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The Diversity of Understory (Shrubs and Herbs) in the Kalikuning Area

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Abstract

Kalikuning is one of the areas that has a diversity of flora. Kalikuning's fertile land helps a variety of plants flourish there. Since there are no people living here, a wide variety of unidentified and underexplored plants can be known. Therefore, more research on the plant diversity is required. The research aims to invent, document, and find out the diversity of the understory (shrubs and herbs) in Kalikuning. This research used survey and exploration methods. The researchers documented shrub and herb species. Based on the results, 28 families consist of 65 species of shrubs and herbs. Those species are flora that have specific characteristics.

Keywords: Kalikuning; Shrubs and Herbs; Understory.

INTRODUCTION

Kalikuning is located on the southern slopes of Mount Merapi, in the Cangkringan District, Sleman Regency, Yogyakarta. Kalikuning, as part of Mount Merapi National Park, has several functions, including the development of knowledge, research, and education. When Mount Merapi erupted, one of the locations through which the rain lava poured was Kalikuning. The Kalikuning River area's ecosystem is affected by this. The condition of the region is affected by environmental changes. The presence of one of them makes the area surrounding the volcanic outburst fruitful (Ginanjar & Ginanjar, 2014). Kalikuning's rich region set off the growth of a variety of flora.

The Kalikuning area is dominated by understory. This is because the Kalikuning area is an open area, so it is exposed to a lot of sunlight. According to Aththorick, (2005), the growth of understory plants is very dependent on sunlight. The more sunlight that penetrates the forest floor, the more it will stimulate the growth of understory vegetation.Understory is also often used as an indicator of soil fertility and produces litter to increase soil fertility. Apart from ecological functions, understory is also used as food and medicinal plants. However, it is not uncommon for understory to act as a weed that inhibits the growth of young trees, especially in cultivated monoculture plants. The presence of plants on the forest floor can function as a buffer against rainwater and surface runoff, thereby minimizing the danger of erosion (Hilwan & Mulyana, 2013).

Understory includes shrubs, herb, and layers of ground cover (Soerianegara. I dan A. Indrawan, 2008) (Soerinagara and Indrawan, 2008). Herbaceus is a soft trunked plants and contains a lot of water. (Mueller-Dombois & Ellenberg, 1974) mention, Herbs are plants without woody stems living in ground cover. Ferns, graminoids, and forbs are the three groups of herbs. Whereas the shrubs is plants that are not large in size, has a small wooden stems and branch close to surface (Tjitrosoepomo;, 2013). According to (Harris, 1983), usually, shrubs are smaller than trees; shrubs often grow to a height of less than 5 meters. The majority of shrubs contain many buds at the base and along the stems.

Flora diversity investigation is required for recording and inventorying species genetic variety, learning the distribution of flora, taxonomy, conservation efforts to avoid extinction, learning the molecular structure of plants, and learning secondary metabolites., etc. (Nurbani, 2015; (Akbar et al., 2019)). This research aims for documenting the diversity of understory (shrubs and herbs) in Kalikuning area. Research data can be used to investigate a range of plant species, shrubs, and herbs in a systematic and visual manner. The existence of species variety in Kalikuning must be communicated in order to demonstrate the richness of flora on the island of Java. Currently, little is know about plant diversity on Java island, including wild species. Other than that, the plants found in the Kalikuning area have the opportunity to be used as a source of learning biology on Plantae material.

MATERIALS AND METHODS

The study was conducted by a direct survey in the Kalikuning neighborhood of the Cangkringan District of Yogyakarta's Sleman Regency. This research was conducted from August 2022 to May 2023 in the Kalikuning area. Equipment used for observation and data collection consists of a spreadsheet concerning data species, digital cameras, and plants identification book. The identification procedure started with photographic evidence. To make identification easier, the picture shoot concentrated on the morphology of the stems, leaves, and inflorescences. Identification was done while also observing the plants in the understory.

The photographs that have been gathered have been recognized, and the habitus, which comprises herbaceous, shrubs, has been determined. identification with compared to illustrations in Flora of Java (Backer & Brink, 1980), Flora (Van Steenis, C.G.G.J, 1992), and a number of online resources including plansystematics.org, natureloveyou.com, plantnet.com, and others. Following identification, the plants were categorized depending on their habitus and classifications.

RESULT AND DISCUSSION

This study produced an inventory of the understory on Kalikuning. Based on life form (habitus) data, which includes bushes in the understory, herbs, and shrubs. This displays the outcome of Understory of diversity:

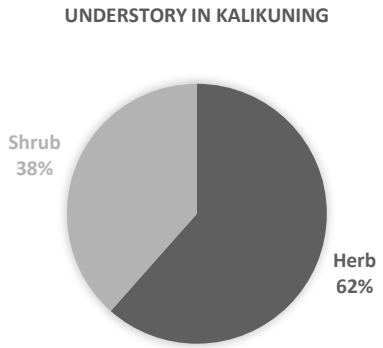

Figure 1. The Distribution of understory species in Kalikuning.

Based on life form (habitus), understory that dominates in Kalikuning is herb. The herb consists of 40 species, 25 shrub species. The herb is very easily to find, because the herb has strong competitiveness and high adaptation to surrounding plants (e.g. Liana, bushes, shrubs, even trees) so that they can grow in an empty place (Diana et al., 2021). Botanist defines herb as a plant whose stem does not become woody or persistent, but dies down after flowering (Jones, Sir Francis Avery: 1996). According to Anaputra et al. (2015), herbs plants are one of the constituent plant types on surfaces in land and water areas and have a smaller size when compared with bushes, trees, and shrubs whose trunks are wet and not woody. The presence of herbs in a forest area plays a very important role. Herbs are the early community that plays an important role in stabilizing soils that are sensitive to erosion (Rahayu, 2006).

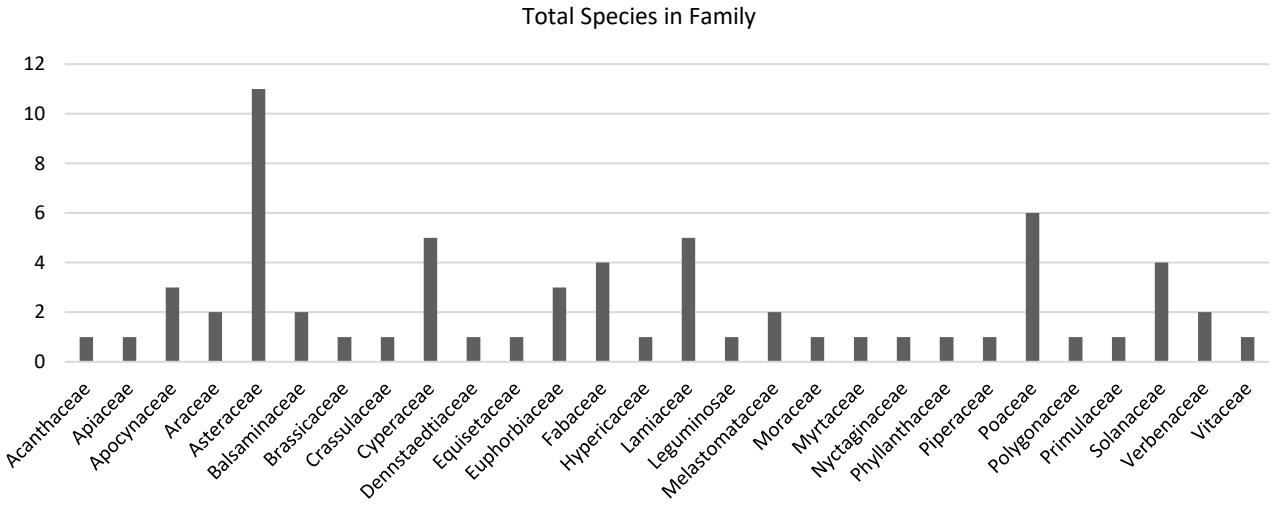

Figure 2. The Famili of understory species in Kalikuning.

Based on the graph, it can be seen that was (shrub and herbs) species with a total of 28 families in Kalikuning area. The Asteraceae families were understory that has the largest number of species, Asteraceae (11 species), Poaceae (6 species), Lamiaceae (5 species), Cyperaceae (5 species), Solanaceae (4 species), and Fabaceae (4 species). Taxonomically, the lower vegetation is generally members of the families Poaceae, Cyperaceae,

Araceae, and Asteraceae. This vegetation is found in many open places, roadsides, riverside, forest floors, and agricultural land (Aththorick, 2005).

Asteraceae family found in Kalikuning grows wild in various location. This plant often grows in undercanopies and places that are exposed to direct sunlight. Asteraceae is a plant taxon with quite high species diversity. According to (Anderson, 1982), plants of the Asteraceae tribe are a group of plants consisting of 1,100 genera, including 20,000 species. (Lawrence, 1966) stated that this family is the family with the second largest members in the kingdom Plantae.

The large number of Asteraceae families plays a major role in the stability of the ecosystem in Kalikuning. This plant plays a role in preventing erosion on mountain slopes. In preventing erosion, this plant has four roles, namely (Heyne, 1987). Prevents direct collisions of raindrops so that the impact force of the raindrops can be reduced. 2). Reduce surface flow velocity and protect against erosion by surface flow. 3). Encourage the development of soil biota, which can improve the physical and chemical properties of the soil, and the roots can influence the infiltration capacity of the soil so that surface water flow is reduced. 4). Plays a role in increasing soil organic matter and increasing soil resistance to erosion.

Table 1. Plant list of Understroty in Kalikuning.

No	Name	Family	Habitus
1	*Strobilanthes crispus*	Acanthaceae	Shrub
2	*Centella asiatica*	Apiaceae	Herb
3	*Catharanthus roseus*	Apocynaceae	Shrub
4	*Anodendron paniculatum*		Shrub
5	*Calotropis sp*		Shrub
6	*Xanthosoma sagittifolium*	Araceae	Herb
7	*Colocasia esculenta*		Herb
8	*Sphagneticola trilobata*	Asteraceae	Herb
9	*Crassocephalum crepidioides*		Herb
10	*Tagetes erecta*		Herb
11	*Eupatorium serotinum*		Herb
12	*Ageratum conyzoides*		Shrub
13	*Ageratina riparia*		Herb
14	*Bidens pilosa L.*		Herb
15	*Centaurea nigra*		Herb
16	*Echinacea purpurea*		Herb
17	*Eclipta prostrata*		Herb
18	*Jaegeria hirta*		Herb
19	*Impatiens walleriana*	Balsaminaceae	Herb
20	*Impatiens flaccida*		Herb
21	*Sisymbrium irio*	Brassicaceae	Herb
22	*Kalanchooe pinnata*	Crassulaceae	Herb
23	*Cyperus esculentus*	Cyperaceae	Herb
24	*Kyllinga nemoralis*		Herb
25	*Carex sylvatica*		Herb
26	*Cyperus esculentus L.*		Herb
27	*Kyllinga brevifolia*		Herb
28	*Dennstaedtia punctilobula*	Dennstaedtiaceae	Herb
29	*Equisetum debile*	Equisetaceae	Herb
30	*Euphorbia milli*	Euphorbiaceae	Shrub
31	*Euphorbia pulcherrima*		Shrub
32	*Manihot esculenta*		Shrub
33	*Leucaena sp*	Fabaceae	Shrub
34	*Gliricidia sepium*		Shrub
35	*acacia decurrens*		Shrub
36	*Mimosa pudica*		Shrub
37	*Hypericum androsaemum*	Hypericaceae	Herb

Table 1. *Cont.*

No	Name	Family	Habitus
38	*Salvia accidentalis*	Lamiaceae	Herb
39	*Clerodendrum paniculatum*		Shrub
40	*Origanum sp.*		Herb
41	*Satureja montana*		Herb
42	*Stachys sylvatica*		Herb
43	*Rhynchosia minima*	Leguminosae	Herb
44	*Melastoma malabathrium*	Melastomataceae	Shrub
45	*Clidemia hirta*		Shrub
46	*Ficus septica*	Moraceae	Shrub
47	*Psidium guajava*	Myrtaceae	Shrub
48	*Mirabilis jalapa*	Nyctaginaceae	Shrub
49	*Phyllanthus urinaria*	Phyllanthaceae	Herb
50	*Piper aduncum*	Piperaceae	Shrub
51	*imperata cylindrica*	Poaceae	Herb
52	*Pannesistum purpureum*		Herb
53	*Neyraudia reynaudiana*		Herb
54	*panicum repens*		Herb
55	*Leersia hexandra*		Herb
56	*Paspalum dilatatum*		Herb
57	*Persicaria sp*	Polygonaceae	Herb
58	*Primula veris*	Primulaceae	Shrub
59	*Capsicum frutescens*	Solanaceae	Shrub
60	*Solandra grandiflora*		Shrub
61	*Solanum melongena*		Herb
62	*Solanum sp*		Shrub
63	*Duranta erecta*	Verbenaceae	Shrub
64	*Lantana camara*		Shrub
65	*Vitis discolor*	Vitaceae	Herb

Based on Table 1, it can be seen that certain species of family poaceae are more common in the Kalikuning area, like *Imperata cylindrica, Pannesistum purpureum, Neyraudia reynaudiana, Panicum repens, Leersia hexandra,* and *Paspalum dilatatum.* These types of plants are Poaceae plants, which have high adaptability, wide distribution, are able to grow on dry land, and like sunlight (Aththorick, 2005). The open conditions cause many types of the Poaceae family to grow in Kalikuning. Open locations cause high wind speeds, which enable the spread of seeds from the Poaceae family. The light seeds of the Poaceae family are easily carried by the wind, so they spread easily and then form new plants (Aththorick, 2005).

Taxonomically, the Cypreaceae family is also a type of family that is often found in forest floor vegetation. This finding is in accordance with the results of research that has been carried out, which shows that many types of Cypreaceae are also found in the Kalikuning area. Several species from the Cypreaceae family in the Kalikuning area are *Cyperus esculentus, Kyllinga nemoralis, Carex sylvatica, Cyperus esculentus L., and Kyllinga brevifolia*. The Cyperaceae family has almost the same ecological characteristics as Poaceae, but because of its clumpy nature, its distribution is uneven. The Poaceae and Cyperaceae tribes have high adaptability, wide distribution, and are able to grow in dry or flooded land (Rukmana, 1999).

CONCLUSIONS

The diversity of understory (Herbs and shurbs) in Kalikuning area consists of 65 species and 28 families. The Asteraceae families were understory that has the largest number of species in Kalikuning. Asteraceae is a plant taxon with very high species diversity. Based on the results of the data collection, there was 40 species of herbaceous, and 25 species of shrubs. According to the life form (habitus), the plants that dominate Kalikuning were herbs. The presence of herbs in a forest area plays a very important role. Herbs are an early community that plays an important role in stabilizing soils that are sensitive to erosion.

***Conflict of Interest*:** The authors declare that they have no conflicts of interest.

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