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Exotic plant species in the restoration project area in Ranupani recreation forest, Bromo Tengger Semeru National Park (Indonesia)

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ABSTRACT

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KEY WORDS

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(Mack & Lonsdale, 2001; Hakim & Nakagoshi, 2007; Dehnen-Schmutz et al., 2007).

A recent survey in Indonesian national park suggested that exotic plant species did contribute to biodiversity decline due to the extinction of several local species, many of which endemics to particular areas (Hakim, 2011; Hakim & Miyakawa, 2014). Hence, restoring tropical mountain forest is very important in mountain biodiversity conservation.

Tropical mountain forest restoration projects, however, exhibit a number of limitations (Hakim & Miyakawa, 2014), one of which certainly is the lack of a scientific comprehensive database of exotic plant species. The aim of this research is to provide basic data of exotic plants in Ranupani forest area in order to contribute to the near-future restoration management projects.

MATERIAL AND METHODS

Study site

In the end of 2010, the Japan International Cooperation Agency implemented the national restoration program in protected areas known as "Project on Capacity Building for Restoration of Ecosystems in Conservation Areas in Indonesia". Bromo Tengger Semeru National Park (BTSNP), particularly the Ranupani forest recreation area (2000–2200 m asl; average temperature 10-20 ºC; relative humidity 80–85%), was one of the selected study areas (Fig.1). The project aimed at protecting the Lakes Pani and Regulo and restoring the tropical mountain forest surrounding them. In the past, Ranupani area was characterized by a great diversity in mountain flora species and both lakes were crucial freshwater resources for humans and wildlife. However, recently, the combination of population growth and forest fire led these areas under rapid degradation. Hence, the conflict between biodiversity protection in national park and socio-economic development appears all around Tengger Highland (Hakim, 2011). In Ranupani, human disturbance and natural forest fire damaged systematically the ecosystem, leading to the forest degradation with major consequences for Lake Ranu. Recently, also Lake Pani has been seriously degraded due to increasing population and intensive agricultural practices.

From a geological standpoint, the soil is composed of volcanic ash; the climax vegetation disappeared being replaced by a recent vegetation structure including pioneer to sub-climax species.

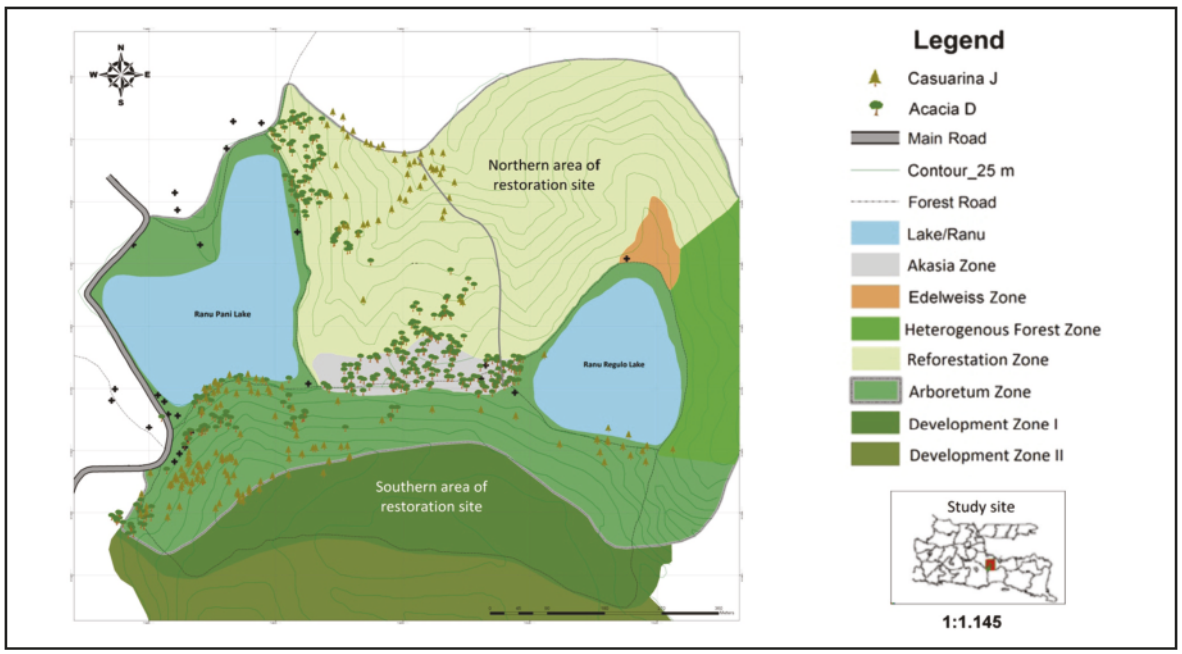

Figure 1. Restoration target area in Ranupani sector of the Bromo Tengger Semeru National Park.

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based on long-term research and monitoring, is crucial.

CONCLUSION

The degraded forest in Ranupani area provides habitat for a numerous exotic plants, including aquatic fern, herbs, shrubs and woody trees. Virtually all of the degraded and open forest areas have been invaded by exotic plants. *Acacia decurrens* and *E. inulifolium* are dominant in restoration area. The invasion of exotic plant species, in Ranupani forest area, constitutes one of the most serious threats to the success of forest restoration programs. The main factors governing the distribution and invasion of numerous exotic plant species include habitat disturbance, poor human knowledge/awareness, and lack of ecological monitoring and control by national park authority. In order to enhance the success of restoration programs, clearing exotic plant species in restoration area, building community awareness about exotic species and enhancing the capacity of national park management to control and monitor the existence of exotic plant species are certainly needed.

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