

# DIVERSITY OF SEED PLANTS IN THE FOREST AREA OF LAMPAGEU VILLAGE, UJONG PANCU, ACEH BESAR DISTRICT

Mulyadi<sup>1</sup>, Muhammad Zhafran<sup>2</sup>, Ulli Zahradi<sup>3</sup>, Chairunnisa<sup>4</sup>.

<sup>1,2,3,4</sup>Prodi Pendidikan Biologi FTK UIN Ar-Raniry Banda Aceh.

Email: [200207023@student.ar-raniry.ac.id](mailto:200207023@student.ar-raniry.ac.id)

## ABSTRACT

Diversity can occur due to differences in color, size, shape, quantity, texture and appearance. Diversity is a description of the condition of the ecosystem in a place. Lampageu Village, which is in Ujong Pancu, Aceh Besar district, is home to various types of plants, both upper and lower plants, which have not been properly recorded. The aim of this research is to identify the diversity of seed plants in this place, as well as identify what types of seed plants only in Lampageu Village in Ujong Pancu, Aceh Besar district. The method used in this research is an exploratory survey and data collection techniques using exploratory techniques. Research data was analyzed using the diversity index formula with the Shannon Wiener formula. The results of research in the Lampageu Ujung Pancu Village Forest Area found that there were 3 divisions of seed plants, namely, the Magnoliophyta division with a total of 36 species, the Tracheophyta division with a total of 16 species and the Spermatophyta division with a total of 2 species. The overall plant diversity index value is  $H' = 3.89$ , this value is included in the high category

**Keywords:** Diversity, Magnoliophyta, Tracheophyta, Spermatophyta.

## ABSTRAK

Keanekaragaman dapat terjadi karena adanya perbedaan warna, ukuran, bentuk, jumlah, tekstur dan penampilan. Keanekaragaman merupakan suatu gambaran kondisi ekosistem di suatu tempat. Desa Lampageu yang berada di Ujong Pancu kabupaten Aceh Besar yang dihidupi berbagai macam jenis tumbuhan baik tumbuhan atas maupun tumbuhan bawah yang belum terdata dengan baik, Tujuan dari penelitian ini adalah untuk mengidentifikasi keanekaragaman tumbuhan berbiji yang berada di tempat ini, serta mengidentifikasi jenis tumbuhan berbiji apa saja yang berada di Desa Lampageu yang berada di Ujong Pancu Kabupaten Aceh Besar . Metode yang digunakan pada penelitian ini adalah survey eksplorasi dan teknik pengumpulan data menggunakan teknik jelajah. Data penelitian dianalisis dengan menggunakan rumus indeks keanekaragaman dengan rumus Shannon Wiener. Hasil penelitian di Kawasan Hutan Desa Lampageu Ujung Pancu ditemukan terdapat 3 divisi tumbuhan berbiji yaitu, divisi *Magnoliophyta* dengan jumlah 36 spesies, divisi *Tracheophyta* dengan jumlah 16

spesies dan divisi *Spermatophyta* dengan jumlah 2 spesies. Nilai indeks keanekaragaman keseluruhan tumbuhan adalah  $H' = 3,89$  nilai ini termasuk dalam kategori tinggi

**Keywords:** Keanekaragaman, Magnoliophyta, Tracheophyta, Spermatophyta.

## A. INTRODUCTION

Forests are natural resources that play a very important role in the life support system. In addition to being a habitat for various organisms that interact with their environment, forests also have a physical role in maintaining environmental stability, playing an important role in soil and water conservation efforts and providing other environmental services. Likewise, the forest in Lampageu Ujong Pancu Village has an important role as a life support system. This forest is utilized by the surrounding community and is an important part of their lives.

Diversity consists of two different components, namely species richness and evenness. Species richness is the total number of species, while evenness is the distribution of abundance (eg number of individuals, biomass, etc.) in each species (Nahlunnisa, 2016). The concept of species diversity originates from what is referred to as biodiversity in a broad definition of biodiversity is the diversity of life in all forms and levels of organization, including structure, function and ecological processes at all levels. The distribution of species is indirectly influenced by the interaction between the vegetation itself, temperature, humidity, soil physical-chemical conditions that produce certain environmental conditions that cause the presence or absence of a species and are distributed with varying levels of adaptation (Nahdi et al., 2014).

Plant diversity includes variations in all plant properties and characteristics, for example the diversity of life forms, sizes, structures, functions, stature (habitus), responses to environmental factors, and so on. The diversity of plant sizes varies from very small (only 1 micron) such as certain algae (*Micromona pusilla*) to very large ones such as tall trees classified as higher plants. The duration of plant growth varies from several months to one year (annual),

two years (biennale), and perennial. Lower to higher plants have diversity in the properties or characteristics of their organs.

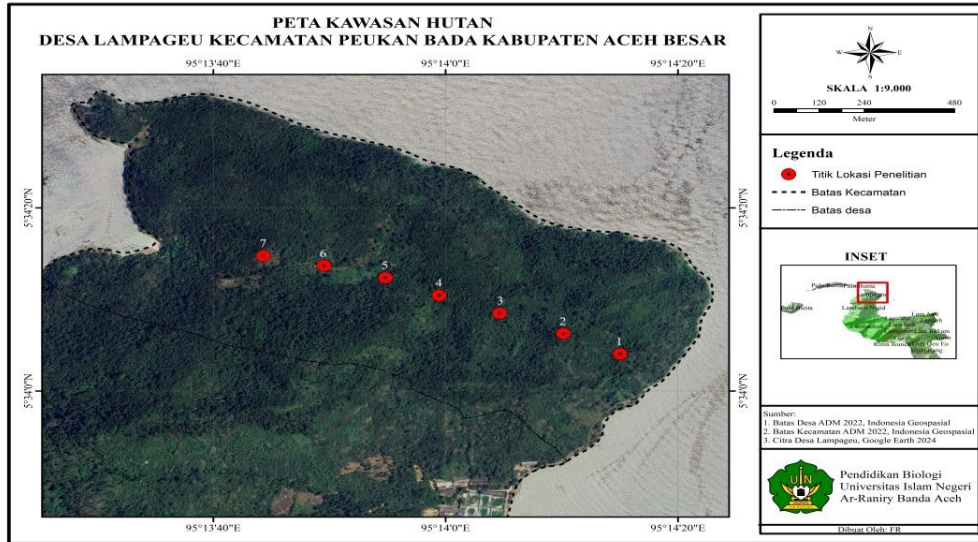
The diversity of plants in the Lampageu Ujong Pancu Village forest is dominated by the division of seed plants (Spermatophyta). Seed plants (Spermatophyta) are a group of plants with a high level of diversity with a distribution throughout the world. Spermatophyta comes from Greek, namely sperma which means seed, and phyton which means plant. Seed plants (Spermatophyta) have a characteristic, namely there is an organ in the form of seeds as a means of reproduction. Spermatophyta is divided into two large groups, namely open seed plants (Gymnospermae) and closed seed plants (Angiospermae).

The results of observations in Lampageu Ujong Pancu Village, Peukan Bada District, because there have been no researchers studying the diversity of seed plants (Spermatophyta) and the location is still very beautiful and far from the roar of vehicles and the hustle and bustle of the city. The results of observations to identify the diversity of seed plants (spermatophytia) and group them based on similarities in the characteristics of a type of seed plant in Lampageu Ujong Pancu Village.

This study provides information on the diversity of seed plants (seeded) as an effort to determine the functional value of plants in the Lampageu Ujong Pancu Village forest.

## **B. RESEARCH METHODS**

It is an exploratory survey research. The aim is to identify plant species in Lampageu Ujong Pancu Village. This research was conducted in Ujong Pancu Village, Aceh Besar Regency in June 2023. The results of the observations were documented and the specimens were taken home to be identified in the basic laboratory of Biology Education, UIN Ar-Raniry Banda Aceh.



Gambar 1. Peta Lokasi Penelitian

The materials used in the study were various plants. The tools needed were sample plastic, label paper, stationery, knives and digital cameras.

Data on determining the name of the observed plant species is obtained through observation of morphological characteristics and recording other special characteristics. These characteristics include plant height, plant diameter, type of branching, leaf shape and so on.

The data obtained were analyzed descriptively quantitatively. Furthermore, in the process of plant identification, it was analyzed by describing the characteristics of the plants found and quantitative analysis to calculate plant diversity using the Shannon-Wiener diversity index formula as follows:

$$H' = - \sum_{i=1}^S (P_i \ln P_i)$$

Where :  $p_i = \frac{n_i}{N}$

Description:

H = Diversity Index

N<sub>i</sub> = Number of individuals in one species

N = Total number of individuals of the species found

Ln = Natural logarithm

S = Number of species (Rozak, 2020).

### C. RESULT AND DISCUSSION

Based on the results of research on the diversity of plant species in Lampageu Ujong Pancu Village, Aceh Besar Regency, it shows that at the research location, 54 types of plant species were found which were divided into 3 divisions, namely the Magnoliophyta division with 36 species, the Tracheophyta division with 16 species and the Spermatophyta division with 2 species. Data on the distribution of plant diversity can't be seen in table 1 below:

**Table 1. Plant diversity in Lampageu Ujong Pancu Village, Aceh Besar District**

Divisi	Class	Ordo	Famili	Genus	Spesies
<u>Magnoliophyta</u>	Magnoliopsida	Euphorbiales	euphorbiaceae	Mallotus	<i>Mallotus philippensis</i>
	Magnoliopsida	Polygonales	Polygonaceae	Coccoloba	<i>Coccoloba diversifolia</i>
	Magnoliopsida	Vioales	Flacourtiaceae	Flacourtia	<i>Flacourtia indica</i>
	Magnoliopsida	Sapindales	Rutaceae	Tetradium	<i>Tetradium daniellii</i>
	Magnoliopsida	Sapindales	Meliaceae	Cedrela	<i>Cedrela odorata</i>
	Magnoliopsida	Sapindales	Rutaceae	Murayya	<i>Murayya koenigii</i>
	Magnoliopsida	Fabales	Fabaceae	Tamarindus	<i>Tamarindus indica</i>
	Magnoliopsida	Fabales	Fabaceae	Inga	<i>Inga edulis</i>
	Magnoliopsida	Sapindales	Meliaceae	Swietenia	<i>Swietenia mahagoni</i>

Magnoliopsida	Scrophulariales	Oleaceae	Jasminum	<i>Jasminum officinale</i>
Magnoliopsida	Urticales	Moraceae	Ficus	<i>Ficus ampelas Brum</i>
Magnoliopsida	Fabales	Fabaceae	Vachellia	<i>Vachellia nilotica L</i>
Magnoliopsida	Rosales	Rhamnaceae	Ziziphus	<i>Ziziphus mauritiana</i>
Magnoliopsida	Myrtales	Punicaceae	Punica	<i>Punica granatum L</i>
Magnoliopsida	Myrtales	Myrtaceae	Syzygium	<i>Syzygium jambos L</i>
Magnoliopsida	Scrophulariales	Oleaceae	Ligustrum	<i>Ligustrum vulgare L</i>
Magnoliopsida	Scrophulariales	Oleaceae	Olea	<i>Olea europaea</i>
Magnoliopsida	Magnoliales	Annonaceae	annona	<i>Annona montana macfad</i>
Magnoliopsida	Myrtales	Combretaceae	Terminalia	<i>Terminalia catappa</i>
Magnoliopsida	Fagales	Fagaceae	Quercus	<i>Quercus nigra L</i>
Magnoliopsida	Rubiales	Rubiaceae	Oldenlandia	<i>Oldenlandia corymbosa</i>
Liliopsida	Commelinales	Commelinaceae	Commelina	<i>Commelina diffusa brum</i>
Liliopsida	Cyperales	Cyperaceae	Carex	<i>Carex sylvatica huds</i>
Liliopsida	Poales	Poaceae	Leersia	<i>Leercia virginica</i>
Liliopsida	Poales	Poaceae	Lophatreum	<i>Lophatreum gracile brongn</i>
Liliopsida	Poales	Poaceae	Oplismenus	<i>Oplismenus hirtellus</i>

	Magnoliopsida	Primulales	Primulaceae	Samolus	<i>Samolus valerandi</i>
	Magnoliopsida	Caryophyllidae	Portulacaceae	Talinum	<i>Talinum paniculatum</i>
	Magnoliopsida	Fabales	Fabaceae	Amorpha	<i>Amorpha fruticose L</i>
	Magnoliopsida	Scrophulariales	Acanthaceae	Asystasia	<i>Asystasia gangetica L</i>
	Magnoliopsida	Laurales	Lauraceae	Umbellularia	<i>Umbellularia californica</i>
	Magnoliopsida	Fabales	Fabaceae	Cassia	<i>Cassia fistula L</i>
	Magnoliopsida	Sapindales	Anacardiaceae	Anacardium	<i>Anacardium occidentale L</i>
	Magnoliopsida	Gentianales	Apocynaceae	Vinca	<i>Vinca minor</i>
	Magnoliopsida	Sapindales	Sapindaceae	Melicoccus	<i>Melicoccus bijugatus Jacq</i>
	Magnoliopsida	Sapindales	Sapindaceae	Nephelium	<i>Nephelium lappaceum L</i>
	Magnoliopsida	Malvales	Bombacaceae	Ceiba	<i>Ceiba pentandra</i>
	Magnoliopsida	Malpighiales	Chrysobalanaceae	Parinari	<i>Parinaric curatellifolia</i>
<u>Tracheophyta</u>	Angiospermae	Sapindales	Anacardiaveae	Spondias	<i>Spondias pinnata</i>
	Angiospermae	Gentianales	Apocynaceae	Hoya	<i>H. Archboldiana</i>
	Angiospermae	Fabales	Fabaceae	Wisteria	<i>Wisterial floribunda</i>
	Angiospermae		Fabaceae	Bauhinia	<i>B. variegata</i>
	Angiospermae	Buxales	Buxaceae	Sarcococa	<i>S. confuse</i>
	Angiospermae	Boraginales	Boraginaceae	Ehretia	<i>Ehretia microphylla</i>

	Angiospermae	Poales	Poaceae	Oplismenus	<i>O. hirtellus</i>
	Angiospermae	Myrtales	Lythraceae	Punica	<i>P. granatum</i>
	Angiospermae	Magnolia	Annonaceae	Desmos	<i>D. chinensis</i>
	Angiospermae	Gentianales	Rubiaceae	Chassalia	<i>C. coraelioides</i>
	Magnoliopsida	Malvales	Sterculiaceae	Theobroma	<i>Theobroma cacao L</i>
	Angiospermae	Magnolia	Annonaceae	Annona	<i>A muricata</i>
	Magnoliopsida	Gentianales	Apocynaceae	Wrightia	<i>Wrightia pubescens</i>
	Angiospermae	Lamiales	Lamiaceae	Clerodendrum	<i>C. thomsoniae</i>
<u>Spermatophyta</u>	Magnoliopsida	Asterales	Asteraceae	Chromolaena	<i>Chromolaena odorata</i>
	Magnoliopsida	Solanales	Convolvulaceae	Ipomoea	<i>Ipomoea batatas</i>

Based on table 1, the diversity of seed plants in Lampague Ujong Pancu Village, there are 54 species of seed plants, consisting of 3 divisions, 3 classes, 25 orders, 32 families, 51 genera, and 54 species. The Magnoliophyta division, magnoliopsida class, contains several species including (*Mallotus philippensis*, *Cocoloba diversifolia*, *Flacourtia Indica*, *Tetradium daniellii*, *Cedrela odorata*). The Tracheophyta division, angiospermae class, contains several species including (*Wisterial floribunda*, *Ehretia microphylla*, *Hoya archboldiana*, *Bauhinia variegata*). The Spermatophyta division, Magnoliopsida class, contains several species including (*Chromolaena odorata*, *Ipomoea batatas*).

Among the plants that inhabit the earth today, Magnoliophyta has the largest number of species and inhabits more types of habitats than any other group of plants. Life forms include trees, shrubs, herbs, lianas that are both perennial and annual. The division Magnoliophyta consists of 2 classes, 11 subclasses, 83 orders, 383 families and about 219,300 species. The class Magnoliopsida consists (six subclasses, 64 orders, 318 families and about 169,400 species) Subclass Magnoliidae (eight orders, 39 families, with about 11,000 species).

As for research related to plant diversity: research conducted by Rizaldi Mokodompit entitled "Plant Diversity on the Campus of Gorontalo State University, Tilong Kabila District,



Bone Bolango Regency". The results of the study were 35 species consisting of 3 divisions, 4 classes, 24 orders, 26 families and 35 genera. The overall plant diversity index value is  $H' = 3.11$ , this value is included in the high category.

Data on the diversity of seed plants based on divisions in Lampageu Ujong Pancu Village can be seen in the bar chart below:

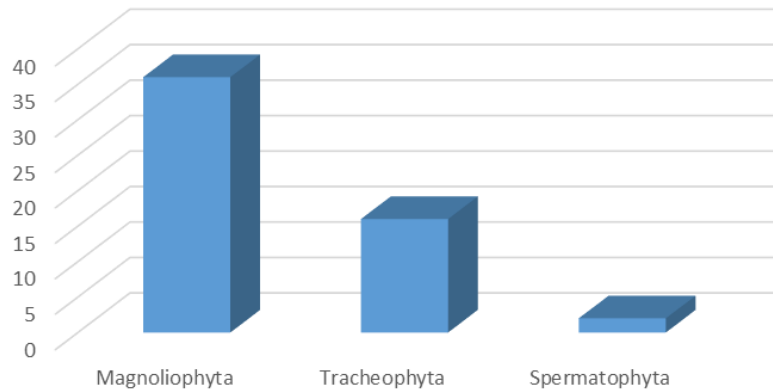


Figure 2. Bar chart of seed plant diversity based on division

Based on the bar diagram, it can be seen that plant diversity is divided into 3 divisions, namely the Magnoliophyta division with 36 species, the Tracheophyta division with 16 species and the Spermatophyta division with 2 species.

**Table 2. Plant diversity index in Lampageu Ujong Pancu Village, Aceh Besar District**

No	Spesies	Number of individu	$ni/N$	$\ln \frac{n}{N}$	$H'$
1	<i>Mallotus philippensis</i>	11	0,026005	-3,64948	-0,0949
2	<i>Coccoloba diversifolia</i>	6	0,014184	-4,25561	-0,06036
3	<i>Flacourtia indica</i>	3	0,007092	-4,94876	-0,0351
4	<i>Tetradium daniellii</i>	6	0,014184	-4,25561	-0,06036

5	<i>Cedrela odorata</i>	9	0,021277	-3,85015	-0,08192
6	<i>Murayya koenigii</i>	14	0,033097	-3,40831	-0,1128
7	<i>Tamarindus indica</i>	4	0,009456	-4,66108	-0,04408
8	<i>Inga edulis</i>	3	0,007092	-4,94876	-0,0351
9	<i>Swietenia mahagoni</i>	5	0,01182	-4,43793	-0,05246
10	<i>Jasminum officinale</i>	7	0,016548	-4,10146	-0,06787
11	<i>Ficus ampelas Brum</i>	14	0,033097	-3,40831	-0,1128
12	<i>Vachellia nilotica L</i>	6	0,014184	-4,25561	-0,06036
13	<i>Ziziphus mauritiana</i>	7	0,016548	-4,10146	-0,06787
14	<i>Punica granatum L</i>	9	0,021277	-3,85015	-0,08192
15	<i>Syzygium jambos L</i>	12	0,028369	-3,56247	-0,10106
16	<i>Ligustrum vulgare L</i>	9	0,021277	-3,85015	-0,08192
17	<i>Olea europaea</i>	5	0,01182	-4,43793	-0,05246
18	<i>Annona montana macfad</i>	3	0,007092	-4,94876	-0,0351
19	<i>Terminalia catappa</i>	4	0,009456	-4,66108	-0,04408
20	<i>Quercus nigra L</i>	7	0,016548	-4,10146	-0,06787
21	<i>Oldenlandia corymbosa</i>	9	0,021277	-3,85015	-0,08192
22	<i>Commelina diffusa brum</i>	5	0,01182	-4,43793	-0,05246

23	<i>Carex sylvatica huds</i>	6	0,014184	-4,25561	-0,06036
24	<i>Leercia virginica</i>	9	0,021277	-3,85015	-0,08192
25	<i>Lophatreum gracile brongn</i>	14	0,033097	-3,40831	-0,1128
26	<i>Oplismenus hirtellus</i>	4	0,009456	-4,66108	-0,04408
27	<i>Samolus valerandi</i>	11	0,026005	-3,64948	-0,0949
28	<i>Talinum paniculatum</i>	3	0,007092	-4,94876	-0,0351
29	<i>Amorpha fruticose L</i>	7	0,016548	-4,10146	-0,06787
30	<i>Asystasia gangetica L</i>	9	0,021277	-3,85015	-0,08192
31	<i>Umbellularia californica</i>	11	0,026005	-3,64948	-0,0949
32	<i>Cassia fistula L</i>	7	0,016548	-4,10146	-0,06787
33	<i>Anacardium occidentale L</i>	9	0,021277	-3,85015	-0,08192
34	<i>Vinca minor</i>	5	0,01182	-4,43793	-0,05246
35	<i>Melicoccus bijugatus Jacq</i>	14	0,033097	-3,40831	-0,1128
36	<i>Nephelium lappaceum L</i>	12	0,028369	-3,56247	-0,10106
37	<i>Ceiba pentandra</i>	4	0,009456	-4,66108	-0,04408
38	<i>Parinaric curatellifolia</i>	6	0,014184	-4,25561	-0,06036
39	<i>Spondias pinnata</i>	8	0,018913	-3,96793	-0,07504

40	<i>Hoya rchboldiana</i>	5	0,01182	-4,43793	-0,05246
41	<i>Wisterial floribunda</i>	10	0,023641	-3,74479	-0,08853
42	<i>B. variegata</i>	11	0,026005	-3,64948	-0,0949
43	<i>S. confuse</i>	13	0,030733	-3,48242	-0,10702
44	<i>Ehretia microphylla</i>	3	0,007092	-4,94876	-0,0351
45	<i>O. hirtellus</i>	6	0,014184	-4,25561	-0,06036
46	<i>P. granatum</i>	8	0,018913	-3,96793	-0,07504
47	<i>D. chinensis</i>	10	0,023641	-3,74479	-0,08853
48	<i>C. coraelioides</i>	5	0,01182	-4,43793	-0,05246
49	<i>Theobroma cacao L</i>	11	0,026005	-3,64948	-0,0949
50	<i>A muricata</i>	9	0,021277	-3,85015	-0,08192
51	<i>Wrightia pubescens</i>	8	0,018913	-3,96793	-0,07504
52	<i>C. thomsoniae</i>	14	0,033097	-3,40831	-0,1128
53	<i>Chromolaena odorata</i>	9	0,021277	-3,85015	-0,08192
54	<i>Ipomoea batatas</i>	4	0,009456	-4,66108	-0,04408
<b>Amount</b>		423			3,899305397

Based on the table presented in table 2, it can be seen that the total number of plant diversity indexes in Lampageu Ujong Pancu Village, Aceh Besar Regency is 3.89, where the diversity index value is included in the high category. This is as stated by (Fachrul 2007),

namely if  $H' = 0$ , then the diversity index is low because the community only consists of one species, if  $H' = > 1 < 3$  then the diversity index is moderate, where productivity is sufficient, ecosystem conditions are quite balanced, and ecological pressure is moderate, and if  $H' > 3$ , then the diversity index is high, because the community has more than one species where productivity is high and ecosystem conditions are good. The high or low diversity index of a plant community depends on the number of species and the number of individuals of each type (species richness). As explained by Indriyanto (2006) said that species diversity can be used to explain community structure. Species diversity can also be used to measure community stability, which is the ability of a community to maintain stability despite disturbances to its components.

The plant diversity index in Lampageu Ujong Pancu Village has a value of 3.89 (Table 2). This value indicates that the number of species among the total individuals is quite high. The high and low values of the diversity of a species are influenced by the number of species and the number of individuals identified. According to Destaranti et al. (2017), the more species found, the higher the diversity index value, the higher the diversity value, the more stable the community.

The diversity index value for plants in Lampageu Ujong Pancu Village is classified as high with a value of  $H' = 3.89$ . This shows that the level of flora diversity in Lampageu Ujong Pancu Village is still very good, as evidenced by the number of species found which is still very diverse and the number of individuals of each species varies greatly. This was also expressed by Wirakusumah (2003) that the higher the diversity value of an area, the more stable the community in the area. The distribution pattern of plants in Lampageu Ujong Pancu Village is also very diverse. This also shows that the condition of the ecosystem in the area is still good and is still maintained amidst ecological pressures.

#### **D. CONCLUSION**

The results of the study on the diversity of plant species in Lampageu Ujong Pancu Village, Aceh Besar Regency showed that at the research location, 54 types of plant species were found, divided into 3 divisions, namely the Magnoliophyta division with 36 species, the Tracheophyta division with 16 species and the Spermatophyta division with 2 species. The plant diversity index in Lampageu Ujong Pancu Village has a value of 3.89. This value indicates that the number of species among the total number of individuals is quite high. The high and low value of the diversity of a species is influenced by the number of species and the number of individuals identified.

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