

Phylogeography of three closely related myrmecophytic pioneer tree species in SE Asia: implications for species delimitation

Abstract

Members of the Euphorbiaceae are ecologically important elements of Southeast Asian forests. Species of the pioneer tree genus *Macaranga*, which is also known for its association with ants, are often abundant in disturbed areas. Phylogenetic studies suggested a recent radiation of section *Pachystemon* which comprises the majority of obligate myrmecophytes within *Macaranga*. In the present study, we analyzed the genetic structure of three closely related species of this section (*M. constricta*, *M. griffithiana*, and *M. motleyana*) with the aim of resolving their controversial taxonomy and historical biogeography. Chloroplast DNA haplotypes proved to be species-specific and showed a strong phylogeographic pattern. Nuclear microsatellite data supported the taxonomic distinctness of *M. griffithiana* and *M. motleyana*, but gave ambiguous results for *M. constricta*. Genetic differentiation was stronger each within *M. griffithiana* and *M. motleyana* than between *M. constricta* and *M. griffithiana*, highlighting problems of defining species boundaries. We found no indication for introgression or hybridization events. The high intraspecific morphological variation of the Bornean endemic *M. motleyana* was partly reflected by similar patterns of genetic variation. The pronounced genetic structure indicates a comparatively long diversification for this species. In contrast, the weak genetic differentiation within *M. griffithiana*, as well as the widespread distribution of its most common chloroplast haplotype from peninsular Malaysia up to Indochina, indicates a recent expansion in this area. Despite their morphological similarity and close relatedness, all species possess their own specific ant-partners with a corresponding distribution pattern.