South Pacific Studies Vol. 25, No.1, 2004

Development and Distribution of Vascular Epiphytes Communities on the Krakatau Islands, Indonesia

Tukirin PARTOMIHARDJO[1], SUZUKI Eizi[2] and YUKAWA Junichi[3]

1: Research & Development Center for Biology, LIPI, Bogor 16122, Indonesia
2: Faculty of Sciences, Kagoshima University, Kagoshima, 890-0065 Japan
3: Faculty of Agriculture, Kyushu University, Fukuoka 812-8581,Japan

Abstract

The development, diversity, vertical distribution and other ecological aspects of epiphyte communities were studied on the Krakatau Islands, Indonesia, which exhibit a primary succession since a catastrophic eruption in 1883. Compiled flora of epiphytes recorded in the studies from 1886 to 1993 by us and many scientists had 108 species in nine and six families of fern and seed plants, respectively, on the four islands of Krakatau: Rakata (98spp.), Sertung (32spp.), Panjang (28spp.) and Anak (7 spp.). The most diverse family in species number in epiphytic seed plants was Orchidaceae consisting of 37 species, followed by Asclepiadaceae and Moraceae with 8 and 6 species, respectively. The epiphytes occupied 5% of flora of the islands in the early 30 years after the eruption, and 20% in recent.

Our quantitative study in five plots from 10 to 700 m altitude on Rakata Island with summit of 813m in altitude showed that the fern epiphytes were more abundant than the seed plants. Upland had more epiphytes than lowland. In the lowland, epiphytes grew chiefly in the canopy layer and on the basal parts of the trees. The population of epiphytic fern *Antrophyum* decreased from the base of trunk to the canopy, whereas the population of orchids increased. Most of woody hemi-epiphytes, such as *Clidemia hirta* and *Schefflera polybotrya* preferred trunks and were found rooted in forks and crannies filled with humus.

Key words: dispersal mechanism, epiphyte, primary succession, species richness

Introduction

Epiphytes consist of some species of algae, bryophytes, lichens, ferns and spermatophytes. They have been distinguished from parasites and hemi-parasites by their ability to collect water and minerals from the air (HOSOKAWA 1968, RUINEN 1953). Although epiphytes are relatively small components among forest communities, they play an important role in characterizing tropical rain forests by having a specific nutrient cycle and life-support systems. For example, NADKARNI (1984), who studied the biomass and nutrient capital of vascular epiphytes in a neotropical elfin forest in northern Andes, reported that epiphytes produce relatively high amount of organic matter and had ability to fix atmospheric nitrogen. BENZING (1983) emphasized that tank epiphytes such as aroids, bromeliads and ferns are also very important in creating hiding and breeding sites for arboreal forest insects and amphibians. In spite of their importance in forest ecosystems, epiphyte communities have seldom been studied in relation to the tropical rain forest succession (WHITMORE 1975, 1984, WHITTAKER *et al.* 1989).

Received May 21, 2004
Accepted July 27, 2004