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Questions about sentience are not scientific but cultural

Commentary on [Segundo-Ortin & Calvo](#) on *Plant Sentience*

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Abstract: The findings of complex cognitive-like behaviours in plants are surprising and exciting. However, they do not provide a scientific reason for ascribing sentience to plants. The target article, in trying to provide evidence for sentience in plants, exposes the weakness of the science of animal consciousness in general. In this commentary, I try to explain why the scientific method is incapable of resolving the question of which organisms or systems are sentient.

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Reductio ad absurdum (RAA) is a form of argument attempting to disprove a claim by showing that it leads logically to a nonsensical conclusion. Tononi's (2004) information integration theory (IIT) of consciousness provides an example of RAA. The theory assumes that consciousness is the integration of information and that it can be quantified. However, while this theoretical quantification is correlated with several observations concerning consciousness in humans, if we follow its implications, we reach the conclusion that the internet (World Wide Web) is conscious, with feelings and awareness (Merker et al., 2022). This is clearly a ridiculous conclusion; hence, the main claim of the IIT of consciousness is refuted by RAA.

In the target article, Segundo-Ortin & Calvo (2023) also begin their exploration of plant sentience with an assumption about consciousness. They adhere to the common assumption that behaviours that are analogous to cognitive traits such as decision making, flexible goal-directed behaviours, anticipatory behaviours, learning and memory and more, are indicative of consciousness (Edelman and Seth, 2009). Then they present findings suggesting that some plants display such complex behaviors. The findings are exciting, clearly showing that we should be careful not to underestimate the behaviour of plants just because they lack brains and move slowly. All organisms, from single celled through plants and large animals, face similar problems of competing for resources, conspecific interactions, and avoiding predation. Evolution converges to analogous behavioural solutions and thus complex cognitive-like behaviours can be found everywhere in biology, often without a brain. Does this mean that all organisms are sentient? Segundo-Ortin & Calvo urge us to take seriously the possibility that plants are sentient. To me, plant sentience does not make sense. Not only does the target article fail to provide convincing evidence to support plant sentience, but it raises questions,

analogous to RAA, about the validity of the ways we define and measure consciousness in other species (for example: Barron and Klein, 2016; Feinberg and Mallatt, 2016; Nieder et al., 2020).

Of course, Segundo-Ortin & Calvo, as well as some other commentators and readers will disagree and argue that, for them, plant sentience is a reasonable possibility. *But this would just be a dispute over our personal beliefs.* There is no experiment or observation to distinguish who is right and who is wrong; we cannot even say who is more likely to be right. In this respect, the target article fails to move the debate over plant sentience from romanticism to the realm of science. Plant sentience remains a mystery, as the authors themselves note. However, the authors seem to think that advanced future scientific research on plant cognition and neurobiology will somehow provide answers about plant sentience. I disagree. Their paper falls short of providing scientific evidence for sentience in plants because the scientific method is limited and agnostic about the question of the distribution of consciousness, in any system, including plants and animals (Dawkins, 2017; Gutfreund, 2018) .

The scientific method seeks explanations of observable phenomena. Its essence is the generation of parsimonious and falsifiable hypotheses (Simon, 2001; Popper, 2005). The problem with consciousness (sentience, awareness, etc.) is that the only reason we talk about it is that we feel it and it is important for us. Apart from our subjective feelings, consciousness is not part of scientific theory. Physical, chemical, biological, ecological and evolutionary theories explain observable behaviours, cognitive and non-cognitive alike, of plants, robots and animals without the need to invoke consciousness (Gutfreund, 2017). The meaning of this is that consciousness in scientific theories of behaviour is neither parsimonious nor falsifiable; scientists are expected to remove such unnecessary elements from their theories.

I agree with the authors that there is no scientific reason to deny consciousness in plants just because they lack brains. But there is also no scientific reason to ascribe consciousness to plants just because they show cognitive-like behaviours. We will never know whether plants are sentient (I personally do not believe so, but others might). Questions about plant, animal or robot consciousness are not scientific but cultural.

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