

The fungal diversity of Madai Cave, Sabah, Malaysia

ABSTRACT

Borneo is one of the biodiversity hotspots of the world, but its limestone caves are one of its least studied ecosystems. Studies of the cave mycobiota of Sabah is essentially nonexistent. In this study, speleothem (n = 4), cavern water (n =4), and bat guano (n = 4) samples were collected and studied for their fungal diversity and abundance. Opportunistic sampling was utilized and the dilution method was performed during isolation. Fifty-five culturable fungi were isolated of which 32 species from 15 genera, nine orders, and two phyla were observed. Morphological characterization and molecular analysis of the ITS gene region were utilized for identification of the isolates. The average fungal abundance count for speleothem samples were 229.3 CFU/cm², cavern water was 335.0 CFU/ml, and bat guano was 6266.7 CFU/g. Simpson and Shannon diversity indices indicated that speleothem samples had the highest fungal diversity, followed by bat guano, and cavern water. Speleothem also resulted in the most pure isolates (n=23) and distinct fungal taxa (n=19). Ascomycetes dominated the fungal composition of all sample types, accounting for 53 out of 55 total isolates. The remaining two isolates were both Basidiomycetes. The most abundant genera recovered from cave samples was *Penicillium*, but *Aspergillus* spp. had the highest occurrence as they were isolated from all samples except for one. *Purpureocillium lilacinum* was the species with the highest occurrence, appearing in five separate samples from all three substrate types. This study serves to produce baseline data useful for further research on the mycoflora of Sabah's various ecosystems. We urge that visitors should be more aware of the potential risks and disturbance they cause to microbial communities when entering cave environments.