

Tree Species Diversity of Various Vegetation Types at the Alliance Level in

Submontane Forest of Mount Salak, Bogor, West Java

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Comment [LDB1]: I believe that "sub mountain" or "submontane" would mean below the mountain in the foothills. If this zone is actually on the mountain, do you mean "subalpine," that is, below the peak of the mountain? (You describe the zone as high elevation with steep slopes.) ["Subalpine" is more common in my experience, but you should use the correct local name for this community. -GH]

Comment [GHT2]: Please indicate the corresponding author with an *, and for that author, provide the complete mailing address (including street or district name and building number), as well as the telephone, fax, and e-mail.

ABSTRACT

The submontane zone on Mount Salak is part of the tropical montane forest ecosystem on West Java. It is important to conserve the biodiversity of Mount Salak, especially the endemic and rare species found only on this mountain. The aims of this research were to determine the structure and composition of the tree species, including species diversity, for all stands in vegetation types classified at the alliance level in the submontane zone of Mount Salak, Bogor, West Java. Vegetation was surveyed in alliance 1, alliance 2, and alliance 3. We counted each tree, measured its basal area, and identified it to the species level. Tree data were used to determine an importance value index of every species from all stands. We also examined the species diversity of each stand using three indexes: the Shannon-Wiener diversity index (H'), Pilon's evenness index (e), and Menhinick's richness index (R). There were 72 tree species found in alliance 1. *Schima wallichii* was the species with the largest number of individuals, whereas *Pinanga javana*, *Dysoxylum excelsum*, and *Antidesma tetrandrum* were represented by only one individual. There were 71 tree species found in alliance 2. *Pinus merkusii* had the largest number of individuals, and *Glochidion rubrum*, *Goniothalamus macrophyllus*, *Schefflera scandens*, *Glutta reinghas*, *Antidesma tetrandrum*, *Dissochaeta gracilis*, and *Polygala venenosa* were represented by one individual. There were 56 tree species in alliance 3. *Pinus merkusii* had the largest number of individuals, and *Pithecellobium montanum*, *Calliandra tetragona*, *Polygala venenosa*, *Dipterocarpus hasseltii*, and *Symplocos spicata* were represented by one individual. The H' values in stands of alliance 1 (mixed forest) ranged from 2.666 to 3.391, stands of alliance 2 (bamboo forest) from 1.163 to 3.233, and stands of alliance 3 (forest plantation) from 1.683 to 3.498. The ranges of e values for alliances 1, 2, and 3 were 1.136–1.403, 0.551–1.331,

Comment [LDB3]: Will readers of this journal understand what this is? Or should you define alliance here: a physiognomically uniform group of plant associations sharing one or more dominant or diagnostic species.

Comment [LDB4]: Spelling as elsewhere, correct?

Comment [LDB5]: Journals require that Abstract be brief. I deleted the sentences regarding statistics to shorten the Abstract.

Comment [LDB6]: I cannot find this in an online taxonomic database. Should this be "tetrandrum"?

Comment [LDB7]: I cannot find this in the database. Please verify spelling. [The genus should probably be "Gluta".--GH]

Comment [LDB8]: As in Table 2.

Comment [LDB9]: Addition correct, this is a range of values among the various stands?

Comment [LDB10]: Correct for "nature forest mixture"? [However, change this to "natural mixed forest" if it has been mostly undisturbed by humans.--GH]

Comment [LDB11]: Note: Throughout the document decimals are indicated with a period rather than a comma. In order to efficiently search and replace these, I also changed the preceding digit in each case (i.e., search for 1, and replace with 1.)

Comment [LDB12]: It is clear which ranges are highest and lowest, so I have deleted these statements for brevity.

and 0.770–1.434, respectively. The ranges of *R* values for alliances 1, 2, and 3 were 1.691–2.662, 0.621–2.829, and 1.051–2.588, respectively.

Comment [LDB13]: Add a sentence or two to summarize your findings and/or describe implications for future research or conservation work.

Key words: Alliance, Pilon's evenness index, Menhinick's richness index, Mount Salak, Shannon-Wiener diversity index, submontane zone.

aktivitas siswa yaitu minimal mencapai 82%

3. Peningkatan aktivitas siswa dapat diketahui berdasarkan data hasil observasi siswa dengan skor minimal 82.

5. Ketuntasan belajar secara klasikal minimal mencapai 70% dari jumlah.

6. Ketuntasan belajar siswa secara perorangan minimal mencapai skor 82.

Indikator sebagai berikut:

Kepertahanan kualitas pembelajaran melalui metode 2028 diukur pada indikator-

C. Indikator ketertarikan

(Sumber: SMP Negeri 1 Jember Kar. Bone)

Introduction

Mount Salak, which ranges in elevation from 400 to 2210 m asl, is home to one of the tropical montane ecosystems on West Java (Sandy, 1997). It is important to conserve the biodiversity of this mountain, especially the endemic and rare species that can be found only on Mount Salak. In addition, this montane ecosystem serves important environmental functions, including maintaining the microclimate around the mountain, CO₂ absorption, and O₂ production (Dephut, 2003).

Comment [LDB14]: Changes correct? Also, can you think of a better example than O2 production? All photosynthesizing plants absorb CO2 and produce O2 (but CO2 absorption has implications for mitigating climate change). Because this is a steep area with high precipitation, perhaps erosion control?

The submontane zone of Mount Salak's ecosystem is susceptible to human interference because it is located very close to human settlement. According to Yusuf et al. (2003), most of Mount Salak's forest is still primary forest in relatively good condition, although it has been disturbed in some places. The disturbance comes in the form of land-use change from primary forest to paddy fields, agricultural fields, and gardens. When such lands are abandoned, they become scrub and brush or secondary forest.

Comment [LDB15]: Meaning correct?

Considering its topographical features, including high-elevation steep slopes, and its relatively high rainfall (up to 3000 mm year⁻¹), the submontane zone of Mount Salak is also susceptible to natural disturbance that results in changes in the distribution, composition, and structure of various vegetation types in the ecosystem. The loss of vegetation types results in the reduction of habitat diversity, which may threaten many species with extinction (Ehrlich, 1997). Such disturbances, in turn, would decrease the stability of the ecosystem (Lambin et al., 2000). A previous study of the area by Wiharto (2009) revealed that the submontane zone of Mount Salak has three vegetation types: (1) *Schima walichii*-*Pandanus punctatus*/*Cinchona officinalis* forest alliance (alliance 1); (2) *Gigantochloa apus*-*Mallotus blumeanus*/*C. officinalis* forest alliance (alliance 2);

and (3) *Pinus merkusii*-*Athyrium dilatatum*/*Dicranopteris dichotoma* forest alliance (alliance 3).

Mount Salak is part of the Gunung Halimun Salak National Park. In order to properly manage this montane ecosystem, it is necessary to improve our understanding of the vegetation ecology of Mount Salak. Among those ecological conditions that need to be better understood are vegetation structure and composition, including the tree species diversity of every stand in all the alliances in the submontane zone.

Methods

Study Site

Mount Salak is located within the Bogor and Sukabumi regencies of West Java, Indonesia. The geographical position of this mountain is $6^{\circ}43'32''$ - $6^{\circ}43'32''$ S and $106^{\circ}37'41''$ - $106^{\circ}40'50''$ E, and it has an area of 31,327 ha. The monthly average precipitation from November to May is more than 300 mm, and precipitation is nearly as high during the rest of the year. Climatologically, the rainy season on the mountain extends year-round. The average temperature is 25.7°C (Hadiyanto, 1997).

Mount Salak is one of more than 40 volcanic mountains on Java Island. Although it is essentially inactive, some volcanic activity still occurs at Ratu crater, Hirup crater, Paeh crater, and Perbakti crater. The mountain's stone consists of lava and pyroclastic materials with a basaltic andesite composition (Putro, 1997).

The soils of Mount Salak largely consist of Andosols. The solum is moderate to deep, with depths from 60 to 120 cm. The soil's upper layer is rich with organic matter, and the color ranges from reddish to black. The soil texture ranges from silt to sandy clay silt, and the granular structure is coarse, with moderate consistency. The lower

Comment [LDB16]: These numbers are the same. Please correct this range.

Comment [LDB17]: Please verify that minutes and seconds are correct. (You had the symbols in the wrong order.)

Comment [LDB18]: Meaning 31 thousand, correct? [If you used commas for decimals, should this become 31.3 ha?--GH]

Comment [LDB19]: Meaning correct? If so, and if the rainy season extends throughout the year, I think it would be better to simply say "The monthly average precipitation throughout the year is ___ mm."

Comment [GHT20]: Variation is often more important than the average, so you should either add "and ranges from ??? to ??? °C" or add "with little variation".

Comment [GHT21]: Please confirm the preferred spelling: this is often "Andisol".