Species Richness of spermatophytes in Mranak forest area of mount Prau, Central Java, Indonesia

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Abstract. Forest clearing that has been used as agricultural land in Mount Prau is increasing. As a result, the sustainability of biodiversity, natural habitat of mountain forest and natural resources are increasingly under threat. However, green, and natural landscapes of mountain forest can still be found in eastern and northern slopes of Mount Prau. Although at lower slopes already contain agricultural land, the rate of forest encroachment for conversion to agricultural land is relatively slow. Mranak forest in Genting Gunung village, Sukorejo sub-district, Kendal district is one forest area that still in good condition. This forest is one of the unofficial hiking routes to the top of Mount Prau. This study aims to assess species richness of seed plants (Spermatophytes) in the Mranak forest. The exploration method was used to assess plant species. Based on preliminary field study, four observation areas were determined at different altitudes (1600, 1900, 2100, and 2300 meter above sea level). The results found 124 species of seed plants belonging to 61 families. Melastoma malabathricum found in zones 1 and 4 (lowest and highest area). The two zones are indeed more open according to the habitat preferences of this species. The Important species found in this research were Sarangan (Castanopsis argentea), Corybas orchid, and Edelweiss (Anaphalis longifolia). All three species are important because of their conservation status.

1. Introduction
Mount Prau is one of the mountains in Central Java with good tropical rain forest vegetation, which is located in the Dieng Plateau area, Central Java, Indonesia. Wonosobo 2011 - 2031. Mount Prau Protected Forest Area is located in Central Java Province. Mount Prau has an altitude of 2565 masl which is the highest mountain in the Dieng plateau and is located between three districts, namely Batang, Kendal, and Wonosobo Regencies. The Tropics are global centers of biodiversity [1]. Accurate and detailed biodiversity information is the foundation for sound conservation planning [2].

The peak of Mount Prau is located at coordinates 7 ° 11′13 ″ LU 109 ° 55′22 ″ East Longitude Forest clearing that has been used as agricultural land in Mount Prau is increasing. Loss of forests will affect the climate, the understanding of which is critical to predicting climatically driven biodiversity loss [3]. species richness and composition are a combination of recent climate change and plant-herbivore interactions [4]. As a result, the sustainability of biodiversity, natural habitat of mountain forest and natural resources are increasingly under threat.

However, green and natural landscapes of mountain forest can still be found in eastern and northern slopes of Mount Prau. Although at lower slopes already contain agricultural land, the
rate of forest encroachment for conversion to agricultural land is relatively slow. Mranak forest in Genting Gunung village, Sukorejo sub-district, Kendal district is one forest area that still in good condition. This forest is one of the unofficial hiking routes to the top of Mount Prau. This study aims to assess species richness of seed plants (Spermatophytes) in the Mranak forest.

2. Methods
The exploration method is used to assess plant species. Based on preliminary field study, four observation areas were determined at different altitudes (1600, 1900, 2100, and 2300 masl). Data collection techniques by observation and collection. The species found were identified using the key of determination. Findings are organized in the form of species descriptions.

3. Results and discussion
The Mount Prau area of Wonosobo Regency is mapped into four main zones based on the height and characteristics of the area as in Figure 1. The four zones are (1) basal (1600 masl) the lowest area with very little open area.; (2) middle A (1900 masl) full canopy area; (3) middle B (2100 maspl), the narrower area ; and (4) top zone (2300 masl), savanna area, open area with a minimum canopy.

![Figure 1. Mapping of the track zone of mount Prau in Wonosobo regency](image)

The results found 124 species of seed plants belonging to 61 families (Figure 2). *Melastoma malabathricum* found in zones 1 and 4 (lowest and highest area). The two zones are indeed more open according to the habitat preferences of this species. The important species found in this research were Sarangan (*Castanopsis argentea*), Corybas orchid (*Corybas umbrosus*), and Edelweiss (*Anaphalis longifolia*). All three species are important because of their conservation status.

![Figure 2. Species number of each Families found in Mranak forest, Mount Prau area.](image)
Anaphalis longifolia or commonly known as the Edelweiss flower is a plant that belongs to the asteraceae family. Anaphalis longophilia is scattered in the highlands of Indonesia which has an altitude of 1000-2000 masl. Anaphalis longifolia can be distinguished from other Anaphalis by its long, small leaves. The flowers are arranged receptively in the bud with the development of the petals which are centered and circled by the bractea. The stems and leaves have thick fur which is a form of adaptation to cold environments and high places. Anaphalis longifolia or commonly known as Edelweiss flowers is included in the Magnoliophyta Division of the Class Magnoliopsida Order of the Asterales and the Asteraceae family. A. longifolia occupies 3 types of land cover (industrial forest plantations, open land and dry land agriculture) and can live in 3 types of soil (humic cambisol, orthic acrisol, and orthic podzols). A. longifolia lives on > 60 land slopes, and is in 3 critical land conditions. Anaphalis sp. included in the inthreatened category or plants in a threatened condition [5-7].

Figure 3 Anaphalis longifolia

Castanopsis argentea is included in the Magnoliophyta Division of the Magnoliopsida class of the Order of Fagales and the Fagaceae Family. Castanopsis is often a key species in ecosystems. They can also live in various types of soil besides calcareous soils. This type is able to survive in rocky soil types [8]. This genus exhibits many of the distinctive characters of Fagaceae, most of which are large shrubs but a few species grow into fairly large trees. It has leaves that are usually hard and scaly and have well-developed cuticles. Unisexual flowers each produce one seed but gather in small groups. The fruit is calybium, a type of wrapped bean typical of Fagaceae. Calybium (bean) has a hard and prickly texture. several types of Castanopsis produce edible nuts and bark containing tinin which can be used for coloring [9].

Figure 4. (A) Castanopsis sp, (B) Corybas umbrosus

Corybas umbrosus belongs to the Tracheophyta Division of the Liliopsida class of the Order of Asparagales and the Orchidaceae family. The genus Corybas is also called Shadowy Corybas which refers to the leaves that leave a shadow on the ground because of their upward-facing shape. This orchid is an endemic to Java [10]. Can be found in thick, moist,
and shaded leaf litter or semi-open habitats with humus soil in primary forest at an altitude of 1070 - 2300 masl. Grows terrestrial (including ground orchids) small with a height of 3-4 mm. *C. umbrosus* has a single leaf in the shape of a heart, with a pointed tip and the edges are usually wavy [11], the leaf surface is bright green with clear leaf veins in white while the underside is green. *C. umbrosus* leaves grow close to the ground parallel. Flowers are single flowers that appear at the base of the leaf, in the form of a bud, dark red in purple, rounded dorsal sepals like a helmet and cover other flower jewelry, 1 - 2 cm long, flowers bloom for about 2 days, facing towards the base of the leaf.

The high species richness of spermatophytes in the Mranak forest holds the potential for biodiversity. For example, *Castanopsis argentea* is one of the rare species protected by the government of the Republic of Indonesia [12] with a conservation status as an endangered species based on the IUCN Red list [13]. The propagation of tillers and conservation efforts are recommended by the IUCN because the population of *C. argentea* in natural habitat is decreasing rapidly. Currently, generative propagation is still conventional using seeds and shoot cuttings [14], but propagation using this method requires a long period. Innovative methods are needed to accelerate the propagation of these rare species, such as in vitro techniques [15].

4. Conclusion
The results found 124 species of seed plants belonging to 61 families. The Important species found in this research were *Castanopsis argentea*, *Corybas orchid*, and *Anaphalis longifolia*. All three species are important because of their conservation status.

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