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## What is good for an octopus?

Commentary on [Mather](#) on *Octopus Mind*

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**Abstract:** Mather (2019) has brought together the current empirical research in support of the claim that octopuses possess minds; and the weight of the evidence does appear to support octopus sentience. Being sentient means an organism has welfare concerns, a subjective experience of life that can go well or poorly. Protecting welfare requires knowing what conditions will have a positive or negative impact. Understanding what is in the mind of an octopus will give us valuable insight into what is good for an octopus.

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Empirical evidence now appears to be in favour of octopus sentience: their ability to experience subjective mental states. [The Cambridge Declaration on Consciousness](#) (Low 2012) states: “*the weight of evidence indicates that humans are not unique in possessing the neurological substrates that generate consciousness. Non-human animals, including all mammals and birds, and many other creatures, including octopuses, also possess these neurological substrates*” (Low 2012, p. 2).

Mather (2019) lends further weight to this conclusion, bringing together the current research on the cognitive abilities of octopuses to argue that they possess a mind. Further than this, Mather goes some way towards exploring what this mind may contain. This is of primary interest when considering the welfare of octopuses. If octopuses are sentient, then they have a welfare that can be harmed or benefitted. Even if it is the case that octopuses possess multiple minds rather than a single unified consciousness (**Favela 2019, Schwartz 2019**), insofar as these are multiple loci of felt experience, they are still each capable of welfare, as for any members of a community of sentient organisms. When keeping captive octopuses, knowing what conditions will positively or negatively impact welfare is crucial for ensuring their quality of life. Understanding the mind(s) of an octopus will be essential in the development of evidence-based standards for care. There are currently few documents detailing husbandry standards for cephalopods ([AITAG 2014, Fiorito et al. 2015](#)), and we should expect these to grow and change in the future as we learn more about what octopuses think and feel.

As Mather argues, the *Umwelt* — or perceptual world — of the octopus is likely to be vastly different from our own. They do not perceive colour, but rather the plane of polarisation of light. They exist within an aquatic environment that allows for sensitivity to chemical and

mechanical cues we are not able to perceive. This means that when considering their welfare, these environmental conditions must be included. Current recommendations for octopus husbandry refer to lighting brightness and appropriate day/night cycles but have not considered light polarisation (AITAG 2014, Fiorito et al. 2015). Lights which appear gentle to the human eye may not be so within the octopus perceptual range, so light polarisation should also be measured and taken into account. Chemicals within the tank can affect health but may also be pleasant or aversive in ways we may not usually consider. Chemosensory enrichment opportunities could open up new avenues of exploration. Vibrations through the water can have a large impact on octopus health and welfare (e.g., André et al. 2011), with “noise and vibration control” forming a core part of the guidelines for octopus husbandry (AITAG 2014, Fiorito et al. 2015).

Mather also describes two of the primary needs motivating octopus behaviour — exploration and fear. These are very likely to impact octopus welfare and should accordingly form an important part of octopus husbandry. She provides evidence that octopuses have a strong motivation to explore, beyond simply the potential for extrinsic (food) reward. Provision of novel environments and objects for octopuses to explore is hence likely to be central to octopus welfare, to prevent boredom and frustration. The guidelines for cephalopod care recommend complex enriched environments (Fiorito et al. 2015); this evidence gives us reason to give this particular recommendation a high priority. Mather also shows that octopuses, lacking the protective shell of their mollusc relatives, probably often feel vulnerable; indeed they are most often found near suitable shelter. It will almost certainly be crucial for octopus welfare to provide sufficient refuge, such as opaque tank walls and shelters, to provide a feeling of safety and allow the opportunity to retreat (Fiorito et al. 2015). Finally, personality differences between different octopuses give us reason to consider their needs not just as members of a species, but as individuals as well.

These concerns are particularly relevant against the background of recent debate on whether octopuses should be farmed for consumption, with the desire for cheaper and more easily obtainable octopus meat conflicting with environmental and welfare concerns (Jacquet et al. 2019). Although there are currently few such farms — mostly in the trial stage — it is likely that their numbers will rise in the near future. Within this context, it is now important that we know not just *that* octopuses think, but also *what* they think. A better understanding of octopus welfare needs could be used to provide a stronger case against their farming if their needs cannot be met (as Jacquet et al. 2019 argue, they cannot). Failing that, it can also help to ensure higher welfare standards if such farms do inevitably arise.

The recognition of octopus sentience has led to legislation and regulations for their protection within laboratory settings (Fiorito et al. 2014). It makes sense that similar regulations should also be in place for the use of octopuses in farming, based on what we know about octopus welfare. Welfare standards thus developed can also be applied to other captive octopuses housed in laboratories and aquariums. The mind of an octopus may be highly different from our own, but it is only by trying to see the world from their point of view that we will be able to find out what is good for them and hence ensure their welfare.

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