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Old Keys, New Techniques: A Path Towards Modernizing Hawaiian Fungal Taxonomy

The methods presented, while in use for the study of fungi, may be found applicable to many fields of natural sciences.

On the world's most isolated archipelago, mycologists are struggling to identify the fungi. Threatened by invasive species and habitat destruction, the biota of the islands must be known if they are to be conserved. Inventories of plants and animals are established, but an understanding of the fungi lags far behind. Prior to the paradigm shift for species identification which arrived with DNA sequencing, Hawaii's mycologists relied on macroscopic and microscopic features for classification. This work of the last century amounts to over 200 papers which mention over 1,400 species. Utilizing this literature for identification today may require hours of literature search and expertise in taxonomic terminology. If we are to develop an understanding of Hawaiian fungi in this century, more accessible approaches to utilizing traditional taxonomic data are necessary. Jack's research presents one technique to consolidate taxonomic data for fungal identification. Through the training of a large language model on publications and publicly available databases and development of an AI workflow, it is possible to coalesce a century of work and collections into formats which enhance the process of identification. Implementation of this AI-Assisted workflow may have implications for the generations of species lists, host species indexes, species distributions, and the identification of trends, biases and holes present in a dataset.