

# The Miocene to Pleistocene colonization of the Philippine archipelago by *Begonia* sect. *Baryandra* (Begoniaceae).

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## Abstract

### PREMISE OF THE STUDY:

One third of the species-rich Philippine flora is endemic, and most of the islands in the archipelago have never been connected to a continental region. We currently lack any well-sampled angiosperm phylogenies that span the archipelago, prohibiting the formation of informed hypotheses as to the evolution of this rich and highly endemic flora.

### METHODS:

We produced time-calibrated phylogenetic trees from both nuclear (ITS) and chloroplast (*ndhA* intron, *ndhF-rpl32* spacer, *rpl32-trnL* spacer, *trnC-trnD* spacer) regions of 41 species of *Begonia* sect. *Baryandra*, all except one endemic to the Philippines. Historical biogeography was reconstructed across the chloroplast phylogeny using a Bayesian binary method of character optimization. Comparison of phylogenies from the two genomes permitted insight into the prevalence of hybridization in the group.

### KEY RESULTS:

The Philippine archipelago was colonized by *Begonia* sect. *Baryandra* in the late Miocene, via long-distance dispersal from western Malesia and a point of entry likely to be in the northwestern region of the archipelago. Palawan, Luzon, and Panay all bear early-branching lineages from this initial colonization. There have been Plio-Pleistocene dispersals from these islands into Borneo and Mindanao. Hybridization was common between species as evidenced by haplotype sharing and phylogenetic incongruence.

## **CONCLUSIONS:**

The phylogenies show a high degree of geographic structure, which millions of years of exposure to typhoons have not blurred, showing long-term species and population stability. The recent dispersals to Mindanao are congruent with the geologically recent arrival of the island at its current latitude in the southern Philippines.

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