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Plant sentience: Not now, maybe later?

Commentary on **Segundo-Ortin & Calvo** on *Plant Sentience*

Helen Tiffin
University of Woolagong, Australia

Abstract: Segundo-Ortin's target article provides compelling evidence for physiological and behavioral complexity in plants, bringing us closer to a recognition of some kind of plant cognition – but it does not as yet offer firm grounds for inferring sentience (feeling) in plants, The recent history of the scientific demonstration and recognition of animal sentience in invertebrates, for example, does not entirely rule out the possibility that further research might provide support for plant sentience. Should this ever turn out to be the case, the ethical problems raised are not insurmountable, and would not threaten the now proven case for animal sentience.

Helen Tiffin, Adjunct Professor, University of Wollongong, Australia, and Fellow, Australian Academy of the Humanities, has degrees in both Biological Science and Arts, and held a Canadian Government Senior Research Professorship at Queens University. Her most recent articles are: Do insects feel pain? (2016), and Human overpopulation: The elephant in the greenhouse (2023). **Website**

Introduction. Over the last thirty years, there has been increasing public and scientific interest in the complexities of plant behavior and plant physiology. The target article of Segundo-Ortiz & Calvo (2023) (S&C) offers a valuable summary of much of this research to date, focusing particularly on the possibility of plant sentience. S&C's claims are based on behavioral complexity, apparent cognitive capacity, and electromagnetic activity, albeit involving pathways different from those of animal models (nonhuman and human).

S&C admit that their evidence for plant sentience — with sentience broadly defined as "a state that it feels like something to be in" (Woodruff, 2017; Harnad, 2023) — requires further investigation. They hope their work will "serve as an invitation to investigate sentience in plants with the same rigor as in non-human animals".

Henning & Mittelbach offer some support, but no commentary has so far agreed fully with S&C's hypothesis of plant sentience.[1] Almost all the peer commentaries to date reject it, on a number of grounds, finding the case for plant sentience, at this point, unproven.

Possible consequences of accepting S&C's hypothesis. At least three of the 27 commentaries consider what effect acceptance of the target article's hypothesis might entail. According to Gutfreund (2023), S&C's case for sentience in plants shows that the scientific method is incapable of proving sentience in either plants *or* animals. Contrary to what is thought to have already been firmly established (i.e., that most major animal groups all the way down to invertebrates are sentient), Gutfreund contends that sentience is a matter for "culture" not "science."

Brooks Pribac (2023), unlike Gutfreund, accepts sentience in animals as proven but rejects

[1] It is worth noting, however, that, with a few exceptions, the bases on which some commentators address the target article seem rather anthropo/zoocentric and occasionally anthropo/zoomorphic (e.g., Robinson et al. 2023).

S&C's evidence in plants, not because its acceptance would call into question the ability of science to demonstrate nonhuman sentience altogether, but because those scientists who still reject sentience in some animal groups (e.g., Key, 2016), could use the acceptance of plant sentience to "trivialize" sentience in animals. Brooks Pribac agrees that plants are crucial for human and nonhuman animal survival, and that the behavioral and physiological complexities of plants reported by S&C could foster a much-needed "de-instrumentalization" of plants, but she fears that concluding that plants feel on the basis of the sparse evidence so far would pose a threat to the little that has so far been accomplished to protect the proven sentience of animals.

Milburn (2023) considers what could be the ethical implications of accepting the evidence of plant sentience, given the problem that all living creatures, including humans, ultimately depend on plants for food. Ethical veganism rejects animal exploitation and consumption on the grounds of proven animal sentience, but what would be the result – where animal consumption is a dietary necessity – if plants were also proved to feel? I agree with Milburn's conclusion that in such a case the "least-harm" principle would apply. Plants, if proven to feel, are unlikely to experience pain (or pleasure) to the same degree as animals or humans. Plants are undoubtedly sensitive, behaviorally responsive to their surroundings, and have been actively involved in forming complex relationships with other species, but in scientific terms, these capacities are not evidence of sentience.

Science, History, and Time. Forty years ago, it was thought inconceivable that insects were sentient. Yet continuing research in that field has tended firmly in the direction of recognizing insect sentience, with increasing numbers of researchers concurring. Given that animal sentience has now been established in so many animal groups, including Invertebrates, it would be irrational to deny the possibility that future work – for which S&C call – could someday prove that plants feel too. At the present time, however, S&C's evidence for plant "cognition" seems more robust than their evidence for plant sentience. Scientific support for claims of sentience in plants is minimal.

Plebe (2023) notes that while we may accept zoomorphic comparisons, we are biased against serious consideration of plant sentience because of our inherent anthropocentrism. He points in particular to the concept of time, noting how differently humans and plants exist and move "in time", which rules out the kinds of analogical experimental comparisons used to demonstrate animal sentience.

Kuhn (1962/2013) argued that "normal science" proceeds much the way it does in this issue of *Animal Sentience*: hypothesis followed by rigorous peer scrutiny of its claims. But at certain times, Kuhn notes, crises in understanding can catalyze scientific "revolutions". Science is a major aspect of our culture – not its antithesis, as Gutfreund seems to suggest. So, perhaps our era of climate change and apocalyptic animal and plant species losses is such a "revolutionary" time: "Confronted with anomaly or with crisis, scientists take a different attitude towards existing paradigms, and the nature of their research changes accordingly.' (Kuhn, 91). It is important that researchers of the caliber of S&C continue their already productive line of inquiry. Even if a compelling case for plant sentience remains elusive, any research that can enhance our understanding of biological complexity beyond our destructive anthropocentric solipsism is extremely desirable.

Conclusion. Although S&C make a good case for physiological and behavioral complexity in plants, thereby providing a potential platform for further investigation of plant "cognition," sentience (feeling) in plants has not been effectively demonstrated. Rejected by most of the peer commentators on the grounds of unconvincing zoomorphic analogies, dependence on "possible/possibly" arguments rather than the empirical evidence, etc., the target article nevertheless offers opportunities for exploring different pathways to understanding biological being.

The history of science, the dominant Western cultural epistemology of the last four centuries, tells us that incremental changes in the acceptance of hypotheses as well as major paradigm shifts do occur.

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