n. (HUJ); Zohary & Plitmann 822413 (HUJ); Thesiger 650 (BM); Terasaki 5/1906 (SPN); Krendl & Burri s.n. (W); Bisby 1811 (SPN); Bisby 1905 (SPN); Bisby 1982 (SPN); Bisby 1868 (SPN); Bisby 1965 (SPN); Bisby 1851 (SPN); Gregg 654 (MO); Alexander & Kupicha 77 (MO); Lewalie 8716 (MO); Miller, Russell & Sutton 300 (RNG); Bangerter 5132 (MO); Dahlstrand 248 (MO); Postian 152 (BM); Maxted, Ehrman & Khattab 2385 (SPN); Maxted, Ehrman & Khattab 2395 (SPN); Maxted, Ehrman & Khattab 2625 (SPN); Maxted, Ehrman & Khattab 2727 (SPN); Boulos 2526 (MO); Rix & al 1571 (E); Davis & Polunin 25934 (BM); Maxted, Kitiki & Allkin 4193 (SPN); Maxted, Kitiki & Allkin 4337 (SPN); Maxted, Kitiki & Allkin 4380 (SPN); Maxted, Kitiki & Allkin 4494 (SPN); Maxted, Kitiki & Allkin 4702 (SPN); Maxted, Auricht & Ehrman 4822 (SPN); Maxted, Auricht & Ehrman 4846 (SPN); Maxted, Auricht & Ehrman 4924 (SPN); Maxted, Auricht & Ehrman 4963 (SPN); Maxted, Auricht & Ehrman 5042 (SPN); Maxted, Auricht & Ehrman 5107 (SPN); Maxted, Auricht & Ehrman 5178 (SPN); Maxted, Auricht & Ehrman 5211 (SPN); Maxted, Auricht & Ehrman 5277 (SPN); Maxted, Auricht & Ehrman 5321 (SPN); Anon. MG-106166 (SPN); Davis & Lightowlers 66705 (E).

vi **Accepted taxon:** V.sativa subsp. **macrocarpa** (Moris) Arcang. 1882 Comp. Fl. Italiana, 201.
Type: (TO).
Iconography: Fl. Eur., 2: 135; Fl. Tur., 3: 320-321.
Synonymy: V. sativa var. macrocarpa Moris (1827) Stirp. Sard. Elench. 1: 17; V. angustifolia var. macrocarpa Moris (1829) Wtirpium Sardoarum Elenchus, 17; V. macrocarpa Bertol. (1850) Fl. It. 7: 511; V. morisiana Jordan ex Boreau (1857) Fl. Centr. Fr., Ed. 3(1): 172; V. sativa subsp. macrocarpa (Bert.) Kiffm. (1952) Z. Acker-Pflzbau, 94: 453.

Description: VEGETATIVE CHARACTERS: Annual; erect or ascending; 35-80cm high. Stipule length 3.5-8.5mm; 4-11mm wide. Stipule semi-hastate; apex acute; number of teeth on distal edge 1-2 teeth or 3-5 teeth or more than 5; number of teeth on proximal edge none or 1-2 teeth or more than 5; stipule edge form entire or uneven with swollen hairs; translucent. Stipule colour (upper plant) green with

purple; less than 10 hairs per sqmm or = or more than 10 hairs per sqmm. Leaf 31-78mm long; petiole 3-5mm long; average leaflet internode 6-13mm long; leaflet 15-26mm long; leaflet 3-12mm wide; tendril or mucro 23-65mm long; average leaf internode 22-85mm long; petiolule 27-76mm long. Leaf apex tendrilous; with 3 branches or with more than 3 branches. Leaflet shape symmetric; 10-16 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet linear elliptic or narrow elliptic or broad elliptic or narrow ovate; apex mucronate and emarginate or mucronate; base angustate; broadest at apex or in middle or at base. Leaflet adaxial hairs absent or less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; leaflet abaxial hair 10-50 per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm) or longer than 2mm, but shorter than flower. Peduncle length 1-3mm; rachis 1-2mm long; pedicel 1-2mm long; flower (15-)20-30mm long; ratio of peduncle to flower length of 0.04-0.12; peduncular cusp absent. Number of flowers per inflorescence one or two. Pedicel less than 10 hairs per mm sq or with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs 0.5-1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 4-6.5mm long; lateral teeth 4-6.5mm long; upper tooth 4-6.5mm long; tube 6-8mm long; ratio of lower tooth to tube length of 0.57-0.91. Calyx base not gibbous; tube mouth truncate; teeth reflexing absent; tooth curvature absent; exterior nectaries seen on lateral teeth or seen on all teeth. Calyx hairs covering calyx; hair density less than 10 per mm sq or 10-35 per mm sq; hair length 0.5-1.5mm long or more than 1.5mm long; hairs adpressed. Calyx colour green. Standard length 15-25mm; limb length 7-13.5mm; claw length 7-11.5mm; limb width 8-15mm; claw width 4.5-8mm; ratio of limb length to claw length 0.77-1.23. Corolla petals concolorous; standard face purple; standard upper surface lilac; face without distinct veining. Standard shape stenonychioid; apex emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 13-21mm; limb length 7-10.5mm; claw length 6-10.5mm; limb width 3.5-5.5mm. Wing colour purple; markings absent. Wing shape 3; spur shape 4; limb base kinking weak; limb pouch absent; wing to keel adhesion weak. Keel length 10-15.5mm; hood length 4-5mm; claw length 6-10.5mm; hood width 3.5-4.5mm. Keel colour white; hood apex distinctly coloured. Keel shape 2; base shape 2; pouch absent. Staminal tube length 8.5-13.5mm; filament length 1.5mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 5.5-9mm; style length 5-7mm; supra-ovary extension 1-1.5mm. Ovary shape oblong; style apex cross sectional dorsi-ventral flattened; supra-ovary curvature absent. Ovary entirely covered with simple hairs; style apex pubescence type 3. Number of ovules per ovary 7-12.

LEGUME CHARACTERS: Legume 21-50mm long; 8-12mm wide; 5-7mm deep; ratio of legume length to width 2.62-6. Amphicarpic legumes absent. Legume colour brown or black; uniform over legume. Legume shape linear or rectangular; cross-sectional shape round or rounded to flat; not falcate; suture straight; distal end unbeaked; valve surface not torulose; surface with strong vein ridging; partitioning absent. Legume hairs 10 - 35 per mm sq or hairs 36 - 60 per mm sq; hairs less than 0.5mm long or hairs 0.5 - 1.5mm long; hairs covering entire legume; suture surface ciliate, hairs less than 1mm long; tubercles absent. Dehiscent legume twisting loose or medium; number of seeds per legume 2-10.

SEED CHARACTERS: Seed 4-6(-8)mm long; 4.5-5.5(-7.5)mm wide; 3-5mm deep; 12-17mm circumference; hilum 2-3mm long; distance from hilum to lens 1mm; seed length to width ratio of 0.81-1.33; seed circumference to hilum length ratio of 0.16-0.18. Seed shape spherical to cubic; shape in side view circular; seed colour brown or black; mottling absent or present; surface matt; smooth. Hilum shape elongated, less than third of circumference; coloured red-brown; groove colour beige; hilum surface excess tissue absent or present. Lens position less than 1.6mm from hilum; prominent or not prominent. Aril absent.

Phenology: May - June **Chromosome number:** 10, 12.
Geographical distribution: AL, BG, DZ, ES, FR, GR, IT, LY, MA, PT, TR, YU.
Ecology: Alt. 45 - 200m; Hab. Agricultural and woodland margins.

Specimen citation: Masson s.n. (E); Witting s.n. (W); Davis & Sutton 65916 (E); Tadaro s.n. (W); Maxted, Kitiki & Allkin 4495 (SPN); Maxted, Kitiki & Allkin 4469 (SPN).

27 **Accepted taxon:** V. barbazitae Ten. & Guss. (1838) Mem. Sulle Peregr., 165.
Iconography: Fl. Eur., 2: 134; Fl. Tur., 3: 315.
Synonymy: V. barbazitae var. concolor Bornm. (1940) Symb. Fl. Anat. 208.

Description: VEGETATIVE CHARACTERS: Annual; ascending; 15-50cm high. Stipule length 3.5-6.5mm; 1.5-6.5mm wide. Stipule semi-hastate; apex acute; number of teeth on distal edge 1-2 teeth or 3-5 teeth or more than 5; number of teeth on proximal edge none or 1-2; stipule edge form entire; translucent. Stipule colour (upper plant) green or green with purple; less than 10 hairs per sqmm or = or more than 10 hairs per sqmm. Leaf 26-78mm long; petiole 2-13mm long; average leaflet internode 7-13mm long; leaflet 6-20mm long; leaflet 5-13mm wide; tendril or mucro 19-41mm long; average leaf internode 25-89mm long; petiolule 22-68mm long. Leaf apex tendrilous; simple or with 2 branches or with 3 branches. Leaflet shape symmetric; 6-14 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire or serrate; leaflet margins level. Leaflet narrow elliptic or broad elliptic or elliptic ovate or narrow ovate; apex mucronate and emarginate; base angustate or truncate to angustate or truncate; broadest at apex or in middle. Leaflet adaxial hairs absent or less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm). Peduncle length 1-2mm; pedicel 1.5-2mm long; flower 15-26mm long; ratio of peduncle to flower length of 0.03-0.16; peduncular cusp absent or present and less than 2.1mm long. Number of flowers per inflorescence one or two (rarely). Pedicel with 10-50 hairs per mm sq; hairs 0.5-1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 4-7.5mm long; lateral teeth 4-7.5mm long; upper tooth 4-7.5mm long; tube 5-8mm long; ratio of lower tooth to tube length of 0.5-1.36. Calyx base not gibbous or slightly gibbous; tube mouth truncate; teeth reflexing absent; tooth curvature absent; exterior nectaries seen on lateral teeth. Calyx hairs covering calyx; hair density less than 10 per mm sq; hair length 0.5-1.5mm long; hairs adpressed. Calyx colour green. Standard length 17.5-27mm; limb length 8.5-17mm; claw length 8-10mm; limb width 9-16mm; claw width 4.5-7mm; ratio of limb length to claw length 0.94-1.7. Corolla petals not concolorous; standard face cream or yellow; standard upper surface cream or yellow; face without distinct veining or face with distinct veins. Standard shape stenonychioid; apex emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 13-21.5mm; limb length 6.5-11.5mm; claw length 6.5-10mm; limb width 2-8mm. Wing colour violet; markings absent. Wing shape 2 or 3; spur shape 4 or 5; limb base kinking weak or strong; limb pouch absent; wing to keel adhesion weak. Keel length 10.5-15mm; hood length 3-4.5mm; claw length 6.5-10.5mm; hood width 3.5-5mm. Keel colour white; hood apex not distinctly coloured or distinctly coloured. Keel shape 2; base shape 2; pouch absent. Staminal tube length 9.5-14.5mm; filament length 2-2.5mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 5.5-8mm; style length 4-6.5mm; supra-ovary extension 1.5-2.5mm. Ovary shape intermediate or oblong; style apex cross sectional dorsi-ventrally flattened;

supra-ovary curvature absent. Ovary entirely covered with simple hairs; style apex pubescence type 1 or 3. Number of ovules per ovary 4-14.

LEGUME CHARACTERS: Legume 25-40mm long; 7mm wide; 4-5mm deep; ratio of legume length to width 3.57-5. Amphicarpic legumes absent. Legume colour brown; uniform over legume. Legume shape linear; cross-sectional shape rounded to flat; not falcate; suture straight; distal end unbeaked; valve surface not torulose; surface smooth or ridged with veins; partitioning absent. Legume hairs 36 - 60 per mm sq; hairs less than 0.5mm long; hairs covering entire legume; suture surface ciliate, hairs less than 1mm long; tubercles absent. Dehiscent legume twisting medium or tight; number of seeds per legume 6-7.

SEED CHARACTERS: Seed 4-4.5mm long; 4-4.5mm wide; 3mm deep; 12-12.5mm circumference; hilum 2-2.5mm long; distance from hilum to lens 1mm; seed length to width ratio of 1; seed circumference to hilum length ratio of 0.16-0.18. Seed shape spherical; shape in side view laterally compressed; seed colour black; mottling absent; surface matt; smooth. Hilum shape elongated, less than third of circumference; colour coloured red-brown; groove colour beige; hilum surface excess tissue absent. Lens position less than 1.6mm from hilum; not prominent. Aril absent.

Phenology: April - July **Chromosome number:** N.A.
Geographical distribution: BG, FR, DE, GR, IT, TR, YU. See Map 27.
Ecology: Alt. 340 - 2100m; Hab. woodland and margins of cultivation.

Taxonomic notes: V. barbazitae is not a common species and at first the use of two varieties may seem unwarranted. However, the distinction of a subspecies within V. sativa based on leaflet incision makes the acknowledgement of a similar situation in the two closely related species, V.barbazitae and V. grandiflora necessary. Bornmuller (1940) described a third variety, var. concolor Bornm., distinguished by a concolorous corolla from Pontus, Amasia, Turkey. The key character that distinguishes this species from the V. sativa agg. is the distinctive flower colour, yellow standard and blue-purple wings. Var. concolor is reported as having a yellow standard and wings, which would suggest the material is outside the specific circumscription. I have not seen the type or any other material of this variety and am reluctant to accept it unseen.

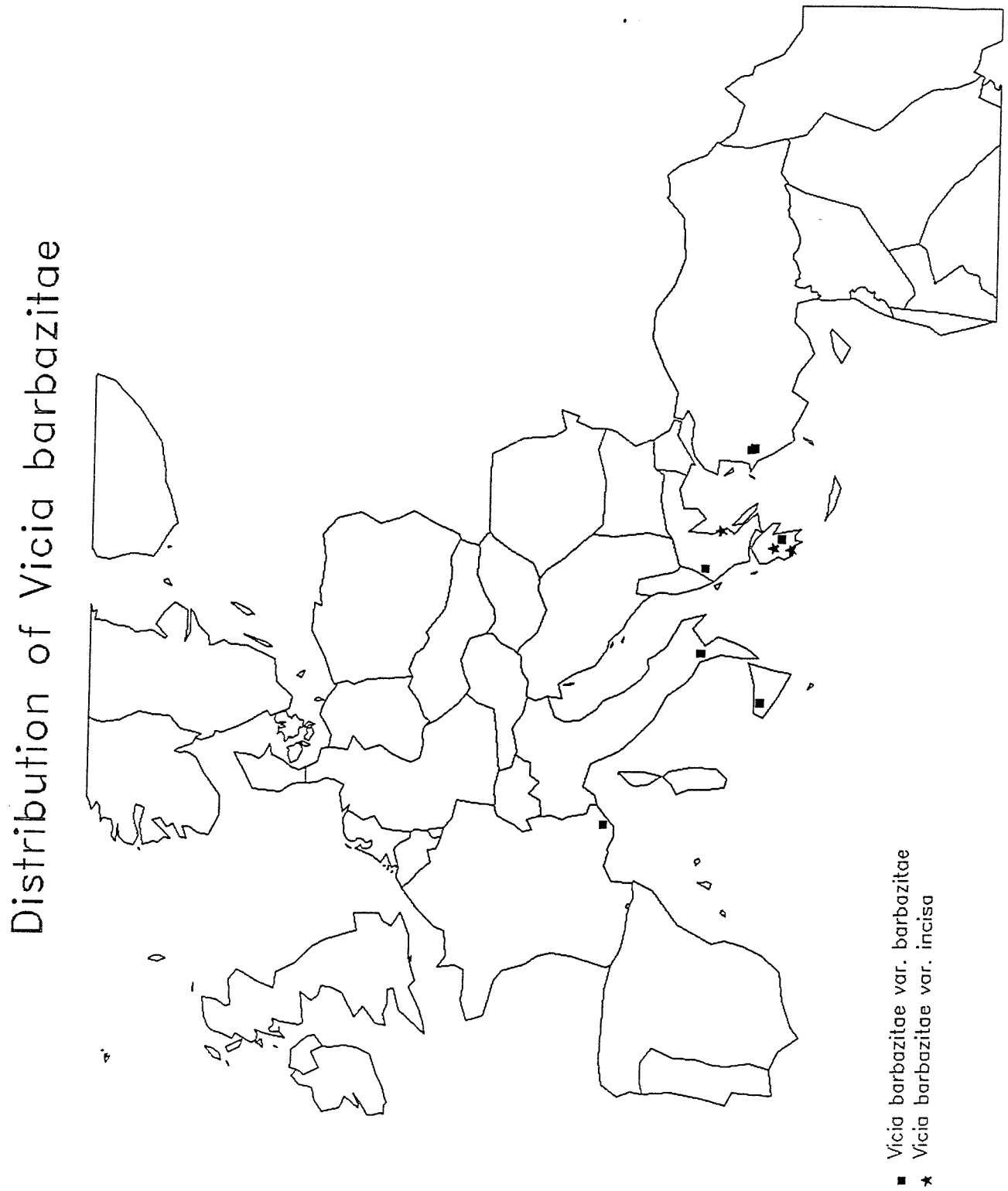
Plitmann (1967) comments that the relations between V. barbazitae and V. grandiflora resemble those existing between the subspecies of the V. sativa complex. This is inaccurate. Both species have yellow standards, which are not found in V. sativa, but a closer study of legume and seed characters shows V. barbazitae to be a closer ally of V. sativa than V. grandiflora.
Key to varieties of V. barbazitae

1(0). Lower leaflet margin entire.....
..... i V. barbazitae var. barbazitae
Lower leaflet margin incised dentate.....
..... ii V. barbazitae var. incisa

i **Accepted taxon:** **V. barbazitae** var. **barbazitae** Ten. & Guss. (1838) Mem. Sulle Peregr., 165.
Type: Holotype, Balvanum, Lacedonia, Italy (NAP).
Synonymy: V. laeta Cesati (1858) Der Sudlichen Theilen von New-Greichenland, 280; V. grandiflora var. laeta (Cesati) Fiori 1923 Nuov. Fl. Anal. Ital. 1: 923.

Description: VEGETATIVE CHARACTERS: Annual; ascending; 15-50cm high. Stipule length 4-6mm; 2.5-6mm wide. Stipule semi-hastate; apex acute; number of teeth on distal edge 1-2 teeth or 3-5 teeth or more

Map 27.


Distribution of Vicia barbazitae
Vicia barbazitae var. barbazitae
Vicia barbazitae var. incisa

than 5; number of teeth on proximal edge none or 1-2; stipule edge form entire; translucent. Stipule colour (upper plant) green or green with purple; less than 10 hairs per sqmm or = or more than 10 hairs per sqmm. Leaf 37-78mm long; petiole 4-13mm long; average leaflet internode 7-13mm long; leaflet 12-20mm long; leaflet 6-13mm wide; tendril or mucro 19-41mm long; average leaf internode 25-89mm long; petiolule 30-68mm long. Leaf apex tendrilous; simple or with 2 branches or with 3 branches. Leaflet shape symmetric; 6-14 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet elliptic ovate or narrow ovate; apex mucronate and emarginate; base angustate or truncate to angustate; broadest at apex or in middle. Leaflet adaxial hairs less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm). Peduncle length 1-2mm; pedicel 1.5-2mm long; flower 15-21mm long; ratio of peduncle to flower length of 0.03-0.16; peduncular cusp absent or present and less than 2.1mm long. Number of flowers per inflorescence one or two (rarely). Pedicel with 10-50 hairs per mm sq; hairs 0.5-1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 4-6.5mm long; lateral teeth 4-6.5mm long; upper tooth 4-6.5mm long; tube 5-7mm long; ratio of lower tooth to tube length of 0.66-0.92. Calyx base not gibbous or slightly gibbous; tube mouth truncate; teeth reflexing absent; tooth curvature absent; exterior nectaries seen on lateral teeth. Calyx hairs covering calyx; hair density less than 10 per mm sq; hair length 0.5-1.5mm long; hairs adpressed. Calyx colour green. Standard length 18-21mm; limb length 9-12mm; claw length 8-10mm; limb width 9-13mm; claw width 5-7mm; ratio of limb length to claw length 1-1.5. Corolla petals not concolorous; standard face cream or yellow; standard upper surface cream or yellow; face without distinct veining or face with distinct veins. Standard shape stenonychioid; apex emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 13-15mm; limb length 6.5-11mm; claw length 6.5-8.5mm; limb width 2-5.5mm. Wing colour violet; markings absent. Wing shape 2 or 3; spur shape 4 or 5; limb base kinking weak or strong; limb pouch absent; wing to keel adhesion weak. Keel length 10.5-12.5mm; hood length 3-4mm; claw length 6.5-8.5mm; hood width 4-4.5mm. Keel colour white; hood apex not distinctly coloured or distinctly coloured. Keel shape 2; base shape 2; pouch absent. Staminal tube length 9.5-12.5mm; filament length 2mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 5.5-8mm; style length 4-6mm; supra-ovary extension 1.5-2mm. Ovary shape oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary entirely covered with simple hairs; style apex pubescence type 1 or 3. Number of ovules per ovary 4-10.

LEGUME CHARACTERS: Legume 27-40mm long; 7mm wide; 4-5mm deep; ratio of legume length to width 3.85-4.42. Amphicarpic legumes absent. Legume colour brown; uniform over legume. Legume shape linear; cross-sectional shape rounded to flat; not falcate; suture straight; distal end unbeaked; valve surface not torulose; surface smooth or ridged with veins; partitioning absent. Legume hairs 36 - 60 per mm sq; hairs less than 0.5mm long; hairs covering entire legume; suture surface ciliate, hairs less than 1mm long; tubercles absent. Dehiscent legume twisting medium or tight; number of seeds per legume 6-7.

SEED CHARACTERS: Seed 4mm long; 4mm wide; 3mm deep; 12-12.5mm circumference; hilum 2mm long; distance from hilum to lens 1mm; seed length to width ratio of 1; seed circumference to hilum length ratio of 0.16-0.18. Seed shape spherical; shape in side view laterally compressed; seed colour black; mottling absent; surface matt; smooth. Hilum shape elongated, less than third of circumference; coloured red-brown; groove colour beige; hilum surface excess tissue absent. Lens position less than 1.6mm from hilum; not prominent. Aril absent.

Phenology: April - June **Chromosome number:** 14.
Geographical distribution: FR, GR, IT, TR.
Ecology: Alt. 340 - 2100m; Hab. woodland and woodland margins.

Specimen citation: Bouchard 1690 (K); Dimonie 409 (E); Heldreich s.n. (W); Gavioli 2705 (OXF); Huet & Pavillion 52 (E); Huet & Huet 52 (W); Huet & Huet 52 (W); Maxted, Kitiki & Allkin 4319 (SPN); Maxted, Kitiki & Allkin 4429 (SPN); Maxted, Kitiki & Allkin 4436 (SPN).

ii **Accepted taxon:** V. barbazitae var. **incisa** (Orph.) Boiss. (1872) Fl. Or., 2: 574.
Type: location unknown.
Synonymy: V. incisa Orph. Fl Gr. exs., 594; V. thessala Spruner ex Boiss. (1872) Fl. Or., 2: 574.

Description: VEGETATIVE CHARACTERS: Annual; ascending; 15-50cm high. Stipule length 3.5-6.5mm; 1.5-6.5mm wide. Stipule semi-hastate; apex acute; number of teeth on distal edge 1-2 teeth or 3-5 teeth or more than 5; number of teeth on proximal edge none or 1-2; stipule edge form entire; translucent. Stipule colour (upper plant) green or green with purple; less than 10 hairs per sqmm or = or more than 10 hairs per sqmm. Leaf 26-64mm long; petiole 2-11mm long; average leaflet internode 8-12mm long; leaflet 13-20mm long; leaflet 6-13mm wide; tendril or mucro 24-36mm long; average leaf internode 35-68mm long; petiolule 22-54mm long. Leaf apex tendrilous; simple or with 2 branches or with 3 branches. Leaflet shape symmetric; 8-12 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin incised dentate; leaflet margins level. Leaflet narrow elliptic or broad elliptic or narrow ovate; apex mucronate and emarginate; base truncate to angustate or truncate; broadest at apex or in middle. Leaflet adaxial hairs absent or less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; leaflet abaxial hair 10-50 per mm sq or more than 50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm). Peduncle length 1mm; pedicel 2mm long; flower 18-26mm long; ratio of peduncle to flower length of 0.03-0.05; peduncular cusp absent or present and less than 2.1mm long. Number of flowers per inflorescence one or two (rarely). Pedicel with 10-50 hairs per mm sq; hairs 0.5-1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 4-7.5mm long; lateral teeth 4-7.5mm long; upper tooth 4-7.5mm long; tube 5.5-8mm long; ratio of lower tooth to tube length of 0.5-1.36. Calyx base not gibbous or slightly gibbous; tube mouth truncate; teeth reflexing absent; tooth curvature absent; exterior nectaries seen on lateral teeth. Calyx hairs covering calyx; hair density less than 10 per mm sq; hair length 0.5-1.5mm long; hairs adpressed. Calyx colour green. Standard length 17.5-27mm; limb length 8.5-17mm; claw length 9-10mm; limb width 9-16mm; claw width 4.5-7mm; ratio of limb length to claw length 0.94-1.7. Corolla petals not concolorous; standard face cream or yellow; standard upper surface cream or yellow; face without distinct veining. Standard shape stenonychioid; apex emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 16-21.5mm; limb length 8-11.5mm; claw length 7.5-10mm; limb width 4-8mm. Wing colour violet; markings absent. Wing shape 3; spur shape 4 or 5; limb base kinking weak or strong; limb pouch absent; wing to keel adhesion weak. Keel length 11.5-15mm; hood length 3.5-4.5mm; claw length 7.5-10.5mm; hood width 3.5-5mm. Keel colour white; hood apex distinctly coloured. Keel shape 2; base shape 2; pouch absent. Staminal tube length 11-14.5mm; filament length 2-2.5mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 5.5-8mm; style length 5.5-6.5mm; supra-ovary extension 1.5-2.5mm. Ovary shape intermediate or oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary entirely covered with simple hairs; style apex pubescence type 1. Number of ovules per ovary 6-14.

LEGUME CHARACTERS: Legume 25-35mm long; 7mm wide; 4-5mm deep; ratio of legume length to width 3.57-5. Amphicarpic legumes absent. Legume colour brown; uniform over legume. Legume shape linear; cross-sectional shape rounded to flat; not falcate; suture straight; distal end unbeaked; valve surface not torulose; surface smooth or ridged with veins; partitioning absent. Legume hairs 36 - 60 per mm sq; hairs less than 0.5mm long; hairs covering entire legume; suture surface ciliate, hairs less than 1mm long; tubercles absent. Dehiscent legume twisting medium or tight; number of seeds per legume 6-7.

SEED CHARACTERS: Seed 4.5mm long; 4.5mm wide; 3mm deep; 12mm circumference; hilum 2.5mm long; distance from hilum to lens 1mm; seed length to width ratio of 1; seed circumference to hilum length ratio of 0.16-0.18. Seed shape spherical; shape in side view laterally compressed; seed colour black; mottling absent; surface matt; smooth. Hilum shape elongated, less than third of circumference; coloured red-brown; groove colour beige; hilum surface excess tissue absent. Lens position less than 1.6mm from hilum; not prominent. Aril absent.

Phenology: May - June **Chromosome number:** 14.
Geographical distribution: AT, GR, TR.
Ecology: Alt. 550 - 1150m; Hab. open woodland and meadows.

Specimen citation: Anon. s.n. (E); Heldreich & Holzmann s.n. (E); Orphanides 594 (W); Haussknecht s.n. (W); Maxted, Kitiki & Allkin 4317 (SPN).

B Series Grandiflorae B. Fedtsch. ex Radzhi (1971) Novosti Sist. Vyssh. Rast., 7: 236.
Type: V. grandiflora Scop. (1772) Flora Carnolica, 2: 65.
Iconography: Fl. USSR., 13: 349.
Synonymy: Cujunia Alef. (1861) Bonplandia, IX: 101; Vicia ser. Annuae Taubert (1894) Die Nat. Pl. III, 10: 351, nomen nudum; Vicia subser. Ochroleucae Taubert (1894) Die Nat. Pl. III, 10: 351, nomen nudum; Vicia ser. Grandiflorae B. Fedtsch. (1948) Fl. USSR., 13: 459 nomen nudum.

Description: Annual; climbing; stem slender. Stipules entire or semi-hastate; length less than 3.5mm or 3.5 to 5.5mm; edge entire or with 1-2 teeth or with 3-5 teeth. Leaf apex tendrilous; leaflet less than 20mm or 20-30mm or longer than 30mm; with 1-4 pairs or more than 4 pairs. Leaflets symmetric; margins entire or serrate or incised. Number of flowers per inflorescence 1 or 1 to 2 or 3 to 4; peduncle 1-2mm or peduncle 3-6mm. Calyx mouth straight; teeth subequal; base not gibbous. Pedicel shorter or equal to 3mm or longer than 3mm. Flowers longer than 20mm; standard cream or yellow; shape stenonychioid; claw bowing absent; upper standard surface glabrous. All petals approximately equal length. Wing marking absent; wing limb with slight kinking or strong kinking. Legume length less than 30mm or 30 to 50mm; width 5 to 10mm wide; linear or rectangular; laterally flattened; sutures straight; valve hairs present; hairs simple; septa absent; number of seeds per legume 7 to 10 or more than 10. Seeds less than 3.4mm; round; laterally flattened; hilum over half seed circumference; lens positioned near hilum; testa surface smooth.

Number of taxa: three. **Chromosome number:** 12, 14.
Geographical distribution: South-east Europe and West Asia.

Taxonomic notes: Series Grandiflorae contains two closely allied species V. grandiflora and V. qatmensis. The latter is an endemic of Western Syria and was unknown to previous authors, preparing classifications of Vicia. The two species are distinguished from Vicia sensu stricto by their yellow to

cream coloured corolla, the corolla size, the laterally flattened legume, generally broader legume and the seed hilum being more than half the seed circumference.

28 **Accepted taxon:** **V. qatmensis** Gomb. (1951) Notulae systematicae, 14(2): 109.
Type: Holotype, Fr. Louis s.n., Qatma, Syria (P).
Iconography: Fl. Syr., 2: 401.

Description: VEGETATIVE CHARACTERS: Annual; ascending; 25-50cm high. Stipule length 4-5.5mm; 3.5mm wide. Stipule semi-hastate; apex acute; number of teeth on distal edge 3-5; number of teeth on proximal edge none or 1-2; stipule edge form entire; translucent. Stipule colour (upper plant) green with purple; glabrous or less than 10 hairs per sqmm or = or more than 10 hairs per sqmm. Leaf 41-54mm long; petiole 2-8mm long; average leaflet internode 6-9mm long; leaflet 11-24mm long; leaflet 2-7mm wide; tendril or mucro 28-39mm long; average leaf internode 54-79mm long; petiolule 34-49mm long. Leaf apex tendrilous; with 2 branches or with 3 branches or with more than 3 branches. Leaflet shape symmetric; 12-14 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet linear elliptic or narrow elliptic or broad elliptic; apex mucronate and emarginate; base truncate to angustate; broadest at apex or in middle or at base. Leaflet adaxial hairs absent; leaflet abaxial hair 10-50 per mm sq; hairs less than 0.5mm long; petiole hairs less than 10 per mm sq. Stem node colour (upper plant) green or purple.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm). Peduncle length 1-2mm; pedicel 2-3mm long; flower 20-21mm long; ratio of peduncle to flower length of 0.05-0.1; peduncular cusp absent or present and less than 2.1mm long. Number of flowers per inflorescence one. Pedicel with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs less than 0.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 3.5-4mm long; lateral teeth 3.5-4mm long; upper tooth 3.5-4mm long; tube 6.5-7mm long; ratio of lower tooth to tube length of 0.5-0.61. Calyx base slightly gibbous; tube mouth truncate; teeth reflexing absent; tooth curvature absent; exterior nectaries absent. Calyx hairs covering calyx; hair density of 10-35 per mm sq or 36-60 per mm sq; hair length less than 0.5mm long; hairs adpressed. Calyx colour green or purple base. Standard length 17-22mm; limb length 9-13mm; claw length 7.5-10mm; limb width 9-14mm; claw width 4.5-7mm; ratio of limb length to claw length 1-1.44. Corolla petals concolorous; standard face cream; standard upper surface yellow-brown; face without distinct veining. Standard shape stenonychioid; apex emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 13.5-18mm; limb length 6.5-9mm; claw length 7.5-10.5mm; limb width 3.5-5mm. Wing colour cream; markings absent. Wing shape 1 or 3; spur shape 5; limb base kinking strong; limb pouch present; wing to keel adhesion weak. Keel length 11-14mm; hood length 3-4mm; claw length 8-10mm; hood width 3.5-4.5mm. Keel colour white; hood apex distinctly coloured. Keel shape 1; base shape 2; pouch absent. Staminal tube length 11.5-13mm; filament length 2-2.5mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 7-9mm; style length 4.5-6mm; supra-ovary extension 1.5-2mm. Ovary shape intermediate or oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary entirely covered with simple hairs; style apex pubescence type 1. Number of ovules per ovary 11-18.

LEGUME CHARACTERS: Legume 30-32mm long; 6-7mm wide; 3-4mm deep; ratio of legume length to width 4.57-5. Amphicarpic legumes absent. Legume colour black; uniform over legume. Legume shape linear; cross-sectional shape laterally flat; not falcate or falcate; suture straight; distal end unbeaked; valve surface not torulose; surface smooth or ridged with veins; partitioning absent. Legume hairs 36 - 60 per mm sq; hairs less than 0.5mm long; hairs covering entire legume; suture surface smooth or

denticulate; tubercles absent. Dehiscent legume twisting tight or very tight; number of seeds per legume 7-9.

SEED CHARACTERS: Seed 3mm long; 3.5mm wide; 1.5mm deep; 9mm circumference; hilum 7mm long; distance from hilum to lens 1mm; seed length to width ratio of 0.85; seed circumference to hilum length ratio of 0.78. Seed shape spherical; shape in side view laterally compressed; seed colour yellow; mottling absent; surface matt; smooth. Hilum shape very elongated, more than third of circumference; coloured yellow; groove colour beige; hilum surface excess tissue absent. Lens position less than 1.6mm from hilum; not prominent. Aril absent.

Phenology: March - May **Chromosome number:** 14.
Geographical distribution: SY (endemic), see Map 28.
Ecology: Alt. 470 - 1040m; Soil, Calcic brown & terra rossa, Woodland brown; Hab. Woodland and coppice margins.

Taxonomic notes: This rare taxon has been located at two sites in North western Syria; near the type location at Masiaf and in the gorge which runs down to the sea from Kessab on the Turkish - Syrian border. Plitmann (1967) after reading the protologue suggests V. qatmensis is related to his ser. Hyrcanicae, specifically to V. hyrcanica based on 1-flowered peduncles and legume characters, and to V. noeana on calyx and habit characters. Having field observation and collecting material of V. qatmensis, I consider Plitmann's suggested allegiance is erroneous. The characters used to distinguish series Grandiflorae indicate V. qatmensis has a close natural relationship with V. grandiflora.

Specimen citation: Maxted, Ehrman & Khattab 2061 (SPN); Maxted, Ehrman & Khattab 2066 (SPN); Maxted, Ehrman & Khattab 2732 (SPN); Maxted, Ehrman & Khattab 2081 (SPN); Maxted, Ehrman & Khattab 3210 (SPN).

29 **Accepted taxon:** V. grandiflora Scop. (1772) Flora Carnolica, 2: 65.
Iconography: Fl. Eur., 2: 134; Fl. Iran., 54; Fl. Pal., 2: 205; Fl. Tur., 3: 315-316; Fl. USSR., 13: 459-460; Illust. Fl. Iran., Tab. 35, fig. 3.

Description: VEGETATIVE CHARACTERS: Annual; ascending; 18-90cm high. Stipule length 2.5-6.5mm; 1-6.5mm wide. Stipule entire or semi-hastate; apex acute; number of teeth on distal edge none or 1-2 teeth or 3-5; number of teeth on proximal edge none or 1-2; stipule edge form entire or uneven with swollen hairs; translucent. Stipule colour (upper plant) green or green with purple; glabrous or hairs located edge only or less than 10 hairs per sqmm. Leaf 26-80mm long; petiole 1-19mm long; average leaflet internode 5-17mm long; leaflet 5-33mm long; leaflet 2-14(-20)mm wide; tendril or mucro 15-84mm long; average leaf internode 21-97mm long; petiolule 21-72mm long. Leaf apex tendrilous; simple or with 2 branches or with 3 branches or with more than 3 branches. Leaflet shape symmetric; 6-16 leaflets per leaf. Upper leaflet margin entire or lobed; lower leaflet margin entire or serrate; leaflet margins level. Leaflet broad linear or linear elliptic or narrow elliptic or broad elliptic or narrow ovate; apex mucronate and emarginate; base angustate or truncate to angustate; broadest at apex or in middle or at base. Leaflet adaxial hairs absent or less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm) or longer than 2mm, but shorter than flower. Peduncle length 1-7(-27)mm; rachis 1-8(-22)mm long; pedicel 1-4mm long; flower 19-33mm long; ratio of peduncle to flower length of 0.03-0.93; peduncular cusp absent or present and less than 2.1mm

Map 28.

long. Number of flowers per inflorescence one or two or three or four (rarely). Pedicel with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 2.5-6mm long; lateral teeth 2.5-6mm long; upper tooth 2.5-6mm long; tube 6.5-9.5mm long; ratio of lower tooth to tube length of 0.31-0.85. Calyx base not gibbous or slightly gibbous; tube mouth truncate; teeth reflexing absent; tooth curvature absent; exterior nectaries absent or seen on lateral teeth. Calyx hairs covering calyx; hair density of 10-35 per mm sq or 36-60 per mm sq; hair length less than 0.5mm long or 0.5-1.5mm long; hairs adpressed. Calyx colour green. Standard length 18-36mm; limb length 8.5-22mm; claw length 8-13mm; limb width 8.5-21.5mm; claw width 4.5-8mm; ratio of limb length to claw length 0.88-2.21. Corolla petals concolorous; standard face cream or yellow (pale) or rarely purple (possibly only on drying). Standard upper surface cream or yellow (pale). Face without distinct veining. Standard shape stenonychioid; apex emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 15.5-24mm; limb length 7.5-13mm; claw length 8-12.5mm; limb width 4.5-12mm. Wing colour yellow (pale). Markings absent. Wing shape 3; spur shape 4 or 5; limb base kinking weak or strong; limb pouch absent; wing to keel adhesion weak. Keel length 11.5-18mm; hood length 4-5.5mm; claw length 7-13.5mm; hood width 3.5-6mm. Keel colour white; hood apex distinctly coloured. Keel shape 2; base shape 2; pouch absent or present. Staminal tube length 11.5-16mm; filament length 4-5mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 6-10.5mm; style length 4.5-8.5mm; supra-ovary extension 3-8mm. Ovary shape linear or intermediate; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary entirely covered with simple hairs; style apex pubescence type 1. Number of ovules per ovary 9-20.

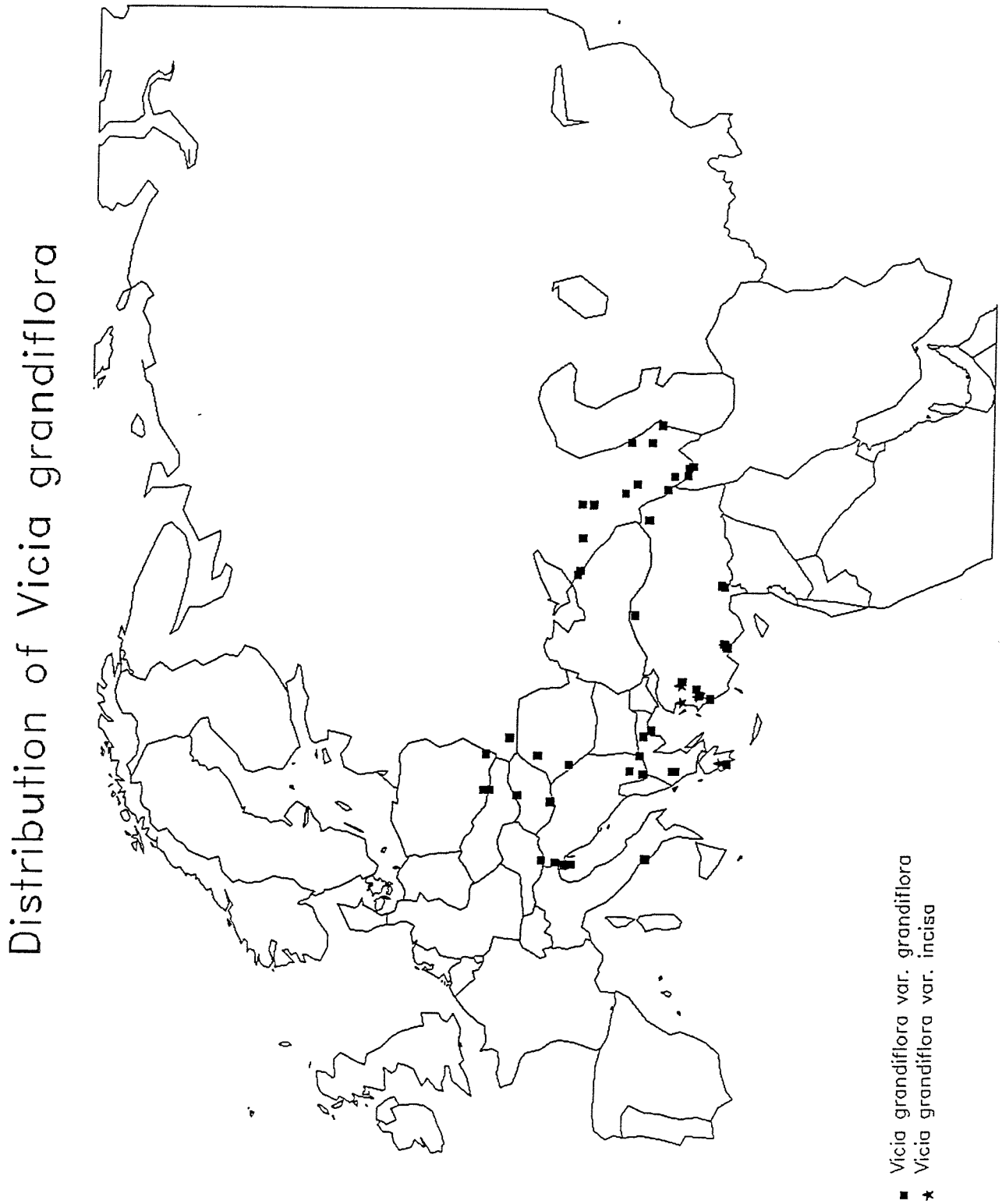
LEGUME CHARACTERS: Legume 25-45(-50)mm long; 6-10mm wide; 3-5mm deep; ratio of legume length to width 4-6.66. Amphicarpic legumes absent. Legume colour brown or black; uniform over legume. Legume shape linear; cross-sectional shape laterally flat; not falcate; suture straight; distal end unbeaked or slightly beaked; valve surface not torulose; surface smooth; partitioning absent. Legume hairs 10 - 35 per mm sq or hairs 36 - 60 per mm sq; hairs less than 0.5mm long; hairs covering entire legume; suture surface ciliate, hairs less than 1mm long; tubercles absent. Dehiscent legume twisting tight or very tight; number of seeds per legume 6-14.

SEED CHARACTERS: Seed 2.5-3.5mm long; 3-4.5mm wide; 1-2.5mm deep; 8-12mm circumference; hilum 6-9.5mm long; distance from hilum to lens 1mm; seed length to width ratio of 0.71-1; seed circumference to hilum length ratio of 0.75-0.79. Seed shape spherical or oblong; shape in side view laterally compressed; seed colour yellow or red-brown; mottling absent or present; surface matt; smooth. Hilum shape very elongated, more than third of circumference; coloured yellow or coloured red-brown; groove colour beige or same as hilum or red-brown; hilum surface excess tissue absent or present. Lens position confluent to hilum or less than 1.6mm from hilum; prominent or not prominent. Aril protruding.

Phenology: March - August **Chromosome number:** (12), 14.
Geographical distribution: AF, AL, AU, BG, CA(I), CS, GR, HU, IQ, IR, IT, PL, RO, SU, TR, YU, US(I). See Map 29.
Ecology: Alt. 200 - 1200m; Hab. Woodland, woodland margin and disturbed land.

Taxonomic notes: If a consistent approach is adopted the distinction of a subspecies within the close allies of V. sativa, then the recognition of a subspecies of V. sativa based on leaflet incision, makes the acknowledgement of a similar situation in V. grandiflora necessary. Plitmann (1967) points out that V. grandiflora is a very polymorphic species and excluding leaflet incision lists five elements of character variation: size and shape of leaflets, size and shape of stipules, length of calyx, length of standard, and dimensions of legume and number of seeds per legume. This variation has lead authors to

Map 29.


Distribution of Vicia grandiflora
■ Vicia grandiflora var. grandiflora
★ Vicia grandiflora var. incisa

erect numerous infra-specific taxa, but the material I have studied divides naturally into the two varieties I accepted. The variation noted by Plitmann appears to be clinal, between extreme forms, with no clear separation into distinct taxa.

Key to varieties of V. grandiflora

1(0). Lower leaflet margin entire.....
..... i V. grandiflora var. grandiflora
Lower leaflet margin incised dentate.....
..... ii V. grandiflora var. incisa

i **Accepted taxon:** **V. grandiflora** var. **grandiflora** Scop. (1772) Flora Carnolica, 2: 65.
Type: Holotype, Menzies 1805, Slovenia, Yugoslavia (BM!).
Iconography: Fl. Tur., 3: 316.
Synonymy: V. sordida Willd. (1802) Sp. Pl., 3(2): 1108; V. sordida Waldst. & Kit. (1805) Desc. et Icon. Pl. Rar. Hungariae, 2: 133; V. sordida M. Bieb. (1808) Fl. Taur. Cauc., 2: 162; V. lutea Pallas ex M. Bieb. (1808) Flora Taurico-Caucasia, 2: 162; V. biebersteinii Besser ex M. Bieb. (1819) Fl. Taur.-Cauc., 3: 472; V. biebersteinii Besser (1822) En. Volhyn., 29; V. grandiflora var. scopoliana Koch (1835) Syn. Fl. Germ. Helv., 3(1): 197; V. grandiflora var. biebersteiniana Koch (1835) Syn. Fl. Germanicae et Helveticae, 3(1): 170; V. grandiflora var. kitaibeliana W. Koch (1835) Syn., 1: 197; V. grandiflora var. sordida (Kit.) Griseb. (1843) Sp. Fl. Rumelicae et Bithynicae, 1: 77-78; V. grandiflora var. villosa Regel (1856) Index Seminum Hort. Bot. Imp. Petropolitanus, 40; Cujunia grandiflora var. rotundata Alef. (1861) Bonplandia, 9: 101; Cujunia grandiflora var. sordida Alef. (1861) Bonplandia, 9: 101-102; V. kitaibeliana Schur (1866) Enum. Pl. Transs., 168; V. grandiflora subsp. biebersteinii (Besser) Dorstal (1884) Folia Mus. Rer. Nat. Bohem. Occid. Bot., 21: 8; V. grandiflora subsp. sordida (Waldst. & Kit.) Dorstal (1884) Folia Mus. Rer. Nat. Bohem. Occid. Bot., 21: 8; V. grandiflora var. typica Beck (1892) Fl. Hieder-Osterreich, 2: 889-894; V. grandiflora var. rotundata (Ser.) Janchen (1911) Neue Beitr. Balk., 3: 213.

Description: VEGETATIVE CHARACTERS: Annual; ascending; 18-90cm high. Stipule length 2.5-5.5mm; 1-5.5mm wide. Stipule entire or semi-hastate; apex acute; number of teeth on distal edge none or 1-2 teeth or 3-5; number of teeth on proximal edge none; stipule edge form entire or uneven with swollen hairs; translucent. Stipule colour (upper plant) green or green with purple; glabrous or hairs located edge only or less than 10 hairs per sqmm. Leaf 26-78mm long; petiole 1-12mm long; average leaflet internode 5-17mm long; leaflet 8-33mm long; leaflet 2-13mm wide; tendril or mucro 15-84mm long; average leaf internode 21-97mm long; petiolule 21-72mm long. Leaf apex tendrilous; with 2 branches or with 3 branches or with more than 3 branches. Leaflet shape symmetric; 8-16 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet broad linear or linear elliptic or narrow elliptic or narrow ovate; apex mucronate and emarginate; base angustate or truncate to angustate; broadest at apex or in middle or at base. Leaflet adaxial hairs absent or less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm) or longer than 2mm, but shorter than flower. Peduncle length 1-7(-27)mm; rachis 1-8(-22)mm long; pedicel 1-4mm long; flower 19-33mm long; ratio of peduncle to flower length of 0.03-0.93; peduncular cusp absent or present and less than 2.1mm long. Number of flowers per inflorescence one or two or three or four (rarely). Pedicel with 10-50 hairs

per mm sq or with more than 50 hairs per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 2.5-6mm long; lateral teeth 2.5-6mm long; upper tooth 2.5-6mm long; tube 6.5-9.5mm long; ratio of lower tooth to tube length of 0.31-0.63. Calyx base not gibbous or slightly gibbous; tube mouth truncate; teeth reflexing absent; tooth curvature absent; exterior nectaries absent or seen on lateral teeth. Calyx hairs covering calyx; hair density of 10-35 per mm sq or 36-60 per mm sq; hair length less than 0.5mm long or 0.5-1.5mm long; hairs adpressed. Calyx colour green. Standard length 18-32mm; limb length 8.5-22mm; claw length 8-13mm; limb width 8.5-21.5mm; claw width 4.5-8mm; ratio of limb length to claw length 0.88-2.21. Corolla petals concolorous; standard face yellow (pale). Standard upper surface yellow (pale). Face without distinct veining. Standard shape stenonychioid; apex emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 15.5-24mm; limb length 7.5-13mm; claw length 8-12.5mm; limb width 4.5-10mm. Wing colour yellow (pale). Markings absent. Wing shape 3; spur shape 4 or 5; limb base kinking weak or strong; limb pouch absent; wing to keel adhesion weak. Keel length 11.5-18mm; hood length 4-5.5mm; claw length 7-13.5mm; hood width 3.5-6mm. Keel colour white; hood apex distinctly coloured. Keel shape 2; base shape 2; pouch absent or present. Staminal tube length 11.5-16mm; filament length 2-2.5mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 6-10.5mm; style length 4.5-8.5mm; supra-ovary extension 3-8mm. Ovary shape intermediate; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary entirely covered with simple hairs; style apex pubescence type 1. Number of ovules per ovary 9-20.

LEGUME CHARACTERS: Legume 25-45(-50)mm long; 6-10mm wide; 3-5mm deep; ratio of legume length to width 4-6.66. Amphicarpic legumes absent. Legume colour brown or black; uniform over legume. Legume shape linear; cross-sectional shape laterally flat; not falcate; suture straight; distal end unbeaked or slightly beaked; valve surface not torulose; surface smooth; partitioning absent. Legume hairs 10 - 35 per mm sq or hairs 36 - 60 per mm sq; hairs less than 0.5mm long; hairs covering entire legume; suture surface ciliate, hairs less than 1mm long; tubercles absent. Dehiscent legume twisting tight or very tight; number of seeds per legume 6-14.

SEED CHARACTERS: Seed 2.5-3.5mm long; 3-4.5mm wide; 1-2.5mm deep; 8-11mm circumference; hilum 6-8.5mm long; distance from hilum to lens 1mm; seed length to width ratio of 0.71-1; seed circumference to hilum length ratio of 0.75-0.77. Seed shape spherical or oblong; shape in side view laterally compressed; seed colour yellow or red-brown; mottling absent or present; surface matt; smooth. Hilum shape very elongated, more than third of circumference; coloured yellow or coloured red-brown; groove colour beige or same as hilum or red-brown; hilum surface excess tissue absent or present. Lens position confluent to hilum or less than 1.6mm from hilum; prominent or not prominent. Aril protruding.

Phenology: March - July **Chromosome number:** 14.
Geographical distribution: AT, GR, HU, IT, PL, RO, SU, TR, US(I), YU.
Ecology: Alt. 200 - 1200m; Hab. Woodland, woodland margin and disturbed land.

Specimen citation: Krendl s.n. (W); Krendl s.n. (W); Heldreich s.n. (E); Heldreich s.n. (E); Haussknecht s.n. (W); Krendl s.n. (W); Krendl & Krendl s.n. (W); Friedricchsthal s.n. (W); Wagner s.n. (E); Krendl s.n. (W); Tauscher s.n. (MO); Steurer 20 (E); Butler 6/1954 (K); Crawford 50 (E); Kummert & Muck 33 (W); Krendl & Krendl s.n. (W); Krendl & Krendl 5/7/1976 (W); Leute 187 (W); Schneider s.n. (W); Jasiewicz & Zarzycki 133 (W); Jasiewicz 37 (W); Jasiewicz 37 (MO); Bujorean 1281 (K); Krendl & Krendl s.n. (W); Prior s.n. (K); Arevschatyan s.n. (BM); Hohenacker 1838 (E); Grossheim,Ilinskaya & Kirpicks.n. (E); Koch s.n. (LE); Akinfiyev s.n. (LE); Poyarkova s.n. (LE); Shishkin s.n. (LE); Gadzhir s.n. (LE); Medvedeva s.n. (LE); Medvedeva s.n. (LE); Alexeyenko s.n. (LE); Manakyan s.n. (LE); Alexeyenko s.n. (LE); Shishkin

s.n. (LE); Gordyagin s.n. (LE); Pastukhov s.n. (LE); Lipsky s.n. (LE); Grossheim & Ilinskaya s.n. (LE); Averkin s.n. (LE); Abramov s.n. (LE); Akverdov & Mirozeva s.n. (ERE); Davis & Hedge 26870 (E); Davis & Polunin 25777 (E); Davis & Polunin 25777 (BM); St.Lager s.n. (BM); Balls 1641 (K); Sintenis 185 (E); Zohary & Plitmann 2561-43 (HUJ); Zohary & Zohary 73/5 (HUJ); Maxted, Kitiki & Allkin 4460 (SPN); Maxted, Kitiki & Allkin 4490 (SPN); Maxted, Kitiki & Allkin 4683 (SPN); Maxted, Kitiki & Allkin 4691 (SPN); Coile 1672 (BM); Scott 122 (E); Duncan 9579 (MO); Faircloth 4197 (MO); Hermann 11411 (MO); Moldenke & Moldenke 26842 (CAIM).

ii **Accepted taxon:** V. grandiflora var. **incisa** Braun & Bouche (1853) App. Spec. Nov. et Minus Cognitarum, 22.

Type: (B).

Iconography: Fl. Tur., 3: 316.

Synonymy: V. grandiflora var. dissecta Boiss. (1872) Fl. Or. 2: 573; V. serrata Pant. (1873) Oestr. Bot. Zeitschr., 23(3): 80; V. grandiflora var. serrata (Pant.) Rohlena (1905) Sitzb. Bohm. Ges. Wiss., 38: 43.

Description: VEGETATIVE CHARACTERS: Annual; ascending; 18-90cm high. Stipule length 2.5-6.5mm; 1.5-6.5mm wide. Stipule entire or semi-hastate; apex acute; number of teeth on distal edge none or 1-2 teeth or 3-5; number of teeth on proximal edge none or 1-2; stipule edge form entire or uneven with swollen hairs; translucent. Stipule colour (upper plant) green or green with purple; glabrous or hairs located edge only or less than 10 hairs per sqmm. Leaf 34-80mm long; petiole 3-19mm long; average leaflet internode 7-17mm long; leaflet 9-20mm long; leaflet 3-14mm wide; tendril or mucro 14-54mm long; average leaf internode 20-74mm long; petiolule 26-62mm long. Leaf apex tendrilous; simple or with 2 branches or with 3 branches or with more than 3 branches. Leaflet shape symmetric; 8-12 leaflets per leaf. Upper leaflet margin entire or incised dentate; lower leaflet margin incised dentate; leaflet margins level. Leaflet broad elliptic or narrow ovate; apex mucronate and emarginate; base angustate or truncate to angustate; broadest at apex or in middle. Leaflet adaxial hairs absent or less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm) or longer than 2mm, but shorter than flower. Peduncle length 1-3mm; rachis 1-2mm long; pedicel 1-2mm long; flower 22-35mm long; ratio of peduncle to flower length of 0.04-0.12; peduncular cusp absent or present and less than 2.1mm long. Number of flowers per inflorescence one or two. Pedicel with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 3.5-6mm long; lateral teeth 3.5-6mm long; upper tooth 3.5-6mm long; tube 7-9mm long; ratio of lower tooth to tube length of 0.6-0.95. Calyx base not gibbous or slightly gibbous; tube mouth truncate; teeth reflexing absent; tooth curvature absent; exterior nectaries seen on lateral teeth. Calyx hairs covering calyx; hair density of 10-35 per mm sq; hair length less than 0.5mm long or 0.5-1.5mm long; hairs adpressed. Calyx colour green. Standard length 22.5-36mm; limb length 12-19mm; claw length 8-11.5mm; limb width 12-20mm; claw width 6-8mm; ratio of limb length to claw length 1.26-2. Corolla petals concolorous; standard face cream; standard upper surface cream; face without distinct veining. Standard shape stenonychioid; apex emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 18-23mm; limb length 7.5-11.5 mm; claw length 9-12mm; limb width 5-12mm. Wing colour cream; markings absent. Wing shape 3; spur shape 4 or 5; limb base kinking weak or strong; limb pouch absent; wing to keel adhesion weak. Keel length 13.5-17.5mm; hood length 4-5mm; claw length 9.5-11.5mm; hood width 4-6mm. Keel colour white; hood apex distinctly

coloured. Keel shape 2; base shape 2; pouch absent or present. Staminal tube length 14-16mm; filament length 2-2.5mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 6.5-9.5mm; style length 6-8mm; supra-ovary extension 2-7mm. Ovary shape linear or intermediate; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary entirely covered with simple hairs; style apex pubescence type 1. Number of ovules per ovary 12-18.

LEGUME CHARACTERS: Legume 27-33mm long; 6-7mm wide; 3-4mm deep; ratio of legume length to width 4.5-5.5. Amphicarpic legumes absent. Legume colour brown or black; uniform over legume. Legume shape linear; cross-sectional shape laterally flat; not falcate; suture straight; distal end unbeaked or slightly beaked; valve surface not torulose; surface smooth; partitioning absent. Legume hairs 10 - 35 per mm sq or hairs 36 - 60 per mm sq; hairs less than 0.5mm long; hairs covering entire legume; suture surface ciliate, hairs less than 1mm long; tubercles absent. Dehiscent legume twisting tight or very tight; number of seeds per legume 8-9.

SEED CHARACTERS: Seed 3-3.5mm long; 3.5-4mm wide; 1.5-2.5mm deep; 8.5-12mm circumference; hilum 6-9.5mm long; distance from hilum to lens 1mm; seed length to width ratio of 0.75-0.87; seed circumference to hilum length ratio of 0.7-0.79. Seed shape spherical or oblong; shape in side view laterally compressed; seed colour yellow or red-brown; mottling absent or present; surface matt; smooth. Hilum shape very elongated, more than third of circumference; coloured yellow or coloured red-brown; groove colour same as hilum; hilum surface excess tissue absent or present. Lens position confluent to hilum or less than 1.6mm from hilum; prominent or not prominent. Aril protruding.

Phenology: May - August **Chromosome number:** N.A.
Geographical distribution: GR, TR, YU.
Ecology: Alt. 340 - 1000m; Hab. woodland and woodland margins.

Specimen citation: Krendl & Krendl s.n. (W); Krendl s.n. (W); Corzizak s.n. (W); Montbret s.n. (W); Davis 34721 (E); Deiriz 4588 (E); Maxted, Kitiki & Allkin 4325 (SPN); Maxted, Kitiki & Allkin 4419 (SPN); Maxted, Kitiki & Allkin 4430 (SPN).

Section Bithynicae

VII **Section Bithynicae** (B. Fedtsch. ex Radzhi) Maxted stat. nov.
Type: V. bithynica (L.) L. (1759) Syst. Nat., ed. 10(2): 1166.
Iconography: Fl. USSR., 13: 472.
Synonymy: Arachus Medikus (1787) Vorl. Churpf. Phys.-okon. Ges. 2: 360; Vicia sect. Aphaca Gray (1821) Brit. Pl. 2: 617, pro parte; Vicia subgen. Taenifila Alef. (1861) Bonplandia 9: 99, pro parte; Vicia sect. Arachus (Medik.) Boswell Syme (1873) Eng. Bot. 3: 99, nomen nudum; Vicia sect. Pedunculatae Rouy in Rouy & Fouc. (1899) Fl. Fr., 5: 221, pro parte; Vicia ser. Bithynicae B. Fedtsch. (1948) Fl. USSR, 13: 472 nomem nudum; Vicia subsect. Bithynicae (1971) Radzhi in Novosti Sist. Vyssh. Rast., 7: 237; Vicia ser. Bithynicae (1971) Radzhi in Novosti Sist. Vyssh. Rast., 7: 237; Vicia sect. Arachus (Medik.) Tutin in Clapham, Tutin & Warburg (1952) Fl Brit. Is., 447 pro parte; Vicia sect. Pseudolathyrus Tsvelev (1980) Novosti Sist. Vyssh. Rast., 17: 204.

Description: Annual; climbing; stem slender. Stipules semi-sagittate; length longer than 5.5mm; edge with 3-5 teeth or with more than 5 teeth. Leaf apex tendrilous; leaflet less than 20mm or 20-30mm or longer than 30mm; with 1-4 pairs. Leaflets symmetric; margins entire. Number of flowers per inflorescence 1 or 1 to 2; peduncle 3-6mm or peduncle longer than 6mm. Calyx mouth straight; teeth subequal; base not gibbous. Pedicel shorter or equal to 3mm or longer than 3mm. Flowers shorter than 15mm or 15 to 20mm; standard blue or purple; shape stenochioid; claw bowing absent; upper standard surface glabrous. All petals approximately equal length. Wing marking absent; wing limb with slight kinking. Legume length less than 30mm or 30 to 50mm; width 5 to 10mm wide or greater than 10mm; rhomboid; laterally flattened; sutures parallel; valve hairs present; hairs tuberculate; septa present; number of seeds per legume less than 7. Seeds less than 3.4mm or 3.5 to 6.0mm; round; not laterally flattened; hilum less than quarter of seed circumference; lens positioned near hilum; testa surface smooth.

Number of species: one. **Chromosome number:** 14.
Geographical distribution: the one known species is distributed through central and southern Europe and the Mediterranean Basin.

Taxonomic notes: The distinct nature of V. bithynica within subg. Vicia was noted as early as 1836 by Koch, who placed the species in a monospecific sub-sectional grouping. Subsequently, it has been included with the V. narbonensis complex species, with sect. Vicia species or placed with the V. cracca related species. The radical difference of opinion between Vicia taxonomists on the placement of V. bithynica within Vicia, seems likely to result from the relative importance given to peduncle length as a group defining character in the various classifications. V. bithynica has the overall features of Vicia subgenus Vicia sensu Kupicha (1976), but the peduncle is often longer than the flower which makes it the exception in a group where the flowers are otherwise sessile to subsessile.

V. bithynica has historically most commonly been linked with the V. narbonensis complex, with which it shares the diagnostic large serrate edged stipule. Kupicha (1974) commented that she placed V. bithynica with her sect. Faba species, because the species fitted even less comfortably elsewhere and she did not want to erect a monospecific section. I feel V. bithynica is sufficiently distinct from the other subg. Vicia taxa to warrants the sectional rank proposed by Maxted et al. (1989) and that it is given here. This proposal has been independently supported by Hanelt & Mettin (1989), who recently published a modification of Kupich's classification. The one modification to Kupicha's subgenus Vicia, Hanelt & Mettin suggest, is the splitting of V. bithynica into a distinct section from the V. narbonensis complex and V. faba.

30 **Accepted taxon:** V. bithynica (L.) L. (1759) Syst. Nat., ed. 10(2): 1166.

Type: Lectotype, Linnaeus 906.19 (LINN!).

Iconography: Fl. Eur., 2: 135; Fl. Pal., 2: 207-208; Fl. Syr., 2: 410; Fl. Tur., 3: 321; Fl. USSR., 13: 472-473; Illust. Draw. Brit. Pl., 3: 68; Fl. Pal., 2 (plates): 296.

Synonymy: Lathyrus bithynicus L. (1753) Sp. Pl. 2: 731; Arachus vicioides Medikus (1787) Vorl. Churpf. Phys.-okon. Ges. 2: 360; V. bithynica Schrank (1789) Baier. Fl., 2: 262; V. angulosa Gaterau (1789) Descr. Pl. Montaub. 129; V. bithynica Schrank (1789) Baiersche Flora, 2: 262; Lathyrus tumidus Willd. (1802) Sp. Pl., 3(2): 1082; V. minuta Moench (1802) Supp. Meth. Pl. Marburgi Cattorum, 50; V. bithynica var. grandifolia Pers. (1807) Syn. Pl., 2: 273-657; Lathyrus turgidus Lam. (1823) Dictionaire. 5(2): 706; Lathyrus bithynicus Lam. (1823) Dictionaire., 5(2): 706; Lathyrus bithynicus var. sessiliflorus Ser. in DC. (1825) Prodr., 2: 374; V. angustifolia Hohen. (1833) Bull. Soc. Imp. Nat. Moscow, 6: 249; V. bithynica var. angustifolia Syme (1873) English Botany, 3: 100; V. bithynica var. latifolia Syme (1873) English Botany 3: 100; Lathyrus barcinonensis Pourret (1877) Prodr. Fl. Hisp., 3: 229; V. bithynica var. major Arcang. (1882) Comp. Fl. Ital., 1: 205; V. bifoliolata Nyman (1889) Cons. Flor. Eur., Supp., 2: 103; V. bithynica var. genuina Posp. (1897) Fl. Oesterr. Kustenl., 2: 414; V. bithynica var. grandifolia Posp. (1898) Fl. Oesterr. Kustenl., 2: 528; V. bithynica var. sessiliflora Beck in Reichb. (1903) Fl. Bosne., 1(1): 1-94.

Description: VEGETATIVE CHARACTERS: Life form annual; erect or ascending; 25-82cm high. Stipule length 4-26mm; 2-16mm wide. Stipule semi-sagittate; apex acute; number of teeth on distal edge 3-5 teeth or more than 5; number of teeth on proximal edge 1-2 teeth (rarely) or 3-5 teeth or more than 5; stipule edge form entire or uneven with swollen hairs; translucent or not-translucent. Stipule colour (upper plant) green; hairs located edge only. Leaf 12-67mm long; petiole 5-26mm long; average leaflet internode 7-35mm long; leaflet (10-)15-53(-70)mm long; leaflet 2-22(-31)mm wide; tendril or mucro 15-85mm long; average leaf internode 20-110mm long; petiolule 8-47mm long. Leaf apex tendrilous; simple or with 2 branches or with 3 branches or with more than 3 branches. Leaflet shape symmetric; 2-6 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet narrow elliptic or broad elliptic or elliptic ovate; apex mucronate; base angustate; broadest in middle. Leaflet adaxial hairs absent or less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle longer than 2mm, but shorter than flower or longer than flower. Peduncle length 1-69mm; rachis 1-17mm long; pedicel 1-5mm long; flower 11-22mm long; ratio of peduncle to flower length of 0.06-3.75; peduncular cusp absent. Number of flowers per inflorescence one or two. Pedicel less than 10 hairs per mm sq or with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 3.5-9mm long; lateral teeth 3.5-9mm long; upper tooth 3.5-8mm long; tube 3-5.5mm long; ratio of lower tooth to tube length of 0.87-2. Calyx base not gibbous or slightly gibbous; tube mouth truncate or slightly oblique; teeth reflexing absent; tooth curvature absent; exterior nectaries seen on lateral teeth. Calyx hairs absent or covering calyx; hair density of 10-35 per mm sq or 36-60 per mm sq; hair length 0.5-1.5mm long or more than 1.5mm long; hairs adpressed. Calyx colour green. Standard length 15-21.5mm; limb length 5.5-15mm; claw length 5-9.5mm; limb width 7.5-12mm; claw width 4.5-8mm; ratio of limb length to claw length 0.68-2.5. Corolla petals concolorous or not concolorous (usually). Standard face lilac or violet; standard upper surface violet or purple; face without distinct veining. Standard shape stenonychioid; apex emarginate; claw bowing absent; upper surface glabrous. Wing length 9-18mm; limb length 5-11mm; claw length 4-7.5mm; limb width 2.5-5.5mm. Wing colour white or lilac; markings absent. Wing shape 2 or 3; spur shape 2; limb base kinking absent; limb pouch absent; wing to keel adhesion weak. Keel length 8-11mm; hood length 2.5-4mm; claw length 5-8mm; hood width 3-4.5mm. Keel colour white; hood apex distinctly coloured. Keel shape 1 or 3; base shape 2 or 3; pouch absent. Staminal tube

length 7-9.5mm; filament length 1.5-3mm; all stamen approx. equal length; distinct tube vein colouring present. Ovary length 5-9mm; style length 1.5-3.5mm; supra-ovary extension 1-2mm. Ovary shape oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary entirely covered with simple hairs or covered with tubercle based hairs; style apex pubescence type 3. Number of ovules per ovary 3-8.

LEGUME CHARACTERS: Legume 23-40(-47)mm long; 6-11mm wide; 3-6mm deep; ratio of legume length to width 2.55-4.66. Amphicarpic legumes absent. Legume colour yellow-brown or brown; uniform over legume. Legume shape rhomboid; cross-sectional shape round or rounded to flat; not falcate; suture straight; distal end unbeaked; valve surface not torulose or torulose; surface ridged with veins; partitioning present. Legume hairs 10 - 35 per mm sq or hairs 36 - 60 per mm sq; hairs 0.5 - 1.5mm long or hairs more than 1.5mm long; hairs covering entire legume or tubercle hairs covering entire legume; suture surface ciliate, hairs less than 1mm long or ciliate, hairs more than 1mm long or ciliate, hairs tubercular; tubercles short. Dehiscent legume twisting loose or medium or tight; number of seeds per legume 2-6(-7).

SEED CHARACTERS: Seed 2-4.5mm long; 2-4mm wide; 2-3.5mm deep; 7.5-12mm circumference; hilum 2mm long; distance from hilum to lens 1-1.5mm; seed length to width ratio of 1-1.33; seed circumference to hilum length ratio of 0.16-0.26. Seed shape spherical to cubic; shape in side view circular; seed colour red-brown or brown or black; mottling absent or present; surface matt; pitted. Hilum shape oval; coloured red-brown or coloured brown; groove colour beige; hilum surface excess tissue present. Lens position less than 1.6mm from hilum or more than 1.5mm from hilum; prominent. Aril absent.

Phenology: March - August **Chromosome number:** 14.
Geographical distribution: AF, AL, AT, BE, BG, CY, DD, DE, DZ, ES, FR, GB, GR, IL, IN, IS, IT, JO, LB, PH, PK, PT, SU, SY, TR, YU. See Map 30.
Ecology: Alt. 10 - 1250m; Hab. Agricultural and disturbed land, more rarely woodland edges.

Taxonomic notes: Plitmann (1967) comments that V. bithynica is both cultivated and wild, which may perhaps explains its wide distribution. I have been unable to trace any further details concerning its cultivation, but it is widely distribution. The species varies greatly in: leaflet dimension and shape, stipule dentation, peduncle length, and pod and seed dimension. This intra-specific variability has lead to the publication of numerous names to describe extreme forms, but variation between these forms is continuous and so none are accepted here.

Specimen citation: Pennington 203 (K); Alston & Sandwith 1718 (K); Guiol 6385 (BM); Picquet 1905 (K); Bowden & Sims 726 (BM); Bowden & Sims 830 (BM); Lousley s.n. (K); Thurston s.n. (K); Thurston 3/6/1920 (K); Thompson s.n. (K); Webster 414 (K); Harris 176/7 (K); Meikle s.n. (K); Thompson s.n. (K); Devis s.n. (K); Riley 406 (K); Sandwith s.n. (K); Gregory s.n. (K); Lousley 449 (K); Jackson s.n. (K); White s.n. (K); Makins 449 (K); Roffeg s.n. (K); Parker s.n. (K); Lousley s.n. (K); Jermyn s.n. (K); Townsend s.n. (K); Kelley 1021 (K); Milne-Redhead 2145 (K); Hall & Hall 77/55 (BM); Foggitt s.n. (BM); Fox 394 (BM); Sewell 369 (BM); Vachell & Vachell s.n. (BM); Blow s.n. (BM); Wheeler 367 (BM); Hilton 1903 (BM); White s.n. (BM); Standen s.n. (BM); White s.n. (BM); Thompson s.n. (BM); Roper s.n. (BM); Slatter s.n. (BM); Morris 1915 (BM); Vaughan s.n. (BM); Ipse s.n. (BM); Kelsall s.n. (SPN); Maxted 1494 (SPN); Aellen 4758 (MO); Cannon & Cannon 4157 (BM); Zohary & Orshan 25403/21 (HUJ); Zohary & Orshan 26412-3 (HUJ); Kennedy 1195 (W); Summerhayes 4146 (K); Wolfe 1853 (K); D'Alleizette 1319 (K); Campbell s.n. (BM); Campbell s.n. (BM); De Witte 17016 (BM); Fleming 111 (BM); White s.n. (E); Maxted 1003 (SPN); Combes s.n. (SPN); Bertrand s.n. (MO); Tedd 1697 (K); Atchley 560 (K); Turrill 324 (K); Guiol s.n. (BM); Guiol s.n. (BM); Heldreich & Holzmann s.n. (E); Kupicha 164 (E); Queralt & Pascual 3022 (BM); Zohary 1083 (HUJ); Hooker s.n. (K); Narducci s.n. (K); Sommier 1704 (K); Eastes s.n. (K); Davis & Sutton 62722 (BM); Dorfler 61 (E); Corccinato s.n. (W); Burri & Krendl s.n. (W); Krendl s.n. (W); Burri & Krendl s.n. (W); Krendl & Krendl s.n. (W); Guers

Map 30.

Distribution of Vicia bithynica

4905 (W); Vatova s.n. (K); Maly s.n. (K); Vatova s.n. (K); Crawford s.n. (E); Bisby 2012 (SPN); Dorfler s.n. (E); Davis 33607 (K); Stankevich s.n. (WIR); Stankevich 5021 (WIR); Stankevich 5011 (WIR); Stankevich & Dorofeyev 2679 (WIR); Stankevich & Vlassov 499 (WIR); Emmerikh & Filatenko 2867 (WIR); Tsvelev s.n. (LE); Smirnova s.n. (LE); Anon. s.n. (LE); Stankov s.n. (LE); Puring s.n. (LE); Bochkin s.n. (LE); Gelde s.n. (LE); Brummitt, Hunt & Leistner 5097 (K); Stace & Cotton s.n. (BM); Davis & Sutton 63966 (BM); Davis & Sutton 64400 (BM); Rigo 8 (W); Maxted, Ehrman & Khattab 1995 (SPN); Maxted, Ehrman & Khattab 2009 (SPN); Maxted, Ehrman & Khattab 2098 (SPN); Maxted, Ehrman & Khattab 2037 (SPN); Maxted, Ehrman & Khattab 2058 (SPN); Maxted, Ehrman & Khattab 2029 (SPN); Sintenis 50 (BM); Davis 33107 (K); Maxted, Kitiki & Allkin 4395 (SPN); Maxted, Kitiki & Allkin 4291 (SPN); Maxted, Kitiki & Allkin 4488 (SPN).

VIII **Section Narbonensis** (B. Fedtsch. ex Radzhi) Maxted stat. nov.
Type: V. narbonensis L. (1753) Sp. Pl. 2: 737.
Iconography: Fl. USSR., 13: 473.

Description: Annual; erect; stem stout. Stipules semi-sagittate; length longer than 5.5mm; edge with 1-2 teeth or with 3-5 teeth or with more than 5 teeth. Leaf apex tendrilous; leaflet longer than 30mm; with 1-4 pairs. Leaflets asymmetric; margins entire or serrate or incised. Number of flowers per inflorescence 1 or 1 to 2 or 3 to 4 or more than 4; peduncle 1-2mm or peduncle 3-6mm. Calyx mouth oblique; lower tooth longer than upper; base not gibbous. Pedicel shorter or equal to 3mm. Flowers 15 to 20mm or longer than 20mm; standard cream or blue or purple; shape platonychioid; claw bowing absent; upper standard surface glabrous. All petals approximately equal length. Wing marking absent or present; wing limb with slight kinking. Legume length less than 30mm or 30 to 50mm or greater than 50mm; width 5 to 10mm wide or greater than 10mm; rectangular or rhomboid; round in cross section or laterally flattened; sutures straight; valve hairs present; hairs tuberculate; septa absent or present; number of seeds per legume less than 7. Seeds 3.5 to 6.0mm or 6.1 to 10mm; round; not laterally flattened; hilum less than quarter of seed circumference; lens positioned near hilum; testa surface smooth.

Number of taxa: fourteen. **Chromosome number:** 14.
Geographical distribution: Europe, West Asia and North Africa.

Taxonomic notes: Sect. Narbonensis is composed of the seven species known as the V. narbonensis complex, these are divided into two series. One species, V. eristalioides is a distinct, peripheral member of the V. narbonensis complex and to reflect this isolation ser. Rhombocarpae has been erected to include this species. The other six species form a more closely related group and are included in ser. Narbonensis. These two series can be distinguished primarily by the difference in legume shape, V. eristalioides, like V. bithynica, has a rhomboid shaped legume, as opposed to the linear-rectangular legume of the ser. Narbonensis species. The inter-relationship of the seven species of this complex is discussed by Maxted et al. (1989).

A **Series Rhombocarpae** Maxted, ser. nov.
Legumen plus quam 10 mm latum rhomboideum lateraliter compressum suturis parallelis et valvis tuberculati-pillosis. Planta annua, erecta, caule crasso. Stipula semisaggitata, plus quam 5.5 mm longa et margine plus quam 5 dentibus ornatus. Folium apice in cirrhium extenso et in 1-4 paribus foliolorum divisum; foliola plus quam 25mm longa, asymmetrica, margine integro vel pauciserrato. Inflorescentia uni-vel biflora. Flores grandes, plus quam 20mm longi vexillo platynychioideo. Hilum seminis minus quam quadrantem circumferentis occupante et lens hilo opposita.
Type: V. eristalioides Maxted (1988) Notes Edin. Bot. Gard., 45(3): 454.

Description: Annual; erect; stem stout. Stipules semi-sagittate; length longer than 5.5mm; edge with more than 5 teeth. Leaf apex tendrilous; leaflet longer than 30mm; with 1-4 pairs. Leaflets asymmetric; margins entire or serrate or incised. Number of flowers per inflorescence 1; peduncle 1-2mm. Calyx mouth oblique; lower tooth longer than upper; base not gibbous. Pedicel shorter or equal to 3mm. Flowers longer than 20mm; standard blue or purple (pale). Shape platonychioid; claw bowing absent; upper standard surface glabrous. All petals approximately equal length. Wing marking absent; wing limb with slight kinking. Legume length 30 to 50mm; width greater than 10mm; rhomboid; laterally flattened; sutures straight; valve hairs present; hairs tuberculate; septa absent; number of seeds per legume less

than 7. Seeds 6.1 to 10mm; round; not laterally flattened; hilum less than quarter of seed circumference; lens positioned near hilum; testa surface smooth.

Number of taxa: one. **Chromosome number:** 14.
Geographical distribution: Turkey.

52 **Accepted taxon:** V. eristalioides Maxted (1989a) Notes Edin. Bot. Gard., 45(3): 454.
Type: holotype, Maxted, Kitiki & Allkin 4256, Cavus, Antalya, Turkey (K!).

Description: VEGETATIVE CHARACTERS: Annual; erect; 25-120cm high. Stipule length 19-25mm; 9.5-14mm wide. Stipule semi-saggitate; apex acute or obtuse mucronate; number of teeth on distal edge more than 5; number of teeth on proximal edge 3-5 teeth or more than 5; stipule edge form uneven with swollen hairs; not-translucent. Stipule colour (upper plant) green or green with purple; hairs located edge only. Leaf 43-62mm long; petiole 10-33mm long; average leaflet internode 24-29mm long; leaflet 30-49mm long; leaflet 17-28mm wide; tendril or mucro 57-65mm long; average leaf internode 28-56mm long; petiolule 25-40mm long. Leaf apex tendrilous; with 3 branches. Leaflet shape asymmetric; 4 leaflets per leaf. Upper leaflet margin less than 7 serrations or more than 6 serrations; lower leaflet margin entire; leaflet margins level. Leaflet linear elliptic or elliptic ovate; apex mucronate; base truncate to angustate; broadest at base. Leaflet adaxial hairs less than 10 per mm sq; hairs 0.5-1.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq; hairs more than 1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm). Peduncle length 2-3mm; pedicel 2mm long; flower 24-27mm long; ratio of peduncle to flower length of 0.07-0.11; peduncular cusp absent. Number of flowers per inflorescence one. Pedicel less than 10 hairs per mm sq or with 10-50 hairs per mm sq; hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 7-8mm long; lateral teeth 6.5-7mm long; upper tooth 3.5-4mm long; tube 8mm long; ratio of lower tooth to tube length of 0.87-1. Calyx base not gibbous; tube mouth slightly oblique; teeth reflexing absent; tooth curvature present; exterior nectaries seen on lateral teeth. Calyx hairs covering calyx; hair density less than 10 per mm sq; hair length more than 1.5mm long; hairs adpressed. Calyx colour green. Standard length 22-25mm; limb length 11-14mm; claw length 9.5-11.5mm; limb width 11-12mm; claw width 10mm; ratio of limb length to claw length 1-1.47. Corolla petals not concolorous; standard face lilac; standard upper surface purple; face with distinct veins. Standard shape platonychioid; apex emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 19-20.5mm; limb length 8-8.5mm; claw length 10.5-12mm; limb width 5-5.5mm. Wing colour cream; markings absent. Wing shape 3; spur shape 3; limb base kinking weak; limb pouch present; wing to keel adhesion weak. Keel length 14.5-17.5mm; hood length 4.5-5.5mm; claw length 10-12mm; hood width 5-6mm. Keel colour white; hood apex distinctly coloured. Keel shape 3; base shape 2; pouch absent or present. Staminal tube length 14.5-16.5mm; filament length 2.5-3mm; all stamen approx. equal length; distinct tube vein colouring present. Ovary length 10-12mm; style length 4.5mm; supra-ovary extension 3mm. Ovary shape oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary covered with tubercle based hairs; style apex pubescence type 3. Number of ovules per ovary 4-5.

LEGUME CHARACTERS: Legume 40-50mm long; 16-20mm wide; 6-8mm deep; ratio of legume length to width 2.35-2.93. Amphicarpic legumes absent. Legume colour brown; uniform over legume. Legume shape rhomboid; cross-sectional shape laterally flat; not falcate; suture straight; distal end unbeaked; valve surface not torulose; surface smooth; partitioning absent. Legume hairs 10 - 35 per mm sq or hairs 36 -

60 per mm sq; hairs more than 1.5mm long; tubercle hairs covering entire legume; suture surface ciliate, hairs tubercular; tubercles long. Dehiscent legume twisting loose; number of seeds per legume 2-4.

SEED CHARACTERS: Seed 6.5-7mm long; 6-6.5mm wide; 6mm deep; 17-19mm circumference; hilum 3-3.5mm long; distance from hilum to lens 1-1.5mm; seed length to width ratio of 1-1.08; seed circumference to hilum length ratio of 0.18. Seed shape spherical; shape in side view circular; seed colour brown; mottling absent; surface matt; smooth. Hilum shape oval; coloured black; groove colour beige; hilum surface excess tissue absent. Lens position less than 1.6mm from hilum or more than 1.5mm from hilum; prominent. Aril absent.

Phenology: April - May **Chromosome number:** 14.
Geographical distribution: TR, (endemic to south west Antalya province). See Map 31.
Ecology: Alt. 550 - 700m; Soil, red mediterranean; Hab. Limestone pavement, disturbed land and agricultural margins.

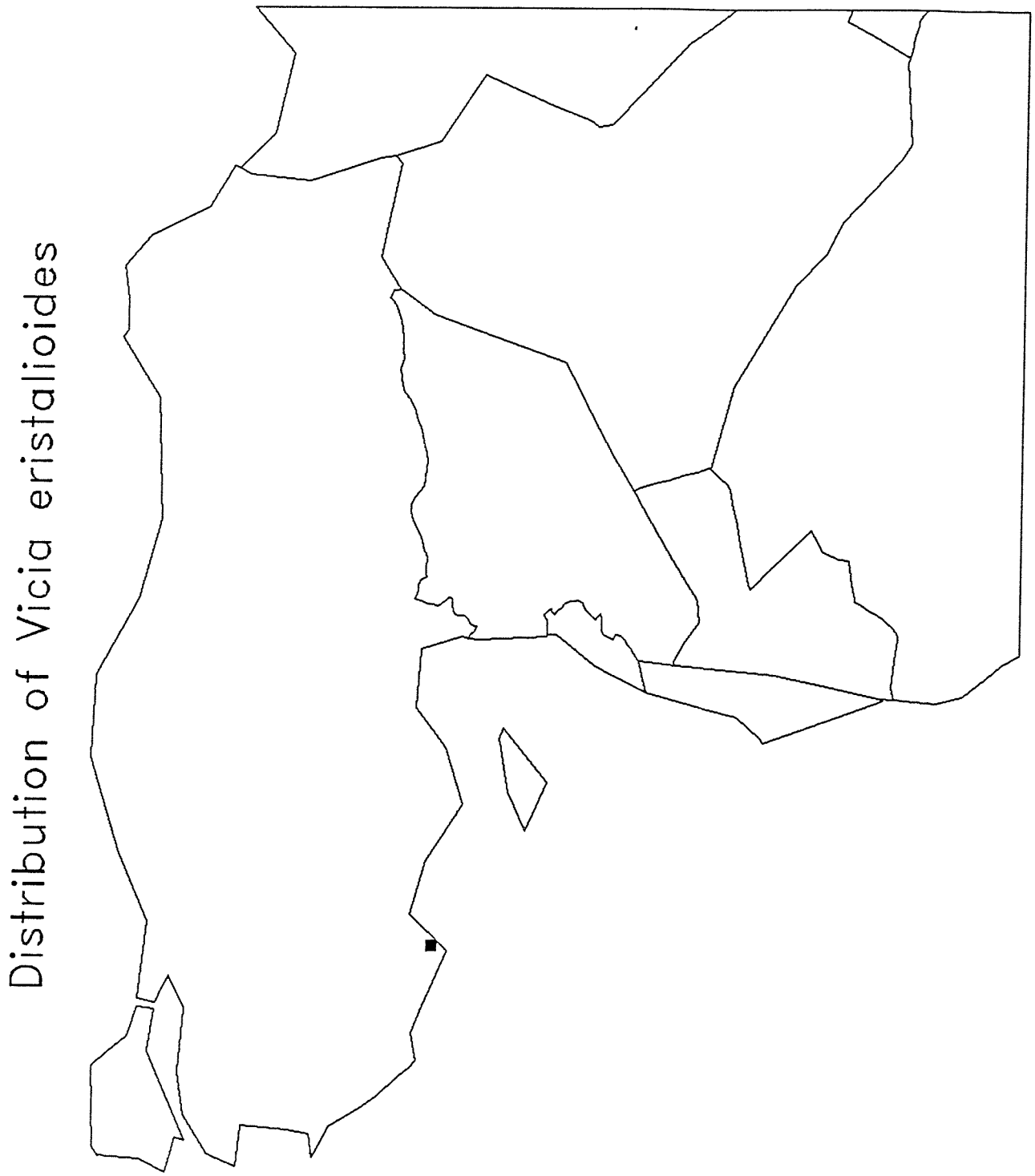
Taxonomic notes: V. eristalioides was linked by Maxted (1989a) in the protologue to V. galilaea, V. johannis and V. kalakhensis. The flower colour and legume shape are similar to those of V. bithynica. The close relationship between V. bithynica and the other sect. Faba sensu Kupicha (1976) had recently been questioned by Maxted and Khattab (unpublished), but the description of V. eristalioides has strengthens the link between V. bithynica and the V. narbonensis complex. There are still sufficient differences between V. eristalioides and V. bithynica, however, to warrant there separation into distinct sections.

Specimen citation: Maxted, Kitiki & Allkin 4256 (SPN); Maxted, Kitiki & Allkin 4385 (SPN); Maxted, Kitiki & Allkin 4393 (SPN).

B Series Narbonensis
Type: V. narbonensis L. (1753) Sp. Pl. 2: 737.
Iconography: Fl. USSR., 13: 473.
Synonymy: Faba Miller (1754) Gard, Dict. Abr. ed 4., pro parte; Bona Medikus (1787). Vorles. Churpf. Phys. Ges. ii. 360; Vicia sect. Euvicia Vis. (1852) Fl. Dalmatica 1: 317, pro parte; Vicia subgen. Taenifila Alef. (1861) Bonplandia 9: 99, pro parte; Vicia ser. Annuae Taubert (1894) Die Nat. Pl. III, 10: 351, nomen nudum; Vicia subser. Fabinae Taubert (1894) Die Nat. Pl. III, 10: 351, nomen nudum; Vicia sect. Pedunculatae Rouy in Rouy & Fouc. (1899) Fl. Fr., 5: 221, pro parte; Vicia sect. Arachus (Medik.) Tutin in Clapham, Tutin & Warburg (1952) Fl. Brit. Is., 447, pro parte; Vicia ser. Narbonenses B. Fedtsch. (1948) Fl. USSR., 13: 358, nomen nudum; Vicia subsect. Laticarpa Stankevich (1970) Tr. Prikl. Bot. Genet. Sel., 43: 111; Vicia subsect. Narbonensis Radzhi (1971) Nov. Sys. Pl. Vasc. 7: 239.

Description: Annual; erect; stem stout. Stipules semi-sagittate; length longer than 5.5mm; edge with 1-2 teeth or with 3-5 teeth or with more than 5 teeth. Leaf apex tendrilous or mucronate (very rarely). Leaflet longer than 30mm; with 1-4 pairs. Leaflets asymmetric; margins entire or serrate or incised. Number of flowers per inflorescence 1 or 1 to 2 or 3 to 4 or more than 4; peduncle 1-2mm or peduncle 3-6mm. Calyx mouth oblique; lower tooth longer than upper; base not gibbous. Pedicel shorter or equal to 3mm. Flowers 15 to 20mm or longer than 20mm; standard cream or blue or purple; shape platonychioid; claw bowing absent; upper standard surface glabrous. All petals approximately equal length. Wing marking absent or present; wing limb with slight kinking. Legume length less than 30mm or 30 to 50mm or greater than 50mm; width 5 to 10mm wide or greater than 10mm; rectangular; round in cross section or laterally flattened; sutures straight; valve hairs present; hairs tuberculate; septa absent or present; number of

Map 31.



seeds per legume less than 7. Seeds 3.5 to 6.0mm or 6.1 to 10mm; round; not laterally flattened; hilum less than quarter of seed circumference; lens positioned near hilum; testa surface smooth.

Number of taxa: thirteen. **Chromosome number:** 14
Geographical distribution: Europe, West Asia and North Africa.

Taxonomic notes: As discussed by Maxted et al. (1989) V. narbonensis, V. serratifolia V. johannis, V. galilaea are very closely related, while V. kalakhensis and V. hyaeniscyamus are both slightly more remote. The close affinity of these six species makes specific identification very difficult unless all the diagnostic characters are scorable. Many of the diagnostic characters are cryptic and are often obscured by the process of specimen drying (e.g. flower colour, which fades on dried specimens), which makes herbarium specimen identification difficult.

32 **Accepted taxon:** V. kalakhensis Khattab, Maxted & Bisby (1988) Kew Bull. 43(3): 536.
Type: Holotype, Maxted, Khattab, Bisby & Ehrman 1764, Tel Kalakh, Homs, Syria (K!).

Description: VEGETATIVE CHARACTERS: Annual; erect or ascending; 40-70cm high. Stipule length 11-21mm; 6-13mm wide. Stipule semi-saggitate; apex obtuse mucronate; number of teeth on distal edge 1-2 teeth or more than 5; number of teeth on proximal edge none; stipule edge form uneven with swollen hairs; not-translucent. Stipule colour (upper plant) green with purple; hairs located edge only. Leaf 19-55mm long; petiole 11-21mm long; average leaflet internode 8-14mm long; leaflet 24-34mm long; leaflet 13-23mm wide; tendril or mucro 7-49mm long; average leaf internode 14-65mm long; petiolule 8-34mm long. Leaf apex tendrilous; simple or with 3 branches (rarely). Leaflet shape asymmetric; 2-6 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins undulating. Leaflet linear elliptic or narrow elliptic; apex mucronate or obtuse; base angustate or truncate to angustate; broadest in middle or at base. Leaflet adaxial hairs absent or less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq; hairs 0.5-1.5mm long or hairs more than 1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq. Stem node colour (upper plant) green or purple.

INFLORESCENCE CHARACTERS: Peduncle longer than 2mm, but shorter than flower. Peduncle length 4-12mm; rachis 1-7mm long; pedicel 1-2mm long; flower 21-25mm long; ratio of peduncle to flower length of 0.16-0.4; peduncular cusp absent. Number of flowers per inflorescence two or three or four. Pedicel less than 10 hairs per mm sq or with 10-50 hairs per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 3.5-9mm long; lateral teeth 3-7mm long; upper tooth 2-5.5mm long; tube 5-7mm long; ratio of lower tooth to tube length of 0.57-1.2. Calyx base not gibbous or slightly gibbous; tube mouth truncate or slightly oblique; teeth reflexing absent; tooth curvature absent or present; exterior nectaries absent or seen on lateral teeth. Calyx hairs absent or only on calyx; hair density less than 10 per mm sq; hair length less than 0.5mm long or 0.5-1.5mm long; hairs adpressed. Calyx colour green. Standard length 21-24mm; limb length 10-13mm; claw length 10-12mm; limb width 4.5-11mm; claw width 3-9mm; ratio of limb length to claw length 0.83-1.18. Corolla petals concolorous; standard face cream; standard upper surface yellow-brown or lilac; face without distinct veining. Standard shape platonychioid or stenonychioid; apex emarginate or emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 17-21mm; limb length 7-9mm; claw length 10-13mm; limb width 4-5.5mm. Wing colour cream; markings absent. Wing shape 1 or 2 or 3; spur shape 3; limb base kinking weak; limb pouch present; wing to keel adhesion weak. Keel length 16-19mm; hood length 4.5-6mm; claw length 10-13.5mm; hood width 4-6mm. Keel colour white; hood apex distinctly coloured. Keel shape 3;

base shape 2; pouch absent. Staminal tube length 11.5-17mm; filament length 2-3mm; all stamen approx. equal length; distinct tube vein colouring absent or present. Ovary length 9-11mm; style length 4-7.5mm; supra-ovary extension 3.5-5mm. Ovary shape linear or intermediate; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary with tubercle based hairs on sutures or covered with tubercle based hairs; style apex pubescence type 3. Number of ovules per ovary 6-12.

LEGUME CHARACTERS: Legume 37-60mm long; 9-12mm wide; 5-8mm deep; ratio of legume length to width 3.7-5. Amphicarpic legumes absent. Legume colour brown; uniform over legume. Legume shape rectangular; cross-sectional shape rounded to flat; not falcate; suture straight; distal end unbeaked; valve surface torulose (slightly). Surface smooth; partitioning present. Legume hairs less than 10 per mm sq or hairs 10 - 35 per mm sq; hairs less than 0.5mm long or hairs 0.5 - 1.5mm long or hairs more than 1.5mm long; tubercle hairs covering entire legume; suture surface ciliate, hairs tubercular; tubercles short. Dehiscent legume twisting loose or medium or tight or very tight; number of seeds per legume 4-7.

SEED CHARACTERS: Seed 5.5-6mm long; 5.5-6mm wide; 4.5-5mm deep; 17-18mm circumference; hilum 2-2.5mm long; distance from hilum to lens 0.5-2mm; seed length to width ratio of 0.91-1.09; seed circumference to hilum length ratio of 0.12-0.14. Seed shape spherical or spherical to cubic; shape in side view circular; seed colour brown; mottling absent; surface matt; smooth. Hilum shape oval; coloured red-brown; groove colour beige; hilum surface excess tissue absent. Lens position less than 1.6mm from hilum or more than 1.5mm from hilum; prominent. Aril absent.

Phenology: March - June **Chromosome number:** 14.
Geographical distribution: SY (endemic to Homs province, possibly spreading across the border into Lebanon). See Map 32.
Ecology: Alt. 270 - 305m; Soil, heavy black (basalt); Hab. Moist meadows and scrubby hillside pasture.

Taxonomic notes: While attempting to locate V. hyaeniscyamus at its type location near Tel Kalakh, Homs, Syria in 1986 a novel member of the V. narbonensis complex was found and was subsequently described as V. kalakhensis by Khattab, Maxted & Bisby (1988). They ally V. kalakhensis, most closely to V.johannis and V.galilaea, and more remotely to V. eristalioides.

Specimen citation: Maxted, Ehrman & Khattab 1764 (SPN); Maxted, Ehrman & Khattab 1770 (SPN); Maxted, Ehrman & Khattab 1780 (SPN); Maxted, Ehrman & Khattab 1802 (SPN); Maxted, Ehrman & Khattab 1825 (SPN); Maxted, Ehrman & Khattab 1841 (SPN).

33 **Accepted taxon:** V. johannis Tamamschjan in Karyagin 1954 Fl. Azerbaidzhan, 5: 495.
Synonymy: V. narbonensis Roth (1787) Bot. Abh. Beobacht., 68; V. narbonensis var. platycarpos Alef. (1861) Bonplandia, 9: 100; V. narbonensis var. lutea Freyn & Sint. (1894) Osterr. Bot. Z. 44: 66; V. narbonensis var. laodicena (1966) Nou. Fl. Liban et Syrie, 2: 406. V. procumbens H. Schäfer (1973) Sched. Herb.

Description: VEGETATIVE CHARACTERS: Annual; erect or ascending or decumbent; 11-65cm high. Stipule length 7-20mm; 4-17mm wide. Stipule semi-hastate or semi-saggitate; apex acute or obtuse mucronate; number of teeth on distal edge 1-2 teeth or 3-5 teeth or more than 5; number of teeth on proximal edge none; stipule edge form uneven with swollen hairs; translucent or not-translucent. Stipule colour (upper plant) green or green with purple; hairs located edge only or less than 10 hairs per sqmm. Leaf (10-)21-80mm long; petiole 8-22mm long; average leaflet internode 6-33mm long; leaflet 19-60mm long;

Map 32.

leaflet 9-35mm wide; tendril or mucro 8-73mm long; average leaf internode 20-76mm long; petiolule 8-60mm long. Leaf apex tendrilous or with terminal leaflet; simple or with 2 branches or with 3 branches. Leaflet shape asymmetric; 2-9 leaflets per leaf. Upper leaflet margin entire or less than 7 serrations; lower leaflet margin entire; leaflet margins level. Leaflet linear elliptic or narrow elliptic; apex mucronate or obtuse; base angustate or truncate to angustate; broadest in middle or at base. Leaflet adaxial hairs absent or less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm) or longer than 2mm, but shorter than flower. Peduncle length 2-13mm; rachis 2-10mm long; pedicel 1-3mm long; flower 14-28mm long; ratio of peduncle to flower length of 0.09-1.18; peduncular cusp absent. Number of flowers per inflorescence one or two or three or four. Pedicel glabrous or less than 10 hairs per mm sq or with 10-50 hairs per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long or hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 2.5-5.5mm long; lateral teeth 1.5-5mm long; upper tooth 1-3mm long; tube 3.5-7mm long; ratio of lower tooth to tube length of 0.41-0.85. Calyx base not gibbous or slightly gibbous; tube mouth slightly oblique; teeth reflexing absent; tooth curvature absent or present; exterior nectaries seen on lateral teeth. Calyx hairs only on calyx teeth or covering calyx; hair density less than 10 per mm sq; hair length less than 0.5mm long or 0.5-1.5mm long or more than 1.5mm long; hairs adpressed. Calyx colour green or purple. Standard length 10-27mm; limb length 5.5-16.5mm; claw length 4.5-12.5mm; limb width 5-13mm; claw width 5-9mm; ratio of limb length to claw length 0.7-2. Corolla petals concolorous; standard face cream or yellow (rarely). Standard upper surface cream or yellow or lilac; face without distinct veining or face with distinct veins. Standard shape platonychioid; apex emarginate or emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 14-23mm; limb length 5.5-10.5mm; claw length 7.5-14mm; limb width 2.5-6.5mm. Wing colour cream or yellow; entire apex tip coloured; marking brown or black or marking purple. Wing shape 2 or 3; spur shape 3; limb base kinking weak; limb pouch present; wing to keel adhesion weak. Keel length 13-21mm; hood length 4-6.5mm; claw length 8-14.5mm; hood width 4-6.5mm. Keel colour white; hood apex not distinctly coloured or distinctly coloured. Keel shape 3; base shape 2; pouch absent. Staminal tube length 11-18mm; filament length 2.5-3.5mm; all stamen approx. equal length; distinct tube vein colouring absent or present. Ovary length 7-14mm; style length 3.5-6mm; supra-ovary extension 1.5-4mm. Ovary shape intermediate or oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary with tubercle based hairs on sutures or covered with tubercle based hairs; style apex pubescence type 3. Number of ovules per ovary 2-9.

LEGUME CHARACTERS: Legume 30-61mm long; 10-13mm wide; 5-7mm deep; ratio of legume length to width 3-4.3. Amphicarpic legumes absent. Legume colour yellow-brown or brown; uniform over legume. Legume shape rectangular; cross-sectional shape rounded to flat; not falcate; suture straight; distal end unbeaked; valve surface not torulose; surface ridged with veins; partitioning present. Legume hairs 10 - 35 per mm sq or hairs 36 - 60 per mm sq; hairs 0.5 - 1.5mm long or hairs more than 1.5mm long; hairs on sutures only or tubercle hairs covering entire legume; suture surface ciliate, hairs tubercular; tubercles short. Dehiscent legume twisting loose or medium; number of seeds per legume 2-6.

SEED CHARACTERS: Seed 3-7mm long; 4-7mm wide; 4-5.5mm deep; 14-19mm circumference; hilum 2-3mm long; distance from hilum to lens 1.5-2mm; seed length to width ratio of 0.84-1.1; seed circumference to hilum length ratio of 0.14-0.16. Seed shape spherical or spherical to cubic; shape in side view circular; seed colour brown; mottling absent or present; surface matt; smooth. Hilum shape oval;

coloured red-brown or coloured brown; groove colour beige; hilum surface excess tissue absent. Lens position less than 1.6mm from hilum or more than 1.5mm from hilum; prominent. Aril absent.

Phenology: March - July **Chromosome number:** 14.

Geographical distribution: AF, AL, AT, BG, CH, CY, DD, DE, ES, FR, GR, IR, IT, LY, PK, PL, RO, SA, SU, SY, TR, YU. See Map 33.

Ecology: Alt. 30 - 1150m; Hab. Maquis, disturbed agricultural land and open woodland.

Taxonomic notes: Plitmann (1967) does not recognise the existence of V. johannis, refering instead to transition forms between other V. narbonensis complex taxa. However, Birch et al. (1985) concluded that V. johannis was a clearly separable taxon within the V. narbonensis complex. Field observation of this taxon has lead me to concur with this view.

Although I initially accepted the V. johannis form with a terminal leaflet (var. ecirrhosa), I later thought the distinction of a variety based on what appeared to be one collection was mistaken. The taxon was described from one collection made by Vvedensky (Vvedensky 270) in the Tien Shien mountains near Salar, Uzbekistan. The material from this one collection has been widely distributed in major herbaria, which lead to the general acceptance of this taxon. Recently I have visited several herbaria in Soviet Central Asia (ASH, TAS, TAK, TAD, FRU and AA) and have discovered many more V. johannis specimens with terminal leaflets. The conclusion of these herbarium visits is that this taxon is not as rare as might be expected from the number of specimens held outside of Central Asia. Thus I retain this variety.

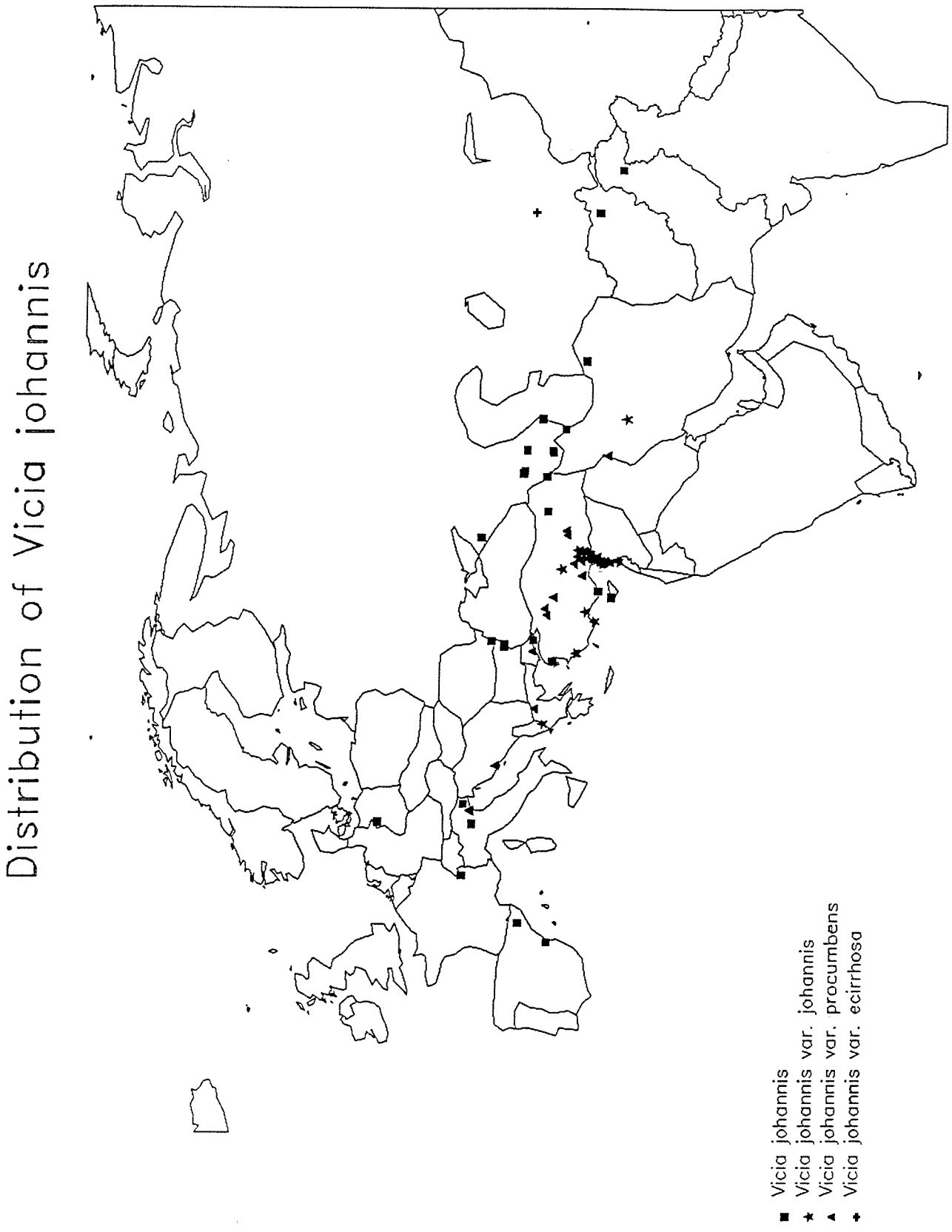
The varietal distinction between the other two V. johannis varieties, var. procumbens and var. johannis is small. The distinction is based on the colour difference of the wing apex marking at maturity, the apex spot for both varieties is brown post maturation. Mixed populations of the two varieties have been encountered in Kessab, Syria. The existence of mixed populations suggests either, that the colour difference between the two varieties is due to comparison of plants at differing senescence stage of the plant (the flower colour of many Vicia species changes as the plant ages) or that the two varieties are reproductively isolated. However, Khattab (1987) grew 22 accessions of V. johannis and found the wing apex colour was genetically fixed. As a result of this evidence the use of two distinct varieties is retained.

Key to varieties of V. johannis

1(0). Leaf apex tendrilous; 1-3-leaflet pairs..... 2
Leaf apex with terminal leaflet; 1-4-leaflet pairs....
..... i V. johannis var. ecirrhosa

2(1). Wing apex marking brown or black.....
..... ii V. johannis var. procumbens
Wing apex marking purple.. iii V. johannis var. johannis

Map 33.


Distribution of Vicia johannis
Vicia johannis
Vicia johannis var. johannis
Vicia johannis var. procumbens
Vicia johannis var. ecirrhosa

i **Accepted taxon:** V. johannis var. ecirrhosa (Popov) H. Schäfer 1973 Kulturpflanze 21: 261.
Type: Syntypes, Vvedensky 19, Salar, Uzbekistan, (C, K!, G!, MO! & TAS!).
Synonymy: V. narbonensis var. ecirrhosa Popov in Sched. (1927) Ad. Herb. Fl. As. Med., 11: 270; V. turkestanica Vassilk. (1955) Fl. Usb. 3: 762.

Description: VEGETATIVE CHARACTERS: Annual; erect; 25-52cm high. Stipule length 9-12mm; 10-17mm wide. Stipule semi-hastate or semi-saggitate; apex acute or obtuse mucronate; number of teeth on distal edge 1-2 teeth or more than 5; number of teeth on proximal edge none or 3-5; stipule edge form uneven with swollen hairs; not-translucent. Stipule colour (upper plant) green; hairs located edge only. Leaf 80-91mm long; petiole 16-18mm long; average leaflet internode 22-28mm long; leaflet 18-55mm long; leaflet 10-33mm wide; average leaf internode 54-75mm long; petiolule 58-60mm long. Leaf apex with terminal leaflet. Leaflet shape asymmetric; 8-9 leaflets per leaf. Upper leaflet margin entire or less than 7 serrations; lower leaflet margin entire; leaflet margins level. Leaflet linear elliptic or narrow elliptic or broad elliptic; apex mucronate; base truncate to angustate; broadest at base. Leaflet adaxial hairs less than 10 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; leaflet abaxial hair less than 10 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle longer than 2mm, but shorter than flower. Peduncle length 5-11mm; rachis 3-5mm long; pedicel 1-2mm long; flower 20mm long; ratio of peduncle to flower length of 0.25-0.55; peduncular cusp absent. Number of flowers per inflorescence two. Pedicel glabrous or less than 10 hairs per mm sq; hairs less than 0.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 3-4mm long; lateral teeth 2.5-3mm long; upper tooth 2-2.5mm long; tube 3.5-5mm long; ratio of lower tooth to tube length of 0.8-0.85. Calyx base not gibbous; tube mouth slightly oblique; teeth reflexing absent; tooth curvature absent; exterior nectaries seen on lateral teeth. Calyx hairs only on calyx; hair density less than 10 per mm sq; hair length less than 0.5mm long or 0.5-1.5mm long; hairs adpressed. Calyx colour green. Standard length 20mm; limb length 11-11.5mm; claw length 8.5-9mm; limb width 7-9mm; claw width 6-7.5mm; ratio of limb length to claw length 1.22-1.35. Corolla petals concolorous; standard face cream; standard upper surface cream; face without distinct veining. Standard shape platonychioid; apex emarginate; claw bowing absent; upper surface glabrous. Wing length 16-17mm; limb length 6mm; claw length 10-11mm; limb width 3.5-4.5mm. Wing colour cream; entire apex tip coloured; wing shape 3; spur shape 3; limb base kinking weak; limb pouch present; wing to keel adhesion weak. Keel length 15mm; hood length 4.5mm; claw length 10.5mm; hood width 4.5mm. Keel colour white; hood apex not distinctly coloured. Keel shape 3; base shape 2; pouch absent. Staminal tube length 12mm; filament length 2.5-3mm; all stamen approx. equal length; distinct tube vein colouring absent or present. Ovary length 8-9.5mm; style length 4.5mm; supra-ovary extension 2.5mm. Ovary shape intermediate; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary covered with tubercle based hairs; style apex pubescence type 3. Number of ovules per ovary 4-5.

LEGUME CHARACTERS: Legume 40-43mm long; 10mm wide; 5-6mm deep; ratio of legume length to width 4-4.3. Amphicarpic legumes absent. Legume colour brown; uniform over legume. Legume shape rectangular; cross-sectional shape rounded to flat; not falcate; suture straight; distal end unbeaked; valve surface not torulose; surface ridged with veins; partitioning present. Legume hairs 10 - 35 per mm sq; hairs more than 1.5mm long; tubercle hairs covering entire legume; suture surface ciliate, hairs tubercular; tubercles short. Dehiscent legume twisting medium; number of seeds per legume 4-5.

SEED CHARACTERS: no data available.

Phenology: May **Chromosome number:** N.A.
Geographical distribution: SU, (collected from a single location near Tashkent, Uzbekistan).
Ecology: Weed in mountain corn.

Taxonomic notes: This variety is endemic to Soviet Central Asia.

Specimen citation: Vvedensky 270 (C, G, E, K, MO);

ii **Accepted taxon:** V. johannis var. procumbens H. Schäfer (1973) Kulturpflanze 21: 261.
Type: holotype, Gatersleben V 367, (GAT).
Synonymy: V. johannis var. intermedia Scheibe (1934) Zuchter, 6: 234; V. procumbens H. Schäfer (1973) Sched. Herb.

Description: VEGETATIVE CHARACTERS: Annual; erect or ascending or decumbent; 20-65cm high. Stipule length 9.5-20mm; 5-15mm wide. Stipule semi-hastate or semi-saggitate; apex obtuse mucronate; number of teeth on distal edge 1-2 teeth or 3-5; number of teeth on proximal edge none; stipule edge form uneven with swollen hairs; not-translucent. Stipule colour (upper plant) green or green with purple; hairs located edge only. Leaf 25-54(-80)mm long; petiole 10-22mm long; average leaflet internode 14-33mm long; leaflet 20-60mm long; leaflet 9-35mm wide; tendril or mucro 12-55mm long; average leaf internode 20-76mm long; petiolule 15-42mm long. Leaf apex tendrilous; simple or with 2 branches or with 3 branches. Leaflet shape asymmetric; 2-6 leaflets per leaf. Upper leaflet margin entire or less than 7 serrations; lower leaflet margin entire; leaflet margins level. Leaflet linear elliptic or narrow elliptic or broad elliptic; apex mucronate or obtuse; base angustate or truncate to angustate; broadest in middle or at base. Leaflet adaxial hairs absent or less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm) (rarely) or longer than 2mm, but shorter than flower. Peduncle length 2-10(-26)mm; rachis 2-9mm long; pedicel 1-3mm long; flower 14-25mm long; ratio of peduncle to flower length of 0.09-1.18; peduncular cusp absent. Number of flowers per inflorescence one or two or three or four. Pedicel glabrous or less than 10 hairs per mm sq or with 10-50 hairs per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long or hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 2.5-5mm long; lateral teeth 1.5-4.5mm long; upper tooth 1-3mm long; tube 5-7mm long; ratio of lower tooth to tube length of 0.41-0.83. Calyx base not gibbous or slightly gibbous; tube mouth slightly oblique; teeth reflexing absent; tooth curvature present; exterior nectaries seen on lateral teeth. Calyx hairs only on calyx teeth or covering calyx; hair density less than 10 per mm sq; hair length 0.5-1.5mm long or more than 1.5mm long; hairs adpressed. Calyx colour green or purple. Standard length (10-)17-27mm; limb length (5.5-)8-16mm; claw length (4.5-)7-12.5mm; limb width (5-)7-12mm; claw width 5-9mm; ratio of limb length to claw length 0.7-2. Corolla petals concolorous; standard face cream or yellow; standard upper surface cream or yellow or lilac; face without distinct veining or face with distinct veins. Standard shape platonychioid; apex emarginate or emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 16-23mm; limb length 5.5-10.5mm; claw length 9.5-14mm; limb width 3.5-6.5mm. Wing colour cream or yellow; entire apex tip coloured; marking brown or black. Wing shape 3; spur shape 3; limb base kinking weak; limb pouch present; wing to keel adhesion weak. Keel length 14-21mm; hood length 4.5-6.5mm; claw length 9-14.5mm; hood width 4.5-6.5mm. Keel colour white; hood apex distinctly coloured. Keel shape 3; base shape 2;

pouch absent. Staminal tube length 12-18mm; filament length 2.5-3.5mm; all stamen approx. equal length; distinct tube vein colouring absent or present. Ovary length 8.5-14mm; style length 4-6mm; supra-ovary extension 2-4mm. Ovary shape intermediate or oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary with tubercle based hairs on sutures or covered with tubercle based hairs; style apex pubescence type 3. Number of ovules per ovary 5-9.

LEGUME CHARACTERS: Legume 23-61mm long; 10-13mm wide; 5-7mm deep; ratio of legume length to width 3-4.09. Amphicarpic legumes absent. Legume colour yellow-brown or brown; uniform over legume. Legume shape rectangular; cross-sectional shape rounded to flat; not falcate; suture straight; distal end unbeaked; valve surface not torulose; surface ridged with veins; partitioning present. Legume hairs 10 - 35 per mm sq or hairs 36 - 60 per mm sq; hairs 0.5 - 1.5mm long or hairs more than 1.5mm long; tubercle hairs covering entire legume; suture surface ciliate, hairs tubercular; tubercles short. Dehiscent legume twisting loose or medium; number of seeds per legume 2-7.

SEED CHARACTERS: Seed 3.5-7mm long; 4-6.5mm wide; 4-5.5mm deep; 16-19mm circumference; hilum 2-3mm long; distance from hilum to lens 1.5-2mm; seed length to width ratio of 0.84-1.1; seed circumference to hilum length ratio of 0.12-0.15. Seed shape spherical or spherical to cubic; shape in side view circular; seed colour brown; mottling absent; surface matt; smooth. Hilum shape oval; coloured brown; groove colour beige; hilum surface excess tissue absent. Lens position less than 1.6mm from hilum; prominent. Aril absent.

Phenology: March - June **Chromosome number:** 14.
Geographical distribution: GR, IR, IT, SA, SY, TR, YU.
Ecology: Alt. 100 - 1350m; Hab. maquis, disturbed agricultural land and open woodland.

Specimen citation: Furse 7344 (K); Turrill 14 (K); Jacobs 6499 (K); Jacobs 6499 (E); Rigo s.n. (K); Noe s.n. (K); Meebold s.n. (K); Porta s.n. (K); Pichler s.n. (K); Heter s.n. (K); Maxted, Ehrman & Khattab 2059 (SPN); Maxted, Ehrman & Khattab 2067 (SPN); Maxted, Ehrman & Khattab 2094 (SPN); Maxted, Ehrman & Khattab 1858 (SPN); Maxted, Ehrman & Khattab 2418 (SPN); Maxted, Ehrman & Khattab 2250 (SPN); Maxted, Ehrman & Khattab 2329 (SPN); Maxted, Ehrman & Khattab 2094 (SPN); Maxted, Ehrman & Khattab 2036 (SPN); Maxted, Ehrman & Khattab 2394 (SPN); Davis & Dodds 18770 (K); Kotte 1136 (K); Davis & Hedge 28917 (K); Hennipman & al 1225 (K); Davis & Hedge 28917 (K); Maxted, Kitiki & Allkin 4701 (SPN); Maxted, Kitiki & Allkin 4146 (SPN); Maxted, Kitiki & Allkin 4154 (SPN); Maxted, Kitiki & Allkin 4468 (SPN); Maxted, Kitiki & Allkin 4165 (SPN); Maxted, Ehrman & Auricht 4949 (SPN); Maxted, Ehrman & Auricht 4930 (SPN); Maxted, Ehrman & Auricht 4880 (SPN); Maxted, Ehrman & Auricht 5272 (SPN); Maxted, Ehrman & Auricht 5289 (SPN); Maxted, Ehrman & Auricht 6167 (SPN); Ehim 603 (E); Davis & Hedge 28917 (E); Dudley 34682 (BM).

iii **Accepted taxon:** V. johannis var. johannis Tamamschian in Karyagin (1954) Fl. Azerbaidzhan, 5: 495.
Type: Holotype, Beideman 7/6/1938 Astara, Azerbaijan (BAK), isotype Radle Lenkoran, Azerbaijan (LE!).
Synonymy: V. procumbens var. violacea H. Schäfer (1973) Sched. Herb.

Description: VEGETATIVE CHARACTERS: Annual; erect or ascending; 11-54cm high. Stipule length 7-19mm; 4-14mm wide. Stipule semi-hastate or semi-saggitate; apex obtuse mucronate; number of teeth on distal edge 1-2 teeth or 3-5 teeth or more than 5; number of teeth on proximal edge none; stipule edge form uneven with swollen hairs; not-translucent. Stipule colour (upper plant) green or green with purple; hairs located edge only or less than 10 hairs per sqmm. Leaf 14-51mm long; petiole 8-22mm long; average leaflet internode 6-29mm long; leaflet 19-49mm long; leaflet 9-32mm wide; tendril or mucro 8-73mm long; average leaf internode 24-67mm long; petiolule 8-28mm long. Leaf apex tendrilous; simple or with 2

branches or with 3 branches. Leaflet shape asymmetric; 2-6 leaflets per leaf. Upper leaflet margin entire or less than 7 serrations; lower leaflet margin entire; leaflet margins level. Leaflet linear elliptic or narrow elliptic or broad elliptic; apex mucronate or obtuse; base angustate or truncate to angustate; broadest in middle or at base. Leaflet adaxial hairs absent or less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; petiole hairs 10-50 per mm sq or more than 50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle longer than 2mm, but shorter than flower. Peduncle length 2-13mm; rachis 2-10mm long; pedicel 1-2mm long; flower 17-28mm long; ratio of peduncle to flower length of 0.1-0.68; peduncular cusp absent. Number of flowers per inflorescence one or two or three or four. Pedicel glabrous or less than 10 hairs per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 2.5-5.5mm long; lateral teeth 2-5mm long; upper tooth 1.5-3mm long; tube 4.5-7mm long; ratio of lower tooth to tube length of 0.5-0.81. Calyx base not gibbous or slightly gibbous; tube mouth slightly oblique; teeth reflexing absent; tooth curvature present; exterior nectaries seen on lateral teeth. Calyx hairs only on calyx teeth or covering calyx; hair density less than 10 per mm sq; hair length 0.5-1.5mm long or more than 1.5mm long; hairs adpressed. Calyx colour green. Standard length 16-26mm; limb length 7-14mm; claw length 8-15mm; limb width 7-13mm; claw width 5-8.5mm; ratio of limb length to claw length 0.73-1.29. Corolla petals concolorous; standard face cream or yellow; standard upper surface cream or yellow or lilac; face with distinct veins. Standard shape platonychioid; apex emarginate or emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 14-23mm; limb length 5-9.5mm; claw length 7.5-13mm; limb width 2.5-5.5mm. Wing colour cream or yellow; entire apex tip coloured; marking purple. Wing shape 2 or 3; spur shape 3; limb base kinking weak; limb pouch present; wing to keel adhesion weak. Keel length 13-19mm; hood length 4-6.5mm; claw length 8-12.5mm; hood width 4-6.5mm. Keel colour white; hood apex distinctly coloured. Keel shape 3; base shape 2; pouch absent. Staminal tube length 11-16mm; filament length 2.5-3mm; all stamen approx. equal length; distinct tube vein colouring absent or present. Ovary length 7-11.5mm; style length 3.5-5mm; supra-ovary extension 1.5-4.5mm. Ovary shape intermediate or oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary with tubercle based hairs on sutures or covered with tubercle based hairs; style apex pubescence type 3. Number of ovules per ovary 5-7.

LEGUME CHARACTERS: Legume 30-60mm long; 10-13mm wide; 5-6mm deep; ratio of legume length to width 3-3.9. Amphicarpic legumes absent. Legume colour yellow-brown or brown; uniform over legume. Legume shape rectangular; cross-sectional shape rounded to flat; not falcate; suture parallel; distal end unbeaked; valve surface not torulose; surface ridged with veins; partitioning present. Legume hairs 10 - 35 per mm sq or hairs 36 - 60 per mm sq; hairs 0.5 - 1.5mm long or hairs more than 1.5mm long; hairs on sutures only or tubercle hairs covering entire legume; suture surface ciliate, hairs tubercular; tubercles short. Dehiscent legume twisting loose or medium; number of seeds per legume 4-6.

SEED CHARACTERS: Seed 4-6mm long; 5-6mm wide; 4-5mm deep; 14-15mm circumference; hilum 2-2.5mm long; distance from hilum to lens 2mm; seed length to width ratio of 0.9; seed circumference to hilum length ratio of 0.14-0.16. Seed shape spherical; shape in side view circular; seed colour brown; mottling present; surface matt; smooth. Hilum shape oval; coloured yellow; groove colour beige; hilum surface excess tissue absent. Lens position more than 1.5mm from hilum; prominent. Aril absent.

Phenology: March - June **Chromosome number:** 14.
Geographical distribution: AL, IR, SU, SY, TR.

Ecology: Alt. 20 - 2050m; Hab. Maquis, disturbed agricultural land and open woodland.

Specimen citation: Alston & Sandwith 1756 (BM); Bowles Scholarship Bot. Exp. 1930 (K); Maxted, Ehrman & Khattab 2048 (SPN); Maxted, Ehrman & Khattab 1968 (SPN); Maxted, Ehrman & Khattab 2089 (SPN); Maxted, Ehrman & Khattab 1709 (SPN); Maxted, Ehrman & Khattab 1954 (SPN); Maxted, Ehrman & Khattab 2416 (SPN); Maxted, Ehrman & Khattab 1945 (SPN); Maxted, Kitiki & Allkin 4061 (SPN); Maxted, Kitiki & Allkin 4014 (SPN); Maxted, Allkin & Khattab 4250 (SPN); Maxted, Allkin & Khattab 4211 (SPN); Maxted, Allkin & Khattab 4486 (SPN); Coode & Jones 1489 (E); Davis & Hedge 27489 (E); Maxted, Kitiki & Allkin 4022 (SPN).

34 **Accepted taxon:** **V. galilaea** Plitm. & Zoh. in Plitm. (1965) Isr. J. Bot., 14: 91.

Iconography: Fl. Pal., 2: 209; Fl. Tur., 3: 323; Illust. Fl. Pal., 2 (plates): 298.

Synonymy: V. narbonensis var. pilosa Post 1896 Fl. Syr. Pal. and Sin., 1: 288;

Description: VEGETATIVE CHARACTERS: Annual; erect or ascending; 17-85cm high. Stipule length 7-28mm; 4.5-17.5mm wide. Stipule semi-hastate or semi-saggitate; apex acute or obtuse mucronate; number of teeth on distal edge 1-2 teeth or 3-5 teeth or more than 5; number of teeth on proximal edge none or 1-2; stipule edge form entire or uneven with swollen hairs; translucent or not-translucent. Stipule colour (upper plant) green or green with purple; hairs located edge only. Leaf 12-94mm long; petiole 8-25mm long; average leaflet internode 10-35mm long; leaflet 21-61mm long; leaflet 13-37mm wide; tendril or mucro 10-62mm long; average leaf internode 14-67mm long; petiolule 11-72mm long. Leaf apex tendrilous; simple or with 2 branches or with 3 branches or with more than 3 branches. Leaflet shape asymmetric; 2-8 leaflets per leaf. Upper leaflet margin entire or less than 7 serrations; lower leaflet margin entire; leaflet margins level. Leaflet linear elliptic or narrow elliptic or elliptic ovate; apex mucronate and emarginate or mucronate or obtuse; base angustate or truncate to angustate; broadest in middle or at base. Leaflet adaxial hairs absent or less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq. Stem node colour (upper plant) green or purple (rarely).

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm) or longer than 2mm, but shorter than flower. Peduncle length 1-14mm; rachis 1-5mm long; pedicel 1-2mm long; flower 15-29mm long; ratio of peduncle to flower length of 0.04-0.7; peduncular cusp absent. Number of flowers per inflorescence one or two. Pedicel glabrous or less than 10 hairs per mm sq or with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long or hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 3-9mm long; lateral teeth 2.5-8mm long; upper tooth 1.5-5mm long; tube 4.5-8mm long; ratio of lower tooth to tube length of 0.5-1.28. Calyx base not gibbous or slightly gibbous; tube mouth truncate or slightly oblique; teeth reflexing absent; tooth curvature absent or present; exterior nectaries seen on lateral teeth. Calyx hairs absent or only on calyx teeth or covering calyx; hair density less than 10 per mm sq or 10-35 per mm sq or 36-60 per mm sq; hair length less than 0.5mm long or 0.5-1.5mm long or more than 1.5mm long; hairs adpressed. Calyx colour green. Standard length 10-27mm; limb length 6-16mm; claw length 4-12mm; limb width 4.5-12mm; claw width 4-10mm; ratio of limb length to claw length 0.58-1.75. Corolla petals concolorous or not concolorous; standard face cream or lilac or violet; standard upper surface cream or lilac or violet; face without distinct veining or face with distinct veins. Standard shape platonychioid; apex emarginate or emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 17-24mm; limb length 6-10.5mm; claw length 7.5-14mm; limb width 2.5-6mm. Wing colour cream or yellow or yellow-pink or

yellow-green or violet; entire apex tip coloured; marking purple. Wing shape 2 or 3; spur shape 3 or 4; limb base kinking weak; limb pouch present; wing to keel adhesion weak. Keel length 13.5-20mm; hood length 4.5-6.5mm; claw length 8.5-13.5mm; hood width 3.5-7mm. Keel colour white or purple or brown; hood apex distinctly coloured. Keel shape 3; base shape 2; pouch absent. Staminal tube length 9-17mm; filament length 2-4mm; all stamen approx. equal length; distinct tube vein colouring absent or present. Ovary length 7.5-13mm; style length 2-7mm; supra-ovary extension 2-5mm. Ovary shape intermediate or oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary with tubercle based hairs on sutures or covered with tubercle based hairs; style apex pubescence type 3 or 4. Number of ovules per ovary 4-8.

LEGUME CHARACTERS: Legume 30-65mm long; 8-14mm wide; 5-7mm deep; ratio of legume length to width 3.16-4.44. Amphicarpic legumes absent. Legume colour yellow-brown or brown; uniform over legume. Legume shape rectangular; cross-sectional shape rounded to flat; not falcate; suture unparallel or straight; distal end unbeaked; valve surface not torulose; surface smooth or ridged with veins; partitioning present. Legume hairs 10 - 35 per mm sq or hairs 36 - 60 per mm sq; hairs 0.5 - 1.5mm long or hairs more than 1.5mm long; tubercle hairs covering entire legume; suture surface ciliate, hairs tubercular; tubercles short. Dehiscent legume twisting loose or medium; number of seeds per legume 4-6.

SEED CHARACTERS: Seed 4-6mm long; 4-6mm wide; 4-4.5mm deep; 10.5-17.5mm circumference; hilum 2-2.5mm long; distance from hilum to lens 1.5-2mm; seed length to width ratio of 0.9-1.1; seed circumference to hilum length ratio of 0.14-0.19. Seed shape spherical to cubic; shape in side view circular; seed colour brown; mottling absent; surface matt; smooth. Hilum shape oval or elongated, less than third of circumference; coloured red-brown or coloured brown; groove colour beige; hilum surface excess tissue absent. Lens position more than 1.5mm from hilum; prominent. Aril absent.

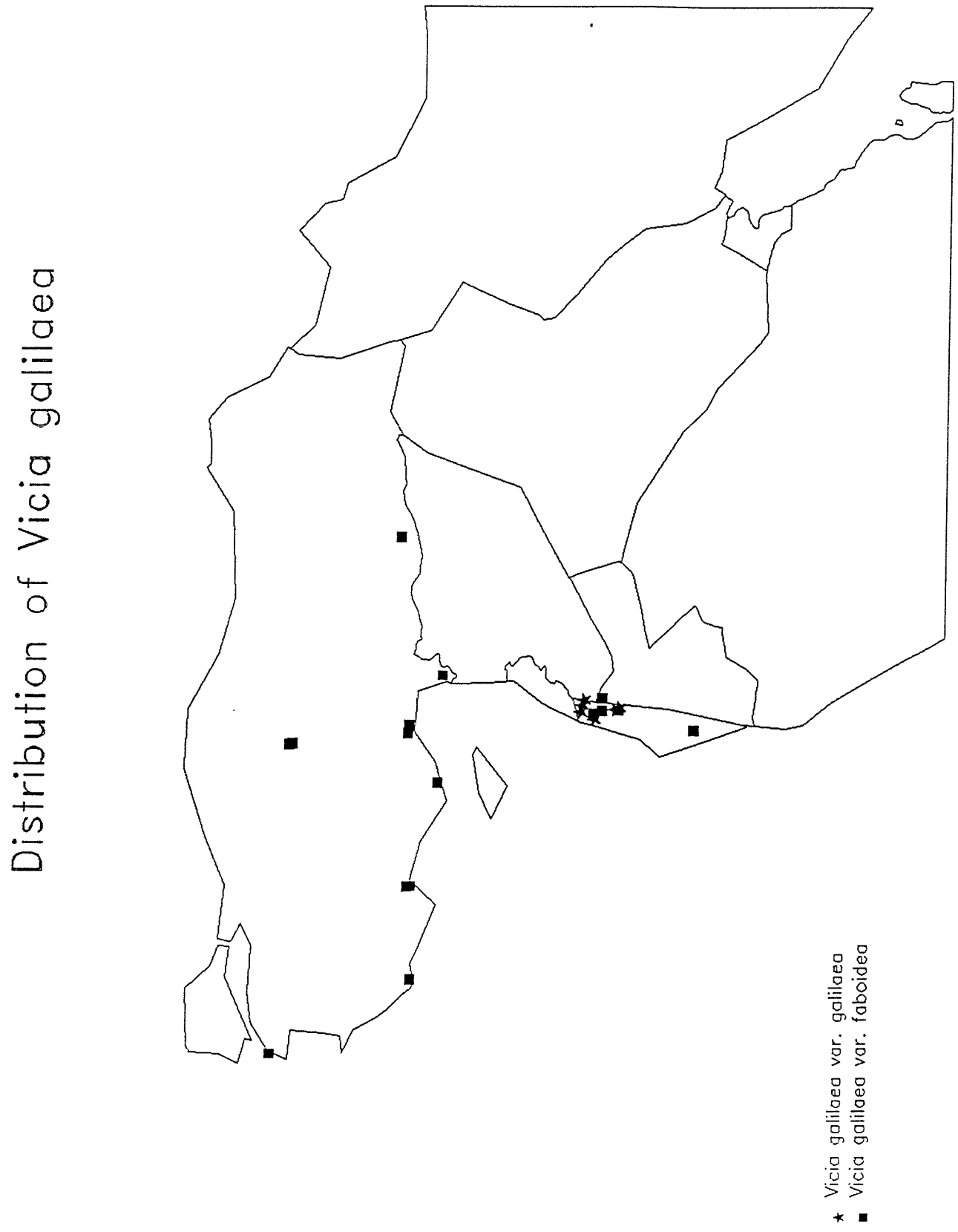
Phenology: March - July **Chromosome number:** 14.
Geographical distribution: IL, JO, LB, SY, TR. See Map 34.
Ecology: Alt. 30 - 1300m; Hab. maquis, open woodland, disturbed agricultural land.

Taxonomic notes: Plitmann (1965) and Zohary & Hopf (1973) tentatively suggest that V. galilaea is the closest ally of the fababean on the basis of morphologically characters. This view was supported by Yamamoto et al. (1982), who following a karyotypic, isozyme polymorphism, morphological and hybridization study of sect. Faba sensu Kupicha (1976) reached the same conclusion. Each of these authors, however, stresses that in their opinion V. galilaea was not the progenitor of V. faba.

Ponert (1973) regards V. galilaea as a subspecies of V. narbonensis. These two species do form a closely related group with V. johannis. However, the clear difference in flower colour, legume dimension and pubescence between V. galilaea and V. narbonensis makes the reduction of V. galilaea to a subspecies of V. narbonensis unsupportable.

The two varieties accepted here are the two extremes of a continuum and intermediate forms are found. This lead Khattab (1987) doubt that these extremes warranted varietal distinction. The majority of the specimens seen during this study were easily attributable to one or other variety and so the existence of the two varieties is retained.

Map 34.


Distribution of Vicia galilaea
Vicia galilaea var. galilaea
Vicia galilaea var. faboidea

Key to varieties of V. galilaea

1(0). Stems up to 25cm; leaflets subglabrous, usually 1-2-leaflet pairs, 4cm broad, margin entire; flowers 20-25mm, solitary; legume > 10mm broad, rectangular rhomboid, valve long pilose..... .....V. galilaea var. galilaea

Stem up to 50cm; leaflets pubescent, usually 2-4-leaflet pairs, 2.5-3cm. broad; flowers 25-35mm, 1-3 per inflorescence; legume approx. 10mm broad, rectangular, valves shortly pilose..... ..... ii V. galilaea var. faboidea

i **Accepted taxon:** **V. galilaea** var. **galilaea** (Plitm. & Zoh. in Plitm.) H. Schäfer (1973) Kulturpflanze 21: 265.

Type: Holotype, Plitmann & Zohary 1802, Mt. Admon, Upper Galilee, Israel (HUJ!).

Iconography: Fl. Pal., 2: 209.

Synonymy: V. galilaea subsp. galilaea Plitm. & Zoh. in Plitm. (1965) Isr. J. Bot., 14: 92; V. narbonensis subsp. galilaea (Plitm. & Zoh.) Ponert (1973) Feddes Repert., 83: 634.

Description: VEGETATIVE CHARACTERS: Annual; erect or ascending; 17-35cm high. Stipule length 7-21mm; 5-10mm wide. Stipule semi-hastate or semi-saggitate; apex acute or obtuse mucronate; number of teeth on distal edge 1-2 teeth or 3-5; number of teeth on proximal edge none; stipule edge form entire or uneven with swollen hairs; not-translucent. Stipule colour (upper plant) green or green with purple; hairs located edge only. Leaf 12-45mm long; petiole 8-20mm long; average leaflet internode 14-28mm long; leaflet 27-45mm long; leaflet 13-32mm wide; tendril or mucro 14-55mm long; average leaf internode 14-48mm long; petiolule 14-27mm long. Leaf apex tendrilous; simple or with 2 branches or with 3 branches. Leaflet shape asymmetric; 2-4 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet linear elliptic or narrow elliptic; apex mucronate and emarginate or mucronate or obtuse; base truncate to angustate or truncate; broadest in middle or at base. Leaflet adaxial hairs absent or less than 10 per mm sq; hairs less than 0.5mm long; leaflet abaxial hair less than 10 per mm sq; hairs less than 0.5mm long; petiole hairs 10-50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm) or longer than 2mm, but shorter than flower. Peduncle length 2-8mm; rachis 2-5mm long; pedicel 1-2mm long; flower 15-23mm long; ratio of peduncle to flower length of 0.09-0.42; peduncular cusp absent. Number of flowers per inflorescence one. Pedicel glabrous or less than 10 hairs per mm sq or with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long or hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 3-6mm long; lateral teeth 2.5-5mm long; upper tooth 1.5-4mm long; tube 4.5-7mm long; ratio of lower tooth to tube length of 0.54-1.2. Calyx base not gibbous or slightly gibbous; tube mouth truncate or slightly oblique; teeth reflexing absent; tooth curvature absent or present; exterior nectaries seen on lateral teeth. Calyx hairs absent or only on calyx teeth or covering calyx; hair density of 10-35 per mm sq or 36-60 per mm sq; hair length 0.5-1.5mm long or more than 1.5mm long; hairs adpressed. Calyx colour green. Standard length 10-27mm; limb length 6-16mm; claw length 4.5-12mm; limb width 4.5-12mm; claw width 4-9mm; ratio of limb length to claw length 0.58-1.45. Corolla petals concolorous or not concolorous; standard face cream; standard upper surface

cream or violet; face with distinct veins. Standard shape platonychioid; apex emarginate or emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 18.5-23.5mm; limb length 6-10.5mm; claw length 7.5-13mm; limb width 2.5-5mm. Wing colour cream or yellow or yellow-pink or yellow-green or violet; entire apex tip coloured; marking purple. Wing shape 2 or 3; spur shape 3 or 4; limb base kinking weak; limb pouch present; wing to keel adhesion weak. Keel length 14-20mm; hood length 4.5-6.5mm; claw length 8.5-13.5mm; hood width 3.5-7mm. Keel colour white or purple or brown; hood apex distinctly coloured. Keel shape 3; base shape 2; pouch absent. Staminal tube length 9-16mm; filament length 2-4mm; all stamen approx. equal length; distinct tube vein colouring absent or present. Ovary length 8-12mm; style length 4-7mm; supra-ovary extension 2-3.5mm. Ovary shape intermediate or oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary glabrous or covered with tubercle based hairs; style apex pubescence type 3. Number of ovules per ovary 4-8.

LEGUME CHARACTERS: Legume 35-45mm long; 10-14mm wide; 5-7mm deep; ratio of legume length to width 3.16-4.44. Amphicarpic legumes absent. Legume colour yellow-brown or brown; uniform over legume. Legume shape rectangular; cross-sectional shape rounded to flat; not falcate; suture unparallel or straight; distal end unbeaked; valve surface not torulose; surface ridged with veins; partitioning present. Legume hairs 10 - 35 per mm sq or hairs 36 - 60 per mm sq; hairs more than 1.5mm long; tubercle hairs covering entire legume; suture surface ciliate, hairs tubercular; tubercles short. Dehiscent legume twisting loose or medium; number of seeds per legume 4-6.

SEED CHARACTERS: Seed 4-5mm long; 4-5mm wide; 4-4.5mm deep; 10.5-17.5mm circumference; hilum 2-2.5mm long; distance from hilum to lens 1.5-2mm; seed length to width ratio of 0.9-1.1; seed circumference to hilum length ratio of 0.14-0.19. Seed shape spherical to cubic; shape in side view circular; seed colour brown; mottling absent; surface matt; smooth. Hilum shape oval or elongated, less than third of circumference; coloured red-brown or coloured brown; groove colour beige; hilum surface excess tissue absent. Lens position more than 1.5mm from hilum; prominent. Aril absent.

Phenology: March - July **Chromosome number:** 14.
Geographical distribution: IL.
Ecology: Alt. 100m; Soil, Basalt; Hab. maquis, open woodland, disturbed agricultural land.

Specimen citation: Norris s.n. (BM); Khattab 176 (SPN); Khattab 175 (SPN); Khattab 174 (SPN); Khattab 153 (SPN); Khattab 46 (SPN); Khattab 31 (SPN); Khattab 72 (SPN); Feinbrun 1177 (HUJ); Zohary et Plitmann 2511446 (E); Khattab 26 (SPN); Khattab 48 (SPN); Plitmann 1173 (HUJ); Zohary et Plitmann 1705 (HUJ); Zohary 1805 (HUJ); Feinbrun 1204 (HUJ).

ii **Accepted taxon:** V. galilaea var. faboidea (Plitm. & Zoh. in Plitm.) H. Schäfer (1973) Kulturpflanze 21: 265.
Type: holtype, Feinbrun 18022, Tivon, Lower Galilee (HUJ!).
Iconography: Fl. Pal., 2: 209.
Synonymy: V. galilaea subsp. faboidea Plitm. & Zoh. (1965) Isr. J. Bot., 14: 92; V. narbonensis subsp. faboidea (Plitm. & Zoh.) Ponert (1973) Feddes Repert., 83: 634.

Description: VEGETATIVE CHARACTERS: Annual; erect or ascending; 17-85cm high. Stipule length 9.5-28mm; 4.5-17.5mm wide. Stipule semi-hastate or semi-saggitate; apex acute or obtuse mucronate; number of teeth on distal edge 1-2 teeth or 3-5; number of teeth on proximal edge none or 1-2; stipule edge form entire or uneven with swollen hairs; translucent or not-translucent. Stipule colour (upper plant) green or green with purple; hairs located edge only. Leaf 21-94mm long; petiole 8-25mm long;

average leaflet internode 10-35mm long; leaflet 21-61mm long; leaflet 23-37mm wide; tendril or mucro 10-62mm long; average leaf internode 14-67mm long; petiolule 11-72mm long. Leaf apex tendrilous; simple or with 2 branches or with 3 branches or with more than 3 branches. Leaflet shape asymmetric; 2-8 leaflets per leaf. Upper leaflet margin entire or less than 7 serrations; lower leaflet margin entire; leaflet margins level. Leaflet linear elliptic or narrow elliptic or elliptic ovate; apex mucronate and emarginate or mucronate or obtuse; base truncate to angustate; broadest in middle or at base. Leaflet adaxial hairs less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq. Stem node colour (upper plant) green or purple (rarely).

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm) or longer than 2mm, but shorter than flower. Peduncle length 1-14mm; rachis 1-5mm long; pedicel 1-2mm long; flower 20-34mm long; ratio of peduncle to flower length of 0.04-0.7; peduncular cusp absent. Number of flowers per inflorescence one or two. Pedicel less than 10 hairs per mm sq or with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long or hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 3-9mm long; lateral teeth 2.5-8mm long; upper tooth 1.5-5mm long; tube 5-8mm long; ratio of lower tooth to tube length of 0.5-1.28. Calyx base not gibbous or slightly gibbous; tube mouth truncate or slightly oblique; teeth reflexing absent; tooth curvature absent or present; exterior nectaries seen on lateral teeth. Calyx hairs absent or only on calyx teeth or covering calyx; hair density less than 10 per mm sq or 10-35 per mm sq; hair length less than 0.5mm long or 0.5-1.5mm long; hairs adpressed. Calyx colour green. Standard length 11-26mm; limb length 6-15.5mm; claw length 4-12mm; limb width 6-12mm; claw width 6-10mm; ratio of limb length to claw length 0.75-1.75. Corolla petals concolorous or not concolorous; standard face cream; standard upper surface cream or violet; face without distinct veining or face with distinct veins. Standard shape platonychioid; apex emarginate or emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 17-24mm; limb length 7-10.5mm; claw length 9-14mm; limb width 3.5-6mm. Wing colour cream or yellow or yellow-pink or yellow-green or violet; entire apex tip marking purple. Wing shape 2 or 3; spur shape 3; limb base kinking weak; limb pouch present; wing to keel adhesion weak. Keel length 13.5-19mm; hood length 4.5-6.5mm; claw length 8.5-13mm; hood width 4.5-6mm. Keel colour white or purple or brown; hood apex distinctly coloured. Keel shape 3; base shape 2; pouch absent. Staminal tube length 12-17mm; filament length 2-4mm; all stamen approx. equal length; distinct tube vein colouring absent or present. Ovary length 7.5-13mm; style length 2-6mm; supra-ovary extension 2-5mm. Ovary shape intermediate or oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary glabrous or with tubercle based hairs on sutures or covered with tubercle based hairs; style apex pubescence type 3 or 4. Number of ovules per ovary 4-8.

LEGUME CHARACTERS: Legume 30-44mm long; 10-11mm wide; 6-7mm deep; ratio of legume length to width 3.45-4.37. Amphicarpic legumes absent. Legume colour yellow or yellow-brown or brown; uniform over legume. Legume shape rectangular; cross-sectional shape rounded to flat; not falcate; suture unparallel or straight; distal end unbeaked; valve surface not torulose; surface smooth or ridged with veins; partitioning present. Legume hairs 10 - 35 per mm sq or hairs 36 - 60 per mm sq; hairs 0.5 - 1.5mm long or hairs more than 1.5mm long; tubercle hairs covering entire legume; suture surface ciliate, hairs tubercular; tubercles short. Dehiscent legume twisting loose or medium; number of seeds per legume 4-6.

SEED CHARACTERS: Seed 4.5-6mm long; 4.5-6mm wide; 4-4.5mm deep; 10.5-17mm circumference; hilum 2-2.5mm long; distance from hilum to lens 1.5-2mm; seed length to width ratio of 0.9-1.1; seed circumference to hilum length ratio of 0.14-0.19. Seed shape spherical to cubic; shape in side view circular; seed colour brown; mottling absent; surface matt; smooth. Hilum shape oval; coloured red-brown

or coloured brown; groove colour beige; hilum surface excess tissue absent. Lens position more than 1.5mm from hilum; prominent. Aril absent.

Phenology: March - July **Chromosome number:** 14.
Geographical distribution: IL, JO, LB, SY, TR.
Ecology: Alt. 30 - 1300m; Hab. maquis, open woodland, disturbed agricultural land.

Specimen citation: Van der Maesen 2167 (K); Davis et Polunin 25282 (BM); Hayne s.n. (K); Davis et Polunin 25282 (K); Van der Maesen 2167 (K); Townsend 71/79 (K); Guichard 16/62 (K); Davis et Polunin 26048 (K); Davis 42324 (K); Davis et Hedge 26379 (K); A., C. et W. 701 (K); Sintenis 370 (K); Davis et Hedge 27489 (K); Davis et Polunin 25282 (E); Bisby 1233 (SPN); Macfarlane 559 (SPN); Khattab 15 (SPN); Guichard Tur/16/62 (E); Khattab 54 (SPN); Feinbrun 18021 (HUJ); Eig, Zohary et Plitmann 1171 (HUJ); Plitmann 1181 (HUJ); Yitzhaqi 17885 (HUJ); Plitmann 1460 (HUJ); Plitmann 1003 (HUJ).

35 **Accepted taxon:** V. serratifolia Jacq. (1778) Fl. Austr. 5: 30.
Type: holotype, Copiose circa Sopronium Hungariae urbem ad limites Austriae crescentum, (W!).
Iconography: Fl. Iran., 56; Fl. Iraq, 3: 542; Fl. Pal., 2: 208-209; Fl. Syr., 2: 407; Fl. Tur., 3: 322; Fl. USSR., 13: 474.
Synonymy: Faba serratifolia Miller (1755) Gard. Dict. Abr., 4; V. monadelpha Roth (1800) Catalecta Botanica, 2: 97; V. serratifolia Willd. (1802) Sp. Pl., 3(2): 1111; V. narbonensis var. serratifolia (Jacq.) Ser. in DC. (1825) Prodr. 2: 365; V. narbonensis var. serratifolia Koch (1857) Syn. Fl. Ger. Helv. 3(1): 215; Faba serratifolia Fuss (1866) Fl. Transsilv. 179; V. narbonensis subsp. serratifolia (Jacq.) Nyman (1878) Consp. Fl. Eur. 1:240; V. narbonensis subsp. serratifolia (Jacq.) Arcang. (1882) Comp. Fl. Ital., 119; V. narbonensis subsp. serratifolia (Jacq.) Asch. & Graebner (1909) Mitteleurop. Fl. 6(2): 986; V. narbonensis var. serratifolia (Jacq.) Hermann (1960) USDA Agric. Handbook, 168: 31; Bona serratifolia (Jacq.) Stankevich (1982) Trudy Prikl. Bot. Genet. Selek., 72(1): 27.

Description: VEGETATIVE CHARACTERS: Annual; erect or ascending; 35-95cm high. Stipule length 5-17mm; 4-25mm wide. Stipule semi-saggitate; apex acute; number of teeth on distal edge 1-2 teeth or 3-5 teeth or more than 5; number of teeth on proximal edge none or 1-2 teeth or 3-5 teeth or more than 5; stipule edge form uneven with swollen hairs; translucent or not-translucent. Stipule colour (upper plant) green or green with purple; hairs located edge only. Leaf 14-126mm long; petiole 7-28mm long; average leaflet internode 7-65mm long; leaflet 12-59mm long; leaflet 7-39mm wide; tendril or mucro 4-83mm long; average leaf internode 9-90mm long; petiolule 7-110mm long. Leaf apex mucronate or tendrilous; simple or with 2 branches or with 3 branches or with more than 3 branches. Leaflet shape asymmetric; 2-8 leaflets per leaf. Upper leaflet margin more than 6 serrations; lower leaflet margin entire or serrate; leaflet margins level. Leaflet linear elliptic or narrow elliptic or broad elliptic or elliptic ovate or narrow ovate; apex mucronate and emarginate or mucronate or obtuse; base angustate or truncate to angustate or truncate; broadest at apex or in middle or at base. Leaflet adaxial hairs absent or less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long or hairs more than 1.5mm long; leaflet abaxial hair absent or less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long or hairs more than 1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq. Stem node colour (upper plant) green or purple.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm) or longer than 2mm, but shorter than flower. Peduncle length 4-29mm; rachis 2-20mm long; pedicel 1-4mm long; flower (14-)19-26(-36)mm long; ratio of peduncle to flower length of 0.1-1.23; peduncular cusp absent. Number of flowers per inflorescence one or two or three or four or more than four. Pedicel glabrous or less than 10 hairs per

mm sq or with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long or hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 3-6mm long; lateral teeth 2.5-5mm long; upper tooth 2.5-3.5mm long; tube 2-7mm long; ratio of lower tooth to tube length of 0.4-2.5. Calyx base not gibbous or slightly gibbous or strongly gibbous; tube mouth truncate or slightly oblique; teeth reflexing absent; tooth curvature absent or present; exterior nectaries absent or seen on lateral teeth. Calyx hairs only on calyx teeth or covering calyx; hair density less than 10 per mm sq or 10-35 per mm sq; hair length less than 0.5mm long or 0.5-1.5mm long or more than 1.5mm long; hairs adpressed. Calyx colour green. Standard length 9-26mm; limb length 5-16mm; claw length 3.5-13mm; limb width 4.5-12mm; claw width 4-10mm; ratio of limb length to claw length 0.72-1.87. Corolla petals concolorous; standard face purple; standard upper surface lilac; face without distinct veining or face with distinct veins. Standard shape platonychioid; apex emarginate or emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 14-21mm; limb length 5-9.5mm; claw length 8-13mm; limb width 3.5-6.5mm. Wing colour purple; markings absent or apex with round spot; marking purple. Wing shape 3; spur shape 3 or 5; limb base kinking weak; limb pouch present; wing to keel adhesion weak or strong. Keel length 13-18mm; hood length 4-6mm; claw length 6.5-13mm; hood width 3.5-6.5mm. Keel colour white or purple or brown; hood apex distinctly coloured. Keel shape 2 or 3; base shape 2 or 3; pouch absent. Staminal tube length 8-19mm; filament length 2-5mm; all stamen approx. equal length; distinct tube vein colouring absent or present. Ovary length 6.5-12mm; style length 3-7.5mm; supra-ovary extension 1.5-3mm. Ovary shape linear or intermediate or oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary with tubercle based hairs on sutures or covered with tubercle based hairs; style apex pubescence type 2 or 3. Number of ovules per ovary 4-11.

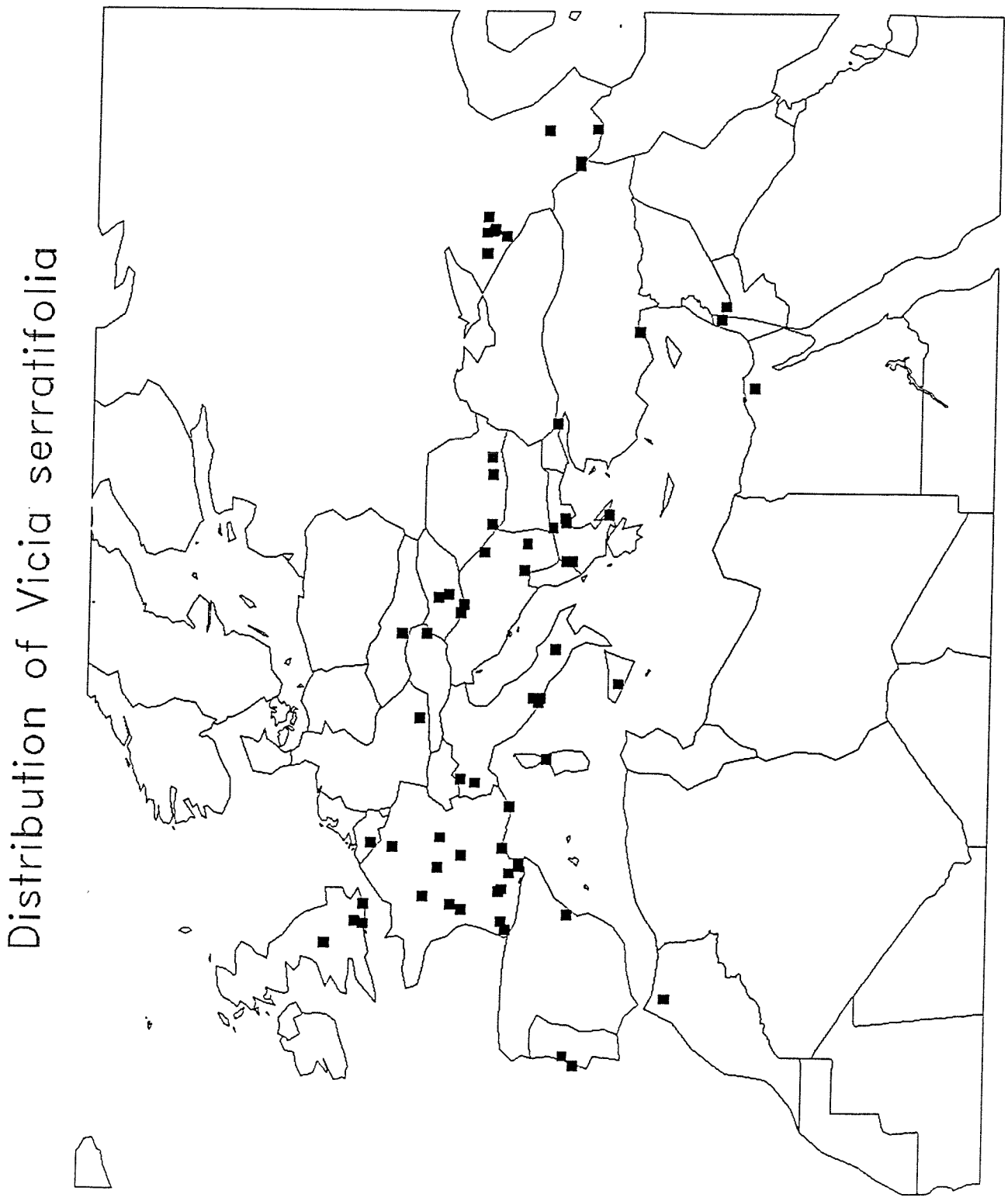
LEGUME CHARACTERS: Legume 30-75mm long; 8-16mm wide; 3-8mm deep; ratio of legume length to width 2.85-4.4. Amphicarpic legumes absent. Legume colour yellow-brown or brown; uniform over legume. Legume shape rectangular; cross-sectional shape round; not falcate; suture unparallel or straight; distal end unbeaked; valve surface not torulose or torulose; surface smooth or ridged with veins; partitioning absent or present. Legume hairs less than 10 per mm sq or hairs 10 - 35 per mm sq; hairs 0.5 - 1.5mm long or hairs more than 1.5mm long; hairs on sutures only or tubercle hairs covering entire legume; suture surface ciliate, hairs tubercular; tubercles short. Dehiscent legume twisting loose or medium or tight; number of seeds per legume 3-9.

SEED CHARACTERS: Seed 4-5.5mm long; 4-5.5mm wide; 2.5-5.5mm deep; 12-16mm circumference; hilum 2.5-3mm long; distance from hilum to lens 1-2 mm; seed length to width ratio of 0.8-1.22; seed circumference to hilum length ratio of 0.19-0.21. Seed shape spherical or spherical to cubic; shape in side view circular; seed colour brown; mottling absent; surface matt; smooth or wrinkled. Hilum shape oval or elongated, less than third of circumference; coloured red-brown or coloured brown; groove colour beige or same as hilum; hilum surface excess tissue absent. Lens position less than 1.6mm from hilum or more than 1.5mm from hilum; prominent. Aril absent.

Phenology: February - September **Chromosome number:** 14.
Geographical distribution: AT, BE, BG, CS, DD, DE, DZ, EG, ES, FR, GB, GR, HU, IL, IQ, IR, IT, JO, MA, PT, RO, SU, TR, YU. See Map 35.
Ecology: Alt. 60 - 1100m; Hab. disturbed and agricultural land, more rarely open woodland.

Taxonomic notes: Some authors believe that V. serratifolia is insufficiently distinct from V. narbonensis to warrant specific status (Rouy, 1899; Ascherson & Graebner, 1909; Plitmann, 1967; Ball 1968; Kupicha, 1976 and Chrtkova-Zertova, 1979). However, Khattab (1987) lists several characters, which were correlated with the difference in leaflet margin serrations and these can be used to distinguish these two species.

Map 35.



Intermediate specimens with characteristics of V. narbonensis and V. serratifolia are rarely found, five specimens were seen during the current study (Al Eisawi 1311, RNG; Maxted, Ehrman et Khattab 2561 SPN; Simpson 467, K; Dinsmore 13090, K and Adamson s.n., BM). All five of these specimens have upper leaflets with more than six margin serrations, but also had lower leaflets with a crenate margin. Although upper leaflet serrations are common in all V. narbonensis complex species, only V. serratifolia was thought to have more than six margin serrations per leaflet (Khattab, 1987) and crenation of the lower leaflet margin was thought to be diagnostic for V. narbonensis var. salmonea. On the basis of other characters, these specimens share more in common with V. serratifolia, than with V. narbonensis and thus they have been attributed to V. serratifolia.

Specimen citation: Godra s.n. (K); Anon. s.n. (W); Poutauschlay 44 (W); Halepa s.n. (W); Krendl s.n. (W); Jacquin 1778 (BM); Drenen 1050 (K); Drenen 1050 (K); Chelsea Physick 97 (BM); Wilcox 690 (BM); Adamson s.n. (BM); Saunders 1906 (BM); Hilton 690 (BM); Khattab 119 (SPN); Stribrny s.n. (E); Schur s.n. (MO); Simpson 467 (K); Reverchon 368 (MPU); Massot s.n. (MPU); Massot s.n. (MPU); D'Alleizette s.n. (MPU); De Bechebrune & Savalier 1050 (MPU); Lambert 443 (MPU); Le Grand 735 (MPU); Fages 627 (MPU); Ozanon 818 (MPU); Guillon 22/5/1898 (MPU); Duffort s.n. (K); Prudhomme 1692 (K); Morresay 16/5/1936 (K); Sinclair 1596 (E); De Witte 17446 (BM); Serres s.n. (W); Deseglise s.n. (BM); Mosserary 16/5/1936 (K); Bernhardi s.n. (MO); Sommares s.n. (MO); Sennen s.n. (MO); Oberneder 6809 (BM); Bramwell s.n. (BM); Alston & Sandwith 567 (K); Ramsbottom s.n. (BM); Hare 1918 (BM); Guiol s.n. (BM); Alston & Sandwith 567 (BM); Elias 63 (BM); Tauscher s.n. (MPU); Tauscher 48 (MPU); Tauscher s.n. (K); Tauscher 877 (E); Tauscher 48 (W); Krendl s.n. (W); Tauscher s.n. (MO); Dinsmore 13090 (K); Zohary & Plitmann 14446 (E); G.B.N. s.n. (E); Heard s.n. (BM); Ferrari & Mattirolo 892 (E); Furth s.n. (W); Burri & Krendl s.n. (W); Ferrari & Mattirolo 892 (BM); Al-Eisawi 1311 (RNG); Anon. 7/1895 (K); Grubb 170 (K); Leute 762 (W); Taveau 3737 (BM); Maxted, Ehrman et Khattab 2561 (SPN); Bisby 2019 (SPN); Gandoger s.n. (MO); Tenone 1829 (MPU); Schultz 48 (BM); Bilimek s.n. (K); Degen s.n. (K); Baenitz s.n. (E); Ciocirlan 100 (BM); Cirtu 678 (BM); Baenitz s.n. (MO); Leokene 66/7 - 350 (WIR); Leokene s.n. (WIR); Teplyakova & Seferova 500365 (WIR); Khinchuk s.n. (WIR); Muratova 6379 (WIR); Muratova 6380 (WIR); Anon. s.n. (LE); Voronova s.n. (LE); Yalovaya s.n. (LE); Marusyak s.n. (LE); Ispolaton s.n. (LE); Hopflinger s.n. (W); Townsend 640422/21 (K); Hooker s.n. (E).

36 **Accepted taxon:** V. narbonensis L. (1753) Sp. Pl. 2: 737.

Type comment: The lectotypification of V. narbonensis is problematic as the material included in LINN is not typical for the species (Ali, 1967). LINN contains one specimen referred to as V. narbonensis, 906.33, but this specimen has a serrate leaflet margin. There is much discord in the literature concerning the nature of the relationship between V. narbonensis and V. serratifolia (see Maxted et al. 1989). The two species are distinguished by the number of leaflet margin serrations, whether the wing has a distinct apical spot, the number of seeds per legume and the size of the seeds. Of these diagnostic characteristics only the first character can be scored from specimen 906.33. This specimen has a few leaflet serrations, which is not rare for V. narbonensis, but can not be considered typical of the species. The presence of leaflet serrations is especially problematic as this is the key characteristic for separating V. narbonensis from its closest ally V. serratifolia.

The Clifford herbarium specimen also has serrate leaflets. Linnaeus (1737b) includes this characteristic in his description in Hortus Cliffordianus and the material from the LINN collection falls into the grey area between the two species as they are currently conceived. Prof. Moberg of the University of Uppsala kindly examined the Burser specimen XIX.52 at UPS and found the leaflet margin "hairy and serrulate", but entire. These minute serrations associated with hairs on the leaflet margins are characteristic of section Narbonensis specimens. As the Uppsala specimen lacks leaflet serration, it is proposed that the Burser specimen be designated the lectotype. However, before the final decision

is made a further specimen S306.13 should be checked to see if it would provides a better representation of the species.

Iconography: Fl. Eur., 2: 135; Fl. Iran., 55-56; Fl. Iraq, 3: 540-542; Fl. Pal., 2: 208-209; Fl. Syr., 2: 406; Fl. Tur., 3: 321-322; Fl. USSR., 13: 473-474; Illust. Fl. Iran., Tab. 36, fig. 1; Fl. Pal., 2 (plates): 297.

Synonymy: Faba equina Miller (1755) Gard. Dict. Abr., 4; Faba bona Medikus (1787) Vorles. Churpf. Ges. 2: 360; Bona narbonensis Medikus (1787) Vorles. Churpf. Ges. 2: 360; V. platycarpos Roth (1787) Bot. Abh. Beobacht., 10; Bona speciosa Medikus (1787) Vorles. Ckurpf. Ges., 2: 361; V. latifolia Moench (1794) Meth. Pl. Hort. Bot. Marburgensis, 149; V. monodelpha Roth (1800) Catalecta Bot. 2: 97; V. platycarpos Willd. (1802) Sp. Pl., 3(2): 1110; V. narbonensis var. hortensis Lam. (1815) Fl. France, 4(2): 597; V. narbonensis var. integrifolia Ser. in DC. (1825) Prodr., 2: 365; V. heterophylla Reichenb. (1832) Fl. Germ. Excurs., 2: 531; V. narbonensis var. heterophylla (Reich.) Koch (1843) Synop. Fl. Ger., 2: 215; V. narbonensis var. integrifolia Koch (1843) Syn. Fl. Germ. Helv., 2: 215; V. narbonensis var. genuina Gren. & Godron (1848) Fl. France, 1(2): 463; V. narbonensis var. culta Alef. (1861) Bonplandia 9: 100; V. narbonensis var. platycarpos Alef. (1861) Bonplandia, 9: 100; Faba narbonensis Schur (1877) Verh. Des Naturf. Vereines In Brunn 15(2): 192; V. narbonensis var. pilosa Post (1896) Fl. Syr. Pal. and Sin., 1: 288; V. narbonensis var. heterophylla Rouy in Rouy & Fouc. (1899) Fl. Fr., 5: 221; V. narbonensis var. typica Fiori & Paol. (1900) Fl. Italia, 2(1): 109; V. serratifolia var. integrifolia Beck in Reichb. (1903) Fl. Bosne., 1(1): 1-94.

Description: VEGETATIVE CHARACTERS: Annual; erect or ascending; (9-)15-114cm high. Stipule length 4.5-24mm; 3-17mm wide. Stipule semi-hastate or semi-saggitate; apex acute or obtuse mucronate; number of teeth on distal edge 1-2 teeth or 3-5 teeth or more than 5; number of teeth on proximal edge none or 1-2; stipule edge form entire or uneven with swollen hairs; not-translucent. Stipule colour (upper plant) green; hairs located edge only or less than 10 hairs per sqmm or = or more than 10 hairs per sqmm. Leaf 7-92mm long; petiole 6-42mm long; average leaflet internode 6-35mm long; leaflet 8-63mm long; leaflet 7-42mm wide; tendril or mucro 3-80mm long; average leaf internode 9-90mm long; petiolule 10-70mm long. Leaf apex tendrilous; simple or with 2 branches or with 3 branches or with more than 3 branches. Leaflet shape asymmetric; 4-12 leaflets per leaf. Upper leaflet margin entire or less than 7 serrations; lower leaflet margin entire or crenate; leaflet margins level. Leaflet linear elliptic or narrow elliptic or broad elliptic; apex mucronate and emarginate or mucronate or obtuse; base angustate or truncate to angustate; broadest at apex or in middle or at base. Leaflet adaxial hairs absent or less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle longer than 2mm, but shorter than flower. Peduncle length 1-17mm; rachis 2-14mm long; pedicel 1-2mm long; flower 14-34mm long; ratio of peduncle to flower length of 0.04-0.76; peduncular cusp absent. Number of flowers per inflorescence one or two or three or four or more than four. Pedicel glabrous or less than 10 hairs per mm sq or with 10-50 hairs per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long or hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 1.5-6mm long; lateral teeth 1.5-5.5mm long; upper tooth 1-4mm long; tube 4-8mm long; ratio of lower tooth to tube length of 0.3-0.91. Calyx base not gibbous or slightly gibbous; tube mouth slightly oblique; teeth reflexing absent; tooth curvature absent or present; exterior nectaries absent or seen on lateral teeth or seen on all teeth. Calyx hairs only on calyx teeth or covering calyx; hair density less than 10 per mm sq or 10-35 per mm sq; hair length less than 0.5mm long or 0.5-1.5mm long or more than 1.5mm long; hairs adpressed. Calyx colour green. Standard length 14-29mm; limb length 7-19mm; claw length 5-13mm; limb width 6-14.5mm; claw width 5-8mm; ratio of

limb length to claw length 0.68-2.37. Corolla petals concolorous or not concolorous; standard face purple; standard upper surface lilac; face without distinct veining or face with distinct veins. Standard shape platonychioid; apex emarginate or emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 11-22mm; limb length 5-10mm; claw length 7.5-13mm; limb width 2.5-6mm. Wing colour purple; markings absent or entire apex tip coloured; marking purple. Wing shape 1 or 2 or 3; spur shape 3 or 5; limb base kinking weak; limb pouch present; wing to keel adhesion weak. Keel length 9.5-18mm; hood length 3-6mm; claw length 6-15mm; hood width 3.5-5.5mm. Keel colour white or purple or brown; hood apex not distinctly coloured or distinctly coloured. Keel shape 3; base shape 2; pouch absent. Staminal tube length 9-16mm; filament length 1.5-3.5mm; all stamen approx. equal length; distinct tube vein colouring absent or present. Ovary length 7.5-11mm; style length 3.5-6mm; supra-ovary extension 1.5-4mm. Ovary shape linear or intermediate or oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary with tubercle based hairs on sutures or covered with tubercle based hairs; style apex pubescence type 3. Number of ovules per ovary 2-8.

LEGUME CHARACTERS: Legume 27-74mm long; 7-15mm wide; 4-7mm deep; ratio of legume length to width 1.85-5. Amphicarpic legumes absent. Legume colour yellow-brown or brown; uniform over legume. Legume shape rectangular; cross-sectional shape rounded to flat; not falcate; suture unparallel or straight; distal end unbeaked; valve surface not torulose; surface smooth or ridged with veins; partitioning present. Legume hairs less than 10 per mm sq or hairs 10 - 35 per mm sq; hairs 0.5 - 1.5mm long or hairs more than 1.5mm long; hairs on sutures only or tubercle hairs covering entire legume; suture surface ciliate, hairs tubercular; tubercles short. Dehiscent legume twisting loose or medium; number of seeds per legume 2-7.

SEED CHARACTERS: Seed 4.5-8mm long; 4.5-8mm wide; 3-8mm deep; 15-29mm circumference; hilum 1.5-3mm long; distance from hilum to lens 1.5-3mm; seed length to width ratio of 0.9-1.5; seed circumference to hilum length ratio of 0.1. Seed shape spherical or spherical to cubic; shape in side view circular; seed colour red-brown or brown; mottling absent or present (rarely). Surface matt; smooth or wrinkled. Hilum shape oval; coloured red-brown or coloured brown or coloured black; groove colour beige or white; hilum surface excess tissue absent. Lens position more than 1.5mm from hilum; prominent. Aril absent.

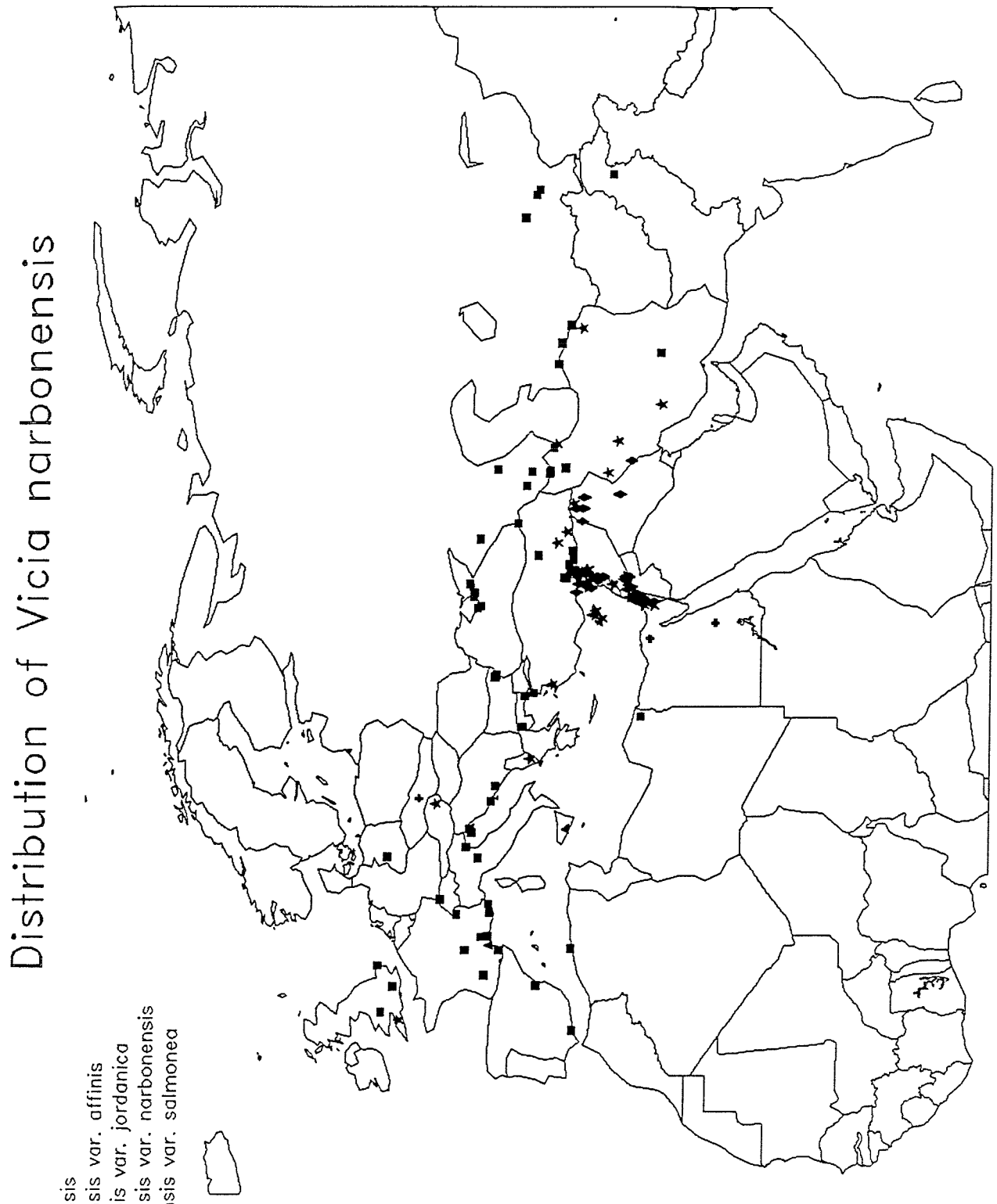
Phenology: March - July **Chromosome number:** 14.
Geographical distribution: AL, AT, BE, BG, BG, CH, CS, CY, DD, DE, DZ, EG, ES, FR, GB, GR, HU, IL, IQ, IR, IT, JO, LB, LY, MA, PK, PL, PT, RO, SU, SY, TN, TR, UG, YU. See Map 36
Ecology: Alt. 14 - 2100m; Hab. disturbed and agricultural land, and more rarely open woodland.

Taxonomic notes: This species is a common wild and minor cultivated forage and fodder plant in North Africa and West Asia. ICARDA (1988) are promoting the use of V. narbonensis as a replacement for fallow in the traditional barley-fallow rotation in the Eastern Mediterranean.

V. narbonensis is considered by many authors (Ball, 1968; Davis & Plitmann, 1970; Hanelt et al., 1972; Schäfer, 1973; Kupicha, 1976; Khattab, 1987) to be the morphological closest wild relative of the fababean. A detailed discussion of inter-taxon relationships between V. narbonensis and V. faba is provided in Maxted et al. (1989).

Plitmann (1967) notes that V. narbonensis is a polymorphic and polyphenetic taxon, varying in leaflet dimension, stipule dentation, tendril branching, number of flowers per inflorescence, corolla colour, pubescence, stature, legume dimensions and legume shape. Though Plitmann's conception of V. narbonensis is undoubtably skewed by his inclusion of what is accepted here as V. johannis within V. narbonensis. He is, however, correct in drawing attention to the wide degree of intra-specific variability.

Map 36.


Distribution of Vicia narbonensis
Vicia narbonensis
Vicia narbonensis var. affinis
Vicia narbonensis var. jordanica
Vicia narbonensis var. narbonensis
Vicia narbonensis var. salmonea

Schäfer (1973) and Khattab (1987), both partition this variability into five taxa and this scheme is accepted here. It is often difficult to identify V. narbonensis specimens to varietal level as many of the important diagnostic characters relate to their seed, which are commonly missing from herbarium specimens. The exception to this, is var. salmonea, which has a very distinctive lower leaf crenation, which is easily distinguished.

Specimen citation: Miller 411 (K); Rahman 25903 (BM); Alger 1839 (MPU); Maudon s.n. (MPU); Anon. 2/5/1884 (MPU); Prennet s.n. (MPU); Raphelis 1147 (MPU); Pabot 744 (G); Sintenis 3661 (BM); Britton 1017 (K); Williams 2213 (K); Baker 500-24 (K); Hausser s.n. (K); Fleischer s.n. (K); Pichler s.n. (K); Lebert 1875 (K); Durham 85 (K); Fiori 891 (K); Turrill 84 (K); Bentham s.n. (K); Meyers et Dinsmore 6845 (K); Schimper 1832 (E); Orphanides 1096 (E); Sintenis 370 (E); Bentham s.n. (E); Reverchon 951 (E); Crawford 104 (E); Rigo s.n. (E); D'Alleizette s.n. (BM); D'Alleizette 610 (BM); Ayasse 5221 (BM); Schneider 128 (BM); Stamatiadou 14858 (BM); Maxted, Auricht et Ehrman 4844 (SPN); Maxted, Auricht et Ehrman 4919 (SPN); Maxted, Auricht et Ehrman 5019 (SPN); Maxted, Auricht et Ehrman 5102 (SPN); Maxted, Auricht et Ehrman 5206 (SPN); Maxted, Auricht et Ehrman 5275 (SPN); Maxted, Auricht et Ehrman 5309 (SPN); Gauba 223 (W); Breckle 1149 (W); Economides 1129 (W); Zohary 87166 (HUJ); Bernhardi s.n. (MO); Schneider 128 (MO); Stewart 3250 (MO); Sennen s.n. (MO); Gandoger 423 (MO); Eggert s.n. (MO); Stankevich et Dorofeyev 2340 (WIR); Stankevich s.n. (WIR); Grossheim s.n. (LE); Ilyinskaya s.n. (LE); Beideman s.n. (LE); Popov s.n. (LE); Manakyan s.n. (LE); Manakyan s.n. (LE); Shiffers s.n. (LE); Lipsky s.n. (LE); Gubanov s.n. (LE); Gubanov s.n. (LE); Gnezdillo s.n. (LE); Fedchenko s.n. (LE); Litvinov s.n. (LE); Nikitina s.n. (LE); Krasheninnikov s.n. (LE); Klopotov s.n. (LE); Kristofovich s.n. (LE); Taleyev s.n. (LE); Ushkin s.n. (LE); Oganezova et Oganesian s.n. (ERE); Akverdov et Mirozoian s.n. (ERE); Meikle 5003 (K); Dorfler 9 (W); Zohary 17869 (HUJ); Sheinkar 101705 (HUJ).

Key to varieties of V. narbonensis

1(0). Plant +/- erect; 1-2(-3) basal side shoots; flowers 1-2(-3); legume valves glabrescent, 3.3-7.0 x 1.1-1.6cm; seeds 6-13mm..... 2
Plant +/- ascending; 2-6 basal side shoots; flowers 1-6; legume valves smooth, glabrescent to rather hairy, 2.7-6.4 x 0.7-1.2cm; seeds 4.5-6mm, +/- spherical or ellipsoid, laterally flattened, central strip of hilum beige, not prominent..... 3

2(1). Legumes pale brown; seeds grey-green or brown, 6-11(-13)mm, slightly laterally compressed, often rugose, funiculus frequently persistent, central strip of hilum white, distinctly prominent..... ..... iv V. narbonensis var. aegyptiaca
Legumes dark brown; seeds greenish, blackish or violet brown, 6-8mm, +/- spherical, funiculus deciduous, central strip of hilum white, scarcely prominent.. ..... v V. narbonensis var. narbonensis

3(1). Lower leaflet margin entire; Seed smooth..... 4
Lower leaflet margin crenate; Seed smooth or wrinkled. ..... i V. narbonensis var. salmonea

4(3). Flowers 1-2; some upper leaflets margins toothed (< 7 serrations)..... iii V. narbonenesis var. affinis

Flowers 3-6; upper leaflets margins entire..... ..... ii V. narbonensis var. jordanica

i **Accepted taxon:** **V. narbonensis** var. **salmonea** (Mout.) H. Schäfer (1973) Kulturpflanze XXI 253-254.
Type: Holotype, Mouterde 6871, Mazra, Jebel Druse, Syria (G!).
Synonymy: V. serratifolia subsp. salmonea Mout. (1970) Nouv. Fl. Liban et Syrie, 2: 407; V. narbonensis var. crenate H. Schäfer (1973) Kulturpflanze, 19: 211.

Description: VEGETATIVE CHARACTERS: Annual; erect or ascending; 9-35cm high. Stipule length 4.5-17mm; 3-12(-17)mm wide. Stipule semi-hastate or semi-saggitate; apex acute or obtuse mucronate; number of teeth on distal edge 1-2 teeth or 3-5; number of teeth on proximal edge none or 1-2 teeth (rarely). Stipule edge form uneven with swollen hairs; not-translucent. Stipule colour (upper plant) green; hairs located edge only or less than 10 hairs per sqmm or = or more than 10 hairs per sqmm. Leaf 14-61(-90)mm long; petiole 6-27mm long; average leaflet internode 6-33mm long; leaflet 8-32(-42)mm long; leaflet 7-19(-23)mm wide; tendril or mucro 3-31(-55)mm long; average leaf internode 9-46(-70)mm long; petiolule 6-40(-56)mm long. Leaf apex tendrilous; simple or with 2 branches or with 3 branches or with more than 3 branches. Leaflet shape asymmetric; 2-6 leaflets per leaf. Upper leaflet margin entire or less than 7 serrations; lower leaflet margin crenate; leaflet margins level. Leaflet linear elliptic or narrow elliptic or broad elliptic; apex mucronate or obtuse; base angustate or truncate to angustate; broadest at apex or in middle or at base. Leaflet adaxial hairs less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle longer than 2mm, but shorter than flower. Peduncle length 1-11mm; rachis 2-7mm long; pedicel 1-2mm long; flower 14-34mm long; ratio of peduncle to flower length of 0.05-0.55; peduncular cusp absent. Number of flowers per inflorescence one or two or three or four. Pedicel glabrous or less than 10 hairs per mm sq or with 10-50 hairs per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long or hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 1.5-5mm long; lateral teeth 1.5-4.5mm long; upper tooth 1-3mm long; tube 4-6mm long; ratio of lower tooth to tube length of 0.3-0.9. Calyx base not gibbous or slightly gibbous; tube mouth slightly oblique; teeth reflexing absent; tooth curvature absent or present; exterior nectaries absent or seen on lateral teeth or seen on all teeth. Calyx hairs only on calyx teeth or covering calyx; hair density less than 10 per mm sq or 10-35 per mm sq or 36-60 per mm sq; hair length less than 0.5mm long or 0.5-1.5mm long or more than 1.5mm long; hairs adpressed. Calyx colour green. Standard length 13-24mm; limb length 8-12.5mm; claw length 5-12.5mm; limb width 6-11mm; claw width 5.5-7.5mm; ratio of limb length to claw length 0.68-1.71. Corolla petals concolorous; standard face purple; standard upper surface lilac; face without distinct veining. Standard shape platonychioid; apex emarginate or emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 11-19mm; limb length 5.5-8mm; claw length 9-12mm; limb width 2.5-4.5mm. Wing colour purple; markings absent or entire apex tip coloured; marking purple. Wing shape 1 or 2 or 3; spur shape 3; limb base kinking weak; limb pouch present; wing to keel adhesion weak. Keel length 9.5-16.5mm; hood length 3.5-5mm; claw length 6-11mm; hood width 3.5-5mm. Keel colour white or purple or brown; hood apex distinctly coloured. Keel shape 3; base shape 2; pouch absent. Staminal tube length 9-15mm; filament length 1.5-3.5mm; all stamen approx. equal length; distinct tube vein colouring absent or present. Ovary length 7.5-11mm; style length 3.5-5.5mm; supra-ovary extension 1.5-3.5mm. Ovary shape linear or

intermediate or oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary with tubercle based hairs on sutures or covered with tubercle based hairs; style apex pubescence type 3. Number of ovules per ovary 4-8.

LEGUME CHARACTERS: Legume 13-45mm long; 7-11mm wide; 4-6mm deep; ratio of legume length to width 1.85-4.57. Amphicarpic legumes absent. Legume colour yellow or yellow-brown or brown; uniform over legume. Legume shape rectangular; cross-sectional shape rounded to flat; not falcate; suture straight; distal end unbeaked; valve surface not torulose; surface ridged with veins; partitioning present. Legume hairs less than 10 per mm sq or hairs 10 - 35 per mm sq; hairs less than 0.5mm long or hairs 0.5 - 1.5mm long or hairs more than 1.5mm long; tubercle hairs covering entire legume; suture surface ciliate, hairs tubercular; tubercles short. Dehiscent legume twisting loose or medium; number of seeds per legume 2-5.

SEED CHARACTERS: Seed 4.5-5.5mm long; 4.5-5.5mm wide; 3-5.5mm deep; 14-15mm circumference; hilum 1.5-2.5mm long; distance from hilum to lens 1.5-2.5mm; seed length to width ratio of 1-1.22; seed circumference to hilum length ratio of 0.1-0.16. Seed shape spherical to cubic; shape in side view circular; seed colour red-brown or brown; mottling absent; surface matt; wrinkled. Hilum shape oval; coloured red-brown; groove colour beige; hilum surface excess tissue absent. Lens position more than 1.5mm from hilum; prominent. Aril absent.

Phenology: February - May **Chromosome number:** 14.
Geographical distribution: CY, CS, EG, FR, GR, IL, IQ, IS, JO, SY, TR.
Ecology: Alt. 20 - 1510m; Hab. disturbed and agricultural land, and more rarely open woodland.

Specimen citation: Dinsmore 10845 (K); Pankhurst 1288 (K); Guest 1288 (K); Shahevain 25127 (K); Omar et Hamid 36410 (K); Janar 43354 (K); Hepper 3235 (K); Al Rawi 20003 (K); Rechinger 9077 (E); Wheeler Haines 1018 (E); D'Angelis et Amdursky 542 (E); Dinsmore 4928 (E); Dinsmore B845 (E); Al-Eisawi 1310 (RNG); Maxted, Ehrman et Khattab 2125 (SPN); Maxted, Ehrman et Khattab 2520 (SPN); Maxted, Ehrman et Khattab 2654 (SPN); Maxted, Ehrman et Khattab 2170 (SPN); Maxted, Ehrman et Khattab 1748 (SPN); Maxted, Ehrman et Khattab 1985 (SPN); Maxted, Ehrman et Khattab 1728 (SPN); Maxted, Ehrman et Khattab 2612 (SPN); Maxted, Ehrman et Khattab 2583 (SPN); Maxted, Ehrman et Khattab 2156 (SPN); Maxted, Ehrman et Khattab 2569 (SPN); Maxted, Ehrman et Khattab 3289 (SPN); Simpson 608 (CAIM); Khattab 169 (CAIM); Boulos s.n. (CAIM); Botany Staff 43354 (K); Maxted, Kitiki et Allkin 4709 (SPN); Maxted, Kitiki et Allkin 4710 (SPN); Maxted, Ehrman et Khattab 1985 (SPN); Maxted, Ehrman et Khattab 2039 (SPN); Maxted, Ehrman et Khattab 2043 (SPN); Maxted, Ehrman et Khattab 2569 (SPN); Haradjian 3277 (W); Zohary et D'Angelis 17868 (HUJ); Maxted, Ehrman et Khattab 2457 (SPN); Plitmann 1447 (HUJ); Mouterde 6871 (G); Handel-Mazzetti 275 (W); Kotschy 1394 (W); Zohary 1453 (HUJ); D'Angelis et Amdursky 542 (HUJ); Zohary 1448 (HUJ); Zohary et D'Angelis 1467 (HUJ); Zohary 1466 (HUJ); Simpson 53064 (K); Oswald 69 (K); Rogers 592 (K).

ii **Accepted taxon:** V. narbonensis var. jordanica H. Schäfer (1973) Kulturpflanze 21: 251.
Type: Holotype, Gatersleben V 250, (GAT).
Synonymy: V. narbonensis var. intermedia Strobl (1887) Flora der Nebroden, 482.

Description: VEGETATIVE CHARACTERS: Annual; erect or ascending; 25-80cm high. Stipule length 7-20mm; 5.5-14mm wide. Stipule semi-hastate or semi-saggitate; apex acute or obtuse mucronate; number of teeth on distal edge 1-2 teeth or 3-5 teeth or more than 5; number of teeth on proximal edge none or 1-2; stipule edge form entire or uneven with swollen hairs; not-translucent. Stipule colour (upper plant) green; hairs located edge only. Leaf 11-35(-84)mm long; petiole 11-24mm long; average leaflet internode 10-29mm long; leaflet 15-47mm long; leaflet 10-24mm wide; tendril or mucro 5-42mm long; average leaf internode 17-60mm long; petiolule 12-63mm long. Leaf apex tendrilous; simple or with 2 branches or with

3 branches or with more than 3 branches. Leaflet shape asymmetric; 4-6 leaflets per leaf. Upper leaflet margin entire or less than 7 serrations; lower leaflet margin entire; leaflet margins level. Leaflet narrow elliptic or broad elliptic; apex mucronate and emarginate or mucronate or obtuse; base angustate or truncate to angustate; broadest in middle. Leaflet adaxial hairs less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle longer than 2mm, but shorter than flower. Peduncle length (3-)7-9(-17)mm; rachis (3-)5-10(-14)mm long; pedicel 1mm long; flower 18-28mm long; ratio of peduncle to flower length of 0.16-0.61; peduncular cusp absent. Number of flowers per inflorescence three or four or more than four. Pedicel glabrous or less than 10 hairs per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 2-5mm long; lateral teeth 1.5-5mm long; upper tooth 1-3.5mm long; tube 4.5-6.5mm long; ratio of lower tooth to tube length of 0.44-0.8. Calyx base not gibbous; tube mouth slightly oblique; teeth reflexing absent; tooth curvature present; exterior nectaries seen on lateral teeth. Calyx hairs only on calyx teeth or covering calyx; hair density less than 10 per mm sq or 10-35 per mm sq; hair length less than 0.5mm long or 0.5-1.5mm long; hairs adpressed. Calyx colour green. Standard length 18-29mm; limb length 9.5-19mm; claw length 8-11mm; limb width 7-14.5mm; claw width 5.5-8mm; ratio of limb length to claw length 1-2.37. Corolla petals concolorous; standard face purple; standard upper surface lilac; face without distinct veining. Standard shape platonychioid; apex emarginate or emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 15-22mm; limb length 5.5-10mm; claw length 9-12mm; limb width 3-6mm. Wing colour purple; markings absent or entire apex tip coloured; marking purple. Wing shape 2 or 3; spur shape 3; limb base kinking weak; limb pouch present; wing to keel adhesion weak. Keel length 13-18mm; hood length 3.5-6mm; claw length 9.5-12.5mm; hood width 4-5.5mm. Keel colour white; hood apex distinctly coloured. Keel shape 3; base shape 2; pouch absent. Staminal tube length 12-16mm; filament length 2.5-3mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 9-11mm; style length 3.5-5mm; supra-ovary extension 2.5-4mm. Ovary shape intermediate or oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary covered with tubercle based hairs; style apex pubescence type 3. Number of ovules per ovary 5-7.

LEGUME CHARACTERS: Legume 35-55mm long; 10-11mm wide; 6mm deep; ratio of legume length to width 3.5-5. Amphicarpic legumes absent. Legume colour yellow-brown; uniform over legume. Legume shape rectangular; cross-sectional shape rounded to flat; not falcate; suture straight; distal end unbeaked; valve surface not torulose; surface ridged with veins; partitioning present. Legume hairs less than 10 per mm sq or hairs 10 - 35 per mm sq; hairs more than 1.5mm long; hairs on sutures only or tubercle hairs covering entire legume; suture surface ciliate, hairs tubercular; tubercles short. Dehiscent legume twisting loose; number of seeds per legume 3-5(-7).

SEED CHARACTERS: Seed 4.5-5mm long; 4.5-6mm wide; 4.5-5mm deep; 15-16.5mm circumference; hilum 1.5mm long; distance from hilum to lens 1.5mm; seed length to width ratio of 0.9-1.2; seed circumference to hilum length ratio of 0.09-0.1. Seed shape spherical to cubic; shape in side view circular; seed colour brown; mottling present; surface matt; smooth. Hilum shape oval; coloured brown; groove colour beige; hilum surface excess tissue absent. Lens position less than 1.6mm from hilum; prominent. Aril absent.

Phenology: March - May **Chromosome number:** 14.
Geographical distribution: CY, FR, IL, IR, IT, JO, SY, TR.

Ecology: Alt. 180 - 1320m; Hab. disturbed and agricultural land, and more rarely open woodland.

Specimen citation: Davis et Hedge 27762 (K); Lowne 1863-4 (K); Postian 338 (K); Paine s.n. (K); Furse 1932 (K); KCR S/1113 (K); Economides 1129 (K); Syngramides 1408 (K); Hepper 3206 (K); Blanchet 5/1939 (MPU); Hopflinger 31/3/1953 (W); Maxted, Ehrman et Khattab 2506 (SPN); VCR S/113 (K); Khattab 201 (SPN); Khattab 148 (SPN); Maxted, Ehrman et Khattab 2330 (SPN); Maxted, Ehrman et Khattab 3288 (SPN); Maxted, Ehrman et Khattab 2458 (SPN).

iii **Accepted taxon:** **V. narbonenesis** var. **affinis** Kornhuber ex Asch. & Schweinf. (1889) Mem. Inst. Egypt, 2: 756.

Type: holotype (B).

Description: VEGETATIVE CHARACTERS: Annual; erect or ascending; 22-73cm high. Stipule length 5-20mm; 3-15mm wide. Stipule semi-hastate or semi-saggitate; apex acute or obtuse mucronate; number of teeth on distal edge 1-2 teeth or 3-5 teeth or more than 5; number of teeth on proximal edge none; stipule edge form uneven with swollen hairs; not-translucent. Stipule colour (upper plant) green; hairs located edge only or less than 10 hairs per sqmm or = or more than 10 hairs per sqmm. Leaf 19-95mm long; petiole 8-28mm long; average leaflet internode 9-33mm long; leaflet 18-50mm long; leaflet 7-28mm wide; tendril or mucro 10-80mm long; average leaf internode 13-90mm long; petiolule 10-70mm long. Leaf apex tendrilous; simple or with 2 branches or with 3 branches or with more than 3 branches. Leaflet shape asymmetric; 4-7 leaflets per leaf. Upper leaflet margin entire or less than 7 serrations; lower leaflet margin entire; leaflet margins level. Leaflet linear elliptic or narrow elliptic; apex mucronate or obtuse; base angustate or truncate to angustate; broadest in middle or at base. Leaflet adaxial hairs less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; leaflet abaxial hair less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq or more than 50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle longer than 2mm, but shorter than flower. Peduncle length 1-8mm; rachis 1-12mm long; pedicel 1-2mm long; flower 15-25mm long; ratio of peduncle to flower length of 0.08-0.76; peduncular cusp absent. Number of flowers per inflorescence one or two. Pedicel glabrous or less than 10 hairs per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 2.5-6mm long; lateral teeth 2.5-5.5mm long; upper tooth 1.5-4mm long; tube 4.5-7mm long; ratio of lower tooth to tube length of 0.41-0.91. Calyx base not gibbous or slightly gibbous; tube mouth slightly oblique; teeth reflexing absent; tooth curvature absent or present; exterior nectaries seen on lateral teeth. Calyx hairs only on calyx teeth or covering calyx; hair density less than 10 per mm sq or 10-35 per mm sq; hair length less than 0.5mm long or 0.5-1.5mm long or more than 1.5mm long; hairs adpressed. Calyx colour green. Standard length 14-24mm; limb length 7-15mm; claw length 7-13mm; limb width 6-11mm; claw width 5-8mm; ratio of limb length to claw length 0.84-1.62. Corolla petals concolorous; standard face purple; standard upper surface lilac; face without distinct veining. Standard shape platonychioid; apex emarginate or emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 12.5-22mm; limb length 5-9mm; claw length 7.5-13mm; limb width 2.5-5.5mm. Wing colour purple; markings absent. Wing shape 1 or 2 or 3; spur shape 3 or 5; limb base kinking weak; limb pouch present; wing to keel adhesion weak. Keel length 11-18mm; hood length 3-6mm; claw length 6.5-15mm; hood width 3.5-5.5mm. Keel colour white; hood apex not distinctly coloured or distinctly coloured. Keel shape 3; base shape 2; pouch absent. Staminal tube length 11-15mm; filament length 2-3mm; all stamen approx. equal length; distinct tube vein colouring absent or present. Ovary length 8-11mm; style length 3.5-6mm; supra-ovary extension 1.5-4mm. Ovary shape intermediate or oblong;

style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary with tubercle based hairs on sutures or covered with tubercle based hairs; style apex pubescence type 3. Number of ovules per ovary 2-7.

LEGUME CHARACTERS: Legume 27-64mm long; 8-12mm wide; 4-7mm deep; ratio of legume length to width 2.7-3.75. Amphicarpic legumes absent. Legume colour yellow-brown or brown; uniform over legume. Legume shape rectangular; cross-sectional shape rounded to flat; not falcate; suture straight; distal end unbeaked; valve surface not torulose; surface ridged with veins; partitioning present. Legume hairs less than 10 per mm sq or hairs 10 - 35 per mm sq; hairs 0.5 - 1.5mm long or hairs more than 1.5mm long; hairs on sutures only or tubercle hairs covering entire legume; suture surface ciliate, hairs tubercular; tubercles short. Dehiscent legume twisting loose or medium; number of seeds per legume 2-7.

SEED CHARACTERS: Seed 5-6mm long; 4.5-5mm wide; 3.5-5mm deep; 15-16mm circumference; hilum 1.5-2mm long; distance from hilum to lens 1.5-2mm; seed length to width ratio of 1.11-1.35; seed circumference to hilum length ratio of 0.1-0.13. Seed shape spherical to cubic; shape in side view circular; seed colour brown; mottling absent or present (rarely). Surface matt; smooth. Hilum shape oval; coloured black; groove colour beige; hilum surface excess tissue absent. Lens position less than 1.6mm from hilum or more than 1.5mm from hilum; prominent. Aril absent.

Phenology: February - May **Chromosome number:** N.A.
Geographical distribution: AL, AT, CY, EG, GB, IL, IQ, IR, JO, PT, SY, TR.
Ecology: Alt. 30 - 1510m; Hab. disturbed and agricultural land, and more rarely open woodland.

Specimen citation: Davis et Hedge 28800 (K); Davis et Hedge 28010 (K); Muschler 27/4/1910 (K); Bowles Scholarship Bot. Exp. 1043 (K); Alston et Sandwith 1756 (K); Davis 42489 (K); Rawi, Nuri et Koas 28169 (K); D'Angelis et Amdursky 542 (K); Deflers 388 (MPU); Maxted, Ehrman et Khattab 2402 (SPN); Davis 42489 (E); Lamond 3044 (E); Hewer 3852 (E); Hauper s.n. (E); Dunn s.n. (BM); Maxted, Ehrman et Khattab 2142 (SPN); Maxted, Ehrman et Khattab 2689 (SPN); Maxted, Ehrman et Khattab 2698 (SPN); Maxted, Ehrman et Khattab 2590 (SPN); Maxted, Ehrman et Khattab 2583 (SPN); Tackholm s.n. (CAIM); Drar 776 (CAIM); Maxted, Kitiki et Allkin 4288 (SPN); Maxted, Kitiki et Allkin 4123 (SPN); Maxted, Ehrman et Khattab 2544 (SPN); Maxted, Ehrman et Khattab 2038 (SPN); Maxted, Ehrman et Khattab 2562 (SPN); Maxted, Ehrman et Khattab 2172 (SPN); Zohary 1474 (HUJ); Lorch 1458 (HUJ); Tengwall 392 (K); Atherton 907 (K).

iv **Accepted taxon:** V. narbonensis var. aegyptiaca Kornhuber ex Asch. & Schweinf. (1889) Mem. Inst. Egypt 2: 756.
Type: holotype specimen partially destroyed (B).

Description: VEGETATIVE CHARACTERS: Annual; erect or ascending; 31-91cm high. Stipule length 8-24mm; 8-15mm wide. Stipule semi-saggitate; apex acute or obtuse mucronate; number of teeth on distal edge 1-2 teeth or 3-5; number of teeth on proximal edge none; stipule edge form entire or uneven with swollen hairs; not-translucent. Stipule colour (upper plant) green; hairs located edge only. Leaf 18-83mm long; petiole 9-27mm long; average leaflet internode 22-32mm long; leaflet 23-63mm long; leaflet 10-42mm wide; tendril or mucro 35-73mm long; average leaf internode 20-56mm long; petiolule 22-30mm long. Leaf apex tendrilous; with 3 branches or with more than 3 branches. Leaflet shape asymmetric; 2-8 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet narrow elliptic or broad elliptic; apex mucronate and emarginate or obtuse; base angustate or truncate to angustate; broadest at apex or in middle. Leaflet adaxial hairs less than 10 per mm sq or 10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; leaflet abaxial hair less than 10 per mm sq or

10-50 per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle longer than 2mm, but shorter than flower. Peduncle length 2-8mm; rachis 1-5mm long; pedicel 1-2mm long; flower 20-25mm long; ratio of peduncle to flower length of 0.04-0.36; peduncular cusp absent. Number of flowers per inflorescence one or two. Pedicel glabrous or less than 10 hairs per mm sq; hairs 0.5-1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 4.5-5.5mm long; lateral teeth 3.5-4.5mm long; upper tooth 2.5-3mm long; tube 5.5-8mm long; ratio of lower tooth to tube length of 0.68-0.91. Calyx base not gibbous; tube mouth slightly oblique; teeth reflexing absent; tooth curvature present; exterior nectaries seen on lateral teeth. Calyx hairs only on calyx teeth or covering calyx; hair density less than 10 per mm sq; hair length less than 0.5mm long or 0.5-1.5mm long; hairs adpressed. Calyx colour green. Standard length 19-22mm; limb length 10-14mm; claw length 7.5-10mm; limb width 7-10.5mm; claw width 6-8mm; ratio of limb length to claw length 1.1-1.8. Corolla petals not concolorous; standard face purple; standard upper surface lilac; face with distinct veins. Standard shape platonychioid; apex emarginate or emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 15-19mm; limb length 6-9mm; claw length 9-10mm; limb width 3-4.5mm. Wing colour purple; entire apex tip coloured; marking purple. Wing shape 2 or 3; spur shape 3; limb base kinking weak; limb pouch present; wing to keel adhesion weak. Keel length 13.5-17.5mm; hood length 4.5-5mm; claw length 9-13mm; hood width 4-5.5mm. Keel colour white; hood apex distinctly coloured. Keel shape 3; base shape 2; pouch absent. Staminal tube length 12-14mm; filament length 2.5-3mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 9-10.5mm; style length 4-4.5mm; supra-ovary extension 2-3mm. Ovary shape oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary with tubercle based hairs on sutures; style apex pubescence type 3. Number of ovules per ovary 3-8.

LEGUME CHARACTERS: Legume 33-63mm long; 10-15mm wide; 6-7mm deep; ratio of legume length to width 3.75-4.54. Amphicarpic legumes absent. Legume colour yellow-brown; uniform over legume. Legume shape rectangular; cross-sectional shape rounded to flat; not falcate; suture straight; distal end unbeaked; valve surface not torulose; surface ridged with veins; partitioning present. Legume hairs less than 10 per mm sq; hairs more than 1.5mm long; hairs on sutures only; suture surface ciliate, hairs tubercular; tubercles short. Dehiscent legume twisting loose; number of seeds per legume 4-7.

SEED CHARACTERS: Seed 5.5-12mm long; 6-10mm wide; 5-9mm deep; 15-25mm circumference; hilum 2.5mm long; distance from hilum to lens 2mm; seed length to width ratio of 0.92-1.5; seed circumference to hilum length ratio of 0.16. Seed shape spherical to cubic; shape in side view circular; seed colour brown; mottling absent; surface matt; smooth. Hilum shape oval; coloured black; groove colour white; hilum surface excess tissue absent. Lens position confluent to hilum; not prominent. Aril absent.

Phenology: April - May **Chromosome number:** 14.
Geographical distribution: EG, FR, SY.
Ecology: Alt. 40 - 1430m; Hab. disturbed and agricultural land, and more rarely open woodland.

Specimen citation: Augustin s.n. (MPU); Khattab 62 (SPN); Khattab 167 (SPN); Khattab 159 (SPN); Khattab 173 (SPN); Macfarlane 615 (SPN); Maxted, Ehrman et Khattab 2649 (SPN).

v **Accepted taxon:** **V. narbonensis** var. **narbonensis** L. (1753) Sp. Pl., 2: 737.
Type: Lectotype, Burser XIX,52 (UPS).
Description: VEGETATIVE CHARACTERS: Annual; erect or ascending; 33-114cm high. Stipule length 8-18mm; 7-13mm wide. Stipule semi-hastate or semi-saggitate; apex acute; number of teeth on distal edge 3-5; number of teeth on proximal edge none; stipule edge form entire or uneven with swollen hairs; not-translucent. Stipule colour (upper plant) green; hairs located edge only. Leaf 7-92mm long; petiole 11-31mm long; average leaflet internode 21-35mm long; leaflet 14-56mm long; leaflet 8-41mm wide; tendril or mucro 25-69mm long; average leaf internode 27-56mm long; petiolule 24-67mm long. Leaf apex tendrilous; with 2 branches or with 3 branches or with more than 3 branches. Leaflet shape asymmetric; 4-6 leaflets per leaf. Upper leaflet margin entire or less than 7 serrations; lower leaflet margin entire; leaflet margins level. Leaflet linear elliptic or narrow elliptic; apex mucronate; base angustate or truncate to angustate; broadest in middle or at base. Leaflet adaxial hairs absent or less than 10 per mm sq; hairs less than 0.5mm long; leaflet abaxial hair less than 10 per mm sq; hairs less than 0.5mm long; petiole hairs less than 10 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle longer than 2mm, but shorter than flower. Peduncle length 1-6mm; rachis 2-3mm long; pedicel 1mm long; flower 16-21mm long; ratio of peduncle to flower length of 0.06-0.28; peduncular cusp absent. Number of flowers per inflorescence one or two. Pedicel glabrous or less than 10 hairs per mm sq; hairs less than 0.5mm long or hairs 0.5-1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 4-5.5mm long; lateral teeth 3.5-4.5mm long; upper tooth 2-3.5mm long; tube 5-8mm long; ratio of lower tooth to tube length of 0.56-0.91. Calyx base not gibbous; tube mouth slightly oblique; teeth reflexing absent; tooth curvature present; exterior nectaries seen on lateral teeth. Calyx hairs only on calyx teeth or covering calyx; hair density less than 10 per mm sq; hair length 0.5-1.5mm long; hairs adpressed. Calyx colour green. Standard length 16-21mm; limb length 8.5-17mm; claw length 8-11mm; limb width 7-14.5mm; claw width 5.5-8mm; ratio of limb length to claw length 1-2.37. Corolla petals concolorous; standard face purple; standard upper surface lilac; face without distinct veining or face with distinct veins. Standard shape platonychioid; apex emarginate or emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 15-22mm; limb length 5.5-8mm; claw length 8-12mm; limb width 3-6mm. Wing colour purple; markings absent or entire apex tip coloured; marking purple. Wing shape 2 or 3; spur shape 3; limb base kinking weak; limb pouch present; wing to keel adhesion weak. Keel length 11-16mm; hood length 4-5.5mm; claw length 7-10mm; hood width 4-5mm. Keel colour white; hood apex distinctly coloured. Keel shape 3; base shape 2; pouch absent. Staminal tube length 10-13mm; filament length 2-3mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 8-11mm; style length 3.5-4.5mm; supra-ovary extension 1.5-2.5mm. Ovary shape intermediate or oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary with tubercle based hairs on sutures; style apex pubescence type 3. Number of ovules per ovary 2-8.

LEGUME CHARACTERS: Legume 35-70mm long; 11-15mm wide; 6-7mm deep; ratio of legume length to width 3.18-4.54. Amphicarpic legumes absent. Legume colour yellow-brown or brown; uniform over legume. Legume shape rectangular; cross-sectional shape rounded to flat; not falcate; suture straight; distal end unbeaked; valve surface not torulose; surface ridged with veins; partitioning present. Legume hairs less than 10 per mm sq; hairs 0.5 - 1.5mm long or hairs more than 1.5mm long; hairs on sutures only or tubercle hairs covering entire legume; suture surface ciliate, hairs tubercular; tubercles short. Dehiscent legume twisting loose or medium; number of seeds per legume 5-6.

SEED CHARACTERS: Seed 6-8mm long; 6-8mm wide; 6.5-8mm deep; 25-29mm circumference; hilum 2.5-3mm long; distance from hilum to lens 2.5-3mm; seed length to width ratio of 0.95-1.2; seed circumference to hilum length ratio of 0.1. Seed shape spherical to cubic; shape in side view circular; seed colour

brown; mottling absent; surface matt; smooth. Hilum shape oval; coloured red-brown or coloured brown or coloured black; groove colour white; hilum surface excess tissue absent. Lens position more than 1.5mm from hilum; prominent. Aril absent.

Phenology: March - April **Chromosome number:** 14.
Geographical distribution: CY, EG, IL, SY, TR.
Ecology: Alt. 360 - 820m; Hab. minor cultivated crop in Middle East. Weed of Disturbed and agricultural land, and more rarely open woodland.

Specimen citation: Muschler s.n. (K); Otto 31 (SPN); Guiol 1932 (BM); Macfarlane 442 (SPN); Maxted, Ehrman et Khattab 2171 (SPN); Maxted, Ehrman et Khattab 1721 (SPN); Maxted, Ehrman et Khattab 2627 (SPN); Maxted, Ehrman et Khattab 2620 (SPN); Maxted, Ehrman et Khattab 2185 (SPN); Maxted, Ehrman et Khattab 2274 (SPN).

37 **Accepted taxon:** **V. hyaeniscyamus** Mout. (1961) Bul. Soc. Bot. Fr., 108: 314.
Type: Syntype, Mouterde 6596, Tel Kalakh, Homs, Syria (G! & W!).
Iconography: Fl. Syr., 2: 408.

Description: VEGETATIVE CHARACTERS: Annual; erect; 50-140cm high. Stipule length 18-28mm; 10-20mm wide. Stipule semi-saggitate; apex acute or obtuse mucronate; number of teeth on distal edge 3-5 teeth or more than 5; number of teeth on proximal edge none; stipule edge form uneven with swollen hairs; not-translucent. Stipule colour (upper plant) green with purple or purple; hairs located edge only. Leaf 27-80mm long; petiole 18-27mm long; average leaflet internode 21-33mm long; leaflet 34-70mm long; leaflet 16-45mm wide; tendril or mucro 30-60mm long; average leaf internode 43-120mm long; petiolule 21-36mm long. Leaf apex tendrilous; with 3 branches or with more than 3 branches. Leaflet shape asymmetric; 2-8 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet linear elliptic or elliptic ovate; apex mucronate and emarginate or mucronate; base truncate to angustate or truncate; broadest at base. Leaflet adaxial hairs absent; leaflet abaxial hair less than 10 per mm sq; hairs 0.5-1.5mm long; petiole hairs less than 10 per mm sq or 10-50 per mm sq. Stem node colour (upper plant) purple.

INFLORESCENCE CHARACTERS: Peduncle longer than 2mm, but shorter than flower. Peduncle length 5-27mm; rachis 3-21mm long; pedicel 1-2mm long; flower 22-25mm long; ratio of peduncle to flower length of 0.22-0.72; peduncular cusp absent. Number of flowers per inflorescence three or four or more than four. Pedicel with 10-50 hairs per mm sq or with more than 50 hairs per mm sq; hairs more than 1.5mm long.

FLOWER CHARACTERS: Calyx lower tooth 4-7mm long; lateral teeth 4.5-7mm long; upper tooth 2.5-5.5mm long; tube 6.5-8mm long; ratio of lower tooth to tube length of 0.57-0.92. Calyx base slightly gibbous; tube mouth slightly oblique; teeth reflexing absent; tooth curvature present; exterior nectaries seen on lateral teeth. Calyx hairs covering calyx; hair density of 10-35 per mm sq or 36-60 per mm sq; hair length more than 1.5mm long; hairs adpressed. Calyx colour green (rarely) or purple base or purple. Standard length 22-34mm; limb length 11-17mm; claw length 10-18mm; limb width 10-14mm; claw width 8-10mm; ratio of limb length to claw length 0.73-1.4. Corolla petals concolorous; standard face cream; standard upper surface lilac; face without distinct veining. Standard shape platonychioid; apex emarginate or emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 21-24mm; limb length 8.5-10.5mm; claw length 12-14mm; limb width 5.5-6.5mm. Wing colour cream; entire apex tip coloured; marking brown or black or marking purple. Wing shape 3; spur shape 3 or 4; limb base kinking weak; limb pouch present; wing to keel adhesion weak. Keel length 18-19mm; hood length 5-6.5mm; claw

length 12-13.5mm; hood width 7-8mm. Keel colour white; hood apex distinctly coloured. Keel shape 3; base shape 2; pouch absent. Staminal tube length 12.5-18mm; filament length 3.5-4.5mm; all stamen approx. equal length; distinct tube vein colouring present. Ovary length 10-12mm; style length 8-10mm; supra-ovary extension 2-3.5mm. Ovary shape intermediate or oblong; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary covered with tubercle based hairs; style apex pubescence type 3. Number of ovules per ovary 5-8.

LEGUME CHARACTERS: Legume 32-70mm long; 9-15mm wide; 5-6mm deep; ratio of legume length to width 3-3.9. Amphicarpic legumes absent. Legume colour brown; uniform over legume. Legume shape rectangular; cross-sectional shape rounded to flat; not falcate; suture straight; distal end unbeaked; valve surface not torulose; surface smooth; partitioning present. Legume hairs 10 - 35 per mm sq or hairs 36 - 60 per mm sq; hairs more than 1.5mm long; tubercle hairs covering entire legume; suture surface ciliate, hairs tubercular; tubercles short. Dehiscent legume twisting medium or tight; number of seeds per legume 3-5.

SEED CHARACTERS: Seed 4-7.5mm long; 4-7.5mm wide; 4-7.5mm deep; 14-17mm circumference; hilum 2-2.5mm long; distance from hilum to lens 1.5-2mm; seed length to width ratio of 0.9-1; seed circumference to hilum length ratio of 0.14-0.15. Seed shape spherical or spherical to cubic; shape in side view circular; seed colour brown; mottling absent; surface matt; pitted. Hilum shape oval; coloured red-brown; groove colour beige; hilum surface excess tissue absent. Lens position more than 1.5mm from hilum; prominent. Aril absent.

Phenology: March - May **Chromosome number:** 14.
Geographical distribution: LE, IL, SY. See Map 37.
Ecology: Alt. 270 - 370m; Soil, basalt, Heavy black & terra rossa Heavy black (basalt); Hab. Disturbed agricultural land and open woodland.

Taxonomic notes: Khattab et al. (1988) attempted to clarify the confusion in the literature concerning the specific distinction of V. hyaeniscyamus from the other species of the V. narbonensis complex. The species was described by Mouterde (1961) from material collected form Tell-Kalakh, Syria, but few specimens were collected subsequently. The species was distinguished from the other V. narbonensis complex taxa by its larger, more numerous leaflets, different coloured flowers, increased density of pubescence and the large conspicuous purple stipules. However, Schäfer (1973) following her detailed study of the V. narbonensis complex concludes that, "V. hyaeniscyamus is presumably conspecific with V. galilaea". She cites as evidence for this view that both species shared a robust stem, are restricted to basaltic soils and the type locations are relatively close together. She unfortunately had no seed of V. hyaeniscyamus and so did not have the advantage of seeing living specimens. The key characters, necessary to distinguish between the two species, are difficult if not impossible to distinguish from dried material.

Ladizinsky (1975a) adopted a similar view, believing that Plitmann (1965) when describing V. galilaea subsp. faboidea described one extreme only of the variation pattern found in V. hyaeniscyamus. Birch et al, (1985) also expressed some doubt about the existence of V. hyaeniscyamus as a distinct species: they cite Ladizinsky's comments and the fact that the seed samples supplied to them as V. hyaeniscyamus all proved on detailed examination to be V. johannis. Due to this confusion in the literature, an attempt was made by Maxted, Khattab & Bisby to relocate V. hyaeniscyamus at its type locality. Five populations with the unique character combination described by Mouterde were located and the characters are sufficiently strong to warranted specific status. Recently (Maxted, 1989b) found a further three populations North of Tel Kalakh.

Map 37.

Specimen citation: Maxted, Ehrman & Khattab 1828 (SPN); Maxted, Ehrman & Khattab 1815 (SPN); Maxted, Ehrman & Khattab 1767 (SPN); Maxted, Ehrman & Khattab 1759 (SPN); Maxted, Ehrman & Khattab 1783 (SPN); Maxted, Ehrman & Khattab 1857 (SPN); Mouterde 6596 (W); Mouterde 6596 (G).

Section Faba

IX **Section** Faba (Miller) Ledeb. (1842) Fl. Ross., 1: 664.
Type: V. faba L. (1753) Sp. Pl. 2: 737.
Synonymy: Faba Miller (1754) Gard, Dict. Abr. ed 4; Vicia sect. Euvicia Vis. (1852) Fl. Dalmatica 1: 317, pro parte; Vicia ser. Annuae Taubert (1894) Die Nat. Pl. III, 10: 351, nomen nudum; Vicia subser. Fabinae Taubert (1894) Die Nat. Pl. III, 10: 351, nomen nudum; Vicia sect. Pedunculatae Rouy in Rouy & Fouc. (1899) Fl. Fr., 5: 221, pro parte; Vicia sect. Arachus (Medik.) Tutin in Clapham, Tutin & Warburg (1952) Fl. Brit. Is., 447, pro parte; Vicia subsect. Faba Radzhi (1971) Nov. Sys. Pl. Vasc. 7: 240.

Iconography: Fl. Iran., 56; Fl. Iraq, 3: 540; Fl. Tur., 3: 321; Fl. USSR., 13: 474.

Description: Annual; erect; stem stout. Stipules semi-hastate or semi-sagittate; length longer than 5.5mm; edge with 1-2 teeth or with 3-5 teeth or with more than 5 teeth. Leaf apex mucronate; leaflet longer than 30mm; with 1-4 pairs. Leaflets symmetric; margins entire. Number of flowers per inflorescence 1 to 2 or 3 to 4 or more than 4; peduncle 1-2mm or peduncle 3-6mm. Calyx mouth oblique; lower tooth longer than upper; base not gibbous. Pedicel shorter or equal to 3mm. Flowers longer than 20mm; standard white; shape platonychioid or stenonychioid; claw bowing absent; upper standard surface glabrous. All petals approximately equal length. Wing marking present; wing limb with slight kinking. Legume length less than 30mm or 30 to 50mm or greater than 50mm; width 5 to 10mm wide or greater than 10mm; rectangular; laterally flattened; sutures straight; valve hairs present; hairs simple; septa present; number of seeds per legume less than 7 or 7 to 10. Seeds 6.1 to 10mm or greater than 10mm; oblong; not laterally flattened or laterally flattened; hilum less than quarter of seed circumference; lens positioned near hilum; testa surface smooth.

Number of taxa: four. **Chromosome number:** 12.
Geographical distribution: Cultivated species unknown in the wild.

Taxonomic notes: Many researchers undertaking a taxonomic study of sect. Faba, have attempted to locate the closest ally of V. faba. Approaching the problem from this aspect they have found the fababeans closest allies to lie in the V. narbonensis complex of species. This has resulted in them classifying V. faba with the V. narbonensis complex, in a single section. This approach biases the results in favour of including V. faba in a single taxon with its closest allies. For a clear view of the relationship between V. faba and other Vicia species a broader approach must be taken. The broader approach gives scale to the allocation of series, section and generic rank and so allows the position of V. faba to be more 'naturally' defined. V. faba is clearly distinct from the sect. Narbonensis species on numerous characters, e.g. plant habit, gross morphology, leaflet size and shape, whether their hairs are tubercular, flower colour and size, legume and seed shape and size. This lead Maxted et al. (1989) to suggest V. faba was more isolated from its closest morphological allies than was generally accepted.

Stankevich (1970, 1982) considers V. faba distinct enough to warrant its complete separation from the other Vicia species into the genus Faba. She uses morphological, anatomical, cytology and biochemical evidence to justify the separation of V. faba from Vicia. However, the adoption of such a radical approach is not supported by the results of my morphological study. Linnaeus (1753) comments that he examined the flowers of hundreds of flowers of V. faba and other Vicia species and could not find any characters that differed significantly enough to warrant generic separation, a position that seems as justifiable then as now. This discussion results from a study of subgenus Vicia and so the question still remains should V. faba be given monospecific section or subgenus status. A broader survey of Vicia, as a whole, would be required to answer this question more conclusively, but based on my observations I consider sectional status is most appropriate.

38 **Accepted taxon:** V. faba L. (1753) Sp. Pl. 2: 737.

Iconography: Fl. Eur., 2: 135-136; Fl. Iran., 57; Fl. Iraq, 3: 542-544; Fl. Syr., 2: 408-409; Fl. Tur., 3: 324; Fl. USSR., 13: 474-475; Illust. Fl. Iran., Tab. 36, fig. 2.

Synonymy: Faba vulgaris Tragus (1552) Strip., 617; Phaseolus sativus Dodoens (1578) Hist. Pl., 472; Faba graeca Matth. (1598) Opera. 326; Phaseolus major Dodoens (1616) Strip. Hist. Pempt., 513; Faba equina Medikus (1787) Vorles. Churpf. Ges. 2: 360; Faba vulgaris Moench (1794) Meth. Pl. Hort. Bot. Marburgensis, 150; V. esculenta Salisb. (1796) Prodr. Strip. Chap. Allerton 1: 339; Faba sativa Bernhardi (1800) Syst. Verz. Erf., 1: 250; Faba vulgaris Bernhardi (1800) Syst. Verz. Erf., 1: 346; Orobus faba (L.) Brot. (1804) Fl. Lusitanica 2: 147; Faba viridis Desf. (1804) Tabl. Bot. Mus. d'Hist. Nat., 1: 196; Potamogeton bifolius Lapeyr. (1818) Hist. Abr. Pyr. Supp. 27. (fide Benth. Cat. Pl. Pyr.); V. vulgaris Gray (1821) Nat. Arr. Brit. Pl., 2: 617; V. faba var. equina Steudel (1821) Nomencl. Bot., 1: 458; V. faba var. humillima Alef. (1861) Bonplandia 9: 348; Faba vulgaris var. equina Alef. (1861) Bonplandia 9: 101; Faba vulgaris var. megalosperma Alef. (1861) Bonplandia 9: 101; V. arcuata Alef. (1866) Landw. Fl., 31; Faba vulgaris var. celtica nana Osw. Heer. (1866) Pfl. d. Pfahlb., 22; Faba vulgaris var. schlagintweiti Alef. (1866) Fl. Landw. 30; Faba vulgaris var. plinii Kornicke ex Schweinf. (1910) Ges. f. Erkunde Berlin, 104; Faba cellica var. nana Trabut (1910) Bull. Soc. Bot. Fr. 57(5): 426; Faba schlagintweitii Trabut (1911) Bull. Soc. Bot. Fr., 58(1): 6; V. faba var. schlagintweiti (Alef.) Thell. (1912) La Flora Adventice de Montpellier, 344; Faba faba (L.) House (1924) New York State Mus. Bull., 254: 457.

Description: VEGETATIVE CHARACTERS: Annual; erect; 18-150cm high. Stipule length 6.5-24mm; 6-15mm wide. Stipule semi-hastate or semi-saggitate; apex acute; number of teeth on distal edge 1-2 teeth or 3-5 teeth or more than 5; number of teeth on proximal edge none or 1-2 teeth or 3-5; stipule edge form entire; translucent or not-translucent. Stipule colour (upper plant) green or green with purple; glabrous or hairs located edge only. Leaf 22-110mm long; petiole 8-35mm long; average leaflet internode 14-23mm long; leaflet 22-90mm long; leaflet 9-47mm wide; tendril or mucro 3-43mm long; average leaf internode 12-53mm long; petiolule 16-76mm long. Leaf apex mucronate. Leaflet shape symmetric or asymmetric; 2-8 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet narrow elliptic or broad elliptic; apex mucronate and emarginate or mucronate; base angustate or truncate to angustate; broadest in middle. Leaflet adaxial hairs absent or less than 10 per mm sq; hairs less than 0.5mm long; leaflet abaxial hair absent or less than 10 per mm sq; hairs less than 0.5mm long; petiole hairs absent or less than 10 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm) or longer than 2mm, but shorter than flower. Peduncle length 3-30mm; rachis 4-19mm long; pedicel 1-3mm long; flower 20-33mm long; ratio of peduncle to flower length of 0.15-1.17; peduncular cusp absent. Number of flowers per inflorescence two or three or four or more than four. Pedicel glabrous.

FLOWER CHARACTERS: Calyx lower tooth 2.5-8mm long; lateral teeth 1.5-7.5mm long; upper tooth 1.5-4mm long; tube 4-10mm long; ratio of lower tooth to tube length of 0.43-1.07. Calyx base not gibbous; tube mouth slightly oblique; teeth reflexing absent; tooth curvature present; exterior nectaries absent or seen on lateral teeth. Calyx hairs absent; hair length less than 0.5mm long. Calyx colour green. Standard length 19-36mm; limb length 10-21mm; claw length 8.5-15mm; limb width 6-20mm; claw width 3-11mm; ratio of limb length to claw length 0.84-2. Corolla petals concolorous; standard face white (rarely other colours). Standard upper surface white; face without distinct veining or face with distinct veins. Standard shape platonychioid or stenonychioid; apex emarginate or emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 17-30mm; limb length 6-17mm; claw length 8-15mm; limb width 3-8mm. Wing colour white; apex with round spot; marking brown or black. Wing shape 2 or 3 or

4; spur shape 2 or 3 or 4; limb base kinking weak; limb pouch present; wing to keel adhesion weak or strong. Keel length 12-21mm; hood length 4-7mm; claw length 7.5-15mm; hood width 4-7mm. Keel colour white; hood apex not distinctly coloured or distinctly coloured. Keel shape 1 or 3; base shape 2 or 3; pouch absent. Staminal tube length 8-22mm; filament length 2-4.5mm; all stamen approx. equal length; distinct tube vein colouring absent or present. Ovary length 6.5-15mm; style length 3-9.5mm; supra-ovary extension 1-4mm. Ovary shape linear or intermediate; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary entirely covered with simple hairs; style apex pubescence type 2 or 3. Number of ovules per ovary 2-10.

LEGUME CHARACTERS: Legume 22-140mm long; 6-23mm wide; 5-8mm deep; ratio of legume length to width 3.23-5.09. Amphicarpic legumes absent. Legume colour brown or black; uniform over legume. Legume shape rectangular; cross-sectional shape rounded to flat or laterally flat; not falcate; suture straight; distal end unbeaked; valve surface not torulose or torulose; surface smooth or ridged with veins; partitioning present. Legume hairs 36 - 60 per mm sq or hairs more than 61 per mm sq; hairs less than 0.5mm long; hairs covering entire legume; suture surface ciliate, hairs less than 1mm long; tubercles absent. Dehiscent legume twisting loose or medium; number of seeds per legume 1-10.

SEED CHARACTERS: Seed 8-30mm long; 6-17.5mm wide; 4-9.5mm deep; 25-76mm circumference; hilum 2-9.5mm long; distance from hilum to lens 2.5-7.5mm; seed length to width ratio of 0.67-2.8; seed circumference to hilum length ratio of 0.07-0.08. Seed shape oblong; shape in side view circular or laterally compressed; seed colour red-brown or brown or black; mottling absent; surface shiny or matt; smooth or wrinkled. Hilum shape oval; coloured black; groove colour same as hilum or white; hilum surface excess tissue absent or present. Lens position less than 1.6mm from hilum or more than 1.5mm from hilum; prominent or not prominent. Aril absent.

Chromosome number: 12, (14).
Geographical distribution: Cultivated species unknown in the wild except as an escape from cultivation. Cultivated throughout the north temperate zone and at higher altitudes in some sub-tropical regions. The highest areas of production are found in China and Europe.

Taxonomic notes: The cultivated fababean (Vicia faba L.) is an important grain legume across the Northern Temperate zone and at higher altitudes in some sub-tropical regions. The highest cultivated areas of V. faba are currently being grown in China, with a large secondary centre in the Mediterranean region (Bond, 1976). The fababean is unusual among pulse crops in that there is still no clear picture of the species ancestry or even its close taxonomic allegiances (Smartt, 1984). However, the relationship between V. faba and its close allies has recently been reviewed by Maxted et al. (1989).

Trabut (1910) describes the new species Faba pliniana from Algerian material and suggested it could be a progenitor of V. faba. Trabut (1911) suggests a two centre hypothesis of evolution for V. faba, South of the Caspian sea and in Southern Algeria. The specific distinction of V. pliniana from V. faba was questioned by Muratova (1931) and Hanelt et al. (1972), the latter considered V. pliniana a primitive landrace of V. faba. Perrino (Pers. Comm.), while collecting in Southern Algeria, encountered populations that fitted the description of V. pliniana, but he considered them to be attributable to V. faba subsp. faba var. minor. As a consequence of the sinking of V. pliniana in V. faba the idea of a second centre of fababean origin in Southern Algeria has not been taken up by subsequent authors.

The fababean is composed of four infraspecific groups (Muratova, 1931), distinguished on the basis of leaflet and flower number, and flower and seed size characteristics. Cubero (1973, 1984) questions the validity of this classification, because he found that the morphological distinction between subsp. paucijuga and subsp. faba breaks down if the subspecies is sympatric, because all four taxa are equally inter-fertile and because there may be greater morphological variation within var. faba

than between var. faba and var. equina. Thus he favours the use of varietal status for all four taxa, however, Muratova's classification is still widely used possibly because of the ease of form recognition on seed shape and size and it is this scheme that is followed here.

Key to subspecies and varieties of V. faba

1(0). Leaflets 2-2.5 paired; lens positioned less than 1.6mm from hilum seed circumference 30-45mm..... i V. faba subsp. paucijuga

Leaflets 2-4 paired; lens positioned equal to or more than 1.5mm from hilum; seed circumference 25-30mm..... ..... ii V. faba subsp. faba 2

2(1). Seed circumference 20.1 to 30mm.... ii/a V. faba subsp. faba var. minor

Seed circumference 30.1 to 55mm.... ii/b V. faba subsp. faba var. equina

Seed circumference 55.1mm or more.. ii/c V. faba subsp. faba var. faba

i **Accepted taxon:** **V. faba** subsp. **paucijuga** Murat. (1931) Bull. App. Bot. Leningrad, Supp. 50, 73. Type: (LE).

Synonymy: Faba vulgaris var. paucijuga Alefeld (1866) Fl. Landw., 31; V. faba var. paucijuga (Alef.) Aschers. et Graebn. (1909) Fl. VI, 2: 988.

Description: VEGETATIVE CHARACTERS: Annual; erect; 36-60cm high. Stipule length 6.5-8mm; 6-7mm wide. Stipule semi-hastate or semi-saggitate; apex acute; number of teeth on distal edge 3-5; number of teeth on proximal edge none; stipule edge form entire; not-translucent. Stipule colour (upper plant) green; glabrous. Leaf 24-30mm long; petiole 9-13mm long; average leaflet internode 9-13mm long; leaflet 24-72mm long; leaflet 9-44mm wide; tendril or mucro 3-7mm long; average leaf internode 20-32mm long; petiolule 13-16mm long. Leaf apex mucronate. Leaflet shape symmetric; 2-5 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet narrow elliptic; apex mucronate; base angustate; broadest in middle. Leaflet adaxial hairs absent; leaflet abaxial hair absent; petiole hairs absent or less than 10 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle longer than 2mm, but shorter than flower. Peduncle length 11-15mm; rachis 3-8mm long; pedicel 1-2mm long; flower 18-27mm long; ratio of peduncle to flower length of 0.15-1.17; peduncular cusp absent. Number of flowers per inflorescence one or two. Pedicel glabrous.

FLOWER CHARACTERS: Calyx lower tooth 2.5-4mm long; lateral teeth 1.5-3.5mm long; upper tooth 1-2mm long; tube 5-6mm long; ratio of lower tooth to tube length of 0.45-1. Calyx base not gibbous; tube mouth slightly oblique; teeth reflexing absent; tooth curvature present; exterior nectaries absent. Calyx hairs absent; calyx colour green. Standard length 19-22.5mm; limb length 10-11.5mm; claw length 8.5-9.5mm; limb width 9.5-10.5mm; claw width 5.5-6.5mm; ratio of limb length to claw length 0.84-1.8. Corolla petals concolorous; standard face white; standard upper surface white; face with distinct veins. Standard shape stenonychioid; apex emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 17.5-20.5mm; limb length 7.5-8.5mm; claw length 8-9.5mm; limb width 3.5-4.5mm. Wing colour white; apex with round spot; marking brown or black. Wing shape 2; spur shape 4; limb base kinking weak; limb pouch present; wing to keel adhesion weak. Keel length 12-14mm; hood length 4.5-5mm; claw length 7.5-9mm; hood width 4.5-5mm. Keel colour white; hood apex not distinctly coloured. Keel shape 1; base shape 3; pouch absent. Staminal tube length 10-11mm; filament length 3-3.5mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 6.5mm; style length 5.5mm; supra-ovary extension 2mm. Ovary shape linear; style apex cross sectional dorsi-ventrally flattened; supra-ovary

curvature absent. Ovary entirely covered with simple hairs; style apex pubescence type 3. Number of ovules per ovary 3-4.

LEGUME CHARACTERS: Legume 22-72mm long; 6-15mm wide; 5-7mm deep; ratio of legume length to width 3.23-4.1. Amphicarpic legumes absent. Legume colour brown or black; uniform over legume. Legume shape linear or rectangular; cross-sectional shape rounded to flat; not falcate; suture straight; distal end unbeaked; valve surface not torulose; surface smooth; partitioning present. Legume hairs 36 - 60 per mm sq; hairs less than 0.5mm long; hairs covering entire legume; suture surface ciliate, hairs less than 1mm long; tubercles absent. Dehiscent legume twisting loose or medium; number of seeds per legume 2-5.

SEED CHARACTERS: Seed 10-13mm long; 7.5-11mm wide; 6.5-9.5mm deep; 30-45mm circumference; hilum 4-5mm long; distance from hilum to lens 2.5-3mm; seed length to width ratio of 1.2-1.33; seed circumference to hilum length ratio of 0.11-0.13. Seed shape oblong; shape in side view circular or laterally compressed; seed colour red-brown; mottling absent; surface shiny; smooth. Hilum shape oval; coloured black; groove colour same as hilum; hilum surface excess tissue present. Lens position less than 1.6mm from hilum; prominent. Aril absent.

Chromosome number: 12.
Geographical distribution: This subspecies has a more restricted current cultivation range than subspecies Faba, it is currently grown in Afghanistan, Pakistan and small areas of North west India.

Specimen citation: Khattab 46 (SPN); Tithecott 24 (SPN); Khattab 59 (SPN); Khattab 56 (SPN); Khattab 35 (SPN); Khattab 34 (SPN); Khattab 203 (SPN); Khattab 5 (SPN); Khattab 6 (SPN).

ii **Accepted taxon:** V. faba subsp. faba L. (1753) Sp. Pl. 2: 737.

Description: VEGETATIVE CHARACTERS: Annual; erect; 18-150cm high. Stipule length 7-24mm; 6-15mm wide. Stipule semi-hastate or semi-saggitate; apex acute; number of teeth on distal edge 1-2 teeth or 3-5 or more than 5 ; number of teeth on proximal edge none or 1-2; stipule edge form entire; translucent or not-translucent. Stipule colour (upper plant) green; glabrous. Leaf 22-110mm long; petiole 8-35mm long; average leaflet internode 14-43mm long; leaflet 22-90mm long; leaflet 11-47mm wide; tendril or mucro 4-33mm long; average leaf internode 12-53mm long; petiolule 12-82mm long. Leaf apex mucronate. Leaflet shape symmetric; 2-8 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet narrow elliptic or broad elliptic; apex mucronate and emarginate or mucronate; base angustate or truncate to angustate; broadest in middle. Leaflet adaxial hairs absent; leaflet abaxial hair absent (rarely) or less than 10 per mm sq; hairs less than 0.5mm long; petiole hairs absent or less than 10 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm) or longer than 2mm, but shorter than flower. Peduncle length 6-30mm; rachis 4-20mm long; pedicel 1-3mm long; flower 18-37mm long; ratio of peduncle to flower length of 0.15-1.17; peduncular cusp absent. Number of flowers per inflorescence two or three or four or more than four. Pedicel glabrous.

FLOWER CHARACTERS: Calyx lower tooth 3-8mm long; lateral teeth 2-7.5mm long; upper tooth 1.5-4mm long; tube 4-10mm long; ratio of lower tooth to tube length of 0.43-1.07. Calyx base not gibbous; tube mouth slightly oblique; teeth reflexing absent; tooth curvature present; exterior nectaries absent or seen on lateral teeth. Calyx hairs absent. Calyx colour green. Standard length 20-37mm; limb length 10-21mm; claw length 8.5-15mm; limb width 6-20mm; claw width 3-11mm; ratio of limb length to claw length

0.86-2. Corolla petals concolorous; standard face white (rarely other colours). Standard upper surface white (rarely reddish). Face without distinct veining or face with distinct veins. Standard shape stenonychioid; apex emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 17-30mm; limb length 6-17mm; claw length 8-15mm; limb width 3-8.5mm. Wing colour white; apex with round spot; marking brown or black. Wing shape 2 or 3 or 4; spur shape 3 or 4; limb base kinking weak; limb pouch present; wing to keel adhesion weak. Keel length 14-21mm; hood length 4-7mm; claw length 8-15mm; hood width 4-7mm. Keel colour white; hood apex not distinctly coloured. Keel shape 1 or 3; base shape 2 or 3; pouch absent or present. Staminal tube length 8-22mm; filament length 2-4.5mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 6.5-15mm; style length 3-9.5mm; supra-ovary extension 1-4mm. Ovary shape linear or intermediate; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary entirely covered with simple hairs; style apex pubescence type 2 or 3. Number of ovules per ovary 2-10.

LEGUME CHARACTERS: Legume 38-140mm long; 9-23mm wide; 5-7mm deep; ratio of legume length to width 3.46-5.09. Amphicarpic legumes absent. Legume colour brown or black; uniform over legume. Legume shape rectangular; cross-sectional shape rounded to flat; not falcate; suture straight; distal end unbeaked; valve surface not torulose; surface smooth; partitioning present. Legume hairs 36 - 60 per mm sq or more than 61 per mm sq; hairs less than 0.5mm long; hairs covering entire legume; suture surface ciliate, hairs less than 1mm long; tubercles absent. Dehiscent legume twisting loose; number of seeds per legume 1-10.

SEED CHARACTERS: Seed 8-30mm long; 6.5-17.5mm wide; 5-9.5mm deep; 25-76mm circumference; hilum 3.5-9.5mm long; distance from hilum to lens 3-7.5mm; seed length to width ratio of 1.23-2.8; seed circumference to hilum length ratio of 0.12-0.15. Seed shape oblong; shape in side view laterally compressed; seed colour red-brown or brown; mottling absent; surface shiny; smooth. Hilum shape oval; coloured black; groove colour same as hilum or white; hilum surface excess tissue absent. Lens position less than 1.6mm from hilum or more than 1.5mm from hilum; prominent. Aril absent.

Chromosome number: 12, (14).

ii/a **Accepted taxon:** **V. faba** subsp. **faba** var. **minor** Beck (1892) Fl. Nieder - Osterreich, 2: 889-894. **Type:** (PRC).

Synonymy: Faba minor Desf. (1804) Tabl. Bot. Mus. d'Hist. Nat., 1: 196; Faba minor Roxb. (1832) Fl. Ind., 3: 323; Faba vulgaris var. minuta Alef. (1861) Bonplandia 9: 101; Faba vulgaris var. minor Harz (1885) Landw. Samenk., 2: 661. Faba vulgaris var. pliniana Trabut (1910) Bull. Soc. Bot. Fr., 57(5): 426; V. pliniana (Trabut) Murat. (1931) Bull. App. Bot. Gen. Pl. Breed., 50: 256.

Description: VEGETATIVE CHARACTERS: Annual; erect; 18-150cm high. Stipule length 7-15mm; 6-12mm wide. Stipule semi-hastate or semi-saggitate; apex acute; number of teeth on distal edge 1-2 teeth or 3-5 teeth or more than 5; number of teeth on proximal edge none or 1-2 teeth or 3-5; stipule edge form entire; translucent or not-translucent. Stipule colour (upper plant) green or green with purple; glabrous or hairs located edge only. Leaf 24-99mm long; petiole 8-25mm long; average leaflet internode 14-23mm long; leaflet 30-70mm long; leaflet 11-43mm wide; tendril or mucro 4-33mm long; average leaf internode 12-53mm long; petiolule 16-70mm long. Leaf apex mucronate. Leaflet shape symmetric; 2-8 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet narrow elliptic or broad elliptic; apex mucronate and emarginate or mucronate; base angustate; broadest in middle. Leaflet adaxial hairs absent or less than 10 per mm sq; hairs less than 0.5mm long; leaflet abaxial hair absent or less than 10 per mm sq; hairs less than 0.5mm long; petiole hairs absent or less than 10 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm) or longer than 2mm, but shorter than flower. Peduncle length 5-25mm; rachis 4-20mm long; pedicel 1-3mm long; flower 24-28mm long; ratio of peduncle to flower length of 0.15-1.17; peduncular cusp absent. Number of flowers per inflorescence two or three or four or more than four. Pedicel glabrous.

FLOWER CHARACTERS: Calyx lower tooth 3-6mm long; lateral teeth 2-5mm long; upper tooth 1.5-4mm long; tube 4-10mm long; ratio of lower tooth to tube length of 0.43-1.07. Calyx base not gibbous; tube mouth slightly oblique; teeth reflexing absent; tooth curvature present; exterior nectaries absent. Calyx hairs absent. Calyx colour green. Standard length 20-30mm; limb length 10-19mm; claw length 8.5-13mm; limb width 6-17.5mm; claw width 3-10mm; ratio of limb length to claw length 0.84-1.8. Corolla petals concolorous; standard face white; standard upper surface white (occationally reddish). Face without distinct veining. Standard shape stenonychioid; apex emarginate or emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 17-25mm; limb length 6-15mm; claw length 8-13mm; limb width 3-6mm. Wing colour white; apex with round spot; marking brown or black. Wing shape 2 or 3; spur shape 3; limb base kinking weak; limb pouch present; wing to keel adhesion strong. Keel length 14-19mm; hood length 4-6.5mm; claw length 8.5-14mm; hood width 4-7mm. Keel colour white; hood apex not distinctly coloured. Keel shape 1 or 3; base shape 2 or 3; pouch absent. Staminal tube length 8-18mm; filament length 2-4mm; all stamen approx. equal length; distinct tube vein colouring absent or present. Ovary length 6.5-12.5mm; style length 4.5-8.5mm; supra-ovary extension 1-2.5mm. Ovary shape linear or intermediate; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary entirely covered with simple hairs; style apex pubescence type 2. Number of ovules per ovary 2-6.

LEGUME CHARACTERS: Legume 38-73mm long; 9-14mm wide; 5-7mm deep; ratio of legume length to width 3.46-5.09. Amphicarpic legumes absent. Legume colour brown or black; uniform over legume. Legume shape rectangular; cross-sectional shape rounded to flat or laterally flat; not falcate; suture straight; distal end unbeaked; valve surface not torulose or torulose; surface smooth or ridged with veins; partitioning present. Legume hairs 36 - 60 per mm sq or hairs more than 61 per mm sq; hairs less than 0.5mm long; hairs covering entire legume; suture surface ciliate, hairs less than 1mm long; tubercles absent. Dehiscent legume twisting loose; number of seeds per legume 2-5.

SEED CHARACTERS: Seed 8-11.5mm long; 6.5-9.5mm wide; 5-6mm deep; 25-30mm circumference; hilum 3.5-4.5mm long; distance from hilum to lens 3-3.5mm; seed length to width ratio of 1.23-1.38; seed circumference to hilum length ratio of 0.14-0.15. Seed shape oblong; shape in side view laterally compressed; seed colour red-brown; mottling absent; surface shiny; smooth or wrinkled. Hilum shape oval; coloured black; groove colour same as hilum or white; hilum surface excess tissue absent or present. Lens position less than 1.6mm from hilum or more than 1.5mm from hilum; prominent. Aril absent.

Chromosome number: 12.

Specimen citation: Parmanand 747 (E); Anon. 12327 (CAIM); Tithecott 12 (SPN); Khattab 144 (SPN); Khattab 129 (SPN); Khattab 67 (SPN); Khattab 3 (SPN); Khattab 81 (SPN); Khattab 102 (SPN); Khattab 37 (SPN); Khattab 37 (SPN); Khattab 125 (SPN); Khattab 88 (SPN); Khattab 124 (SPN); Khattab 66 (SPN).

ii/b **Accepted taxon:** V. faba subsp. faba var. equina Pers. (1807) Syn. pl. (2): 273-657.
Type: (L).
Synonymy: Faba minor var. equina Baub. (1623) Pinax.; Faba equina Medikus (1787) Vorles. Churpf. Ges. 2: 360. V. faba var. equina Steudel, E. (1821) Nomencl. Bot., 1: 458; V. equina Steudel (1821) Nomenclator Botanicus, 1: 881; V. equina Reichenbach, H.G.L. (1832) Fl. Germ. Excurs., 2: 532; Faba vulgaris var. equina Alef. (1861) Bonplandia 9: 101.

Description: VEGETATIVE CHARACTERS: Annual; erect; 18-95cm high. Stipule length 10-23mm; 8-15mm wide. Stipule semi-hastate or semi-saggitate; apex acute; number of teeth on distal edge 1-2 teeth or 3-5 teeth or more than 5; number of teeth on proximal edge none or 1-2 teeth or 3-5; stipule edge form entire; translucent or not-translucent. Stipule colour (upper plant) green or green with purple; glabrous. Leaf 24-60mm long; petiole 8-25mm long; average leaflet internode 14-40mm long; leaflet 30-70 mm long; leaflet 11-27mm wide; tendril or mucro 4-33mm long; average leaf internode 12-53mm long; petiolule 16-46mm long. Leaf apex mucronate. Leaflet shape symmetric; 2-6 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet narrow elliptic or broad elliptic; apex mucronate; base angustate; broadest in middle. Leaflet adaxial hairs absent or less than 10 per mm sq; hairs less than 0.5mm long; leaflet abaxial hair absent or less than 10 per mm sq; hairs less than 0.5mm long; petiole hairs less than 10 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle obsolescent (1-2mm) or longer than 2mm, but shorter than flower. Peduncle length 3-21mm; rachis 4-19mm long; pedicel 1-3mm long; flower 20-29mm long; ratio of peduncle to flower length of 0.15-1.17; peduncular cusp absent. Number of flowers per inflorescence three or four or more than four. Pedicel glabrous.

FLOWER CHARACTERS: Calyx lower tooth 3-8mm long; lateral teeth 2-7mm long; upper tooth 1-4mm long; tube 4-10mm long; ratio of lower tooth to tube length of 0.43-1.07. Calyx base not gibbous; tube mouth slightly oblique; teeth reflexing absent; tooth curvature present; exterior nectaries absent or seen on lateral teeth. Calyx hairs absent. Calyx colour green. Standard length 19-29mm; limb length 10-17mm; claw length 9-13mm; limb width 6-20mm; claw width 3-11mm; ratio of limb length to claw length 0.84-1.8. Corolla petals concolorous; standard face white; standard upper surface white; face without distinct veining. Standard shape stenonychioid; apex emarginate or emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 17-29mm; limb length 6-15mm; claw length 8-14mm; limb width 3-8mm. Wing colour white; apex with round spot; marking brown or black. Wing shape 2; spur shape 3; limb base kinking weak; limb pouch present; wing to keel adhesion strong. Keel length 14-21mm; hood length 4-7mm; claw length 8-15mm; hood width 4-6.5mm. Keel colour white; hood apex not distinctly coloured or distinctly coloured. Keel shape 1 or 3; base shape 2 or 3; pouch absent. Staminal tube length 8-20mm; filament length 2-4mm; all stamen approx. equal length; distinct tube vein colouring present. Ovary length 7-15mm; style length 3-9mm; supra-ovary extension 1-3.5mm. Ovary shape linear; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary entirely covered with simple hairs; style apex pubescence type 2. Number of ovules per ovary 3-6.

LEGUME CHARACTERS: Legume 38-100mm long; 9-20mm wide; 5-7mm deep; ratio of legume length to width 3.46-5.09. Amphicarpic legumes absent. Legume colour brown or black; uniform over legume. Legume shape rectangular; cross-sectional shape rounded to flat or laterally flat; not falcate; suture straight; distal end unbeaked; valve surface not torulose or torulose; surface smooth or ridged with veins; partitioning present. Legume hairs more than 61 per mm sq; hairs less than 0.5mm long; hairs covering entire legume; suture surface ciliate, hairs less than 1mm long; tubercles absent. Dehiscent legume twisting loose; number of seeds per legume 2-6.

SEED CHARACTERS: Seed 12-16mm long; 8-13mm wide; 5-7mm deep; 35-44mm circumference; hilum 6-6.5mm long; distance from hilum to lens 3.5-4.5mm; seed length to width ratio of 1.08-1.28; seed circumference to hilum length ratio of 0.14-0.17. Seed shape oblong; shape in side view laterally compressed; seed colour red-brown; mottling absent; surface shiny or matt; smooth or wrinkled. Hilum shape oval; coloured black; groove colour same as hilum or white; hilum surface excess tissue absent. Lens position more than 1.5mm from hilum; prominent. Aril absent.

Chromosome number: 12.

Specimen citation: Taquet 4199 (E); Tithecott 11 (SPN); Khattab 78 (SPN); Khattab 2 (SPN); Khattab 111 (SPN); Khattab 69 (SPN); Khattab 202 (SPN); Khattab 110 (SPN); Khattab 38 (SPN); Khattab 100 (SPN); Khattab 202 (SPN); Khattab 84 (SPN).

ii/c **Accepted taxon:** V. faba subsp. faba var. faba L. (1753) Sp. Pl. 2: 737.
Type: Lectotype, Clifford 906.34, (LINN!).
Synonymy: Faba compressa var. major Morison (1680) Hist. Oxon. 2: 85; Faba major Blackw. (1737) Herb. 1: 19; Faba major J.A. Weinmann (1739) Phyt. Ic. 2: 435; Faba major Desf. (1804) Tabl. Bot. Mus. d'Hist. Nat., 1: 196; V. faba subsp. faba var. major Harz (1885) Landw. Samenk., 2: 661; V. faba var. major Murat. (1931) Bull. Appl. Bot. Leningrad, Supp. 50, 73.V. faba subsp. faba var. major Harz, C. (1885) Landw. Samenk., 2: 661; V. faba var. major Muratova (1931) Bull. Appl. Bot. Leningrad, Supp. 50, 73.

Description: VEGETATIVE CHARACTERS: Annual; erect; 18-150cm high. Stipule length 7-24mm; 6-15mm wide. Stipule semi-hastate or semi-saggitate; apex acute; number of teeth on distal edge 1-2 teeth or 3-5; number of teeth on proximal edge none or 1-2; stipule edge form entire; translucent or not-translucent. Stipule colour (upper plant) green; glabrous. Leaf 22-110mm long; petiole 8-35mm long; average leaflet internode 14-43mm long; leaflet 22-90mm long; leaflet 11-47mm wide; tendril or mucro 8-14mm long; average leaf internode 20-33mm long; petiolule 12-82mm long. Leaf apex mucronate. Leaflet shape symmetric; 2-8 leaflets per leaf. Upper leaflet margin entire; lower leaflet margin entire; leaflet margins level. Leaflet narrow elliptic or broad elliptic; apex mucronate; base angustate or truncate to angustate; broadest in middle. Leaflet adaxial hairs absent; leaflet abaxial hair absent (rarely) or less than 10 per mm sq; hairs less than 0.5mm long; petiole hairs absent or less than 10 per mm sq. Stem node colour (upper plant) green.

INFLORESCENCE CHARACTERS: Peduncle longer than 2mm, but shorter than flower. Peduncle length 6-20(-30)mm; rachis 5-17(-20)mm long; pedicel 1-2mm long; flower 18-37mm long; ratio of peduncle to flower length of 0.2-1.17; peduncular cusp absent. Number of flowers per inflorescence three or four or more than four. Pedicel glabrous.

FLOWER CHARACTERS: Calyx lower tooth 4-8mm long; lateral teeth 2.5-7.5mm long; upper tooth 1.5-4mm long; tube 4-10mm long; ratio of lower tooth to tube length of 0.53-1.07. Calyx base not gibbous; tube mouth slightly oblique; teeth reflexing absent; tooth curvature present; exterior nectaries absent or seen on lateral teeth. Calyx hairs absent. Calyx colour green. Standard length 21-37mm; limb length 10-21mm; claw length 9-15mm; limb width 6-20mm; claw width 3-11mm; ratio of limb length to claw length 0.86-2. Corolla petals concolorous; standard face white (rarely other colours). Standard upper surface white (rarely reddish). Face without distinct veining or face with distinct veins. Standard shape stenonychioid; apex emarginate with mucro; claw bowing absent; upper surface glabrous. Wing length 17-30mm; limb length 7.5-17mm; claw length 8-15mm; limb width 4.5-8.5mm. Wing colour white; apex with round spot; marking brown or black. Wing shape 2 or 3 or 4; spur shape 4; limb base kinking weak; limb pouch present; wing to keel adhesion weak. Keel length 15-21mm; hood length 4-7mm; claw length 8-15mm; hood width 4.5-7mm. Keel colour white; hood apex not distinctly coloured. Keel shape 1 or 3; base shape 3; pouch absent or present. Staminal tube length 11.5-22mm; filament length 2.5-4.5mm; all stamen approx. equal length; distinct tube vein colouring absent. Ovary length 7-15mm; style length 3-9.5mm; supra-ovary extension 1-4mm. Ovary shape linear or intermediate; style apex cross sectional dorsi-ventrally flattened; supra-ovary curvature absent. Ovary entirely covered with simple hairs; style apex pubescence type 2 or 3. Number of ovules per ovary 2-10.

LEGUME CHARACTERS: Legume 40-140mm long; 11-23mm wide; 5-7mm deep; ratio of legume length to

width 3.6-5.09. Amphicarpic legumes absent. Legume colour brown or black; uniform over legume. Legume shape rectangular; cross-sectional shape rounded to flat; not falcate; suture straight; distal end unbeaked; valve surface not torulose; surface smooth; partitioning present. Legume hairs more than 61 per mm sq; hairs less than 0.5mm long; hairs covering entire legume; suture surface ciliate, hairs less than 1mm long; tubercles absent. Dehiscent legume twisting loose; number of seeds per legume 1-10.

SEED CHARACTERS: Seed 22-30mm long; 15.5-17.5mm wide; 8-9.5mm deep; 59-76mm circumference; hilum 8-9.5mm long; distance from hilum to lens 6.5-7.5mm; seed length to width ratio of 1.42-2.8; seed circumference to hilum length ratio of 0.12-0.13. Seed shape oblong; shape in side view laterally compressed; seed colour red-brown or brown; mottling absent; surface shiny; smooth. Hilum shape oval; coloured black; groove colour same as hilum or white; hilum surface excess tissue absent. Lens position more than 1.5mm from hilum; prominent. Aril absent.

Chromosome number: 12, (14).

Specimen citation: Giles s.n. (E); Podlech 12031 (E); Reichenbach s.n. (W); Detenschlay 43 (W); Ronniger s.n. (W); Schmitt & Schmitt 124 (MO); Hubbard 11832 (K); D'Argy 56 (E); Ho-Ch'ang Chow 232 (E); Naguib s.n. (CAIM); Boulos s.n. (CAIM); Shabetai 4846 (CAIM); Buysman 95 (E); Bonnet s.n. (K); Stuart Mill 5/1863 (K); Meyers & Dinsmore 4890 (E); Lace 450 (E); Graham 9/1920 (K); Yokohama Nursery Co. s.n. (E); Bisby 1948 (SPN); Rosas 801 (BM); Vazquez 2073 (MO); King & al 266 (MO); Prior 1843 (K); Walton s.n. (E); Maxted, Allkin & Khattab 4285 (SPN); Maxted, Allkin & Khattab 4203 (SPN); Maxted, Allkin & Khattab 4187 (SPN); Maxted, Allkin & Khattab 4017 (SPN); Maxted, Allkin & Khattab 4032 (SPN); Maxted, Allkin & Khattab 4389 (SPN); Maxted, Allkin & Khattab 4371 (SPN); Steyermark & Liesner s.n. (MO).

Species Dubia

V. pseudo-sepium Nym. (1844) Linnaea, 18: 648.

I have seen no specimens of this taxon, but from the description it does appear that it represents a member of subgenus Vicia. Nyman described the species from material collected near Messina, Sicily and suggests it was allied to V. sepium. However, the protologue is unclear as to how this species differs from V. sepium and so without observing material it cannot be accepted as a distinct Vicia subgenus Vicia species.

Appendix 6. Distribution of Vicia Subgenus Vicia Taxa

Data taken from GEODIST database file.

	TAXA														
	010	020	030	040	050	060	070	080	090	100	110	120	130	140	150
Ab	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Af	-	-	-	-	-	-	-	-	-	-	2	1	-	-	-
Ag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ak	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Al	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
An	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
As	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
At	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Au	-	-	-	-	-	1	-	-	-	-	3	-	-	-	-
Az	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Be	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Bg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bl	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
Bm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bo	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Br	-	-	-	-	-	42	-	-	-	-	1	-	-	-	-
BrI	-	7	-	-	-	-	-	-	-	-	-	1	-	1	11
Bu	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bz	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ca	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cb	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ch	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
Cl	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cn	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Co	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Cr	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-
Cs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cy	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-
Cz	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Da	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ec	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Egaf	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-
Egas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Es	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Et	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Fa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fe	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ga	-	-	-	2	-	11	-	-	-	-	2	-	-	-	-
Ge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gl	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gr	-	-	-	-	-	6	-	1	-	-	-	-	-	-	-
Gu	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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Ha	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TAXA

	010	020	030	040	050	060	070	080	090	100	110	120	130	140	150
Hb	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
He	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ho	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hs	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
Hu	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Il	1	-	-	-	-	-	-	1	2	-	1	-	-	-	12
In	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-
Iq	1	-	2	-	-	-	-	-	-	-	1	-	-	-	-
Ir	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Is	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
It	-	-	-	-	-	12	-	-	-	-	-	-	-	-	-
Ja	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Jo	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ju	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-
Ke	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ko	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
La	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Le	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Li	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lu	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-
Ma	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Md	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Me	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
Ml	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mo	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mr	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mu	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ne	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ni	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nz	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pe	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Pg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ph	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Pn	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Po	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rseu	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
Rssa	-	23	1	51	-	14	22	-	-	-	-	-	-	-	-
Rssi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sb	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Si	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-
Sn	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
So	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Su	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sy	6	-	-	-	-	6	-	20	-	-	1	-	-	-	4
Ta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TAXA

	010	020	030	040	050	060	070	080	090	100	110	120	130	140	150
Tb	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Th	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tn	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tuas	11	7	19	8	-	5	3	34	-	-	7	-	-	-	4
Tueu	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ug	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ur	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Us	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vz	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Wi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Za	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-

TAXA

	160	170	180	190	200	210	220	230	240	250	260	270	280	290
Ab	-	-	-	-	-	-	1	-	-	-	1	-	-	-
Af	-	-	-	-	-	1	4	1	-	-	-	-	-	-
Ag	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ak	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Al	-	-	-	-	-	-	1	-	-	1	-	-	-	-
An	-	-	-	-	-	-	-	-	-	-	-	-	-	-
As	-	-	-	-	-	-	-	-	-	-	-	-	-	-
At	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Au	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Az	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Be	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bg	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bh	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bl	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bm	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bo	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Br	-	-	-	-	-	-	-	-	-	-	-	2	1	2
BrI	-	4	9	-	-	-	4	-	-	8	1	7	-	8
Bu	-	-	-	-	-	-	-	3	-	-	-	1	-	1
Bz	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ca	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Cb	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cg	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ch	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cl	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cn	-	-	-	-	-	-	-	-	-	-	-	1	-	-
Co	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cr	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Cs	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cy	-	-	-	-	-	1	-	1	-	-	-	1	-	-
Cz	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Da	-	-	-	-	-	-	-	-	-	-	-	2	-	-
Ec	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TAXA

	160	170	180	190	200	210	220	230	240	250	260	270	280	290
Egaf	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Egas	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Es	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Et	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fa	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fe	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ga	-	-	-	-	-	9	-	-	-	-	-	5	-	9
Ge	-	-	-	-	-	-	-	1	-	-	-	1	-	-
Gf	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gl	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gr	-	-	-	-	-	10	-	1	-	-	1	1	-	-
Gu	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gy	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ha	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hb	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hd	-	-	-	-	-	-	-	-	-	-	-	-	-	-
He	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Ho	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hs	-	-	-	-	-	-	-	2	-	-	-	-	-	4
Hu	-	-	-	-	-	-	-	-	-	-	-	1	-	-
Il	1	6	7	-	-	1	-	-	-	-	-	1	-	-
In	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iq	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Ir	-	-	-	-	-	-	6	1	-	1	2	-	-	-
Is	-	-	-	-	-	2	-	-	-	-	-	-	-	-
It	-	-	-	-	-	2	-	3	-	-	4	1	-	-
Ja	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Jo	-	1	-	-	-	2	-	-	-	-	-	-	-	-
Ju	-	-	-	-	-	1	-	-	-	-	1	-	-	-
Ke	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ko	-	-	-	-	-	-	-	-	-	-	-	-	-	-
La	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Le	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Li	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lu	-	-	-	-	-	-	-	-	-	-	-	3	-	7
Ma	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Md	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Me	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ml	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mo	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mr	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Mu	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ne	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ni	-	-	-	-	-	-	-	-	-	-	-	-	-	-
No	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nz	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pa	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Pe	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pg	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ph	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pn	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Po	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TAXA

	160	170	180	190	200	210	220	230	240	250	260	270	280	290
Rm	-	-	-	-	-	-	-	1	-	-	-	2	-	-
Rseu	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rssa	-	-	-	-	-	7	22	9	-	-	-	8	2	-
Rssi	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sa	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sb	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sd	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sh	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Si	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Sn	-	-	-	-	-	-	-	-	-	-	-	-	-	-
So	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Su	-	-	-	-	-	-	-	-	-	-	-	3	-	-
Sy	-	-	-	-	8	12	-	1	-	7	10	9	1	-
Ta	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tb	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Th	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tn	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tuas	-	13	-	-	-	12	4	5	1	8	18	16	-	-
Tueu	-	-	-	-	-	-	-	1	-	-	1	-	-	-
Tw	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ug	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ur	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Us	-	-	-	-	-	-	-	-	-	-	-	4	-	-
Vt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vz	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wi	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Za	-	1	-	-	-	1	-	-	-	-	1	1	-	-

TAXA

	310	320	330	340	350	360	370	380	390	400	410	420	430	440	450
Ab	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Af	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-
Ag	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Ak	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Al	1	-	-	-	-	-	1	-	1	-	-	-	-	-	-
An	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
As	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
At	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Au	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Az	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Be	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bl	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bo	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Br	4	-	-	-	-	-	3	-	1	-	-	-	-	-	-
BrI	3	-	3	5	-	-	-	5	-	2	2	-	-	3	1
Bu	-	-	-	1	-	-	2	-	-	-	-	-	-	-	-

TAXA

	310	320	330	340	350	360	370	380	390	400	410	420	430	440	450
Bz	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ca	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cb	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cl	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cn	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Co	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cr	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cy	-	-	-	-	-	-	2	-	3	1	-	1	-	-	-
Cz	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Da	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ec	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Egaf	1	-	-	-	-	-	1	-	3	-	2	3	-	-	-
Egas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Es	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Et	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fe	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ga	-	-	3	-	-	-	10	1	-	1	-	-	-	-	-
Ge	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Gf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gl	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gr	-	-	5	-	-	-	2	-	-	-	-	-	-	-	-
Gu	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ha	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hb	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
He	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-
Ho	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hs	5	-	-	-	-	-	2	-	-	-	-	-	-	-	-
Hu	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Il	2	-	-	-	-	-	2	-	2	2	-	7	-	-	-
In	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iq	-	-	-	-	-	1	-	-	1	-	-	9	-	1	-
Ir	2	-	-	-	3	1	-	-	5	-	-	-	-	-	-
Is	-	-	-	-	-	-	-	-	-	-	-	6	-	-	-
It	-	-	7	-	-	-	2	-	-	1	-	-	-	-	-
Ja	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Jo	-	-	-	-	-	-	-	-	2	3	-	2	-	-	-
Ju	-	-	3	-	-	-	5	-	-	-	-	-	-	-	-
Ke	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ko	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
La	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Le	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Li	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lu	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ma	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Md	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TAXA

	310	320	330	340	350	360	370	380	390	400	410	420	430	440	450
Me	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ml	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mo	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mr	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mu	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ne	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ni	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nz	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pa	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-
Pe	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ph	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pn	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Po	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rm	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Rseu	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rssa	5	-	-	-	17	-	24	-	-	-	-	-	1	2	-
Rssi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sb	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Si	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sn	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
So	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Su	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sy	2	-	-	-	-	9	-	-	10	5	7	21	-	3	-
Ta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tb	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Th	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tn	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tuas	15	-	6	-	9	20	10	-	8	-	-	3	-	23	3
Tueu	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-
Tw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ug	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ur	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Us	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vz	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Za	-	-	1	-	2	-	-	-	-	-	-	-	-	-	-

TAXA

	460	470	480	490	500	510	520	530	550	560	570	590	600
Ab	-	-	-	-	-	-	-	-	-	-	1	1	-
Af	-	-	-	-	-	-	-	-	-	-	-	-	-
Ag	-	-	-	-	-	-	-	-	-	-	-	1	-
Ak	-	-	-	-	-	-	-	-	-	-	-	-	-

TAXA

	460	470	480	490	500	510	520	530	550	560	570	590	600
Al	-	-	-	-	-	-	-	-	-	-	-	-	-
An	-	-	-	-	-	-	-	-	-	-	-	-	-
As	-	-	-	-	-	-	-	-	-	-	2	-	-
At	-	-	-	-	-	-	-	-	-	-	1	-	-
Au	9	-	4	-	-	-	-	-	-	-	5	-	-
Az	-	-	-	-	-	-	-	-	-	-	1	-	-
Be	-	-	-	-	-	-	-	-	-	-	-	-	-
Bg	-	-	-	-	-	-	-	-	-	-	-	-	-
Bh	-	-	-	-	-	-	-	-	-	-	-	-	-
Bl	-	-	-	-	-	-	-	-	-	-	-	-	-
Bm	-	-	-	-	-	-	-	-	-	-	-	-	-
Bo	-	-	-	-	-	-	-	-	-	-	-	-	-
Br	-	-	-	1	-	-	-	-	-	-	21	3	2
BrI	4	-	1	10	-	4	-	-	4	4	3	-	-
Bu	-	-	-	-	-	-	-	-	-	-	-	1	-
Bz	-	-	-	-	-	-	-	-	-	-	1	-	-
Ca	-	-	-	-	-	-	-	-	-	-	1	-	-
Cb	-	-	-	-	-	-	-	-	-	-	-	-	-
Cg	-	-	-	-	-	-	-	-	-	-	-	-	-
Ch	-	-	-	-	-	-	-	-	-	-	-	-	-
Cl	-	-	-	-	-	-	-	-	-	-	2	2	-
Cm	-	-	-	-	-	-	-	-	-	-	-	-	-
Cn	-	-	-	-	-	-	-	-	-	-	3	2	-
Co	-	-	-	-	-	-	-	-	-	-	5	-	-
Cr	-	-	-	-	-	-	-	-	-	-	-	-	-
Cs	-	-	-	-	-	-	-	-	-	-	-	-	-
Cy	-	-	-	-	1	-	-	-	-	-	1	-	-
Cz	-	-	1	-	-	-	-	-	-	-	-	-	-
Da	-	-	-	-	-	-	-	-	-	-	1	-	-
Ec	-	-	-	-	-	-	-	-	-	-	-	1	-
Egaf	-	-	-	-	-	-	-	-	-	-	4	1	-
Egas	-	-	-	-	-	-	-	-	-	-	-	1	-
Es	-	-	-	1	-	3	-	-	-	-	-	-	-
Et	-	-	-	-	-	-	-	-	-	-	1	-	-
Fa	-	-	-	-	-	-	-	-	-	-	-	-	-
Fe	-	-	-	-	-	-	-	-	-	-	-	-	-
Ga	-	-	-	12	8	10	-	-	-	1	9	1	-
Ge	-	-	-	-	-	-	-	-	-	-	2	-	-
Gf	-	-	-	-	-	-	-	-	-	-	-	-	-
Gl	-	-	-	-	-	-	-	-	-	-	-	-	-
Gr	-	-	-	1	1	-	-	2	-	-	3	-	-
Gu	-	-	-	-	-	-	-	-	-	-	-	-	-
Gy	-	-	-	-	-	-	-	-	-	-	-	-	-
Ha	-	-	-	-	-	-	-	-	-	-	-	-	-
Hb	-	-	-	-	-	-	-	-	-	-	2	-	-
Hd	-	-	-	-	-	-	-	-	-	-	-	-	-
He	-	-	-	-	-	-	-	-	-	-	1	-	-
Ho	-	-	-	-	-	-	-	-	-	-	-	-	-
Hs	-	-	-	1	3	10	-	1	-	1	10	2	-
Hu	-	-	1	-	-	-	-	-	-	-	-	-	-
Il	-	-	-	-	4	-	-	1	-	-	5	3	-
In	-	-	-	-	-	-	-	-	-	-	-	-	-

TAXA

	460	470	480	490	500	510	520	530	550	560	570	590	600
Iq	-	-	-	-	-	-	-	-	-	-	1	1	-
Ir	-	-	1	-	-	-	-	2	-	-	1	-	-
Is	-	-	-	-	-	-	-	-	-	-	-	-	-
It	2	-	-	-	1	-	-	-	-	2	-	-	-
Ja	-	-	-	-	-	-	-	-	-	-	2	1	-
Jo	-	-	-	-	-	-	-	-	-	-	-	-	-
Ju	8	-	3	2	1	-	-	-	-	-	1	1	-
Ke	-	-	-	-	-	-	-	-	-	-	2	-	-
Ko	-	-	-	-	-	-	-	-	-	-	-	-	-
La	-	-	-	-	-	-	-	-	-	-	-	-	-
Le	-	-	-	-	-	-	-	-	-	-	-	-	-
Li	-	-	-	-	-	-	-	-	-	-	-	-	-
Lu	-	-	-	-	-	-	-	-	-	-	5	6	-
Ma	-	-	-	-	-	-	-	-	-	-	-	-	-
Md	-	-	-	-	-	-	-	-	-	-	-	-	-
Me	-	-	-	-	-	-	-	-	-	-	1	1	-
Ml	-	-	-	-	-	-	-	-	-	-	-	-	-
Mo	-	-	-	-	-	-	-	-	-	-	-	-	-
Mr	-	-	-	-	2	-	-	-	-	-	-	3	-
Mu	-	-	-	-	-	-	-	-	-	-	2	-	-
Ne	-	-	-	-	-	-	-	-	-	-	-	-	-
Ni	-	-	-	-	-	-	-	-	-	-	-	-	-
No	-	-	-	-	-	-	-	-	-	-	-	-	-
Nz	-	-	-	-	-	-	-	-	-	-	1	1	-
Pa	-	-	-	-	-	-	-	-	-	-	-	-	-
Pe	-	-	-	-	-	-	-	-	-	-	-	-	-
Pg	-	-	-	-	-	-	-	-	-	-	-	-	-
Ph	-	-	-	-	-	-	-	-	-	-	-	-	-
Pn	-	-	-	-	-	-	-	-	-	-	-	-	-
Po	-	-	-	-	-	-	-	-	-	-	1	-	-
Rm	-	-	2	-	1	-	-	-	-	-	-	-	-
Rseu	-	-	-	-	-	-	-	-	-	-	-	-	-
Rssa	-	12	6	6	10	-	-	1	7	-	3	-	-
Rssi	-	-	-	-	-	-	-	-	-	-	-	-	-
Sa	-	-	-	-	-	-	-	-	-	-	-	1	-
Sb	-	-	-	-	-	-	-	-	-	-	-	-	-
Sd	-	-	-	-	-	-	-	-	-	-	-	-	-
Sh	-	-	-	-	-	-	-	-	-	-	-	-	-
Si	-	-	-	-	-	-	-	-	-	-	-	-	-
Sn	-	-	-	-	-	-	-	-	-	-	-	-	-
So	-	-	-	-	-	-	-	-	-	-	1	-	-
Su	-	-	-	1	-	-	-	-	-	-	1	-	-
Sy	-	-	-	1	11	-	-	24	-	-	7	5	-
Ta	-	-	-	-	-	-	-	-	-	-	-	-	-
Tb	-	-	-	-	-	-	-	-	-	-	-	-	-
Th	-	-	-	-	-	-	-	-	-	-	-	-	-
Tn	-	-	-	-	-	-	-	-	-	-	-	1	-
Tuas	-	-	2	-	17	-	-	11	1	2	18	17	-
Tueu	-	-	-	-	-	-	-	-	-	-	-	-	-
Tw	-	-	-	-	-	-	-	-	-	-	-	-	-
Ug	-	-	-	-	-	-	-	-	-	-	-	-	-
Ur	-	-	-	-	-	-	-	-	-	-	-	-	-

TAXA

	460	470	480	490	500	510	520	530	550	560	570	590	600
Us	-	-	-	-	-	-	-	-	-	-	9	2	-
Vt	-	-	-	-	-	-	-	-	-	-	-	-	-
Vz	-	-	-	-	-	-	-	-	-	-	-	-	-
Wi	-	-	-	-	-	-	-	-	-	-	1	-	-
Za	-	-	-	-	-	-	-	1	-	-	4	-	-

TAXA

	610	620	630	640	650	660	670	680	690	700	710	720	730
Ab	-	-	-	-	-	-	-	-	-	-	-	-	-
Af	-	-	-	-	-	-	-	-	-	-	-	-	-
Ag	-	-	-	-	-	-	-	-	-	-	-	-	-
Ak	-	-	-	-	-	-	-	-	-	-	-	-	-
Al	-	-	-	-	-	-	-	-	-	-	-	-	-
An	-	-	-	-	-	-	-	-	-	-	-	-	-
As	-	-	-	-	-	-	-	-	-	-	-	-	-
At	-	-	-	-	-	-	-	-	-	-	-	-	-
Au	3	-	-	3	1	-	-	-	-	2	-	-	1
Az	-	-	-	-	-	-	-	-	-	-	-	-	-
Be	-	-	-	2	-	-	-	-	-	-	-	-	-
Bg	-	-	-	-	-	-	-	-	-	-	-	-	-
Bh	-	-	-	-	-	-	-	-	-	-	-	-	-
Bl	-	-	-	-	-	-	-	-	-	-	-	-	-
Bm	-	-	-	-	-	-	-	-	-	-	-	-	-
Bo	-	-	-	-	-	-	-	-	-	-	-	-	-
Br	1	1	-	6	-	-	-	-	-	12	-	-	-
BrI	-	-	-	9	-	-	-	-	-	2	-	-	-
Bu	1	-	-	1	-	-	-	-	-	-	-	-	-
Bz	-	-	-	-	-	-	-	-	-	-	-	-	-
Ca	-	-	-	-	-	-	-	-	-	-	-	-	-
Cb	-	-	-	-	-	-	-	-	-	-	-	-	-
Cg	-	-	-	-	-	-	-	-	-	-	-	-	-
Ch	-	-	-	-	-	-	-	-	-	-	-	-	-
Cl	-	-	-	-	-	-	-	-	-	-	-	-	-
Cm	-	-	-	-	-	-	-	-	-	-	-	-	-
Cn	1	-	-	-	-	-	-	-	-	-	-	-	-
Co	-	-	-	-	-	-	-	-	-	-	-	-	-
Cr	-	-	-	-	-	-	-	-	-	-	-	-	-
Cs	-	-	-	-	-	-	-	-	-	-	-	-	-
Cy	-	-	-	-	-	-	-	-	-	-	-	-	-
Cz	-	-	-	1	-	-	-	-	-	1	-	-	-
Da	-	-	-	-	-	-	-	-	-	1	-	-	-
Ec	-	-	-	-	-	-	-	-	-	-	-	-	-
Egaf	-	-	-	1	-	-	-	-	-	-	-	-	-
Egas	-	-	-	-	-	-	-	-	-	-	-	-	-
Es	-	-	-	-	-	-	-	-	-	-	-	-	-
Et	-	-	-	-	-	-	-	-	-	-	-	-	-
Fa	-	-	-	-	-	-	-	-	-	-	-	-	-
Fe	-	1	-	-	-	-	-	-	-	-	-	-	-
Ga	-	1	-	21	-	-	-	-	-	1	-	-	-
Ge	-	-	-	1	1	-	-	-	-	1	-	-	-

	TAXA												
	610	620	630	640	650	660	670	680	690	700	710	720	730
Gf	-	-	-	-	-	-	-	-	-	-	-	-	-
Gl	-	-	-	-	-	-	-	-	-	-	-	-	-
Gr	-	1	-	6	-	-	-	-	-	-	-	-	3
Gu	-	-	-	-	-	-	-	-	-	-	-	-	-
Gy	-	-	-	-	-	-	-	-	-	-	-	-	-
Ha	-	-	-	-	-	-	-	-	-	-	-	-	-
Hb	1	-	-	-	-	-	-	-	-	4	-	-	-
Hd	-	-	-	-	-	-	-	-	-	-	-	-	-
He	-	-	-	-	-	-	-	-	-	-	-	-	-
Ho	-	-	-	-	-	-	-	-	-	-	-	-	-
Hs	-	-	-	1	-	-	-	-	-	-	-	-	-
Hu	-	1	-	7	-	-	-	-	-	-	-	-	-
Il	-	-	2	2	-	-	-	-	-	-	-	-	-
In	-	-	-	-	-	-	-	-	-	-	-	-	-
Iq	-	-	1	-	-	-	-	-	-	-	-	-	-
Ir	-	-	3	-	-	-	-	-	-	-	-	-	-
Is	-	-	-	-	-	-	-	-	-	-	-	-	-
It	-	-	-	6	-	-	-	-	-	-	-	-	-
Ja	1	-	-	-	-	-	-	-	-	-	-	-	-
Jo	-	-	-	1	-	-	-	-	-	-	-	-	-
Ju	-	-	-	3	4	-	-	-	-	-	-	-	-
Ke	-	-	-	-	-	-	-	-	-	-	-	-	-
Ko	-	-	-	-	-	-	-	-	-	-	-	-	-
La	-	-	-	-	-	-	-	-	-	-	-	-	-
Le	-	-	1	-	-	-	-	-	-	-	-	-	-
Li	-	-	-	-	-	-	-	-	-	-	-	-	-
Lu	-	-	-	2	-	-	-	-	-	-	-	4	-
Ma	-	-	-	-	-	-	-	-	-	-	-	-	-
Md	-	-	-	-	-	-	-	-	-	-	-	-	-
Me	-	-	-	-	-	-	-	-	-	-	-	-	-
Ml	-	-	-	-	-	-	-	-	-	-	-	-	-
Mo	-	-	-	-	-	-	-	-	-	-	-	-	-
Mr	-	-	-	1	-	-	-	-	-	-	-	-	-
Mu	-	-	-	-	-	-	-	-	-	-	-	-	-
Ne	-	-	-	-	-	-	-	-	-	-	-	-	-
Ni	-	-	-	-	-	-	-	-	-	-	-	-	-
No	-	-	-	-	-	-	-	-	-	1	-	-	-
Nz	-	-	-	-	-	-	-	-	-	-	-	-	-
Pa	-	-	-	-	-	-	-	-	-	-	-	-	-
Pe	-	-	-	-	-	-	-	-	-	-	-	-	-
Pg	-	-	-	-	-	-	-	-	-	-	-	-	-
Ph	-	-	-	-	-	-	-	-	-	-	-	-	-
Pn	-	-	-	-	-	-	-	-	-	-	-	-	-
Po	-	-	-	-	-	-	-	-	-	-	-	-	-
Rm	-	2	-	5	-	-	-	-	-	-	-	-	-
Rseu	1	-	-	-	1	-	-	-	-	-	-	-	-
Rssa	21	-	-	11	52	-	-	-	-	-	-	-	-
Rssi	-	-	-	-	-	-	-	-	-	-	-	-	-
Sa	-	-	-	-	-	-	-	-	-	-	-	-	-
Sb	-	-	-	-	-	-	-	-	-	-	-	-	-
Sd	-	-	-	-	-	-	-	-	-	-	-	-	-
Sh	-	-	-	-	-	-	-	-	-	-	-	-	-
Si	-	-	-	1	-	-	-	-	-	-	-	-	-

	TAXA												
	610	620	630	640	650	660	670	680	690	700	710	720	730
Sn	-	-	-	-	-	-	-	-	-	-	-	-	-
So	-	-	-	-	-	-	-	-	-	-	-	-	-
Su	-	-	-	-	-	-	-	-	-	-	-	-	-
Sy	-	-	14	-	-	6	5	5	2	-	-	-	-
Ta	-	-	-	-	-	-	-	-	-	-	-	-	-
Tb	-	-	-	-	-	-	-	-	-	-	-	-	-
Th	-	-	-	-	-	-	-	-	-	-	-	-	-
Tn	-	-	-	-	-	-	-	-	-	-	-	-	-
Tuas	-	2	20	2	7	-	-	-	-	-	3	-	1
Tueu	-	-	-	-	-	-	-	-	-	-	-	-	-
Tw	-	-	-	-	-	-	-	-	-	-	-	-	-
Ug	-	-	-	-	-	-	-	-	-	-	-	-	-
Ur	-	-	-	-	-	-	-	-	-	-	-	-	-
Us	1	-	-	-	-	-	-	-	-	1	-	-	-
Vt	-	-	-	-	-	-	-	-	-	-	-	-	-
Vz	-	-	-	-	-	-	-	-	-	-	-	-	-
Wi	-	-	-	-	-	-	-	-	-	-	-	-	-
Za	-	-	-	6	1	-	-	-	-	-	-	-	-

Appendix 7. Listing of Database Files Included on Disc

For full explaination of database file contents see thesis section 10.3.1. Copies of the discs containing the database files are held by the author and the Legume Section of the Royal Botanical Garden, Kew, Richmond, Surrey.

Database File	Content	Disc
SPECIMEN	- curatorial data on the specimens	1
HERBARIA	- addresses data for herbaria loaning specimens	1
COLECTOR	- specimen collector(s) and their codes	5
DATAVEGA	- morphological character scores	2
DATAVEGB	- morphological character scores	2
DATAINFA	- morphological character scores	2
DATAINFB	- morphological character scores	2
DATAINFC	- morphological character scores	3
DATALEGA	- morphological character scores	3
DATASEDA	- morphological character scores	3
MORPCHAR	- morphological characters used in phenetic study	3
GEODISTA	- geographical distribution of taxa	1
GEODISTB	- geographical distribution of taxa	1
GEODISTC	- geographical distribution of taxa	1
COUNTRYS	- countries and their code	1
ECOGEOG (1-1500)	- ecogeographic data on the specimens	4
ECOGEOG (1501-2008)	- ecogeographic data on the specimens	5
CHROMNOS	- taxon chromosome counts	6
CHROMREF	- chromosome count references	6
TAXNOME1	- initial taxonomic nomenclatural details	6
TAXNOME2	- novel nomenclatural details	6
SECTNOME	- sectional nomenclatural details	6
GENNOME	- generic nomenclatural details	6

Appendix 8. dBASE Program Listings

a) **CELIA**

```
* CHARACTER CAPTURE PROGRAM
* MAIN MENU OPTIONS
* AUTHOR: Nigel Maxted
* 10/02/85
SET TALK OFF
SET PRINT OFF
SET FORMAT TO SCREEN
SET CONSOLE ON
CLEAR
ERASE
@ 5,27 SAY "********** CELIA **********"
@ 9,22 SAY "SPECIMEN CHARACTER SCORE INPUT PROGRAM"
@ 14,30 SAY "AUTHOR : NIGEL MAXTED"
STORE 0 TO delay
DO WHILE delay < 120
  STORE delay +1 TO delay
ENDDO
ERASE
SET INTENSITY OFF
* OPTIONS
DO WHILE t
  CLEAR
  ERASE
  SET INTENSITY ON
  @ 5,35 SAY  "MENU OPTIONS"
  SET INTENSITY OFF
  @  8,10 SAY  "0     EXIT TO OPERATING SYSTEM"
  @ 10,10 SAY  "1     EXIT TO dBASE II"
  @ 12,10 SAY  "2     COMMENCE SCORING SPECIMENS"
  @ 16,10 SAY "PLEASE SELECT OPTION : "
  STORE " " TO option
  WAIT TO option
  DO CASE
        CASE option="0"
             CLEAR
             QUIT
        CASE option="1"
             CANCEL
             ERASE
        CASE option="2"
             DO CELIPROG
             CANCEL
             ERASE
        OTHERWISE
             @ 20,20 SAY "ILLEGAL OPTION"
             STORE 1 TO xx
             DO WHILE xx<35
                  STORE xx+1 TO xx
             ENDDO
  ENDCASE
ENDDO WHILE t
```

b) **CELIPROG**

```
* FILENAME = CELIPROG
* AUTHOR :Nigel Maxted
* 21/1/86
* SPECIMEN CHARACTER SCORE INPUT PROGRAM.
SET INTENSITY OFF
SET FORMAT TO SCREEN
SET PRINT OFF
SET CONSOLE ON
SET TALK OFF
SET COLON OFF
CLEAR
ERASE
STORE y TO repeat
DO WHILE repeat
   *Data input
 STORE "Enter a number to score characters or return to add zero's"        TO presskey
```

```
*Databases in use
USE b:datavega INDEX b:datavega
STORE "     " TO specimen
ERASE
@ 10,25 SAY "Please input specimen number:S" GET specimen              PICTURE "99999"
READ
FIND &specimen
IF .NOT. # = 0
   ERASE
   @ 10,25 SAY "Specimen previously scored"
   STORE 0 to delay
      DO WHILE delay <80
         STORE delay + 1 TO delay
      ENDDO
ELSE
   @ 15,25 SAY "Appending blanks to all database files"
   USE
   STORE VAL(specimen) TO specimen1
   USE DATAVEGA
   APPEND BLANK
   REPLACE cs WITH specimen1
   USE DATAVEGB
   APPEND BLANK
   REPLACE cs WITH specimen1
   USE DATAINFA
   APPEND BLANK
   REPLACE cs WITH specimen1
   USE DATAINFB
   APPEND BLANK
   REPLACE cs WITH specimen1
   USE DATAINFC
   APPEND BLANK
   REPLACE cs WITH specimen1
   USE DATALEGA
   APPEND BLANK
   REPLACE cs WITH specimen1
   USE DATASEDA
   APPEND BLANK
   REPLACE cs WITH specimen1
   SELECT SECONDARY
      USE DATAVEGB
      GO BOTTOM
   SELECT PRIMARY
      USE DATAVEGA
      GO BOTTOM
   DO VEG1
   DO VEG2
   DO VEG3
   SELECT SECONDARY
   DO VEG4
   DO VEG5
   DO VEG6
   DO VEG7
    *NEXT DATABASES IN USE
   SELECT SECONDARY
     USE DATAINFB
     GO BOTTOM
   SELECT PRIMARY
     USE DATAINFA
     GO BOTTOM
   DO INF1
   DO INF2
   DO INF3
   DO INF4
   DO INF5
   DO INF6
   SELECT SECONDARY
   DO INF7
   DO INF8
   DO INF9
   *NEXT DATABASES IN USE
   SELECT SECONDARY
     USE DATALEGA
     GO BOTTOM
```

```
      SELECT PRIMARY
        USE DATAINFC
        GO BOTTOM
      DO INF10
      DO INF11
      DO INF12
      DO INF13
      SELECT SECONDARY
      DO LEG1
      DO LEG2
      DO LEG3
      DO LEG4
      DO LEG5
      *NEXT DATABASES IN USE
      SELECT PRIMARY
        USE DATASEDA
        GO BOTTOM
      DO SED1
      DO SED2
      DO SED3
      DO SED4
      DO SED5
   ENDIF
   *CLOSE DATABASE FILES
   SELECT SECONDARY
     USE
   SELECT PRIMARY
     USE
   ERASE
   @ 5,27 SAY "********** CELIA **********"
   @ 9,22 SAY "SPECIMEN CHARACTER SCORE INPUT PROGRAM"
   @ 14,20 SAY  "DO YOU WISH TO SCORE ANOTHER SPECIMEN y/n "
   @ 14,61 GET repeat
   READ
ENDDO
*Reindexing files
USE DATAVEGA INDEX DATAVEGA
REINDEX
USE DATAVEGB INDEX DATAVEGB
REINDEX
USE DATAINFA INDEX DATAINFA
REINDEX
USE DATAINFB INDEX DATAINFB
REINDEX
USE DATAINFC INDEX DATAINFC
REINDEX
USE DATALEGA INDEX DATALEGA
REINDEX
USE DATASEDA INDEX DATASEDA
REINDEX
CLEAR
ERASE
QUIT
```

c) **VEG1**

```
* FILENAME = VEG1
* AUTHOR = NIGEL MAXTED
* 19/11/86
* VEGETATIVE CHARACTER SCORE INPUT PROGRAM
* VEG/1.CMD
ERASE
STORE "0" TO a,b,f
STORE "00" TO c,d
STORE "000" TO e
@  1,0  SAY presskey
@  2,25 SAY "SUBGENERIC CHARACTER SET"
@  3, 0 SAY "No. ¦           Characters                ¦State¦"
@  3,56 SAY "Description       ¦Score"
@  4, 4 SAY "¦                                      ¦ No. ¦"
@  4,74 SAY "¦"
@  5, 0 SAY "----+-----------------------------------+-----+-"
@  5,50 SAY "----------------------+-----"
@  6, 0 SAY "1   ¦Growth habit                        ¦ 1   ¦E" @  6,50 SAY "rect                  ¦"
```

```
@  7, 4 SAY "|                                    | 2   |Ascen" @  7,54 SAY "ding                |"
@  8, 4 SAY "|                                    | 3   |Procu" @  8,54 SAY "mbent               |"
@  9, 0 SAY "----+------------------------------------+-----+-"
@  9,50 SAY "----------------------+-----"
@ 10, 0 SAY "2   |Stipule shape                        | 1   |E"
@ 10,50 SAY "ntire                    |"
@ 11, 4 SAY "|                                    | 2   |Semi-"
@ 11,54 SAY "hastate             |"
@ 12, 4 SAY "|                                    | 3   |Semi-"
@ 12,54 SAY "saggitate           |"
@ 13, 4 SAY "|                                    | 4   |Lacin" @ 13,54 SAY "ate                 |"
@ 14, 0 SAY "----+------------------------------------+-----+-"
@ 14,50 SAY "----------------------+-----"
@ 15, 0 SAY "3   |Stipule length (A)                   |     |0"
@ 15,50 SAY ".5mm                     |"
@ 16, 0 SAY "----+------------------------------------+-----+-"
@ 16,50 SAY "----------------------+-----"
@ 17, 0 SAY "4   |Stipule width (B)                    |     |0"
@ 17,50 SAY ".5mm                     |"
@ 18, 0 SAY "----+------------------------------------+-----+-"
@ 18,50 SAY "----------------------+-----"
@ 19, 0 SAY "5   |Stipule length-width ratio           |     |"
@ 19,74 SAY "|"
@ 20, 4 SAY "|(A divided by B)                     |     |"
@ 20,74 SAY "|"
@    21,    0    SAY    "----+------------------------------------+-----+-"    @    21,50    SAY
"----------------------+-----"
@ 22, 0 SAY "6   |Stipule edge form                    | 1   |E"
@ 22,50 SAY "ntire                    |"
@ 23, 4 SAY "|                                    | 2   |Uneve"
@ 23,54 SAY "n with swollen hairs|"
STORE " " TO p
@ 1, 60 GET p PICTURE "9"
READ
IF.NOT. p =" "
  @ 8,75 GET a PICTURE "9"
  @ 13,75 GET b PICTURE "9"
  @ 15,75 GET c PICTURE "99"
  @ 17,75 GET d PICTURE "99"
  @ 23,75 GET e PICTURE "9"
  READ
ENDIF
STORE VAL(a) TO aa
STORE VAL(b) TO ba
STORE VAL(c) TO ca
STORE VAL(d) TO da
STORE VAL(e) TO ea
STORE VAL(f) TO fa
IF .NOT. p = " "
  STORE ca * 100 / da TO ea
ENDIF
IF .NOT. aa = 0
  DO WHILE aa>3
        @  8,75 GET aa PICTURE "9"
        READ
  ENDDO
ENDIF
IF .NOT. ba = 0
  DO WHILE ba>4
        @  13,75 GET ba PICTURE "9"
        READ
  ENDDO
ENDIF
IF .NOT. ca = 0
  DO WHILE ca>99
        @  15,75 GET ca PICTURE "99"
        READ
  ENDDO
ENDIF
IF .NOT. da = 0
  DO WHILE da>99
        @  17,75 GET da PICTURE "99"
        READ
```

```
  ENDDO
ENDIF
IF .NOT. ea = 0
  DO WHILE ea>999
        @  20,75 GET ea PICTURE "999"
        READ
  ENDDO
ENDIF
IF .NOT. fa = 0
  DO WHILE fa>2
        @  23,75 GET fa PICTURE "9"
        READ
  ENDDO
ENDIF
REPLACE C1 WITH aa,C2 WITH ba,C3 WITH ca,C4 WITH da,C5 WITH ea,C6 WITH fa
RETURN
```

d) **LICEA**

```
* Filename LICEA - SPECIMEN TO TAXON SYNTHESIS
* Authors -  Nigel Maxted and James Williams
* dBASE II, RML 380Z-D
* Input files - SPECIMEN,MCOUNT,MDESCRIP,DATAVEGA,DATAVEGB
*             - DATAINFA,DATAINFB,DATAINFC,DATALEGA,DATASEDA
* Output files - C:CTAX & C:MTAX
* Version 4.2  11/09/86  NM & JMW
* Control parameters
SET EXACT ON
SET TALK OFF
SET INTENSITY OFF
SET FORMAT TO SCREEN
SET PRINT OFF
SET CONSOLE ON
CLEAR
ERASE
* Frontpanel
@ 5,27 SAY "********** LICEA **********"
@ 9,22 SAY "SPECIMEN TO TAXON SYNTHESIS PROGRAM"
@ 14,20 SAY "AUTHORS : NIGEL MAXTED AND JAMES WILLIAMS"
STORE 0 TO delay
DO WHILE delay < 100
  STORE delay + 1 TO delay
ENDDO
ERASE
* Selection of taxon or taxa description
STORE " " TO series
DO WHILE series =" "
   @ 6,27 SAY "********** LICEA **********"
   @ 15,10 SAY "Do you wish to produce descriptions for a Series of"
   @ 16,10 SAY "taxa, or One particular taxon ? "
   @ 16,45 GET SERIES
   READ
   STORE !(series) TO series
   IF series ='S' .OR.  series ='O'
      STORE -1 TO q
      ERASE
   ELSE
      STORE " " TO series
   ENDIF
ENDDO
* Descriptions of taxa
IF series = "S"
   DO WHILE q < 1
      STORE 0 TO s
      STORE 0 TO f
      @  1,27 SAY "********** LICEA **********"
      @  5,10 SAY "Please input starting taxon code T"
      @  5,45 GET s PICTURE "99"
      @  7,10 SAY "Please input finishing taxon code T"
      @  7,45 GET f PICTURE "99"
      READ
      STORE f-s TO q
      STORE STR(s,2) TO tax
      STORE q+1 TO q
```

```
      ERASE
      @ 1,27 SAY "********** LICEA **********"
      @ 3,5 SAY "A series of taxa is being described"
      @ 4,5 SAY "The series starts at " + STR(s,2)
      @ 5,5 SAY "     and finishes at " + STR(f,2)
   ENDDO
ELSE
   STORE "  " TO tax
   @  1,27 SAY "********** LICEA **********"
   @  5,05 SAY "Please enter taxon code for the taxon you wish to describe"
   @  5,65 GET tax PICTURE "99"
   READ
   STORE 1 TO q
   ERASE
   @ 1,27 SAY "********** LICEA **********"
   @ 3,5 SAY "One particular taxon is being described"
   @ 5,5 SAY "The taxon being described is " + tax
ENDIF
* Find specimens attributed to taxa or the taxon
STORE 0 TO sfin
* Series loop
DO WHILE sfin < q
   SELECT SECONDARY
      USE DATAVEGA
   SELECT PRIMARY
      USE SPECIMEN INDEX SPECNDX
   GO TOP
   IF VAL(tax) < 10
      STORE "0" + $(tax,2,1) TO tax
   ENDIF
   @ 7,5 SAY "Current taxon being described is " + tax
   @ 9,5 SAY "Counting the number of specimens loaned as taxon " + tax
   COUNT FOR $(BEGNOS,2,2) = tax TO tt
   @ 9,35 SAY "                              "
   @ 9,5 SAY "Total number of specimens loaned of " + tax
   @ 9,43 SAY " =" + STR(tt,3)
   @ 11,5 SAY "Counting the number of specimens scored as taxon " + tax
   SELECT SECONDARY
   STORE tax + "000" TO barb
   STORE tax + "999" TO reb
   COUNT FOR cs < VAL(reb) .AND. cs > VAL(barb) TO ct
   @ 11,35 SAY "                               "
   @ 11,5 SAY "Total number of specimens scored of " + tax
   @ 11,43 SAY " =" + STR(ct,3)
   IF ct = 0
      @ 11,5 SAY"There are no specimens scored of taxon " + tax
   ELSE
*Creating output files
      STORE "M" + tax TO mtax
      STORE "C" + tax TO ctax
      @ 13,5 SAY "Creating files to store results"
      @ 15,5 SAY "                                    "
      @ 15,35 SAY "                                   "
      SELECT SECONDARY
         USE mcount
      COPY TO &ctax
         use mdescrip
      COPY TO &mtax
      STORE "T" + tax + "0" TO ttax
      SELECT PRIMARY
      FIND &ttax
      STORE $(ACCNOS,2,5) TO specno
      STORE 1 TO tst
* Taxon loop
      DO WHILE tst < ct + 1
         SELECT SECONDARY
            USE DATAVEGA
         LOCATE FOR cs = &specno
         IF # < 1
            @ 13,5 SAY "Specimen  " + specno
            @ 13,20 SAY " has yet to be scored"
         ELSE
            STORE tst + 1 TO tst
            @ 13,20 SAY "                                  "
```

```
          @ 13,5 SAY "Specimen being used is " + specno
          STORE 1 TO x
* Specimen loop
          DO WHILE x < 172
             DO CASE
                CASE x <10
                   STORE STR(x,1) TO xx
                   STORE "C00" + xx TO lx
                CASE x >9 .AND. x <100
                   STORE STR(x,2) TO xx
                   STORE "C0" + xx TO lx
                CASE x >99
                   STORE STR(x,3) TO xx
                   STORE "C" + xx TO lx
             ENDCASE
             STORE "C" + xx TO cx
             @ 15,5 SAY "Character being used is "
             @ 15,32 SAY "   "
             @ 15,32 SAY xx
* Sorting out DATA input files
             DO CASE
                CASE x =1
                   STORE "DATAVEGA" TO file
                CASE x =20
                   STORE "DATAVEGB" TO file
                CASE x =40
                   STORE "DATAINFA" TO file
                CASE x =70
                   STORE "DATAINFB" TO file
                CASE x =92
                   STORE "DATAINFC" TO file
                CASE x =123
                   STORE "DATALEGA" TO file
                CASE x =147
                   STORE "DATASEDA" TO file
             ENDCASE
* Distinguish multistate from continuous characters
             DO CASE
                CASE x<3 .OR. (x<13 .AND. x>5) .OR. (x<24 .AND. x>19);
                   .OR. (x<41 .AND. x>25) .OR. (x<55 .AND. x>47);
                   .OR. (x<70 .AND. x>59) .OR. (x<84 .AND. x>77)
                   STORE "M" TO t
                CASE (x<101 .AND. x>89) .OR. (x<109 .AND. x>106);
                   .OR. (x<113 .AND. x>111) .OR. (x<121 .AND. x>115);
                   .OR. (x<124 .AND. x>121) .OR. (x<144 .AND. x>128)
                   STORE "M" TO t
                CASE (x<147 .AND. x>144) .OR. (x<172 .AND. x>155)
                   STORE "M" TO t
                OTHERWISE
                   STORE "C" TO t
             ENDCASE
             SELECT SECONDARY
                USE &file
             LOCATE FOR cs = &specno
* Conflation for multistate characters
             IF t = "M"
                STORE &cx TO stateno
                SELECT SECONDARY
                   USE &mtax
                LOCATE FOR CHARNOS = lx
                DO CASE
                   CASE stateno =0
                      STORE "MISS" TO which
                   CASE stateno =1
                      STORE "ONE" TO which
                   CASE stateno =2
                      STORE "TWO" TO which
                   CASE stateno =3
                      STORE "THREE" TO which
                   CASE stateno =4
                      STORE "FOUR" TO which
                   CASE stateno =5
                      STORE "FIVE" TO which
                   CASE stateno =6
```

```
                     STORE "SIX" TO which
                  CASE stateno =7
                     STORE "SEVEN" TO which
                  CASE stateno =8
                     STORE "EIGHT" TO which
               ENDCASE
               STORE &which TO ch
               STORE ch +1 TO ch
               REPLACE &which WITH ch
            ELSE
* Conflation for continuous characters
               STORE &cx TO nbr
               SELECT SECONDARY
                  USE &ctax
               LOCATE FOR CHARNOS = lx
               IF nbr < 1
                  STORE miss TO ms
                  STORE ms + 1 TO ms
                  REPLACE miss WITH ms
               ELSE
                  STORE MAX TO mmax
                  STORE MIN TO mmin
                  STORE TOTAL TO mtotal
                  STORE NUMBER TO mn
                  STORE mtotal + nbr TO mtotal
                  STORE mn +1 TO mn
                  IF nbr > mmax
                     REPLACE MAX WITH nbr
                  ENDIF
                  IF nbr < mmin
                     REPLACE MIN WITH nbr
                  ENDIF
                  REPLACE TOTAL WITH mtotal,NUMBER WITH mn
               ENDIF
            ENDIF
            STORE x + 1 TO x
         ENDDO
         SELECT PRIMARY
         SKIP
         STORE $(accnos,2,5) TO specno
      ENDIF
   ENDDO
   @ 15,5 SAY "Calculating means for the continuous characters"
   SELECT SECONDARY
      USE &ctax
   GO TOP
   DO WHILE .NOT. EOF
      STORE TOTAL TO mtotal
      STORE NUMBER TO mn
      IF mtotal = 0 .OR. mn = 0
         STORE 0 TO mmean
      ELSE
         STORE mtotal/mn TO mmean
      ENDIF
      REPLACE MEAN WITH mmean
      SKIP
   ENDDO
ENDIF
@ 7,5 SAY "                                          "
@ 7,35 SAY "                                          "
@ 9,5 SAY "                                          "
@ 9,35 SAY "                                          "
@ 11,5 SAY "                                          "
@ 11,35 SAY "                                          "
@ 13,5 SAY "                                          "
@ 13,35 SAY "                                          "
@ 15,5 SAY "                                          "
@ 15,35 SAY "                                          "
STORE sfin + 1 TO sfin
STORE VAL(tax) TO vt
STORE vt + 1 TO vt
STORE STR(vt,2) TO tax
ENDDO
ERASE
```

```
@ 15,15 SAY "LICEA IS NOW FINISHED."
QUIT
```

e) **CALIE**

```
* Filename CALIE - TAXON SYNTHESIS TO DELTA FORMAT
* Authors -  Nigel Maxted and Diana Richardson
* dBASE II, RML 380Z-D
* Input files - CTAX, MTAX, HTAX & DTAX
* Output files - OTAX
* Version 1  21/11/87  NM & DR
* Control parameters
SET EXACT ON
SET TALK OFF
SET INTENSITY OFF
SET FORMAT TO SCREEN
SET PRINT OFF
SET CONSOLE ON
CLEAR
ERASE
* Frontpanel
@ 5,27 SAY "********** CALIE **********"
@ 9,22 SAY "SYNTHESIS TAXON TO DELTA FORMAT PROGRAM"
@ 14,20 SAY "AUTHORS : NIGEL MAXTED AND DIANA RICHARDSON"
STORE 0 TO delay
DO WHILE delay < 100
  STORE delay + 1 TO delay
ENDDO
ERASE
* Selection of taxon or taxa to be converted description
STORE " " TO series
DO WHILE series =" "
   @ 6,27 SAY "********** CALIE **********"
   @ 15,10 SAY "Do you wish to convert descriptions for a Series of"
   @ 16,10 SAY "taxa, or One particular taxon ? "
   @ 16,45 GET SERIES
   READ
   STORE !(series) TO series
   IF series ='S' .OR.  series ='O'
      STORE -1 TO q
      ERASE
   ELSE
      STORE " " TO series
   ENDIF
ENDDO
* Descriptions conversion of taxa
IF series = "S"
   DO WHILE q < 1
      STORE 0 TO s
      STORE 0 TO f
      @  1,27 SAY "********** CALIE **********"
      @  5,10 SAY "Please input starting taxon code T"
      @  5,45 GET s PICTURE "99"
      @  7,10 SAY "Please input finishing taxon code T"
      @  7,45 GET f PICTURE "99"
      READ
      STORE f-s TO q
      STORE STR(s,2) TO tax
      STORE q+1 TO q
      ERASE
      @ 1,27 SAY "********** CALIE **********"
      @ 3,5 SAY "A series of taxa is being converted"
      @ 4,5 SAY "The series starts at " + STR(s,2)
      @ 5,5 SAY "     and finishes at " + STR(f,2)
   ENDDO
ELSE
   STORE "  " TO tax
   @  1,27 SAY "********** CALIE **********"
   @  5,05 SAY "Please enter taxon code for the taxon you wish to convert"
   @  5,65 GET tax PICTURE "99"
   READ
   STORE 1 TO q
   ERASE
   @ 1,27 SAY "********** CALIE **********"
```

```
   @ 3,5 SAY "One particular taxon is being converted"
   @ 5,5 SAY "The taxon being converted is " + tax
ENDIF
* Find specimens attributed to taxa or the taxon
STORE 0 TO sfin
DO WHILE sfin < q
   IF VAL(tax) < 10
      STORE "0" + $(tax,2,1) TO tax
   ENDIF
* check to see if taxon is described
   @ 7,5 SAY "Current taxon being converted is " + tax
   * Create output files
   STORE "O" + tax TO otax
   STORE "M" + tax TO mtax
   STORE "C" + tax TO ctax
   STORE 1 TO zt
@ 13,5 SAY "                                                                    "
   @ 13,5 SAY "Creating files to store results       "
   USE dtax
   COPY TO &otax
   SELECT SECONDARY
      USE &otax
      GO TOP
   SELECT PRIMARY
      USE &mtax
      GO TOP
      STORE 1 TO zt
      @ 13,5 SAY "Converting the multistate characters to DELTA format"
   DO WHILE .NOT. EOF
      STORE "," TO mi
      IF one > 0
         STORE mi + "1/" TO mi
      ENDIF
      IF two > 0
         STORE mi + "2/" TO mi
      ENDIF
      IF three > 0
         STORE mi + "3/" TO mi
      ENDIF
      IF four > 0
         STORE mi + "4/" TO mi
      ENDIF
      IF five > 0
         STORE mi + "5/" TO mi
      ENDIF
      IF six > 0
         STORE mi + "6/" TO mi
      ENDIF
      IF seven > 0
         STORE mi + "7/" TO mi
      ENDIF
      STORE LEN(mi) TO me
      STORE $(mi,1,(me-1)) TO mi
      SELECT SECONDARY
      GOTO zt
      STORE charnos TO st
      DO CASE
         CASE st < 10
            STORE 1 TO lst
         CASE st < 100
            STORE 2 TO lst
         CASE st > 99
            STORE 3 TO lst
      ENDCASE
      STORE str(st,lst) + mi + " " to r
      REPLACE attr WITH r
      RELEASE mi,me,st,lst,r
      STORE zt + 1 TO zt
      SELECT PRIMARY
      SKIP
   ENDDO
   SELECT SECONDARY
      USE &otax
   SELECT PRIMARY
```

```
   USE &ctax
   GO TOP
   @ 13,5 SAY"Converting the continuous characters to DELTA format"
DO WHILE zt < 172
   STORE min TO n
   STORE max TO x
   SELECT SECONDARY
   GOTO zt
   STORE charnos TO st
   DO CASE
      CASE st < 10
         STORE 1 TO lst
      CASE st < 100
         STORE 2 TO lst
      CASE st > 99
         STORE 3 TO lst
   ENDCASE
   DO CASE
      CASE n < 10
         STORE 1 TO ln
      CASE n < 100
         STORE 2 TO ln
      CASE n > 99
         STORE 3 TO ln
   ENDCASE
   DO CASE
      CASE x < 10
         STORE 1 TO lx
      CASE x < 100
         STORE 2 TO lx
      CASE x > 99
         STORE 3 TO lx
   ENDCASE
   STORE str(st,lst) + "," + str(n,ln) + "-" + str(x,lx) + " " to r
   REPLACE attr WITH r
   RELEASE n,x,st,ln,lx,lst,r
   STORE zt + 1 TO zt
   SELECT PRIMARY
   SKIP
ENDDO
   SELECT SECONDARY
   SORT ON charnos TO etax
   USE ftax
   COPY TO gtax STRUCTURE
   USE gtax
   APPEND FROM etax
   GO TOP
   SELECT PRIMARY
   USE htax
   COPY TO itax
   USE itax
   GO BOTTOM
   APPEND BLANK
   GO TOP
   STORE 1 TO rick
   DO WHILE rick < 44
      SELECT SECONDARY
      STORE TRIM(attr) TO chara
      SKIP
      STORE TRIM(attr) TO charb
      SKIP
      STORE TRIM(attr) TO charc
      SKIP
      IF rick = 43
         STORE " " TO chard
      ELSE
         STORE TRIM(attr) TO chard
      ENDIF
      SKIP
      SELECT PRIMARY
      STORE tax + TRIM(linnos) + "     " TO line
      REPLACE linnos WITH line
      REPLACE chars WITH chara+" "+ charb+" " + charc+" " + chard
      RELEASE chara,charb,cahrc,chard
```

```
         STORE rick + 1 TO rick
         SKIP
      ENDDO
      SELECT PRIMARY
      STORE "CAL" + tax TO caltax
      COPY TO &caltax.dat sdf
      SELECT SECONDARY
         USE
      SELECT PRIMARY
         USE
      DELETE FILE etax
      DELETE FILE gtax
      DELETE FILE itax
      DELETE FILE &otax
      STORE sfin + 1 TO sfin
      STORE VAL(tax) TO vt
      STORE vt + 1 TO vt
      STORE STR(vt,2) TO tax
   ENDDO
ENDDO
ERASE
@ 15,15 SAY "CALIE IS NOW FINISHED."
```

f) **PHYTOGEOG**

```
* Filename PHYTOGEOG - TAXON DISTRIBUTION SYNTHESIS PROGRAM
* Authors -  Nigel Maxted
* dBASE II, RML 380Z-D
* Input files - ECOGEOG
* Output files - GEODISTA,GEODISTB,GEODISTC
* Version 3  21/11/86  NM
SET TALK OFF
SET PRINT OFF
SET INTENSITY OFF
CLEAR
ERASE
DO WHILE .NOT. EOF
   SELECT PRIMARY
   USE c:ecogeog INDEX C:endind
   DO CASE
      CASE $(endnos,2,3) < 310
         SELECT SECONDARY
         USE geodista
      CASE $(endnos,2,3) > 300 .AND. < 610
         SELECT SECONDARY
         USE geodistb
      OTHERWISE
         SELECT SECONDARY
         USE geodistc
   ENDCASE
   SELECT PRIMARY
      STORE endnos TO tax
      STORE ctryorig TO unit
      SELECT SECONDARY
      LOCATE FOR code = unit
         IF $(tax)  = "-"
            REPLACE unit WITH "1"
         ELSE
            STORE $(tax) + 1 TO x
            REPLACE unit WITH x
         ENDIF
      SELECT PRIMARY
      SKIP
ENDDO
SELECT SECONDARY
USE
SELECT PRIMARY
USE
CLEAR
ERASE
```

g) **MENULAB**

```
* LABEL PRODUCTION PROGRAM
```

```
* MAIN MENU OPTIONS
* AUTHOR: Nigel Maxted
* 21/04/86
SET TALK OFF
SET PRINT OFF
SET FORMAT TO SCREEN
SET CONSOLE ON
CLEAR
ERASE
@ 5,27 SAY "********** LABELS **********"
@ 9,22 SAY " LABEL PRODUCTION PROGRAM"
@ 14,30 SAY "AUTHOR : NIGEL MAXTED"
STORE 0 TO delay
DO WHILE delay < 120
  STORE delay +1 TO delay
ENDDO
ERASE
SET INTENSITY OFF
* OPTIONS
DO WHILE t
  CLEAR
  ERASE
  SET INTENSITY ON
  @ 5,35 SAY  "MENU OPTIONS"
  SET INTENSITY OFF
  @  8,10 SAY  "0     EXIT TO OPERATING SYSTEM"
  @ 10,10 SAY  "1     EXIT TO dBASE II"
  @ 12,10 SAY  "2     PRODUCE HERBARIUM SPECIMEN LABELS"
  @ 13,10 SAY  "3          PRODUCE DETERMINATION LABELS"
  @ 14,10 SAY  "4          PRODUCE SEED CONTAINER LABELS"
  @ 16,10 SAY "PLEASE SELECT OPTION : "
  STORE " " TO option
  WAIT TO option
  DO CASE
        CASE option="0"
             CLEAR
             QUIT
        CASE option="1"
             CANCEL
             ERASE
        CASE option="2"
             DO HERBLAB
             CANCEL
             ERASE
        CASE option="3"
             DO DETLAB
             CANCEL
             ERASE
        CASE option="4"
             DO SEEDLAB
             CANCEL
             ERASE
        OTHERWISE
             @ 20,20 SAY "ILLEGAL OPTION"
             STORE 1 TO xx
             DO WHILE xx<35
                   STORE xx+1 TO xx
             ENDDO
  ENDCASE
ENDDO WHILE t
```

h) **HERBLAB**

```
* FILENAME HERBLAB - PRINTS LABELS FOR HERBARIUM SHEETS
* AUTHOR - NIGEL MAXTED
* DB FILES USED TUSITE AND TUPLASM
* VERSION 2 12/08/87
*SET CONTROL PARAMETERS
SET TALK OFF
SET COLON OFF
SET CONSOLE ON
SET FORMAT TO SCREEN
SET EXACT ON
SET INTENSITY OFF
```

```
CLEAR
ERASE
*FRONT PANEL
@ 5,25 SAY "HERBARIUM LABELING PROGRAM"
@ 8,27 SAY "AUTHOR - NIGEL MAXTED"
@ 12,18 SAY "DEDICATED TO S. HOLLIS WITH LOVE AND TEARS"
STORE 0 TO DELAY
DO WHILE DELAY < 150
   STORE DELAY +1 TO DELAY
ENDDO
ERASE
STORE "Y" TO ANS
STORE "   " TO HERB
@ 10,20 SAY "FOR WHICH SET OF SPECIMENS DO YOU WISH TO PRODUCE LABELS ?"
@ 12,35 SAY "eg. SPN, K, E, MO etc." GET HERB PICTURE "XXX"
READ
STORE !(HERB) TO HERB
STORE TRIM(HERB) TO HERB
ERASE
@ 10,00 SAY "Please align labels in printer and then press return to continue"
WAIT TO CONT
ERASE
SET CONSOLE OFF
SET PRINT ON
@ 12,20 SAY "PRINTING - PLEASE WAIT TILL COMPLETED"
STORE 1 TO CT
STORE 1 TO CNT
STORE 1 TO COT
SELECT PRIMARY
USE C:TUPLASM INDEX A:NAMES
GO TOP
DO WHILE .NOT. EOF
  SELECT PRIMARY
  IF TAG>0
* IF HERB$(HERCOLL)
     *DATABASE FILES IN USE
           STORE SITENOS TO SN
           STORE STR(COLLNOS,4) TO C
           STORE TRIM(FGENNAME) TO G
           STORE TRIM(FSPNAME) TO S
           STORE TRIM(FSSPNAME) TO SS
           STORE TRIM(HERBDATE) TO D
           STORE TAG TO NS
*          STORE NOSSPEC TO NS
           SKIP
     SELECT SECONDARY
        USE C:TUSITE
           GO TOP
           LOCATE FOR SITENOS = SN
           STORE TRIM(PROVINCE) TO P
           STORE TRIM(NRSETTLE) TO N
           STORE TRIM(LOCATION) TO LO
           STORE 40 TO X
           STORE LEN(LO) TO Q
           IF Q < 40
              STORE LO TO LA
              STORE " " TO LB
           ELSE
              DO WHILE $(LO,X,1) <>" "
                 STORE X-1 TO X
              ENDDO
              STORE $(LO,1,X-1) TO LA
              STORE Q-X TO Q
              STORE $(LO,X+1,Q) TO LB
           ENDIF
           STORE TRIM(ALTITUDE) TO A
           STORE LONGTUDE TO L
           STORE LATITUDE TO LT
           STORE TRIM(PHYSICAL) TO PY
           DO WHILE CNT<NS + 2
              *STORING VALUES FOR EACH LABEL

?
?
```

```
?"------------------------------------------------------------------------"
?
?"                University of Southampton"
?
? "                      Flora of Turkey"
?
?  G + " " + S
?  SS
?
? "Province : " + P + "  Nearest Settlement : " + N
? "Location : " + LA
? LB
? "Habitat : " + PY
? "Altitude : "+A+" "+"  Latitude : "+LT+"N"+"   Longitude : "+L+"E"
?
? "Collectors : Maxted, Allkin and Khattab  "+C
? "Date : " + D + "/87"
?
?"------------------------------------------------------------------------"
?
?
        STORE CT + 1 TO CT
        STORE COT + 1 TO COT
        STORE CNT + 1 TO CNT
      IF CT = 4
         STORE 1 TO CT
         ?
      ENDIF
      IF COT = 22
         ERASE
         STORE 1 TO COT
         @ 12,0 SAY "Re-align labels then press a key to continue "
         @ 13,0 say "  or 'Q' to quit  " GET ANS
         READ
         STORE !(ANS) TO ANS
         IF ANS = 'Q'
            SET PRINT OFF
            SET CONSOLE ON
            CANCEL
         ENDIF
      ENDIF
      ENDDO
      STORE 1 TO CNT
   ELSE
      SKIP
   ENDIF
ENDDO
ERASE
@ 12,35 SAY "FINISHED"
@ 14,20 SAY "YET ANOTHER SUCCESSFUL HERBLAB RUN"
CLEAR
```

i) **DETLAB**

```
* FILENAME DETLAB - DETERMINATION LABELS FOR ACCESSIONS
* AUTHOR - NIGEL MAXTED
* DBASEII, RML 380Z-D
* USES 12 PITCH CHARACTERS AND 6 LINES/INCH ON THE DIABLO PRINTER
* VERSION 13   03/08/87  NM
* SET CONTROL PARAMETERS
SET TALK OFF
SET PRINT OFF
SET CONSOLE ON
SET FORMAT TO SCREEN
SET EXACT ON
CLEAR
ERASE
@ 5,10 SAY "Determination Labelling Program"
@ 10,0 SAY "Please align labels in printer and then press a key to continue"
* VARIABLES
STORE 1 TO CNT
STORE 2 TO CT
STORE "Y" TO ANS
USE C:TUPLASM INDEX A:NAMES
```

```
WAIT TO CONT
@ 17,0 SAY "Printing, please wait ...."
@ 20,0
SET PRINT ON
GO TOP
DO WHILE .NOT. EOF
   STORE TAG TO TAG
   STORE STR(COLLNOS,4) TO CN
   STORE TRIM(DGENNAME) TO G
   STORE TRIM(DSPNAME) TO SP
   STORE TRIM(DSSPNAME) TO SSP
   STORE LEN(SSP) TO LSSP
   DO WHILE CT<TAG + 1
      ?
      ? "Maxted, Allkin & Khattab " + CN
      ?
      ? "  " + G + " " + SP
      IF LSSP >1
         ? "  " + SSP
      ENDIF
      ?
      IF G = "Lathyrus"
         ? "Det.  D.J. Goyder     10.viii.87"
      ELSE
         ? "Det.  Nigel Maxted    05.viii.87"
      ENDIF
      IF LSSP < 2
         ?
      ENDIF
      STORE CNT + 1 TO CNT
      STORE CT + 1 TO CT
   ENDDO
   STORE 2 TO CT
   SKIP
   IF CNT = 50
      STORE 1 TO CNT
      @ 14,0 SAY "        "
      @ 12,0 SAY "Please re-align labels then press a key to continue "
      @ 13,0 SAY " or 'Q' to quit " GET ANS
      READ
      STORE !(ANS) TO ANS
      IF ANS ='Q'
         SET PRINT OFF
        SET CONSOLE ON
         CANCEL
      ENDIF
   ENDIF
ENDDO
SET PRINT OFF
SET CONSOLE ON
@ 20,35 SAY "Finished."
USE
```

j) **SEEDLAB**

```
* FILENAME SEEDLAB - PRINTS LABELS FOR SEEDLOTS
* AUTHOR - Nigel Maxted
* DBASEII, RML 380Z-D
* USES 12 PITCH CHARACTERS AND 6 LINES/INCH ON THE DIABLO PRINTER
* VERSION 2.1  13/08/86
* SET CONTROL PARAMETERS
SET TALK OFF
SET PRINT OFF
SET CONSOLE ON
SET FORMAT TO SCREEN
SET EXACT ON
CLEAR
ERASE
@ 5,10 SAY "Seed Labelling Program"
@ 10,0 SAY "Please align labels in printer and then press a key to continue"
@ 12,0
* VARIABLES
STORE 1 TO CT
STORE "Y" TO ANS
```

```
STORE "Original Seed." TO ST
STORE "1986" TO YEAR
SELECT PRIMARY
   USE C:SYPLASM INDEX C:SYPLASM
GO 876
WAIT TO CONT
@ 17,0 SAY "Printing, please wait ...."
@ 20,0
SET PRINT ON
SET CONSOLE OFF
DO WHILE .NOT. EOF
   STORE STR(ACESNOS,6) TO A
   STORE TRIM(TGENNAME) TO G
   STORE TRIM(TSPNAME) TO SP
   STORE TRIM(TSSPNAME) TO SSP
   STORE LEN(SSP) TO LSSP
   STORE CT +1 TO CT
   SKIP
   ? "VICIEAE  SEED  COLLECTION"
   ? "    Syrian  Germplasm"
   ?
   ? G + " " + SP
   IF LSSP >1
      ?? "subsp " + SSP
   ENDIF
   ? "Our Accession Number : " + A
   ? ST + "    Year : " + YEAR
   ?
   ?
   ?
   IF CT = 8
      STORE 1 TO CT
      @ 14,0 SAY "        "
      @ 12,0 SAY "Please re-align labels then press a key to continue "
      @ 13,0 SAY " or 'Q' to quit " GET ANS
      READ
      STORE !(ANS) TO ANS
      IF ANS ='Q'
         SET PRINT OFF
         SET CONSOLE ON
         CANCEL
      ENDIF
   ENDIF
ENDDO
SET PRINT OFF
SET CONSOLE ON
@ 20,35 SAY "Finished."
USE
```

Appendix 9. Directive Files Used for DELTA Product Generation

TONAT.DIR - Production Of Natural Language Decsriptions

```
*COMMENT File TONAT.DIR
*SHOW: Translate into natural language
*HEADING: Vicia subgenus Vicia data
*LISTING FILE TONAT.LST
*PRINT FILE TONAT.PRT
*INPUT FILE SUBG.SPC
*TRANSLATE INTO NATURAL LANGUAGE
*OMIT TYPESETTING MARKS
*REPLACE ANGLE BRACKETS
*OMIT CHARACTER NUMBERS
*OMIT INAPPLICABLES
*HEADING Vicia Subgenus Vicia Taxon Descriptions
*NEW PARAGRAPHS AT CHARACTERS 1 42 54 126 150
*ITEM SUBHEADINGS
     #1. VEGETATIVE CHARACTERS:
     #42. INFORESCENCE CHARACTERS:
     #54. FLOWER CHARACTERS:
     #126. LEGUME CHARACTERS:
     #150. SEED CHARACTERS:
*EXCLUDE CHARACTERS 6 26 35 47 48 74 76 85 90 91 104 105
     113 121 130 141 157 166 167 170
*INPUT FILE SUBG.CHR
*PRINT HEADING
*INPUT FILE SUBG.ITM
```

TOKEY.DIR - Production Of KEY Input Files

```
*COMMENT FILE TOKEY.DIR
*SHOW: Vicia subgenus Vicia (Species) 10 December 1989.
*HEADING: Vicia subgenus Vicia (Species) data
*LISTING FILE TOKEY.LST
*NUMBER OF CHARACTERS 174
*MAXIMUM NUMBER OF STATES 8
*MAXIMUM NUMBER OF ITEMS 75
*CHARACTER TYPES 2,OM 3-5,RN 6,IN 7,OM 9-10,OM 13-14,OM
15-22,RN 24,OM 27,IN 28,OM 31-34,OM 36-40,OM 42,OM
43-46,RN 47-48,IN 49,RN 50-53,OM 54-58,RN 59,OM 63-68,OM
69-73,RN 74,IN 75,RN 76,IN 78-79,OM 82,OM 85,OM 86-89,RN
90-91,IN   92-93,OM   95-97,OM   100-103,RN   104-105,IN
108-109,OM 111-112,RN 113,IN 116-118,RN 119,OM 123-124,OM
125,IN 126-129,RN 130,IN 132,OM 134-135,OM 138,OM 140,OM
143-148,OM 149,IN 150-158,RN 159,OM 161,OM 164-165,OM
167-168,OM 172,OM
*NUMBERS OF STATES 2,3 7,4 9-10,4 13,3 14,4 23,3 24,5
28,4 29,3 31,8 32,5 33-34,3 36-40,4 42,4 50-53,4 59-60,3
63-64,3 65,5 66,4 67,3 68,4 78,8 79,7 82,4 85,3 92,8
93-94,3 95-96,5 97,3 108,5 109,4 119,3 121,3 123-124,5
132,4 133,3 134,4 135,3 138,3 140,3 141,4 143,5 144-145,4
146,6  147-148,4  159,3  161,4  163,3  164-165,4  167,3
168-169,4 170,3 172,4
*TRANSLATE INTO KEY FORMAT
*USE NORMAL VALUES
```

```
*KEY STATES
3,~40/41-64/65-84/85-100/101~
4,~2.4/2.5-6.0/6.1-10.0/10.1-14.9/15.0~
5,~2.4/2.5-6.0/6.1-10.0/10.1-14.9/15.0~
15,~10/11-26/27-55/56-109/110~
16,~5/6-10/11-20/21-30/31~
18,~9.9/10-20/21-40/41-57/58~
19,~5/6-10/11-20/21-35/35.1~
20,~5/6-10/11-25/26-79/80~
27,~4/5-6/7-8/9-12/13~
43,~2/2.1-5/5.1-10/10.1-30/30.1~
45,~1/1.1-2/2.1-4/4.1-6/6.1~
46,~6/6.1-9.9/10-14.9/15-25.9/26~
49,~0.1/0.11-1.0/1.01-2.0/2.01-3.0/3.01~
54,~3.0/3.1-4.4/4.5-9.4/9.5-15.0/15.1~
57,~3.0/3.01-5.0/5.01-7.0/7.01-9.0/9.01~
58,~0.49/0.5-0.99/1.0-1.49/1.5-1.99/2.0~
69,~9.4/9.5-13.9/14.0-18.9/19.0-27.9/28.0~
72,~4.9/5.0-9.9/10.0-15.9/16.0~
73,~3.9/4.0-5.9/6.0-7.4/7.5-9.9/10.0~
86,~9.4/9.5-14.9/15-21.9/22-25.9/26~
89,~3.8/3.9-5/5.1-7.9/8.0-10/10.1~
100,~4.9/5-9.9/10.0-19.9/20-32.9/33~
111,~4.9/5-6.9/7-11.9/12-17.9/18~
116,~4.9/5-6.5/6.6-8.5/8.6-9.9/10.0-11.9/12.0~
117,~4.4/4.5-5.9/6-7.9/8.0~
118,~1/1.1-2.0/2.1-3.0/3.1-4.5/4.6~
125,~4/5-9/10-14/15~
126,~10/10.1-25/25.1-45/45.1-80/80.1~
127,~4.9/5-7.9/8.0-13.9/14.0-19.9/20~
129,~1.99/2.0-3.49/3.5-4.49/4.5-5.99/6.0~
149,~2/3-4/5-6/7-8/9-10/11~
150,~3.9/4.0-7.4/7.5-15.0/15.1-25.0/25.1~
151,~2.7/2.8-4.7/4.8-9.4/9.5-15.0/15.1~
153,~8.9/9-20/20.1-30/30.1-55/55.1~
154,~1.9/2.0-2.9/3.0-5.0/5.1-8.0/8.1~
155,~1.9/2.0-2.8/2.9-5.5/5.6-8.0/8.1~
156,~0.99/1.0-1.19/1.2-1.69/1.7-2.09/2.1~
158,~0.1/0.11-0.3/0.31-0.45/0.46-0.6/0.61~
*KEY OUTPUT FILE SUBCHR.KEY
*INPUT FILE KEY.CHR
*KEY OUTPUT FILE TAXITM.KEY
*INPUT FILE SUBG.ITM
```

SUBKEY18.DIR - Key Generation Directive File

```
*COMMENT File SUBKEY18.DIR
*HEADING Vicia SUBGENUS Vicia - KEY 18
*ITEMS FILE SPEITM.KEY
*CHARACTERS FILE SUBCHR.KEY
*CHARACTER RELIABILITIES 1,10 2,7 3,6 4,7 5,6 6,2 7,6 9,8
10,8  11,6 12,4 13,8 14,6 17,4 21,4 22,4 23,8 24,7 26,3
27,10 28,8 29,8 30,7 34,3 35,2 36,4 37,4 40,4 41,8 42,10
43,6 44,3 46,8 47,4 48,4 49,7 51,10 52,4 53,4 54,7 55,4
56,4 57,7 58,7 59,9 60,10 61,7 64,7 67,8 69,8 70-76,4
77,6 78,8 79,8 80,6 81,9 83,8 84,8 85,3 86,7 87,4 88,4
```

```
89,6 90,4 91,4 92,8 93,8 94,8 97,7 98,3 99,3 100,7
101-109,4 112-113,4 114,7 115,7 118,8 121,4 122,6 123,7
125,6 126,8 127,8 128,4 129,7 130,3 131-133,7 134,8
135-136,7 137,4 139-140,7 141,4 147,8 148,4 149,6
150-151,7 152,3 153-156,7 158,7 163,4 164,7 165,7
166-168,3 170,4 171,6 172,9 173,6 174,7
*NUMBER OF CONFIRMATORY CHARACTERS 3
*OMIT TYPESETTING MARKS
*VARYWT .1
*PRESET CHARACTERS 42,1:1 78,2:1 60,2:2 1,2:3 1,2:4
*RBASE 2
*PRINT WIDTH 61
*KEY OUTPUT FILE SUBKEY18.KEY
```

TOINT.DIR - Production Of INTKEY Input Files

```
*COMMENT File TOINT.DIR
*SHOW: Translate into INTKEY format.
*HEADING: Vicia subgenus Vicia
*LISTING FILE TOINT.LST
*INPUT FILE SUBG.SPC
*TRANSLATE INTO INTKEY FORMAT
*INTKEY OUTPUT FILE SUBINT.CHR
*INPUT FILE SUBGKEY.CHR
*INTKEY OUTPUT FILE SUBINT.ITM
*INPUT FILE SUBG.ITM
```

INTKEY.INI - Interactive Polyclave Generation Directive File

```
*COMMENT File INTKEY.INI
DATA T SUBINT.ITM
DATA C SUBINT.CHR
SHOW Nigel Maxted Vicia subgenus Vicia taxon data set.*
SET STOPBEST 40
OMIT I U
MATCH O
RELIABILITIES +
1,10 2,7 3,6 4,7 5,6 6,2 7,6 9,8 10,8 11,6 12,4 13,8 14,6
17,4 21,4 22,4 23,8 24,7 26,3 27,10 28,8 29,8 30,7 34,3
35,2 36,4 37,4 40,4 41,8 42,10 43,6 44,3 46,8 47,4 48,4
49,7 51,10 52,4 53,4 54,7 55,4 56,4 57,7 58,7 59,9 60,10
61,7 64,7 67,8 69,8 70-76,4 77,6 78,8 79,8 80,6 81,9 83,8
84,8 85,3 86,7 87,4 88,4 89,6 90,4 91,4 92,8 93,8 94,8
97,7 98,3 99,3 100,7 101-109,4 112-113,4 114,7 115,7
118,8 121,4 122,6 123,7 125,6 126,8 127,8 128,4 129,7
130,3 131-133,7 134,9 135-136,7 137,4 139-140,7 141,4
147,8 148,4 149,6 150-151,7 152,3 153-156,7 158,7 163,4
164,7 165,7 166-168,3 170,4 171,6 172,10 173,6 174,7 *
SHOW +
Note. The program has been set to a mode suitable for
information retrieval. To use for identification, enter
MATCH O U I. *
DEFINE CHARACTERS "vegetative characters" 1-41
DEFINE CHARACTERS "stipule characters" 4-14
DEFINE CHARACTERS "leaf characters" 15-40
DEFINE CHARACTERS "stem character" 41
```

```
DEFINE CHARACTERS "inflorescence characters" 42-53
DEFINE CHARACTERS "flower characters" 54-125
DEFINE CHARACTERS "calyx characters" 54-68
DEFINE CHARACTERS "standard characters" 69-85
DEFINE CHARACTERS "wing characters" 86-99
DEFINE CHARACTERS "keel characters" 100-110
DEFINE CHARACTERS "staminal characters" 111-115
DEFINE CHARACTERS "ovary and style characters" 116-124
DEFINE CHARACTERS "legume characters" 126-149
DEFINE CHARACTERS "seed characters" 150-174
DEFINE CHARACTERS "seed dimension characters" 150-158
DEFINE CHARACTERS "hilum characters" 165-171
DEFINE CHARACTERS "lens characters" 172-173
DEFINE CHARACTERS "preset for diagnostic descriptions" +
1 2 4 7 13 18 19 23 27 28 29 31 42 46 51 54 57 59 60 77
78 83  84 92 93 122 126 127 131 132 134 135 142 147 149
150 159 164 165 172  *
DEFINE TAXA "sec.Atossa" 4 49 61 62 63 64 67
DEFINE TAXA "sec.Kupicha" 69
DEFINE TAXA "sec.Hypechusa" 2 3 9 11 17 25 26 28 32 33 +
34 35 36 37 39 46 47 48 50 51 52 65 71 *
DEFINE TAXA "sec.Peregrinae" 1 38 53
DEFINE TAXA "sec.Seminasculptura" 10 31
DEFINE TAXA "sec.Vicia" 5 6 7 21 22 23 54 55 56 57 58 +
59 60 70 73 *
DEFINE TAXA "sec.Bithynica" 8
DEFINE TAXA "sec.Narbonenses" 18 19 20 24 27 28 29 30 40+
41 42 43 44 45 66 68 72 *
DEFINE TAXA "sec.Faba" 12 13 14 15 16
```

TODIS.DIR - Production Of A Distance Matrix Directive File

```
*COMMENT File TODIS.DIR
*SHOW: Translate into DIST format
*HEADING: Vicia Subgenus Vicia Taxon Similarity Matrix
*LISTING FILE TODIS.LST
*INPUT FILE SUBG.SPC
*EXCLUDE CHARACTERS 6 47 48 74 76 80 90-91 104-105 113
130 157 166-167
*TRANSLATE INTO DISTANCE FORMAT
*DIST OUTPUT FILE SUBG.SIM
*INPUT FILE SUBG.ITM
```

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AUTHOR: MAXTED N. TITLE: A revision of Vicia subgenus Vicia using database techniques

DATE: 1991

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