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# Plant Diversity in Teak Forest Areas as a Source of Animal Feed in Muna District, Indonesia

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ABSTRACT

Plants in teak forest areas are often used by breeders in Muna Regency as a source of animal feed. However, until now these plant species have not been known in detail, especially forage for livestock. This study will specifically examine the diversity of plants found in the teak forest area in Watopute District, Muna Regency starting from August to December 2022 using the Summed Dominance Ratio which aims to compare which plant species dominate the teak forest area in Muna Regency. The findings showed that the most abundant plant species was *Pennisetum purpureum*, both those controlling the growing facilities and as a potential feed source.

**Keywords:** Plant Species, Teak Forest, Animal Feed

## I. INTRODUCTION

Forest is a plant community with various plants that live together in an area that is spread spatially and temporally [1]. Forests are a combination of existing species and their relative abundance supports the function of forests in providing nitrogen, oxygen, carbon, and others [2],[3]. The plants that grow in the forest are very different depending on the environmental conditions [4],[5],[6].

Indonesia has an agreed forest utilization-based area of 140.4 million hectares. including 26.6 million hectares of permanent plantations, 18.8 million hectares of nature conservation and tourism forests, and 64.3 million hectares of production forests and forests that serve as centers for research, education, and training of elephants and countless other animals. The teak forest is one of the protected forests for the people of Muna Regency, which is located in the Watopute sub-district, with an area of 16 hectares. Teak forests with a variety of flora and fauna are protected. Given the status of teak forests as protected forests, it is necessary to carry out a special study of the species composition, in this case, the botanical composition and the number of each plant species in the teak forests [7]. Apart from species composition, another thing that is important for the public to know is the Important Value Index [8] and the diversity of plant species found in teak forest areas.

The vitality index shows the importance of a plant species and its role in the community, while species diversity shows the variation in species or the number of species in a community [9],[10]. By knowing the composition, Importance Value Index, and diversity of plant species in teak forests [11],[12], we can know the vegetation structure of the teak forest community [13],[14].

The results of this study certainly mean that the government can easily implement policies related to teak forest areas and the utilization of forest products according to the needs of local communities by considering the forest's status as a protected forest [15],[16]. This research will specifically review the diversity of plant species in the teak forest area to know the types of plants that can be used as a food source.

## II. METHODS AND MATERIAL

This research was conducted in Watopute District, Muna Regency from August to December 2022. The calculations used to analyze vegetation in teak forest areas use the Summed Dominance Ratio (SDR), both Absolute Density, Absolute Frequency, Relative Density, Relative Frequency, and Significance.

The tools used in this study were questionnaires, GPS (Global Positioning System), digital cameras, roll meters, tropical forage E-books, compasses, raffia ropes, digital scales, bamboo, machetes, scissors, large plastic, label paper, newsprint, and writing tools. Data collection techniques used field observation methods by exploring and taking samples using the transect method to determine the type of plant community in teak forest areas.

Then the method of work is carried out by walking along the transect line and identifying plant species, taking notes, and comparing these plant species using tropical forage e-books, the internet, and other literature. Botanical sampling by taking a sample of 50 points.

## III. RESULTS AND DISCUSSION

Forests tend to be converted to plantations, plantations, and other uses, although secondary forests can still be restored using local commercial species. Indonesia's tropical forest is one of the largest tropical forests in the world after Brazil on the South American continent and Congo on the African continent. The Summed Dominant Ratio of plant species in the teak forest area in Watopute District, Muna Regency is presented in Table 1.

Table 1. Summed Dominant Ratio

| Family | Species | AD | RD | AF | RF | IS | SDR |
|---|---|---|---|---|---|---|---|
| Acanthaceae | *Asystasia coromandeliana* | 933 | 2.19 | 7 | 3.52 | 5.71 | 2.85 |
| | *Mikania micrantha* | 1018 | 2.39 | 6 | 3.02 | 5.40 | 2.70 |
| Adiantaceae | *Taenitis blechnoides* | 996 | 2.34 | 6 | 3.02 | 5.35 | 2.68 |
| Aspleniaceae | *Asplenium macrophyllum* | 902 | 2.12 | 4 | 2.01 | 4.13 | 2.06 |
| | *Asplenium nidus* | 915 | 2.15 | 3 | 1.51 | 3.65 | 1.83 |
| | *Asplenium platyneuron* | 1078 | 2.53 | 6 | 3.02 | 5.54 | 2.77 |
| Asteraceae | *Ageratum conyzoides* | 959 | 2.25 | 4 | 2.01 | 4.26 | 2.13 |
| | *Chromolaena odorata* | 982 | 2.30 | 4 | 2.01 | 4.31 | 2.16 |
| Cyperaceae | *Cyperus distans* | 970 | 2.28 | 2 | 1.01 | 3.28 | 1.64 |
| | *Cyperus rotundus* | 958 | 2.25 | 5 | 2.51 | 4.76 | 2.38 |
| | *Cyperus kylingia* | 1023 | 2.40 | 4 | 2.01 | 4.41 | 2.20 |
| | *Scleria sumatrensis* | 987 | 2.32 | 6 | 3.02 | 5.33 | 2.67 |
| Dennsteadtiaceae | *Nephrolepis bisserrata* | 1003 | 2.35 | 7 | 3.52 | 5.87 | 2.94 |
| | *Euphorbia hirta* | 1016 | 2.38 | 5 | 2.51 | 4.90 | 2.45 |
| Euphorbiaceae | *Phyllanthus amarus* | 1024 | 2.40 | 7 | 3.52 | 5.92 | 2.96 |
| Gleicheniaceae | *Gletchenia linlaris* | 1152 | 2.70 | 1 | 0.50 | 3.20 | 1.60 |
| Lycopodiaceae | *Licopodium cernuum* | 1088 | 2.55 | 4 | 2.01 | 4.56 | 2.28 |
| Malvaceae | *Urena lobata* | 1056 | 2.48 | 5 | 2.51 | 4.99 | 2.49 |
| Melastomataceae | *Clidemia hirta* | 904 | 2.12 | 3 | 1.51 | 3.63 | 1.81 |
| Mimosaceae | *Mimosa pudica* | 1125 | 2.64 | 6 | 3.02 | 5.65 | 2.83 |
| Poaceae | *Axonopus compressus* | 937 | 2.20 | 7 | 3.52 | 5.72 | 2.86 |
| | *Brachiaria miliformis* | 993 | 2.33 | 7 | 3.52 | 5.85 | 2.92 |
| | *Brachiaria mutica* | 969 | 2.27 | 3 | 1.51 | 3.78 | 1.89 |
| | *Cynodon dactylon* | 911 | 2.14 | 4 | 2.01 | 4.15 | 2.07 |
| | *Cyrtococcum accrencens* | 942 | 2.21 | 3 | 1.51 | 3.72 | 1.86 |
| | *Chrysopogon aciculatus* | 963 | 2.26 | 6 | 3.02 | 5.27 | 2.64 |
| | *Digitaria cilliaris* | 953 | 2.24 | 6 | 3.02 | 5.25 | 2.63 |
| | *Imperata cylindrica* | 1000 | 2.35 | 5 | 2.51 | 4.86 | 2.43 |
| | *Ischaemum timorense* | 1040 | 2.44 | 4 | 2.01 | 4.45 | 2.22 |
| | *Panicum brevifolium* | 987 | 2.32 | 3 | 1.51 | 3.82 | 1.91 |
| | *Panicum maximum* | 983 | 2.31 | 4 | 2.01 | 4.32 | 2.16 |
| | *Panisetum polystachyon* | 933 | 2.19 | 9 | 4.52 | 6.71 | 3.36 |
| | *Pennisetum purpureum* | 898 | 2.11 | 10 | 5.03 | 7.13 | 3.57 |
| Polypodiaceae | *Davalia denticulata* | 1054 | 2.47 | 4 | 2.01 | 4.48 | 2.24 |
| | *Goniophiebium persicifolium* | 945 | 2.22 | 6 | 3.02 | 5.23 | 2.62 |
| | *Phymatodes sp.* | 946 | 2.22 | 5 | 2.51 | 4.73 | 2.37 |
| | *Phymatopteris triloba* | 1104 | 2.59 | 4 | 2.01 | 4.60 | 2.30 |
| Rubiaceae | *Borreria latifolia* | 987 | 2.32 | 9 | 4.52 | 6.84 | 3.42 |
| Solanaceae | *Solanum torvum* | 1035 | 2.43 | 2 | 1.01 | 3.43 | 1.72 |
| Verbenaceae | *Stachytarpheta indica* | 1075 | 2.52 | 3 | 1.51 | 4.03 | 2.01 |
| Leguminaceae | *Calopogonium mucunoides* | 945 | 2.22 | 5 | 2.51 | 4.73 | 2.36 |
| | *Alysicarpus vaginalis* | 983 | 2.31 | 8 | 4.02 | 6.33 | 3.16 |
| | *Desmodium triflorum* | 961 | 2.25 | 7 | 3.52 | 5.77 | 2.89 |

**Description:** AD (Absolute Density), RD (Relative Density), AF (Absolute Frequency), RF (Relative Frequency), IS (Important score), SDR (Summed Dominance Ratio)

The abundance of tropical forest flora and fauna in Indonesia is very high and many are still unidentified. However, the increasing number of people around the forest is a threat to forest sustainability. An increase in the number of people will be directly proportional to the increase in the need for resources such as food, protection, equipment, and land.

The findings in Table 1 show that the plant that dominates the teak forest area in Watopute District is Pennisetum purpureum which was deliberately planted by residents as a source of feed for beef cattle, while the plant that has the lowest Summed Dominant Ratio is Gleichenia linearis.

The structure and composition of plant vegetation are influenced by other ecosystem components that interact with each other so vegetation that grows naturally is the result of the interaction of various environmental factors [17]. A vegetation structure is an organization of individuals in space that forms a stand [18]. While the composition of the forest is the constituent species that occupy vegetation somewhere [19]. The types of forage plants found in the teak forest area in Watopute District, Muna Regency are presented in Table 2.

Table 2. Types of forage plants

| Family | Species | AD | RD | AF | RF | IS | SDR |
|---|---|---|---|---|---|---|---|
| Poaceae | *Axonopus compressus* | 937 | 2.20 | 7 | 3.52 | 5.72 | 2.86 |
| | *Brachiaria miliformis* | 993 | 2.33 | 7 | 3.52 | 5.85 | 2.92 |
| | *Brachiaria mutica* | 969 | 2.27 | 3 | 1.51 | 3.78 | 1.89 |
| | *Cynodon dactylon* | 911 | 2.14 | 4 | 2.01 | 4.15 | 2.07 |
| | *Cyrtococcum accrencens* | 942 | 2.21 | 3 | 1.51 | 3.72 | 1.86 |
| | *Chrysopogon aciculatus* | 963 | 2.26 | 6 | 3.02 | 5.27 | 2.64 |
| | *Digitaria cilliaris* | 953 | 2.24 | 6 | 3.02 | 5.25 | 2.63 |
| | *Imperata cylindrica* | 1000 | 2.35 | 5 | 2.51 | 4.86 | 2.43 |
| | *Ischaemum timorense* | 1040 | 2.44 | 4 | 2.01 | 4.45 | 2.22 |
| | *Panicum brevifolium* | 987 | 2.32 | 3 | 1.51 | 3.82 | 1.91 |
| | *Panicum maximum* | 983 | 2.31 | 4 | 2.01 | 4.32 | 2.16 |
| | *Panisetum polystachyon* | 933 | 2.19 | 9 | 4.52 | 6.71 | 3.36 |
| | *Pennisetum purpureum* | 898 | 2.11 | 10 | 5.03 | 7.13 | 3.57 |
| Leguminaceae | *Calopogonium mucunoides* | 945 | 2.22 | 5 | 2.51 | 4.73 | 2.36 |
| | *Alysicarpus vaginalis* | 983 | 2.31 | 8 | 4.02 | 6.33 | 3.16 |
| | *Desmodium triflorum* | 961 | 2.25 | 7 | 3.52 | 5.77 | 2.89 |

Description: AD (Absolute Density), RD (Relative Density), AF (Absolute Frequency), RF (Relative Frequency), IS (Important score), SDR (Summed Dominance Ratio)

The findings in Table 2 can be explained that the highest forage plants were found in the Pennisetum purpureum plant species and the lowest forage plant species were found in Brachiaria mutica. This finding indicates that in the teak forest area in Watopute District, there are potential types of feed that can be used as a source of animal feed.

Differences in the structure and composition of each stratum of undergrowth are closely related to habitat conditions [20],[21]. Environmental factors that will affect the existence of plants are the altitude above sea level [22]. Altitude will affect species richness, structure and composition of understorey vegetation, soil conditions, temperature, and light and water intensity [23],[24]. Altitude will indirectly play a role in the process of photosynthesis as well as being a

limiting factor that will inhibit the growth of undergrowth.

## IV. CONCLUSION

The results of research conducted in teak forest areas in Watopute District, Muna Regency can be concluded that the type of plant that dominates the means of growing under teak trees is the Pennisetum purpureum plant which is generally planted by breeders as a source of feed for beef cattle.

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