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BOOK OF ABSTRACTS

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Tracking Leaf Trait Differentiation of Newly Diverging Subspecies of Chenopodium Oahuense on the Hawaiian Isla

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A single native *Chenopodium* species, *Chenopodium oahuense*, can be found throughout the Hawaiian archipelago. Subpopulations of this species can be found in a wide range of habitats that differ greatly in temperature, humidity and elevation. Field observations and experiments in common gardens suggest that large climate differences across the population range are driving distinct morphologies. These morphological differences are likely associated with physiological adaptations to the local climates of the subpopulations, however, physiological comparisons have not been done. By utilizing a common garden, we will compare previously observed differences in gross plant structure with functional differences in whole plant water use strategies and couple this to an environmental niche model based on data from GBIF, iDigBio, and field surveys. Our main objective is to document *Chenopodium oahuense* leaf traits (e.g. leaf size, stomatal density, leaf hydraulic conductance, osmotic potential at full turgor and leaf level capacitance) for the different sub-populations and between juvenile and adult growth forms. We are able to understand the relationship between leaf structure and function by imaging the leaf surface, measuring stomatal conductance, and conducting pressure-volume curves. We also intend to elucidate how variation in each sub population's home environment has led to adaptive shifts in plant water use strategies. Preliminary results suggest that the environmental niche differences such as elevation, rainfall, and annual temperature experienced by each subpopulation are strongly coupled to differences in water use strategy. Pressure volume curve analyses of the different subpopulations are showing differences in osmotic potential at full turgor and turgor loss point. Preliminary stomatal conductance and leaf size measurements also indicate differences between juveniles and adults within populations. In conclusion our preliminary data suggest differences in plant water use strategy are linked to the population's distinct environmental conditions. Increasing our understanding of diversification and evolutionary adaptations within a specific lineage has broad implications for understanding other ecological systems with diverging sub populations. Our results allow for more informed conservation decisions for *C. oahuense* that will, in turn, impact the conservation of other organisms that rely on them.

Keywords Ecology, Diverging Leaf Traits, Plant Physiology, Speciation, Chenopodium oahuense

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Root Functional Traits and Microbial Variations across a Gradient of Foliar Disease Incidence in Agroforestry Systems

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In tropical agroforestry systems, root functional traits are important indicators of ecosystem functioning, including nutrient cycling and soil trophic interactions. These trophic interactions are important for crop health, as they can assist plants via enhanced nutrient uptake, improved performance under drought conditions, and altered susceptibility to phytopathogen attacks. While previous research has investigated the response of root functional traits and soil-microbial processes to nutrient availability, little work has investigated root response to aboveground plant disease and the role that management plays in moderating these relationships. The main objective of this study is to determine variations in root functional traits and root endophytic fungal populations across a gradient of plant-level foliar disease incidence in a variety of amendment regimes. Using Coffea arabica (coffee) as a model species, we measured key coffee root functional traits and characterized root endophytic fungal populations across a gradient of coffee leaf rust (CLR) incidence – a fungal disease prominent in coffee systems – under contrasting but widespread management conditions in biodiverse agroforestry systems. Preliminary results suggest that both coffee root traits and fungal community composition expressed significant variability across three agroforestry management regimes, where fungal community composition was significantly related to select root functional traits and site conditions. However, variability in fungal communities and root functional trait expression were not different between different levels of CLR incidence. These results suggest that patterns in foliar disease incidence do not disrupt belowground resource acquisition strategies via root traits or microbial associations; rather, site conditions, including soil moisture and bulk density, dictate variability in these belowground strategies.

Keywords agroforestry, Coffea arabica, Hemileia vastatrix, functional traits, root fungal endophyte

Linking Taxonomy and Macroecology: The Impact of 300 Years of Taxonomic Reclassification on Observed Species Richness of the Amazonian Flora

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The importance of taxonomy for ecology is undisputed. Key aspects of ecological research, from understanding biodiversity to identifying conservation targets, depend on how we classify organisms. Yet, ecologists spent surprisingly little attention to understand how progress in the classification of organisms impacts their models and empirical findings. Here we explore how taxonomic reclassification affects our knowledge of species richness of the Amazonian flora. We integrate the available checklists of Amazonian plants, compile information about their synonyms from different nomenclatural databases, and track historical nomenclatural changes by consulting botanical monographs. We then zoom in and investigate how such nomenclatural changes for Lecythidaceae and Arecaceae — two of the most dominant families in Amazonia — unfolded in the past 300 years. We focus on these two families because they are relatively well-studied and have been recently monographed. Our results show that the ca. 10 000 currently accepted species names of the Amazonian flora are associated with 45 000 synonyms. The number of synonyms associated with individual species names varies enormously across genera and families. It may require up to a century for taxonomists to first describe and then revise the classification of a given species. Moreover, taxa are at different odds of being revised, with several of them having been rarely assessed by botanical monographs. Our findings expose the inherent taxonomic uncertainty associated with species names. Incorporating such uncertainty in ecological models would allow quantifying the impact of taxonomic progress on ecological predictions. These findings provide a first insight of a more comprehensive research into the evolution of taxonomic knowledge in the Amazon rainforest. They can also contribute to a probabilistic view on species names and highlight taxa that deserve fresh botanical monographs.

Keywords Amazonian flora, taxonomy, taxonomic monographs, species richness, nomenclatural databases, Amazonia