

Study unearths survival strategies of root systems

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New research from The University of Western Australia has examined how fine root lifespan is linked to root strategies of resource acquisition and protection.

Emeritus Professor Hans Lambers, from UWA's School of Biological Sciences, was co-author of [the study](#) published in *Proceedings of the National Academy of Science*.

"How the lifespan of roots is related to the strategies roots use to acquire nutrients from the soil is largely unknown," Professor Lambers said.

"We compiled the most comprehensive dataset of what roots absorb over their lifespan from 98 observations of 79 woody species using underground recordings of roots across 40 sites.

"Our study then linked average root lifespan to other plant traits to address questions of what regulates root lifespan on a large spatial scale."

The study found median root lifespan decreases with plant investment in more metabolically active compounds, such as root nitrogen, but increases in plants that have a reliance on symbiotic fungi.

"Previous theories have suggested plant organ structure and function together with root traits play a role in lifespan, but our study found there was no correlation," he said.

The study also found there was no link between fine root and leaf lifespan except among evergreen species.

"This suggested that the environment has influenced evolutionary selection in different ways aboveground compared to belowground," Professor Lambers said.

"We also found the root lifespan was typically longer in places with a lower mean annual temperature and higher average yearly rainfall."

The results of the study will help to identify key variables and

environmental drivers of [root lifespan](#) and understand how the ecosystem responds to [climate change](#).

More information: Jiawen Hou et al, Linking fine root lifespan to root chemical and morphological traits—A global analysis, *Proceedings of the National Academy of Sciences* (2024). [DOI: 10.1073/pnas.2320623121](https://doi.org/10.1073/pnas.2320623121)

Provided by University of Western Australia

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