

PBS Plants Use An Internet Made of Fungus

Season 2 Episode 24 | 4m 8s

<https://www.pbs.org/video/gross-science-wood-wide-web/>

We are scientists who conduct research in the field of mycorrhizal ecology. We have reviewed the claims in your video and noted that some are misleading. As such, we request that you take down this video as it is promulgating misinformation.

The claims in question are below followed by an explanation for why they are misinformation.

‘Mycorrhizal fungi can also enable parental care among plants. Some adult trees will help out their younger relatives by sending those seedlings more nutrients through the fungal network than they send to strangers.’

‘Mycorrhizal fungi tend to pick favorites. They may share resources with one species of a tree but bleed another species dry without giving anything back in return.’

‘The fungi may also judge a plant’s health. If they think it’s too weak or sick they may not allow it to receive nutrients or danger signals from the network.’

The claims above are not supported by any peer-reviewed, published studies.

‘During the fall months when paper birch trees lose their leaves and can’t produce sugar, Douglas-fir trees may shuttle the nutrients through the fungal network. And in the summer when paper birch trees have lots of leaves they send sugars to young Douglas-fir saplings growing in their shadows.’

The claim above appears to be based on this graduate thesis 'The role of ectomycorrhizal fungi in carbon transfer within common mycorrhizal networks' by Leanne J Philip. University of British Columbia 2006.' The study presented in Chapter 4 is an experiment testing bi-directional carbon exchange among seedlings planted in the field. However, it is inconclusive whether carbon moved through the fungal network, and this point is reiterated in Chapter 6 of the thesis.

‘Plants can also warn each other of danger. Douglas-fir trees connected by a fungal network can alert their ponderosa pine neighbors if they are attacked by budworms. In response, the ponderosa pine trees will produce insect repelling chemicals even though they haven’t been directly exposed to the insects themselves.’

The only peer-reviewed, published study testing the claim above was a greenhouse experiment in which chemical signaling was shown to occur in the presence of fungal connections, but only when roots were not allowed to intermingle as they would in a real forest. Please see <https://www.nature.com/articles/srep08495>.

For further details on misinformation about the ‘wood-wide web’, please see:

Karst, J., Jones, M.D. & Hoeksema, J.D. 2023. Positive citation bias and overinterpreted results lead to misinformation on common mycorrhizal networks in forests. *Nature Ecology and Evolution* <https://doi.org/10.1038/s41559-023-01986-1> 5.

Henriksson, N., Marshall, J., Högberg, M.N., Högberg, P., Polle, A., Franklin, O. and Näsholm, T. 2023. Re-examining the evidence for the mother tree hypothesis – resource sharing among trees via ectomycorrhizal networks. *New Phytologist* <https://doi.org/10.1111/nph.18935>

Sincerely,

Justine Karst, Associate Professor, University of Alberta

Jason Hoeksema, Professor, University of Mississippi

PBS Why do Trees Talk to Each Other?

Season 7 Episode 17 | 5m 27s

<https://www.pbs.org/video/do-trees-talk-6mx1nr/>

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The claims in question are below followed by an explanation for why they are misinformation.

‘They also form massive branching networks of fungal threads called mycelium that can extend to thousands of acres connecting entire forests.’

Mycorrhizal networks putatively connecting trees in a forest have been mapped in only five forests in the world; two are of the same forest type. The size of plots mapped are each less than a hectare in size. This claim is exaggerated and unfounded. For more details, please see <https://doi.org/10.1038/s41559-023-01986-1> 5

‘The fungi can act like a season bank account for trees, giving loans of sugar if the trees need an extra boost.’

The claim above is not supported by any peer-reviewed, published studies.

‘And scientists have found that if a tree is dying, it will release its extra glucose into the wood wide web where it can be delivered to younger, nearby trees, even trees of a different species.’

The claim above is not supported by any peer-reviewed, published studies. The studies do not exist.

‘Trees can also use the network to send out warning signals. If insects bite into one tree, it can send a chemical signal through the wood wide web. And when trees deeper in the forest receive this insect alert message, they produce bitter compounds they make their leaves less tasty to the same insects.’

The only peer-reviewed, published study testing this claim was a greenhouse experiment in which chemical signaling was shown to occur in the presence of fungal connections, but only when roots were not allowed to intermingle as they would in a real forest. Please see <https://www.nature.com/articles/srep08495>.

For further details on misinformation about the ‘wood-wide web’, please see:

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