HONDURAS DISSERTATION/THESIS PROJECT

The diversity of the fungal genus Amanita in Cusuco National Park

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Only 1-2% of the estimated 2.5 million species of fungi are described, and a geographical bias exists with less representation from tropical areas. Virtually no work on fungal taxonomy has been completed in Honduras. In 2019, our team began a long-term fungal monitoring project in Cusuco National Park with the goal of mapping fungal records and determining drivers of fungal diversity within the area. In addition, it will generate data to supplement our initiative to compile a fungal checklist for Honduras and reveal areas with particularly species-rich fungal diversity. Incidental collections and standard surveys in 2019, 2022, and 2023 have yielded 1,120 fungal collections some of which represent new species to science. Thus far, new species from Cusuco National Park have been described in the genera *Chlorosplenium*, *Gloeandromyces*, *Lactifluus*, and *Trechispora*.

Cusuco National Park has multiple species of oaks (*Quercus*) and pines (*Pinus*) that form mutualistic ectomycorrhizal relationships with many well-known groups of macrofungi, including the genus *Amanita*. *Amanita* is a large genus of some of the most well-known mushrooms in the world, containing edible, deadly-poisonous, and psychoactive species. In this dissertation project, students will complete a taxonomic study of the genus *Amanita*, with an emphasis on macromorphology and micromorphology in the field, supplemented by photographs and DNA sequence data from collections in previous years.

The fieldwork will consist of sampling 24 10m × 10m plots in elevations varying from 1,181 to 2,112 m and with vegetation varying from *Pinus*-dominated to mixed broadleaf forests. Fungal plots are paired with vegetation plots from which habitat data have been collected for 19 years. Within each fungal plot, sampling for macrofungi will occur in 2m × 2m subplots for 20 min each, with two individuals searching for fungi, one taking photographs, and another recording data. Tissue samples will be taken from macrofungi and placed in a DNA lysis buffer before drying fungal collections with silica beads. Students will learn to make fungal collections in standardized manner, collect and identify fungi, perform fungal microscopy, and contribute to understanding the diversity and identity of *Amanita* within Cusuco and Central America. Students will also survey other groups of fungi in long-term fungal plots.

Recommended Reading

Codjia JEI, Cai Q, Zhou SW, Luo H, Ryberg M, Yorou NS, Yang ZL. 2020. Morphology, multilocus phylogeny, and toxin analysis reveal *Amanita albolimbata*, the first lethal *Amanita* species from Benin, West Africa. Frontiers in Microbiology 11: 599047. https://doi.org/10.3389/fmicb.2020.599047

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