

April 10, 2023

Dear BBC CrowdScience,

We are scientists who do research in the field of mycorrhizal ecology. We have reviewed the statements and visuals in your video 'How trees secretly talk to each other' [<https://www.bbc.com/news/av/science-environment-44643177>] and noted that some are misleading. As such, we request that you take down this video as it is promulgating misinformation.

Below we outline the misleading statements or visuals.

1. 'Trees send resources to each other through shared fungal networks.'

There is no conclusive evidence this occurs. For a recent review of the evidence for this claim, 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>

2. The image portraying all trees in a forest connected and sharing resources has no evidence. Specifically, no study has both mapped common mycorrhizal networks in a forest and tested resource transfer. 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>

3. 'It's thought that older trees, fondly known as mother trees, use this fungal network to supply shaded seedlings with sugar.'

There are no peer-reviewed, published studies testing whether old, large trees ('mother trees') direct resources to seedlings. From the single experiment testing the transfer of resources from saplings to seedlings, it was determined that very small amounts of carbon were transferred through a mycorrhizal root - soil pathway. This is distinct from transfer within a common mycorrhizal network. The small amount of carbon transferred belowground is unlikely to be of consequence for seedling growth or survival. Please see this paper for details: Teste, F. P., et al. 2009. Access to mycorrhizal networks and roots of trees: importance for seedling survival and resource transfer. *Ecology* <https://doi.org/10.1890/08-1884.1>

4. 'giving [seedlings] a better chance at survival.'

When assessed across all published field studies in forests, the most common response of seedlings to access to a potential common mycorrhizal network was neutral, not positive. 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. 'Those trees that are sick or dying may dump their resources into the network which might then be used by healthier neighbors.'

There are no peer-reviewed, published studies testing whether old, large trees 'dump' their resources into the fungal network.

6. 'Plants also use fungi to send messages to one another. If they are attacked they can send chemical signals through their roots which can warn their neighbors to raise their defenses.'

The only peer-reviewed, published study testing this idea on tree seedlings was a greenhouse experiment in which chemical signaling was shown to occur through mycorrhizal fungi, but only when roots were not allowed to intermingle as they would in a real forest. Please see Song, Y., et al. 2015. Defoliation of interior Douglas-fir elicits carbon transfer and stress signalling to ponderosa pine neighbors through ectomycorrhizal networks. Scientific Reports <https://www.nature.com/articles/srep08495>.

It is misleading to use results from a greenhouse experiment on bean plants as evidence for how 'trees secretly talk to each other'. For the original experiment, please see Babikova, Z., et al. 2013. Underground signals carried through common mycelial networks warn neighbouring plants of aphid attack. Ecology Letters <https://onlinelibrary.wiley.com/doi/10.1111/ele.12115>

We also noticed that many of these same inaccurate claims are repeated in the BBC documentary 'Wild Isles' (40.30-42.10). This is unfortunate. Not only is this documentary spreading misinformation, but it also erodes the credibility of science.

Thank you for considering our concerns.

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