

# And one root said to the other root, 'Don't I know you from somewhere?'

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Seeds from rare cycad species are often planted together in batches that force germinating seedlings to compete with adjacent siblings. This approach to nursery management may be counter-productive for species that reduce competitive behaviors when an adjacent plant is a close relative. Credit: Thomas Marler

The global population of cycad plants is facing increasing threats, but research-driven decisions are rarely achievable for conservationists. The general lack of applied research on cycad plants has been discussed for decades, yet many of the roughly 340 species have never been the subject of ecology or horticulture experimental work. The paucity of empirical information places decision-makers and managers at a disadvantage when attempting to proactively conserve a species.

*Cycas micronesica* is an endangered cycad species that hails from several western Pacific Micronesian islands, and is one of the few cycad species with diverse conservation programs in place. Recent research by the University of Guam has shown that roots of this species are able to recognize the identity of other roots that they encounter. The experimental results appeared in the June 2016 issue of the international journal *Tropical Conservation Science*.

Authors Thomas Marler, Nirmala Dongol, and Gil Cruz used an established experimental approach that forced two plants to compete within a fixed volume of rooting substrate. By using the seedlings from a single mother tree as the focal plants, then altering the closeness of the relationship of the competing seedlings, the behavior of the focal plant's roots were carefully observed. Under these conditions, the identity of the competing plant determined the behavior of the focal plant.

"The results revealed that one plant can recognize when an adjacent plant is a close relative, and when an adjacent plant is not a relative," said Cruz. This ability of roots to recognize kin has been proven for many plant species, but the team's interest in the subject is founded in the fact that contemporary cycads are derived from an ancient plant lineage. They contend that inclusion of more cycad species in this line of research may help validate if the root behavior is an ancient plant trait.

The results also revealed a decline in competitive behaviors when a close relative was the adjacent plant, and an increase in competitive behaviors when a non-relative was the adjacent plant. "The results provide compelling evidence that this insular [cycad species](#) exhibits cooperative behaviors when closely related individuals are forced to compete for soil resources," said Marler.

The research outcomes are valuable for improving management decisions in various conservation settings. For example, sowing seeds from the same mother plant in a single community pot is a common practice in cycad nurseries. Root system quality may be enhanced by using an alternative approach, such as sowing individual seeds in individual pots or by co-mingling a mixed batch of seeds from unrelated species. Furthermore, positioning [plants](#) adjacent to close relatives in botanic garden settings may undermine the management goal of eliciting robust plant growth. Clearly, a greater consideration of the below-ground communication habits of plant roots is needed while making critical conservation decisions.

**More information:** [tropicalconservationscience.mo ...  
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Provided by University of Guam

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