

Floristic composition and host tree utilization of vascular epiphyte assemblages
in a Bornean lowland tropical rain forest

(ボルネオ島低地熱帯雨林における維管束着生植物群集の組成と宿主木利用様式)

Natsuki Komada

Vascular epiphytes (hereafter epiphytes) are vascular plants that grow non-parasitically on other plants. Epiphytes comprise approximately 28,000 species and account for nearly 9% of global vascular plant diversity. High diversity and abundance of epiphytes are found in tropical rain forest areas, where they contribute substantially to ecosystem functioning. However, studies on the diversity of epiphyte assemblages in the Southeast Asian tropics remain limited. As such, I sought to elucidate the composition and host tree utilization patterns of epiphyte assemblages in a lowland tropical rain forest in Lambir Hills National Park in Malaysian Borneo. In Chapter 2, I describe the general characteristics of my research site, Lambir Hills National Park, in Sarawak, Malaysia. In Chapter 3, I provide a preliminary checklist of 183 vascular epiphyte species observed in Lambir Hills. In Chapter 4, I describe the floristic characteristics of vascular epiphyte assemblages, based on the number of species and the component percentage of each epiphyte taxon, among 11 montane and lowland sites from the Southeast Asian tropics, Afrotropics, and Neotropics. The results suggest that the epiphyte flora of the Bornean lowland is distinct from those of the other regions. At the subclass and class levels, Lambir Hills had the greatest number of species and component percentage of eudicots. When comparing between montane and lowland forests within the Southeast Asian tropics, Lambir Hills was characterized by the highest number of species and component percentage for the Apocynaceae and Moraceae, low number of species and component percentage for the Orchidaceae, and low component percentage for the Polypodiaceae. Again, at the subclass and class levels, Lambir Hills had higher number of species and component percentage of eudicots. In Chapter 5, I examine the relationships between epiphyte species richness and the abundance and diameter at breast height (DBH) of host trees. The results indicate that number of epiphyte species and number of epiphyte individuals both increase exponentially with DBH. The greatest increase was observed in trees with DBH > 40 cm. In addition, approximately half of all epiphyte species recorded in this study were observed exclusively on trees with DBH > 60 cm. These results suggest that in lowland tropical rain forests in the Southeast Asian tropics, large trees play an important role in maintaining the species diversity of epiphyte assemblages by providing them with habitats. Meanwhile, several epiphyte species were found only trees with DBH ≤ 40 cm, suggesting that the small trees also provide essential habitats with such epiphyte species. In Chapter 6, I investigate how the number of epiphyte species on a tree and number of epiphyte individuals, and the structure of epiphyte assemblages, vary among seven host tree species belonging to Dipterocarpaceae. The results showed that number of epiphyte species on a tree and number of epiphyte individuals on a tree differ significantly among host species, two species of *Dipterocarpus* were shown to host markedly many species and individuals of epiphytes. The assemblage structure of epiphytes was also significantly different among host tree species. Especially, four out of seven host tree species belonging to the genus *Dryobalanops* and *Shorea* were shown to host distinct epiphyte assemblages compared to the other host tree species. These results suggest that in lowland tropical rain forests in the Southeast Asian tropics, large individuals of each tree species provide characteristic habitats with epiphyte assemblages, contributing to the maintaining of the epiphyte species diversity. In Chapter 7, I summarize the key findings and provide recommendations for future ecological and conservation studies on epiphyte assemblages in Southeast Asian tropical forests.