for total abundance and another for species richness, to determine if there were differences between different categories of diameter and different elevational zones within trees. Results showed greater abundance and richness of orchids in the canopy of the medium-sized trees. Thus, estimates of plant diversity in cloud forests including the canopy are important. With regard to size of trees, it could be argued that the three diameter categories are associated with different temporal stages in the population dynamics of these orchids.

Reproductive biology of *Masdevallia coccinea and Masdevallia ignea* in Guasca (Cundinamarca: Colombia)

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Masdevallia coccinea and *Masdevallia ignea* (popularly known as "banderitas") are ornamental orchids which are prized by amateur farmers and collectors. In Colombia, the harvest pressure on these species has been enormous, and few natural populations survive. Therefore, both species are on Appendix II of CITES. The goal of the project was to study the reproductive biology and pollination biology of *M. coccinea* and the *M. ignea* (Pleurothallidinae) under semi-cultivation conditions in the Villa Rosa farm located in the Municipality of Guasca, Cundinamarca (Colombia). For both species we studied floral morphology, phenology, breeding system, floral visitors, and pollinators, as well as visual and chemical cues. *Masdevallia coccinea* and *M. ignea* differ in floral color and in length of the sepals. In both species the labellum is articulated at the base of the column, but the lip is devoid of nectar and osmophores. Both species flower asynchronously and are self-compatible but pollinator-dependent. *Masdevallia coccinea* and *M. ignea* were visited by 15 and 7 insect morphospecies, respectively. Both orchid species were pollinated by female flies (Diptera: Drosophilidae) that performed different activities on the flowers. The flowers of *M. coccinea* and *M. ignea* reflected through all wavelengths such as UV, blue, and red. Floral volatiles of *M. coccinea* and *M. ignea* were also different.

Identificación de bacterias endófitas asociadas a raíces de *Cattleya quadricolor* Lindl.

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Las bacterias endófitas se encuentran colonizando los tejidos internos de las plantas sin ocasionar infección y aportando características competitivas importantes para éstas. El objetivo de este trabajo fue identificar especies endófitas asociadas a raíces de *C. quadricolor*. Los aislamientos se realizaron lavando las muestras con agua corriente, desinfectando con hipoclorito de sodio 1%/3min, etanol 50%/3min y agua destilada estéril; posteriormente, se retiró la corteza y se maceró el cilindro central, sembrando

0.1mL del macerado sobre agar Nutritivo y agar Infusión Cerebro Corazón, y extendiendo con asa de Digralsky; las cajas fueron incubadas a 28°C hasta observar desarrollo de colonias, las cuales fueron caracterizadas por marcador morfológico macroscópico y microscópico mediante tinciones de Gram para la determinación de reacción, forma y disposición. De las raíces procesadas se obtuvieron dos morfotipos; el morfotipo CQB1 de colonias circulares, borde entero y continuo, tamaño promedio de 2mm, superficie lisa y conformado por bacilos Gram-positivos sin disposición celular. El morfotipo CQB2, de colonias grandes (5mm), irregulares, convexas bajas, superficie rugosa, consistencia cremosa, borde ondulado y conformado por bacilos Gram-positivos sin disposición celular. A la fecha, se han obtenido dos morfotipos bacterianos los cuales serán identificados molecularmente a nivel de especie y evaluados para determinar su actividad biológica sobre *C. quadricolor*, subrayando el papel importante que juegan los microorganismos en los ecosistemas y teniendo en cuenta el escaso conocimiento que existe de estas bacterias y su función en las raíces de las plantas.

Mycorrhizal and endophytic fungal communities associated with roots of *Pseudorchis albida* (Orchidaceae)

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Orchid mycorrhizal symbiosis constitutes one of the most significant specializations in orchid evolution. Most importantly, orchid mycorrhizal fungi (OrMF) are essential for orchid seed germination and further development and determine the carbon nutrition of non-photosynthetic species. Together with OrMF, orchid roots harbor a miscellaneous group of non-mycorrhizal root associated fungi (RAF), which belong to the omnipresent group of plant fungal endophytes. Despite their ubiquity and cosmopolitan distribution, orchid RAF have been rarely studied. Methods used for assessing OrMF and RAF diversity in plant roots recently shifted from culture-dependent to culture-independent approaches. In the present study, the endangered photosynthetic orchid *Pseudorchis albida* was screened for OrMF and RAF presence using culture-dependent and culture-independent techniques. The efficiency of the three different approaches was evaluated as well as the effect of sampling season. Sixty-six distinct OTUs of mycorrhizal and non-mycorrhizal fungi were found in *P. albida* roots in total. The OrMF community was dominated by *Tulasnella* species, which were mainly detected by isolation from pelotons or the culture-independent technique (direct DNA isolation from roots and cloning). The vast majority of RAF species belonged to the order Helotiales and had surprisingly wide putative ecological amplitude. Although the diversity and community assemblages of RAF were higher using the culture-independent technique, three of the seven most abundant RAF were exclusively detected by the culture-dependent approach. A combination of both methodological approaches seems to be the best way to study RAF diversity in orchid roots.