

Minds Without Attention

What Kind of Experience Could Plants Have?

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Outline

1. The Question of Plant Minds
2. Findings about Plant Behaviour
3. The Decentralisation of Plants
4. Decentralisation and Attention
5. Decentralisation and Pain
6. Implications for Moral Status

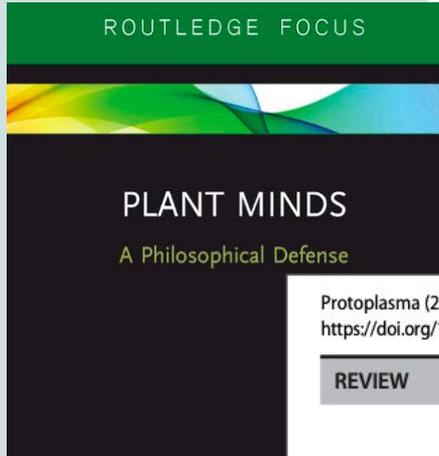
1. The Question of Plant Minds

It is impossible to know whether or not plants are conscious; but it is consistent with the doctrine of continuity that in all living things there is something psychic, and if we accept this point of view we must believe that in plants there exists a faint copy of what we know as consciousness in ourselves.

...a plant and a man must be placed in the same great class, in spite of the obvious fact that as regards complexity of behavior the difference between them is enormous.

Francis Darwin, addressing the British Association for the Advancement of Science, 1908

1. The Question of Plant Minds



Synthese (2016) 193:1323–1343
DOI 10.1007/s11229-016-1040-1

S.I.: NEUROSCIENCE AND ITS PHILOSOPHY

The philosophy of plant neurobiology: a manifesto

Paco Calvo¹



Trends in Plant Science

UPDATE LETTERS | VOLUME 12, ISSUE 4, P135-136, APRIL 01, 2007

Plant neurobiology: no brain, no gain?

Amedeo Alpi • Nikolaus Amrhein • Adam Berti • ... Lincoln Taiz • Gerhard Thiel • Richard Wagner •

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Protoplasma (2021) 258:459–476
<https://doi.org/10.1007/s00709-020-01579-w>

REVIEW

Debunking a myth: plant consciousness

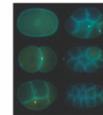
Jon Mallatt¹  • Michael R. Blatt² • Andreas Draguhn³ • David G.

Plants are intelligent, here's how

Paco Calvo^{1*}, Monica Gagliano², Gustavo M. Souza³ and Anthony Trewavas⁴

Annals of Botany 125: 11–28, 2020
doi: 10.1093/aob/mcz155, available online

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Communicative & Integrative BIOLOGY

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ANTHONY TREWAVAS

PLANT BEHAVIOUR & INTELLIGENCE



The mind of plants: Thinking the unthinkable

Monica Gagliano

2. Findings about Plant Behaviour

We've known for a long time that plants detect and respond to things like light, gravity, water, and nutrition.

They also activate a range of anti-herbivore responses (cf. Maffei and Boland 2007):

- Detecting damage from caterpillars, mites, beetles, etc. leads to the secretion of repellent chemicals.
- It can also lead to the release of chemicals that *attract* carnivores to eat the herbivores
- These responses can be specific to distinct herbivore species, identified by their saliva.



2. Findings about Plant Behaviour

Plants in forests are systematically connected under the ground through their roots systems.

As well as direct root connections, they are systematically connected by mycorrhizal fungi.

These networks allow plants to exchange resources, share information, and even try to poison one another (cf. Simard 2018).

This phenomenon has been termed the ‘Wood-Wide Web’.



Illustration by Enzo Pérès-Labourdette

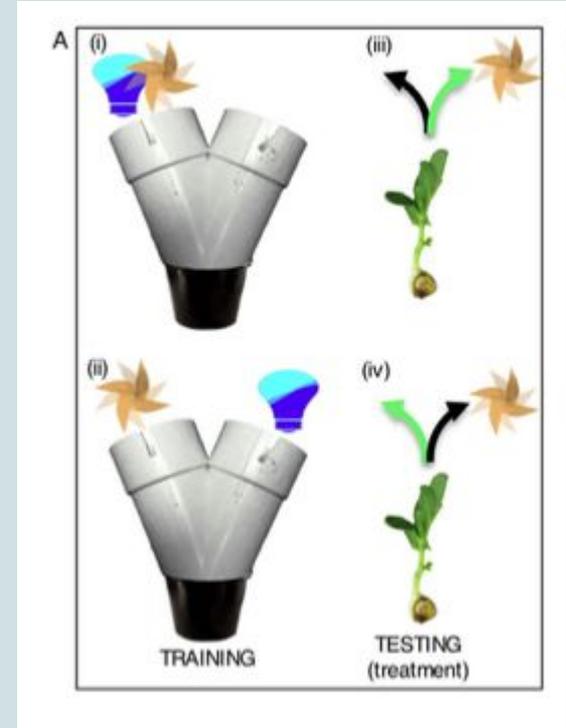
2. Findings about Plant Behaviour

Monica Gagliano claims to have shown associative learning in pea plants (Gagliano et al. 2016).

They learned to grow towards or away from a fan (previously neutral) based on its association with blue light (attractive).

(Replicability is disputed, see Markel 2020-a, 2020-b, Gagliano et al. 2020)

This is important, because on one account associative learning marks the boundary between conscious and non-conscious animals. (Ginsberg and Jablonka 2019, Birch et al. 2020)



2. Findings about Plant Behaviour

The plausibility of plant consciousness depends on our background theory of consciousness:

Some theories tie consciousness closely to advanced cognitive functions:

- Consciousness is metacognition (Lau and Rosenthal 2011, Carruthers 2000)
- Consciousness is attention (De Brigard and Prinz 2009, Prettyman 2017)
 - Little prospect of plant consciousness

Other theories tie consciousness to something very basic:

- Consciousness is an aspect of life itself (Biopsychism: Thompson 2010, Maher 2017)
- Consciousness arises wherever information is integrated (IIT: Tononi 2012, Koch 2020)
- Consciousness is inherent in all matter (Panpsychism: Mathews 2003, Goff 2019)
 - Good prospect of plant consciousness

2. Findings about Plant Behaviour

I'm going to stay agnostic on the Big Questions, and on whether plants are conscious.

But I'm interested in the conditional question:

'If plants are conscious, what might it like to be a plant?'

This is necessarily a speculative question: without being a plant, we'll never know for sure. Radically different consciousness is literally unimaginable to us.

But we can aim for a best guess about broad structural features.

2. Findings about Plant Behaviour

We cannot form more than a schematic conception of what it is like [to be a bat]. For example, we may ascribe general types of experience on the basis of the animal's structure and behavior. Thus we describe bat sonar as a form of three-dimensional forward perception; we believe that bats feel some versions of pain, fear, hunger, and lust, and that they have other, more familiar types of perception besides sonar. But we believe that these experiences also have in each case a specific subjective character, which it is beyond our ability to conceive.

(Nagel 1974, p.439)



3. Decentralised Minds

We, like most animals, are unified in 3 ways:

1. We have a fixed body plan.
2. Our whole body moves together in a coordinated way (facilitated by nerves).
3. Information processing is centralised in one organ (the brain).

(Almost all animals have 1., most have 2., and many have 3.)

3. Decentralised Minds

Plants have none of these:

- No fixed body plan
- No integrated whole-body movement
- No centralised brain

Hence if there are experiences, they don't necessarily belong to 'the plant'.

We can't assume that there's a well-defined individual here: there are processes at multiple levels, and no level is clearly privileged over the others.

3. Decentralised Minds

Hedda Hassel Mørch puts it succinctly:

3. Decentralised Minds

Hedda Hassel Mørch puts it succinctly:

“In terms of consciousness, then, a plant would be a society, not an individual.”
(Mørch 2017)

(She derives this claim from the Integrated Information Theory, a low-threshold view which is relatively friendly to plant consciousness.)

(The Wood-Wide-Web means these ‘societies’ can be continuous with neighbouring ‘societies’, and the greater society they all form.)

4. Decentralisation and Attention

What role does attention have in a decentralised mind?

Well, what does attention do in our centralised minds?

Plausibly, it solves what Wayne Wu calls ‘the Many-Many’ Problem:

“What is the Many-Many Problem? The Problem can be clearly seen in contexts where an agent confronts many perceptual inputs and many possible behavioral outputs ...what we typically see is a field of view cluttered with many objects, each exemplifying many visible properties. We cannot at a given moment act on all of these... Action requires that we be selective, identifying one target and selecting its relevant properties... selection of an object and property among others by the subject is plausibly a way that the subject *attends* to the world...” (Wu 2011, p.53)

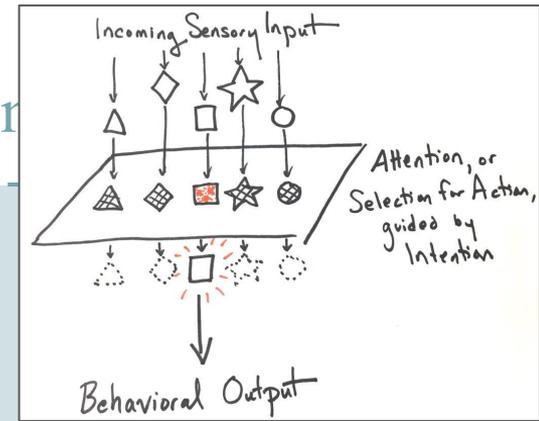


Diagram from Jennings, 2016

4. Decentralisation and Attention

This idea of attention as selecting and prioritising is widespread, even among theorists who disagree with Wu about details.

Sebastian Watzl (yesterday) said: “Attention is the process by which we regulate priority structures in our mind.”

The Many-Many problem only arises because of centralisation:

- Many perceptual inputs: because they are all sent to a single organ to be integrated.
- Many (incompatible) behaviour outputs: because they involve whole-body coordination

4. Decentralisation and Attention

Plants aren't centralised, so they don't face the Many-Many Problem.

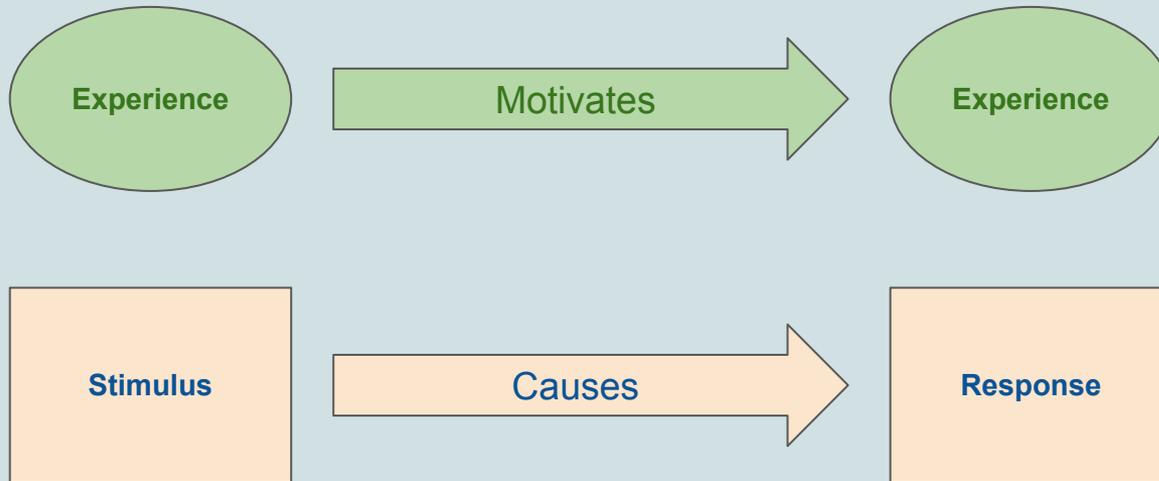
Hence they don't need attention to solve it.

When we imagine being a plant, we have to subtract attentional structure:

- Subtract the focus-periphery structure
- Subtract the dynamic shifting of focus from one thing to another
- Subtract the voluntary power to shift focus

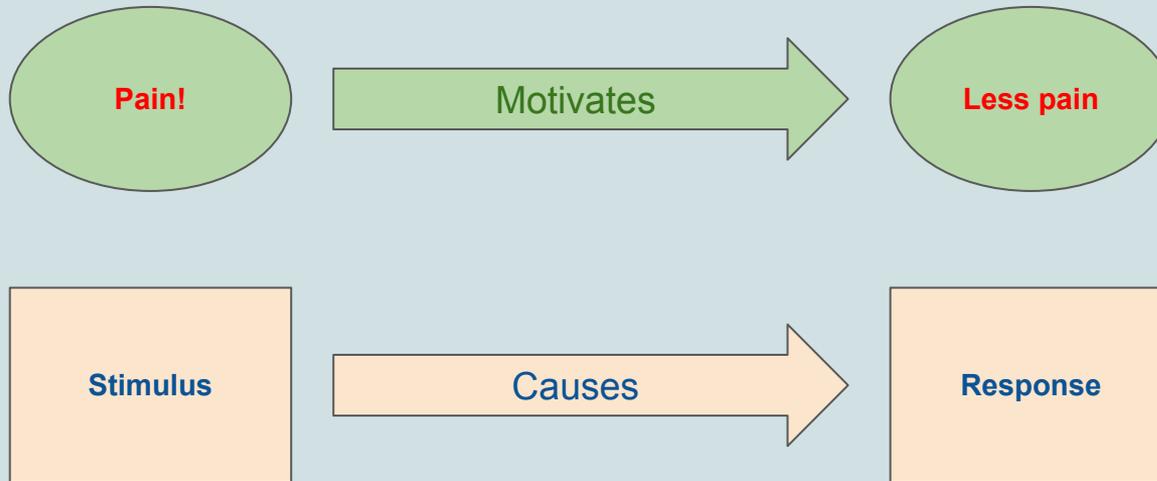
5. Decentralisation and Pain

When we see a stimulus producing a response, we might suppose that there's a corresponding experience that motivates the response.



5. Decentralisation and Pain

When the stimulus is **damage**, and the response seems aimed at averting it, we might suppose the corresponding experience is **pain**.



5. Decentralisation and Pain

But not all motivation involves pleasure/displeasure.

Compare:

- Salience and attention
- Premise and conclusion
- Cue and habitual response
- Impulse and whimsical action

These don't provide good models for plant experiences.

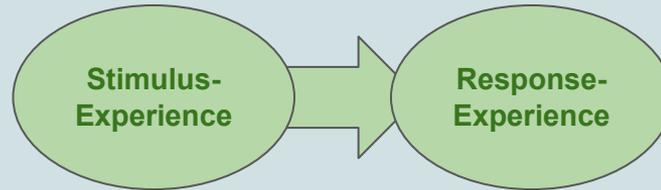
But together they show that motivation need not involve pleasure/displeasure.

5. Decentralisation and Pain

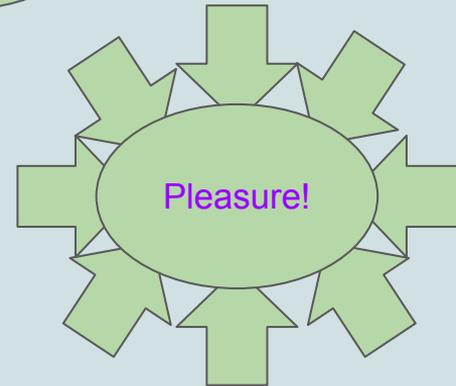
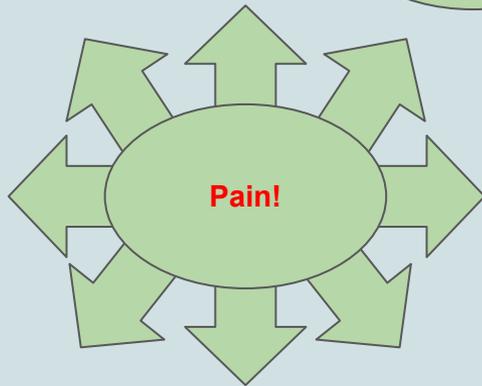
So what does pleasure/displeasure do specifically?

It provides ‘omnidirectional’ motivation.

Not just:



But:



5. Decentralisation and Pain

This lets us compare, add, and balance multiple factors going into a single decision.

Also: pleasure/displeasure is very attention-grabbing.

Both of these features are vital for a centralised mind with a capacity for attention.

But plants don't seem to have that.

→ *Even if* plant behaviour is motivated by experiences, they're probably not pleasant/unpleasant.

6. Implications for Moral Status

The reflections so far moderate the moral implications of plant consciousness.

Suffering raises the most pressing moral issues.

If plants can't suffer, they don't pose this sort of issue.

This supports seeing a big moral difference between plants and (most) animals.

6. Implications for Moral Status

Maybe there is still moral value even in consciousness that's not pleasant/unpleasant.

Maybe it is wrong to destroy conscious individuals.

But plants are not well-defined individuals: each is a society, often continuous with external societies (mycorrhizal network).

Hence: if plants have moral status, it's probably 'in the aggregate', not as individuals.

6. Implications for Moral Status

Plant consciousness would support seeing value in the existence and abundance of plant life.

- This just reinforces the case for environmental protection.
- This doesn't undermine ethical vegetarianism.
- (In practice, animal agriculture requires *more* plant agriculture than just eating plants does.)

In Summary...

1. Plants are capable of a lot of things we never knew about.
 2. Whether they're conscious depends on how we answer Big Questions about what consciousness requires.
 3. If plants are conscious, their consciousness will be radically decentralised relative to ours.
 4. This means they probably don't face the problems attention is a solution to.
 5. This means they probably don't need pleasure and displeasure.
 6. This means they probably matter morally in the aggregate, not as individuals.
- Thus, plant consciousness does not undermine the case for ethical vegetarianism.

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