



Decapod sentience: broadening the framework

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Commentary on [Crump et al.](#) on *Decapod sentience*

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Abstract: A framework for studying sentience in decapods is of great value, but how high a cost (in suffering) to each individual decapod (or any animal) is warranted for collecting scientific evidence of sentience? The lack of evidence for some of the target article's proposed criteria surely results from the fact that research is focused mainly on biomedical studies, ecotoxicology, and commercial production, with decapod sentience and welfare seen as only a secondary research topic. I draw attention also to the possibility of a wider framework that includes all felt experiences, from suffering to pleasure.

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1. Introduction. Crump et al. (2022) propose an elaborate framework with eight criteria for evaluating the current scientific evidence of sentience in a given animal taxon, with emphasis on the capacity to experience pain in decapod crustaceans.

2. The lack of evidence and the possibility of a wider framework. The target article addresses the impossibility of obtaining high confidence levels for their eight criteria of sentience in decapods, because the available behavioural and cognitive research (such as for criterion 2 [sensory integration] and 8 [analgesia preference] in penaeid shrimp) is limited. It is indeed hard to find a space to study and debate sentience and welfare in shrimp; it is somewhat easier to work with larger decapods. The use of anaesthetics on shrimp remains taboo because it might interfere with the accuracy of research results. In addition, considerable research focuses on biomedical, ecotoxicology or commercial production. Other matters are considered secondary to the research, pertinent only for normative guidance.

It is hence timely that the concern about decapod sentience and welfare protection is increasing today. Albalat et al. (2022), focussing on penaeid shrimp farming, suggest using the five domains of animal welfare (i.e., nutrition, physical environment, health, behaviour, and mental needs) as indicators of penaeid shrimp welfare. Decapod sentience is one of the pillars used to construct Albalat and colleagues' welfare assessment, which is also based on physiological biomarkers, shrimp farming practices, and methods of shrimp stunning and slaughter. Crump and colleagues do not seem to consider physiological stress as a criterion for animal sentience, justifying its exclusion because stress is not necessarily associated with pain. Research, however, has focused

on physiological stress and physiological biomarkers, including with penaeid shrimp (Rosas et al. 2004, Tu et al. 2010). Although physiological biomarkers and parameters for decapod crustaceans are still not firmly established and may require mild invasive procedures (e.g., haemolymph collection), they are utilized in decapod farming and research and are a useful tool to complement the study of their sentience and welfare.

Crump et al.'s criterion 8 (valuing analgesia or anaesthesia through self-administration, preference, or prioritization) has likewise reached only a very low confidence level in all decapod crustaceans so far studied. Reliable literature regarding this criterion is almost non-existent [see also the commentaries of Brown 2022, Jablonka & Ginzburg 2022, Ng 2022, and Solms 2022]. We again need to keep in mind the industrial/commercial focus of most of the research on decapods.

Another relevant variable is animal self-medication (Criterion 8a), which has so far been studied mainly in vertebrates (companion, free-living and zoo animals) and some invertebrates (insects). Decapods also tend to be studied in human-made environments (e.g., aquaria, tanks) instead of in their natural environment where many more compounds and materials would be available to facilitate their choice in self-medication. Even in the captive setting, enriching the environment as much as possible, with different anaesthetics, including synthetic and natural, can stimulate natural behaviour and support options for choice.

Crump et al. also cite the small number of studies on sentience in decapod larval stages. These are indeed very few. The current major research interest in decapod larval/post-larval stages concerns their survival, followed by nutrition and health. Yet their welfare and protection, and how they are treated in the context of farming and research are matters of significant concern. In larval and post-larval stages they may be confined to tiny spaces; their size and number may make them more likely to suffer. Because these (conceivably sentient) beings are so small, their potential suffering and death may not be noticed or prevented. Investigating larval and post-larval sentience is necessary for adequate legislative protection of decapods.

3. The ability to feel is not limited to the ability to feel pain. Even though pain is among the most relevant aspects of sentience from a legislative perspective, other aspects of sentience must be taken into account too. Even if evidence were to show that decapods lack the ability to feel pain (something that is not currently known, because of lack of evidence, which, as Brown [2022] cautions, is not evidence of lack) it would not follow that decapods are not sentient. Sentience includes the capacity to feel any internal state, whether negative or positive (Cunha 2021). In a "sentio-centric" ethic (Bekoff & Meaney 2013), it is sentience that makes an animal taxon eligible for moral consideration and legal protection. The framework proposed by Crump et al. is timely and important, but the study and attribution of animal sentience should not be limited to the evidence for pain. It should encompass all physiological, anatomic, and behavioural evidence underlying all felt experiences, from suffering to pleasure.

4. The cost of the scientific evidence of sentience. One disquietude remains: Is it ethically and morally right to perform painful or distressful tests on potentially sentient

animals so as to achieve (very) high scientific confidence of their sentience? What is the cost to the individual decapods? Several sentience tests entail disturbance, confinement, stress, anxiety and pain - in addition to the harm of death at the end of most studies. How high a cost in suffering does the Precautionary Principle (Birch 2017) warrant?

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