

Mycorrhizal diversity of epiphytic orchids in a hyperdiverse tropical forest: insights on temporal and life stage changes

**Melania FERNÁNDEZ^{1,2}, D. Lee TAYLOR³, Andrew D. TAYLOR⁴,
Jyotsna SHARMA^{1,*}**

¹ Texas Tech University, Department of Plant and Soil Science, Lubbock, TX 79409, USA.

² University of Costa Rica, Lankester Botanical Garden, Cartago, Costa Rica

³ University of New Mexico, Department of Biology, Albuquerque, NM 87131, USA

⁴ University of Hawai'i at Mānoa, Department of Biology, Honolulu, HI 96822, USA

* [jyotsna.sharma@ttu.edu](mailto: jyotsna.sharma@ttu.edu)

Few studies have examined the diversity of fungal communities of epiphytic orchids from hyperdiverse tropical forests and its temporal dynamics. This study aims to describe the fungal diversity associated with three tropical, epiphytic orchid species from a Costa Rican hyperdiverse forest across a three year-period at the juvenile and adult stages, by applying standard Sanger sequencing methods.

Results show that fungi belong to orders Cantharellales (most common clade), Atractiellales and Trechisporales. This is the first report of Trechisporales in photosynthetic orchids. Members of the Cantharellales and Atractiellales were found in *D. fragrantissima* and *O. klotzschianum*, while *E. odontochilum* had mycobionts only from Cantharellales and Trechisporales. Mycorrhizal diversity was higher in the common *O. klotzschianum* (20 OTUs recognized), while the rare *D. fragrantissima* and *E. odontochilum* hosted 9 and 7 OTUs, respectively. These results suggest a broader mutualistic interaction in *O. klotzschianum*, which may confer more opportunities for establishment, and narrow associations in the scarce species, which may favor growth and competitive dominance. Within each species, less than three mycobionts were shared between years, revealing high unprecedented dynamism on the relationships between orchids and their mycorrhizal composition through time.