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Phylogenetic and Evolutionary Insights into Independent Gametophyte Ferns of the Tropical Genus *Lomariopsis* (Lomariopsidaceae)



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Venue: Auditorium, 1st Floor,

Interdisciplinary Research Building

跨領域科技研究大樓1樓演講廳

Host: Dr. Ko-Hsuan Chen 陳可萱助研究員

Terrestrial Biodiversity and Ecosystems



Abstract

The rapid exploration of genomic DNA sequences has greatly broadened and deepened our phylogenetic understanding of biodiversity. This is also true for ferns, the second-largest lineage of land plants which possess the largest eukaryotic genomes. Among ferns, independent gametophyte species represent one of the last decoded pieces of diversity, particularly their presence in the tropics. Because of the unique lifestyle—lacking sporophytes and existing solely as asexually reproduced gametophytes, these ferns cannot be readily identified using traditional morphological approaches. Instead, their identities must be phylogenetically confirmed through DNA sequences. In the tropical genus *Lomariopsis*, several remarkable independent gametophyte cases have been documented, yet their precise identities have required more advanced phylogenetic investigation. Our recent phylogeny based on comprehensive species sampling was the first to clarify their identities, and to confirm their occurrence in all major geoclades. Notably, two of these species were further revealed to be widely distributed in Taiwan. To resolve the evolutionary origins of these independent *Lomariopsis* gametophytes in Taiwan with greater resolution, we aim to generate phylogenomic and population genomic datasets for them. We have therefore designed targeted bait-capture probes that are specific to these *Lomariopsis* ferns and cover more than 1,000 loci. We have also demonstrated the effectiveness of this bait set, which performs well even with DNA derived from a single gametophyte individual. By compiling and analyzing these datasets, we hope to elucidate the origins of *Lomariopsis* independent gametophytes in Taiwan, and to identify potential genetic causes for their absence of mature sporophytes and spores. Ultimately, our results will provide rare empirical insights into how asexual or “dead-ending” plant lineages evolve and persist within the highly species-diversified tropics.