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Diversity of floor vegetation in various levels in South Central Timor, East Nusa Tenggara, Indonesia

Abstract

The topographic conditions in South Central Timor which are prone to damage, require special attention in their utilization, such as through the application of the principles of soil and water conservation. This principle is not spared from the role of floor vegetation as grounding the blow of rainwater and surface flow so as to minimize the danger of erosion. This study aims to examine the diversity of floor vegetation in the karst ecosystem at various altitudes in South Central Timor. A total of 15 plots were placed along the elevation gradient starting from altitude of 307m asl to 1782m asl. Data was sampled using a 1mx1m subplot placed in plots of 20m x 20m. The results showed that the highest number of species was found in upland zone; as many as 61 species with the highest IV occupied by *Cyperus rotundus* L with a value of 40.2%. In middle and and highland zones were *Eleusine indica* (L.) Gaertn and *C. rotundus* respectively, with 60.9% and 20.9% of IV. Diversity index at the research location was also classified as medium.

Keywords: diversity, floor vegetation, south central timor

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Introduction

Biodiversity is currently considered as one of the most important criteria for the sustainability of forest production. The main component of forest ecosystems, other than trees, is floor vegetation.[1] Floor vegetation plays an important role in maintaining the structure and function of forest ecosystems,[2] facilitating energy flows and nutrient cycles, and influencing canopy succession as a driver of forest ecosystems.[3] Although floor vegetation contributes relatively little to total forest vegetation biomass, floor vegetation contributes the largest proportion of floristic diversity.[4] In addition, the variety of floor vegetation can increase the complexity of the forest structure and provide habitat and food for other biotic groups; and increase the diversity of the floor vegetation itself. Understanding floor vegetation is also very important for forest regeneration, because floor vegetation can affect germination, survival and growth of tree seedlings by competing for light, water and nutrition or by allelopathic effects.[5]

Floor vegetation is used as an indicator of soil fertility and litter production in improving soil fertility. In addition to ecological functions, several types of understorey have been identified as plants that can be used as food, medicinal plants, and as alternative energy sources. But not infrequently also the understorey can act as a weed that inhibits tree regeneration, especially in cultivated monocultures.[6]

Based on its biophysical conditions, 72.27% of the area of South Central Timor Regency is in topographic conditions that are prone to damage, thus requiring special attention in its utilization, among others through the application of soil and water conservation principles. Attention is needed because the potential for surface erosion and landslides is high due to the opening of dry agricultural land or gardens, the use of fire in farming traditions, livestock cultivation; and the application of soil and water conservation principles are still very limited.[7] The principle of soil and water conservation is not spared from the role of floor vegetation as grounding the blow of rainwater and surface flow so as to minimize the danger of erosion. More research has been carried out in the western part of West Timor, while biodiversity in the northern and southern parts of the island of Timor (Belu Regency, parts of South Central Timor and North Central Timor has not been explored much[8] This study aims to examine the diversity of floor vegetation in the Karst Ecosystem at various altitudes in South Central Timor.

Method

A total of 15 plots were placed along the elevation gradient starting from a height of 300m above sea level to 1800m above sea level, divided into 3 zones namely the Middleland zone (307-382m asl), upland (784-1031m asl) and highland (1665-1782m asl). In the middleland zone, 4 plots were placed; in the upland zone as many as 7 plots and 4 in the highland zones. South Central Timor regency, which has a height of more than 500m above sea level is approximately 51%, while the rest is at an altitude of less than 500m above sea level to the coastline area of 49% (BPS TTS, 2016) (Figure 1).

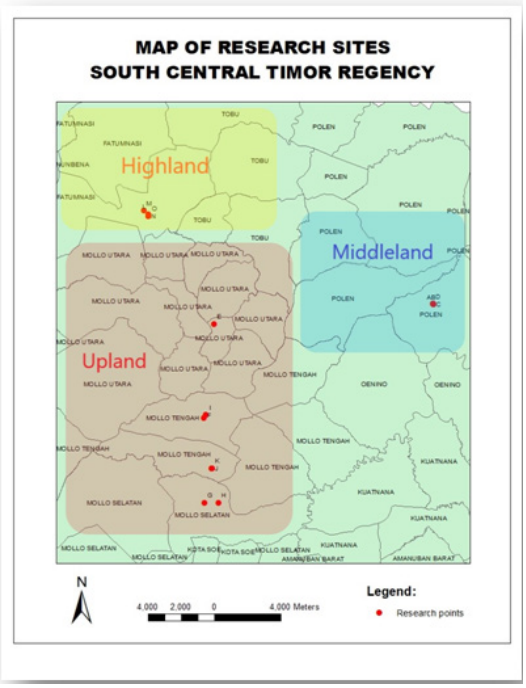

Figure 1 Research Location.

Floor vegetation is vegetation with a height of less than 1m.[9] Floor vegetation is classified into several life forms such as shrubs and tree seedlings, herbs, nails, and non-vascular plants.[10]

Floor vegetation parameters measured include:

a. Plant species
b. Number of individuals of each type
c. Density
d. Frequency of each species

To sample vegetation data, a 1m x 1m sub plot was placed in a plot measuring 20mx20m.[11] Floor vegetation is classified into several life forms such as shrubs and tree seedlings, herbs, nails, and other non-vascular plants.[10]

Data analysis

Vegetation - After the measurement data from the field is obtained, the data is tabulated and entered into MS Excel as a tool to calculate. The calculation for obtaining Important Value (IV) (Barbour et al, 1987) is as follows:

$$\text{Density of species A} = \frac{\text{individual count of species A}}{\text{Area wide}}$$

$$\text{Relative density of species A} = \frac{\text{a total count of species A}}{\text{density of whole species}} \times 100\ \%$$

$$\text{Frequency of species A} = \frac{\text{number of plots found species A}}{\text{number of whole plot}}$$

$$\text{Frequency relative of species A} = \frac{\text{frequency of species A}}{\text{frequency of whole species}} \times 100\ \%$$

Wide of basal area of species A = π (stem radius of species A)^2

$$\text{Wide of relative basal area of species A} = \frac{\text{wide of basal area of species A}}{\text{wide of basal area of whole species}} \times 100\%$$

Canopy wide of spesies A = π (lengths x width) canopy
Relative canopy wide of spesies A =

$$\frac{\text{canopy wide of species A}}{\text{canopy wide of whole species}} \times 100\ \%$$

IV of species A=Relative density of species A + Relative frequency of species A + Wide of basal area of species + Relative canopy wide of species A

To predict species diversity for each study location, the Shannon diversity index was calculated[12] using the formula:

$$H' = -\sum_{i=1}^{s} pi \ln pi$$

Description:
Pi = individual number of each type (i = 1, 2, 3, ...)
S = number of types
H'= index number
In = logarithm naturally

Results and discussion

Floor vegetation species

A total of 27 species, 61 species and 30 species were found in the middle, upland and highland zones respectively. The types that have the most individuals in the middle zone are *Eleusine indica* (L.) Gaertn with a density of 2267 individuals/0.16ha and Important Value (IV) of 60.93%. *Cyperus rotu*ndus L is has the most individuals in the upland zone with a density of 2889 individuals /0.28ha and IV of 40.02%, while in the highland zone *Cyperus rotundus* L. is also occupied with a density of 2253 individuals / 0.16 ha and IV of 29.69%. An et al.[13] revealed that *E. indica* is a herb that has a high level of fecundity and a wide tolerance to habitats that have various environmental factors. Types that have high IV indicate that the species is more adaptive and more able to adjust to environmental conditions than other types. The type that has the highest IV means that the species is able to utilize available resources better than other types. This is explained by Soerianegara & Indrawan[14] that plants have a very real correlation with their growth. Vegetation with high IV has an important role and can adapt to the environment, using energy sources in the community.[15] The most important value owned by different species in the three sandalwood forests, indicates that these species have a great opportunity to spur growth and maintain the sustainability of the species (It meant floor vegetation).[16] Based on the results of the analysis it was found that as many as 27 species belonging to 17 families were found in the middle land zone, with the family having the most number of individuals being poaceae (Table 1). The Poaceae has a light breeding tool, is easily dispersed and also has simple life requirements in various habitats. Poaceae has microscopic sized seeds that are easily carried by the wind; it has a high adaptability; distribution is very broad, and Poaceae family members are able to grow both on dry and inundated land. The properties possessed by the Poaceae family cause the members of the Poaceae family to be distributed widely in various habitats.[17]

Based on the results of the analysis, it is known that the species that dominate the research locations are also different (Table 2). This difference is due to each species dominating different regions. In addition, environmental conditions lead to competition between one species and another. Competition will increase the fighting power to sustain life, so that strong species will win and suppress other species. The losing species become less adaptive and cause low reproductive rates and are found in small numbers.[18] Each type of plant has a minimum, maximum and optimum condition for the existing environmental factors. The species that dominates has e a wider range of tolerance. So that a wide range of tolerance for environmental factors enables this species to have a wide distribution.[19,20]

A total of 61 species belonging to 33 families were found in the upland zone, where families with the highest number of individuals were cyperaceae (Table 3). The cyperaceae family has an extraordinary diversity, with species found in almost all habitats except deserts and aquatic ecosystems. The majority of cyperaceae are plants that live in moist to wet habitats, such as ponds, grasslands, swamps and savannas. This species likes moist areas such as trenches and canal. Many cyperaceae species are also found in various types of forests, both temperate and tropical.[21]

The highland zone is included in the Mount Mutis Nature Reserve. Mount Mutis forest has a distinctive ecology. The Mount Mutis forest has a homogeneous vegetation composition, namely ampupu (*Eucalyptus urophylla*). This type of ecosystem does not exist in other regions. In addition, the Mount Mutis forest is located in a transition

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zone between Asia and Australia so that in the forest of Mount Mutis there are flora and fauna from both Asia and Australia.[22] A total of 30 species belonging to 19 families were found in the highland zone (Table 4). The family that has the highest number of individuals is cyperaceae. In the highland zone several types of orchids, fungi, moss and lichens are also found. Types of fungi found include *Pleurotus ostreatus, Ganoderma applanatum and Pleurotus cystidiosus*. Types of moss found include *Pellia endiviifolia, Anthoceros punctatus,* and *Polytrichum abbreviatum*. *Usnea* sp. and *Parmalia* sp. also found in the highland zone. The orchid species found, live commensally with ampupu plants, as well as species of moss and lichens.

Table 1 Floor Vegetation in the Middle land Zone

No	Local name	Species name	Family	Density (Ind./Ha)	IV (%)
1	Huk you	*Eleusine indica* (L.) Gaertn	*Poaceae*	2267	60.9
2	Species A	*Portulaca oleracea* L.	*Portulacaceae*	513	16.7
3	Huk Pisu	*Axonopus compressus* (Sw.) P. Beauv.	*Poaceae*	355	10
4	Teak	*Tectona grandis* L.f.	*Lamiaceae*	169	9.8
5	Purple flower	*Stachytarpheta acuminata* DC. ex Schauer	*Verbenaceae*	159	8.1
6	Tapak Liman	*Elephantopus scaber* L.	*Compositae*	131	8.9
7	Suf Muti	*Chromolaena odorata* (L.) R.M. King & H.Rob.	*Compositae*	95	8
8	Leaf paste clothes	*Toxicodendron radicans* (L.) Kuntze	*Anacardiaceae*	76	6.1
9	Caliandra	*Calliandra biflora* Tharp	*Leguminosae*	57	5.6
10	Acacia	*Acacia mangium* Wild.	*Leguminosae*	52	8.4
11	Kabesak	*Acacia leucophloea* (Roxb.) Willd	*Leguminosae*	49	6.9
12	Eucalyptus	*Melaleuca leucadendra* (L.) L.	*Myrtaceae*	31	6.4
13	Temulawak	*Curcuma aeruginosa* Roxb.	*Zingiberaceae*	25	2
14	Timu	*Timonius sereceus* (Desf) K. Schum	*Rubiaceae*	24	3.4
15	Kusambi	*Schleichera oleosa* (Lour.) Merr.	*Sapindaceae*	19	6.1
16	Mahogany	*Swietenia macrophylla* King	*Meliaceae*	13	3.1
18	Kebo excerpts	*Euphorbia hirta* L.	*Euphorbiaceae*	12	4.5
17	Masi	*Bauhinia purpurea* L	*Leguminosae*	12	4.5
20	Guava	*Psidium guajava* L	*Myrtaceae*	10	3.1
19	Sandalwood	*Santalum album* L.	*Santalaceae*	10	3.1
21	Biduri	*Calotropis gigantea* (L.) W.T. Aiton	*Apocynaceae*	6	1.5
22	White flower	*Hippobroma longiflora* (L.) G.Don	*Campanulaceae*	6	1.5
23	Petes	*Leucaena leucocephala* (Lam.) de Wit	*Leguminosae*	5	2.9
24	White teak	*Gmelina arborea* Roxb.	*Lamiaceae*	4	4.3
25	Mint leaves	*Plectranthus amboinicus* (Lour.) Spreng	*Lamiaceae*	3	1.5
26	Mimosa	*Mimosa pudica* L.	*Fabaceae*	2	1.4
27	Papih	*Syzygium aromaticum* (L.) Merr. L. M. Perry	*Myrtaceae*	1	1.4

Table 2 Dominant Species in Research Sites

Species	Zone		
	Middleland	**Upland**	**Highland**
	Eleusine indica (L.) Gaertn	*Cyperus rotundus* L	*Cyperus rotundus* L.
	Portulaca oleracea L.	*Plectranthus amboinicus* (Lour.) Spreng	*Centella asiatica* (L.) Urb.
	Axonopus compressus (Sw.) P.Beauv.	*Axonopus compressus* (Sw.) P.Beauv.	*Elephantopus scaber* L.

Solikin[23] revealed that the Mount Mutis Nature Reserve is dominated by ampupu plants, especially in savanna areas. Species of orchids found in Mount Mutis Nature Reserve include *Bulbophyllum ovalifolium, Bulbophyllum odoratum, Ceratostylis radiate, Dendrobium kuhlii, Eria retusa, Eria rhynchostyloides* and *Pholidota rubra*. In the highland zone grazing wild animals such as cattle and horses were also found. Livestock grazing in the Gunung Mutis forest has been long-standing and is the culture of the local community. This makes the grazing of livestock in the Mount Mutis forest difficult to prevent by the government. Pasture has an impact on tree regeneration so that the forest area used for grazing cannot change into forest again. This happened to the pasture fields in the Mutis forest area.

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Conversely, forests that have dense vegetation cannot produce animal feed so they cannot be used for livestock grazing. Local people prefer the condition of forests which have low canopy density because they can be used for grazing and feeding their livestock.[22]

Table 3 Floor vegetation in Upland Zone

No	Local name	Species name	Family	Density (Ind./0.28 ha)	IV (%)
1	Cyperus	*Cyperus rotundus* L	*Cyperaceae*	2889	40
2	Mint leaves	*Plectranthus amboinicus* (Lour.) Spreng	*Lamiaceae*	685	8.9
3	Huk Pisu	*Axonopus compressus* (Sw.) P.Beauv.	*Poaceae*	613	8.9
4	Purple flower	*Stachytarpheta acuminata* DC. ex Schauer	*Verbenaceae*	559	12.4
5	Crocodile nest grass	*Lophatherum gracile* Brongn.	*Poaceae*	475	7.2
6	Reeds	*Imperata cylindrica* (L.) Raeusch	*Poaceae*	432	5.9
7	Leaves	*Plantago major* L.	*Plantaginaceae*	397	6.3
8	Papo'e	*Arachis pintoi Krapov.* & W.C Greg	*Leguminosae*	337	8.1
9	Elephant grass	*Poa trivialis* L.	*Poaceae*	303	4.4
10	Species A	*Portulaca oleracea* L.	*Portulacaceae*	226	4.3
11	Leaf shape of the heart	*Mikania micrantha* Kunth	*Compositae*	158	3.5
12	Sapotilii	*Ficus natalensis* Hochst.	*Moraceae*	157	3.5
13	Kebo excerpts	*Euphorbia hirta* L.	*Euphorbiaceae*	154	4.3
14	Suf Muti	*Chromolaena odorata* (L.) R.M.King & H.Rob.	*Compositae*	153	6
15	Fua Koti	*Phyllanthus urinaria* L.	*Phyllanthaceae*	136	3.2
16	Kiun'ut	*Cosmos caudatus* Kunth.	*Compositae*	116	3
17	Petes	*Leucaena leucocephala* (Lam.) de Wit	*Leguminosae*	92	5.2
18	Liman footprint	*Elephantopus scaber* L.	*Compositae*	88	1.8
19	Maleku	*Oxalis corniculata* L.	*Oxalidaceae*	72	1.6
20	White flower	*Hippobroma longiflora* (L.) G.Don	*Campanulaceae*	62	3.2
21	Guava	*Psidium guajava* L	*Myrtaceae*	48	4.7
22	Sandalwood	*Santalum album* L	*Santalaceae*	31	1.2
23	Species C	*Emilia sonchifolia* (L.) DC. ex DC.	*Compositae*	26	1.9
24	King rass	*Pennisetum purpureum* Schumach.	*Poaceae*	26	1.1
25	Bakoma'a	*Hyptis capitata* Jacq.	*Lamiaceae*	23	1.9
26	Mahogany	*Swietenia macrophylla* King	*Meliaceae*	20	1.9
27	Pangkase	*Lantana camara* L.	*Verbenaceae*	20	2.7
28	White teak	*Gmelina arborea* Roxb.	*Lamiaceae*	19	2.7
29	Caliandra	*Calliandra biflora* Tharp	*Leguminosae*	18	2.7
30	Acacia	*Acacia mangium* Wild.	*Leguminosae*	17	4.4
31	Pulai	*Alstonia scholaris* (L.) R. Br.	*Apocynaceae*	15	1
32	Bandotan	*Ageratum conyzoides* (L.) L.	*Compositae*	14	1.8
33	Kuk Nefo	*Tridax procumbens* (L.) L.	*Compositae*	14	1.8
34	Mimosa	*Mimosa pudica* L.	*Fabaceae*	11	0.9
35	Euporbia	*Euphorbia heterophylla* L.	*Euphorbiaceae*	6	0.9
36	Venus	*Senna siamea* (Lam.) H.S.Irwin & Barneby	*Leguminosae*	6	1.7
37	Put'puta	*Polygala paniculata* L.	*Polygalaceae*	5	0.8
38	Paria forest	*Tithonia diversifolia* (Hemsl.) A.Gray	*Compositae*	4	0.8
39	Nombesa	*Talinum fruticosum* (L.) Juss	*Talinaceae*	4	0.8
40	White flower trumpet	*Hymenocallis acutifolia* (Herb. ex Sims) Sweet	*Amaryllidaceae*	3	1.7
41	Papa'i	*Sida cordifolia* L.	*Malvaceae*	3	0.8

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Table Continued.....

42	Gotu kola	*Centella asiatica* (L.) Urb.	*Apiaceae*	2	0.8
43	Biduri	*Calotropis gigantea* (L.) Dryand	*Apocynaceae*	2	0.8
44	Teak	*Tectona grandis* L.f.	*Lamiaceae*	2	1.7
45	Kusambi	*Schleichera oleosa* (Lour.) Merr.	*Sapindaceae*	2	0.8
46	Red ginger	*Zingiber officinale* Roscoe	*Zingiberaceae*	2	0.8
47	Baunoet	*Spigelia anthelmia* L.	*Loganiaceae*	1	0.85
48	Nabasbot	*Hibiscus trionum* L.	*Malvaceae*	1	0.8
49	Bonsai	*Streblus asper* Lour	*Moraceae*	1	0.8
50	Yellow flowers	*Tribulus terrestris* L.	*Zygophyllaceae*	1	0.8
51	Taro	*Colocasia esculenta* (L.) Schott	*Araceae*	1	0.8
52	Sweet potato leaves	*Manihot esculenta* Crantz	*Euphorbiaceae*	1	0.8
53	Kate is gold	*Euphorbia heterophylla* L.	*Euphorbiaceae*	1	0.8
54	Gamal	*Gliricidia sepium* (Jacq.) Kunth ex Walp.	*Leguminosae*	1	0.8
55	Masi	*Bauhinia purpurea* L	*Leguminosae*	1	0.8
56	Species E	*Sida rhombifolia* L.	*Malvaceae*	1	0.8
57	Nails of deer horns	*Platycerium bifurcatum* (Cav.) C. Chr	*Polypodiaceae*	1	0.8
58	Pearl grass	*Oldenlandia corymbosa* L.	*Rubiaceae*	1	0.8
59	Stir	*Brucea javanica* (L.) Merr	*Simaroubaceae*	1	0.8
60	eggplant	*Solanum melongena* L.	*Solanaceae*	1	0.8
61	Turmeric	*Curcuma longa* L.	*Zingiberaceae*	1	0.8

Table 4 Floor vegetation in the Highland Zone

No	Local name	Species name	Family	Density	IV (%)
1	Cyperus	*Cyperus rotundus* L.	*Cyperaceae*	2253	29.6
2	Gotu kola	*Centella asiatica* (L.) Urb.	*Apiaceae*	1454	27.8
3	Liman footprint	*Elephantopus scaber* L.	*Compositae*	911	18.4
4	Huk Pisu	*Axonopus compressus* (Sw.) P.Beauv.	*Poaceae*	649	8.6
5	Crocodile nest grass	*Lophatherum gracile* Brongn.	*Poaceae*	395	7.4
6	Elephant grass	Poa trivialis L.	*Poaceae*	276	5.7
7	Kangkung Hutan	*Ipomoea pes-caprae* (L.) R. Br.	*Convolvulaceae*	218	3.8
8	Leaf god	*Gynura divaricata* (L.) DC	*Compositae*	215	1.9
9	Kebo excerpts	*Euphorbia hirta* L.	*Euphorbiaceae*	183	8.3
10	Bunga mayana	*Coleus aromaticus* Benth.	*Lamiaceae*	106	2.5
11	Reeds	*Imperata cylindrica* (L.) Raeusch	*Poaceae*	79	4.4
12	Leaves	*Plantago major* L.	*Plantaginaceae*	75	4.9
13	Papoe	*Arachis pintoi* Krapov. & W.C Greg	*Leguminosae*	64	2.8
14	Bandotan	*Ageratum conyzoides* (L.) L.	*Compositae*	54	1.9
15	White flower	*Hippobroma longiflora* (L.) G.Don	*Campanulaceae*	46	4
16	Ampupu	*Eucalyptus urophylla* S.T.Blake	*Myrtaceae*	43	4.5
17	Cocor bebek	*Bryophyllum pinnatum* (Lam.) Oken	*Crassulaceae*	39	18
18	Taro	*Colocasia esculenta* (L.) Schott	*Araceae*	32	2.3
19	Kiun'ut	*Cosmos caudatus* Kunth.	*Compositae*	30	2.3
20	Forest nuts	*Senna occidentalis* (L.) Link	*Leguminosae*	27	6.8
21	The jungle forest	*Spondias pinnata* (L.F.) Kurz	*Anacardiaceae*	16	2.1
22	Purple flower	*Stachytarpheta acuminata* DC. ex Schauer	*Verbenaceae*	16	1.9

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Table Continued.....

23	White umbrella mushroom	*Pleurotus ostreatus* (Jacq.) P. Kumm.	*Pleurotaceae*	6	6.1
24	Betel stem forest	*Peperomia luisana* Trel. & Standl.	*Piperaceae*	4	3.3
25	Wood mushrooms	*Ganoderma applanatum* (Pers.) Pat.	*Ganodermataceae*	2	1.9
26	Cat leaves	*Plectranthus amboinicus* (Lour.) Spreng	*Lamiaceae*	2	1.9
27	Eucalyptus	*Melaleuca leucadendra* (L.) L.	*Myrtaceae*	2	2.3
28	Chocolate umbrella mushrooms	*Pleurotus cystidiosus* O.K.Mill.	*Pleurotaceae*	2	3.9
29	Forest cherry	*Syzygium cumini* (L.) Skeels	*Myrtaceae*	1	2.4
30	Pomegranate	*Punica granatum* L.	*Lythraceae*	1	6.2

The grazing of wild animals can also change the structure and composition of the forest constituents. Grass eating animals are the main key in the dynamics of vegetation in the ecosystem in general. However, with its position as a key driver, this affects the structure and composition of vegetation because the explosion of grazing animals can affect the process of vegetation regeneration, as well as change the structure and composition of vegetation.[24–26] Increasing herbivory density results in decreased growth and the amount of seedling and sapling changing the woody-plant composition and native flora in an ecosystem,[24,25,27] as well as potentially increasing the growth of other vegetation which is not used as food.[26] The effects of high herbivory densities over a long period of time need special attention, especially in terms of conservation.[26] The grazing of livestock in the wild can affect seed density, species richness and composition of bank seeds, and affect the amount of seeds produced through the reproduction process.[28] Pol et al.[29] revealed that grazing intensity can reduce productivity of productive plant parts so that the photesynthesis process decreases and the flowering process becomes inhibited, and thus causing a decrease in the amount of seed produced so that the availability of the seed bank in the soil is reduced.

Diversity index

A community is said to have high species diversity when it exists of many species. Conversely, a community is said to have low species diversity when it exists by a small number of species and if there are only a few dominant species.[30] Based on the results of the analysis, it was found that the diversity index in all study locations was classified as medium (Table 5).

Table 5 Diversity Index Value

Zone	Diversity index
Middleland	1.19
Upland	1.51
Highland	1.29

The diversity index classified as high when the value is more than 3, and classified as low wehen the values is less than 1. The diversity of species classified as moderate is caused by environmental conditions that are less supportive for the growth and breeding of a plant species. The research area belongs to the karst region which has a nutrient-poor soil layer so that the species that grow in this karst area are only plant species that are able to adapt[31] and have a high tolerance for drought.[32–34]

Conclusion

Based on the results of the analysis it can be concluded that the floor vegetation in the study location has a moderate level of diversity, with the highest number of species found in the upland zone. Dominant species are also different due to differences in location. The grazing of wild animals in the highland zone can reduce the diversity of floor vegetation so that the interference of the government is needed by offering alternatives to the community.[35]

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Conflict of Interest

The author declares that there is no conflict of interest.

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