

Conservation assessment and spatial distribution of endemic orchids in Sabah, Borneo

ABSTRACT

Orchids are among the most threatened plants due to habitat loss and illegal harvesting for horticultural demands. Sabah is a centre of orchid diversity, with approximately 1300 species of which 250 orchid taxa are endemic to Sabah. In this study, we conducted an IUCN Red List assessment on 136 endemic species and used Maximum Entropy (MaxEnt) to develop species distribution models for 47 species. The species distribution models were developed using presence-only data and six environmental predictors. The accuracy of the models were assessed using the area under the curve (AUC) and models with an AUC of higher than 0.8 stacked together to produce a species richness heatmap. We found that 83% of the researched species were threatened, of which 14 species were assessed to be Critically Endangered, eight species as Endangered and 93 species as Vulnerable. The heatmap shows that all of the species occurred within the Totally Protected Area (TPA) network in western Sabah. The heatmap highlighted the mid-altitude areas adjacent to the Kinabalu and Crocker Range parks and Ulu Sipitang regions as areas with a high species richness that were outside the TPA network. These areas are also important for the conservation of the majority of the species assessed as Critically Endangered and Endangered. Urgent conservation actions are needed to protect these species from extinction. The results from this work will be used as part of an intensive conservation action plan for threatened endemic orchids of Sabah and used to identify important plant areas currently not within the existing TPA network.