THE PLANT STUDY OF GUNUNG SARI UNM CAMPUS AREA AS A HIGHER PLANT BOTANY LEARNING RESOURCES

Syamsiah[1], Mushawwir Taiyeb[2], Hamka Lodang[3]
[1,2,3]Department of Biology Education, Universitas Negeri Makassar
[1,2,3]Mallengkeri Raya Street, Parang Tambung, Makassar
Email: syamsiah@unm.ac.id[1], mtaiyeb333@gmail.com[2], hamka.l@unm.ac.id[3]

Abstract:

The study aimed to describe the diversity of flora in the UNM Gunung Sari Campus area. This research is qualitative descriptive research, namely research conducted by describing the research data that have been carried out systematically and accurately regarding the characteristics of higher plants with varied habitus, such as herbs, bushes, shrubs, and trees. The observation of plants was carried out by roaming method by exploring all research locations. The data collection techniques were conducted by carrying out direct identification in the field, and further identification for unknown species concerning literature/ books, identification keys, and plantNet applications. In addition, the documentation was carried out by taking pictures of each plant sample found, both habitus pictures and pictures of each organ. The results of the study revealed that the flora of the UNM Gunung Sari Campus area was quite diverse consisting of 121 species belonging to 51 families, representing all of the higher plants, Pinophyta division (open seed plant group/Gymnosperm) and Magnoliophyta division (closed seed plant group/ Angiosperm), included in the class of Magnoliopsida (Dicotyledon), class of Liliopsida (Monocotyledon). All of these species represent all habitus categories, namely herbs, bushes, shrubs, and trees. Thus, the flora in UNM Gunung Sari Campus Area is representative to serve as a source of learning for several Botany hump courses in the Department of Biology.

Abstrak:

Tujuan penelitian adalah untuk mengetahui gambaran keragaman flora di kawasan Kampus UNM Gunung Sari. Penelitian ini merupakan penelitian deskriptif kualitatif yaitu penelitian yang dilakukan dengan menggambarkan dan mendeskripsikan data hasil penelitian yang telah dilakukan secara sistematis dan akurat mengenai ciri-ciri tumbuhan tingkat tinggi dengan habitus bervariasi, seperti herba, semak, perdu, dan pohon. Pengamatan tumbuhan dilakukan dengan metode jelajah dengan menjelajahi seluruh lokasi penelitian. Teknik pengambilan data dengan melakukan identifikasi langsung di lapangan, dan identifikasi lanjutan untuk spesies yang belum diketahui dengan mengacu pada literatur/ buku, kunci identifikasi, dan aplikasi plantNet. Di samping itu dilakukan dokumentasi dengan pengambilan gambar setiap sampel tumbuhan yang ditemukan, baik gambar habitus maupun gambar setiap organ. Hasil penelitian mengungkapkan bahwa flora Kawasan Kampus UNM Gunung Sari cukup beragam terdiri dari 121 species termasuk ke dalam 51 familia, mewakili tumbuhan tingkat tinggi yaitu divisio Pinophyta (tumbuhan biji terbuka/Gymnospermae) dan divisio Magnoliophyta (tumbuhan biji tertutup/Angiosperm), tercakup dalam classis Magnoliopsida (Dicotyledonae), classis Liliopsida (Monocotyledonae). Semua species tersebut mewakili kategori habitus, yaitu herba, semak, perdu, dan pohon. Dengan demikian flora pada Kawasan Kampus UNM Gunung Sari representatif untuk dijadikan sebagai sumber belajar beberapa mata kuliah Botani pada Jurusan Biologi.

Keywords:
Flora, Learning Resources, UNM Gunung Sari Campus

***How to Cite*:** Syamsiah, Taiyeb, M., & Lodang, H. (2023). The Plant Study of Gunung Sari UNM Campus Area as a Higher Plant Botany Learning Resources. *Lentera Pendidikan : Jurnal Ilmu Tarbiyah dan Keguruan,* 26(2), 242-255. https://doi.org/10.24252/lp.2023v26n2i2.

INTRODUCTION

Universitas Negeri Makassar (UNM) has a large area, on which several faculties are built, besides that it is also equipped with an experimental garden located in the Parang Tambung UNM area, with a variety of plants in it. The existence of the UNM Campus which has a variety of higher plant species produces healthy and beautiful environmental conditions so that it can accommodate various needs in supporting academic activities and other related activities. The environmental conditions created are supported by a large number of plant species, especially shade plants and ornamental plants. Most of these plant groups are seed plants which are trees, shrubs, bushes and herbs. Seed plants are the plants that have seed organs as a means of sexual reproduction, while tree-boned plants are plants that have woody stems, and they are large and varied (Tjitrosomo, 1983). The variety of plants in the campus area provides benefits, especially for students majoring in Biology. However, most of them have not been identified. An identification process is needed to determine the identity of each species.

Identification of plants is defined as an activity to reveal and establish plant identity, in this case determining the correct plant name and the appropriate taxon unit in the classification system. Classification is an arrangement of taxon levels that is used to facilitate the grouping of plants. Identification and classification begin with observing the characters or morphological characteristics of roots, stems and leaves, and reproductive organs. This character can be used for the identification process. Unknown plants can be identified using the help of plant experts, flora books, or using a determination key (Tjitrosoepomo, 2009).

The process of plant identification aims to determine the identity of unknown plants. The plants to be identified must be described in full morphologically. The use of references includes all the possibilities that will occur in the identification process. Native plants or naturalized plants and regional flora can also be used in the process of identifying unknown plants. Identification is one of the scopes in plant taxonomy besides nomenclature (naming) and classification. The properties or characters that form the basis of classification vary depending on the goals to be achieved. One of the characters that can be used is the morphological character (Kaplan, 2001).

Morphological characters in fruit are the most common way to identify or recognize one plant from another. However, this method is sometimes considered ineffective because each plant species has a seasonal/ annual period to produce fruit. However, plant classification can be done by identifying the leaves. The classification based on leaves is an alternative and most effective way to do this because the leaves

exist all the time, while flowers and fruits only exist at certain times. According to Agmalaro, Kustiyo, & Akbar (2013), classification based on leaves can be done with morphological characteristics in the form of leaf structure, texture, leaf bones and based on the overall characteristics of the leaf.

UNM Gunung Sari Campus is a campus that has implemented the concept of a comfortable and beautiful environment. The implementation of this concept is the existence of various species of plants in the campus area, both those planted intentionally and those that grow naturally. Various tree species and several other habitus have grown since the establishment of this campus, such as herbs, shrubs, and bushes. From the aspect of the benefits of plants, there are main categories, namely as a provider of oxygen (O2) for a healthy environment, ornamental plants, shade plants or protective plants, especially in campus gardens and on roadsides. Moreover, these plant species are very important because they are used as practicum material for several subjects in the Biology FMIPA major, especially in the courses of plant morphology, plant anatomy, low plant botany, and higher plant botany.

The data of plant species in the UNM Gunung Sari campus area are not available, either in the books, atlases, or other learning resources. Therefore, exploratory research is needed to determine the plant species in the area. It is necessary as the basic data for the development of learning resources for students in botany courses, now and in the future. Accordingly, a study was carried out entitled "The Plant Study of Gunung Sari UNM Campus Area as a Higher Plant Botany Learning Resources".

RESEARCH METHOD

This research is a qualitative descriptive study, namely research conducted to describe the research data that have been carried out systematically and accurately regarding the characteristics of higher plants with herbaceous habit, shrubs, bushes, and trees found in the UNM Gunung Sari campus area, and including plants found around the UNM campus, especially those that grow on the side of the highway. UNM Gunung Sari campus area is a part of UNM which is located on A.P. Pettarani street with a campus area of 40 hectares consisting of 3 faculties such as Faculty of Social Sciences and Law, Faculty of Psychology, Faculty of Economics, Phinisi Central Office, and the Postgraduate Building. Geographically, UNM Gunung Sari campus area is located at 5°10'7.44"S latitude and 119°26'10"E latitude. Taking plant samples was carried out by roaming method by exploring all research locations. Plant sampling technique was conducted by doing direct identification in the field, and further identification for unknown species by referring to literature/books, identification key, and the plantNet application. In addition, the documentation was carried out, namely taking pictures/photos of each plant sample, both the complete image (habitus) and the image of each organ.

RESULTS AND DISCUSSION

Based on the results of a Floristic Study in the UNM Gunung Sari Campus area, there are 121 plant species in the herbaceous category, shrubs, bushes, and trees that

grow in several faculties, that are the Faculty of Social Sciences, the Faculty of Psychology, the Faculty of Economics, the Phinisi Central Office, and the Postgraduate Program, are among the species that grow around the UNM campus and on the roadside. A detailed list of plant species can be seen in Table 1 below.

Table 1. List of Plant Species in the UNM Gunung Sari Campus Area

No	Division	Class	Family	Species	Habitus
1	Magnoliophyta	Magnoliopsida	Acanthaceae	*Asystasia gangetica* (Israeli grass)	Herbs
				Barleria prionitis (Hedgehog Flower)	Bush
				Justicia gendarussa (Gandarus)	Bush
				Pseuderanthemum carruthersii (Japanese Jasmine)	Bush
				Rawelia varigata (Gandarus)	Bush
				Ruellia angustifolia (Purple Golden Flower)	Herbs
				Strobilanthes crispus (Amazing)	Bush
			Amaranthaceae	*Alternanthera brasiliana* (Purple Spinach)	Herbs
				Alternanthera dentate (Red cream)	Herbs
				Amaranthus spinosus (Spinach spines)	Herbs
				Celosia argentea (Cock's comb)	Herbs
			Anacardiaceae	*Mangifera indica* (Mango)	Tree
			Annonaceae	*Annona squamosa* (Srikaya)	Tree
				Polyalthia longifolia (Glodok Pole)	Tree
			Apocynaceae	*Adenium obesum* (Cambodia)	Shrub
				Catharanthus roseus (Virgin)	Shrub
				Cerbera odollam (Pong-pong)	Tree
				Plumeria acuminata	Shrub

			(Japanese Cambodia) *Tabernaemontana divaricate* (Mondokaki)	Bush
		Araliaceae	*Osmoxylon lineare* (Ararea)	Bush
			Schefflera grandiflora (The Wali Sanga)	Shrub
Magnoliophyta	Magnoliopsida	Asteraceae	*Tetrapanax papyrifer* (Tetrapanax)	Shrub
			Calyptocarpus vialis (Babandotan)	Herbs
			Eclipta prostrata (Urang Aring)	Herbs
			Eupatorium odoratum (Budget)	Shrub
			Gynura procumbens (Continue Life)	Shrub
			Sphagneticola trilobata (Wedelia)	Herbs
			Synedrella nodiflora (Gletang Warak)	Bush
		Bignoniaceae	*Handroanthus chrysotricchus* (Yellow Tabebuya)	Tree
		Caricaceae	*Carica papaya* (Pawpaw)	Tree
		Casuarinaceae	*Casuarina equisetifolia* (Fir)	Tree
		Combretaceae	*Terminalia catappa* (Ketapang)	Tree
			Terminalia ivorensis (Almond Ivory)	Tree
		Convolvulaceae	*Ipomoea reptana* (Land Kale)	Herbs
		Crassulaceae	*Kalanchoe pinnata* (Cocor duck)	Herbs
		Elaeocarpaceae	*Muntingia calabura* (Cherry)	Tree
		Euphorbiaceae	*Codiaeum variegatum* (Croton)	Bush
			Euphorbia tithymaloides (Sig-Sag)	Herbs
			Jatropha curcas (Fence distance)	Shrub

			Jatropha gossypiifolia (Red Distance)	Tree
			Manihot esculenta (Cassava)	Shrub
			Pedilanthus tithymaloides (Sig-Sag)	Herbs
		Fabaceae	*Bauhinia acuminata* (White butterfly flower)	Tree
			Falcataria moluccana (Albasia)	Tree
			Parkia speciosa (Pete)	Tree
			Samanea saman (Ki Rain)	Tree
		Lauraceae	*Persea americana* (Avocado)	Tree
			Umbellularia californica (California Bay Leaf)	Tree
		Malvaceae	*Hibiscus rosa-sinensis* (Hibiscus)	Shrub
			Hibiscus tiliaceus (Waru)	Tree
		Meliaceae	*Swietenia mahagoni* (Mahogany)	Tree
		Mimosaceae	*Mimosa invisa* (Princess big shame)	Shrub
			Mimosa pudica (Mimosa)	Shrub
		Moraceae	*Artocarpus altilis* (Breadfruit)	Tree
			Artocarpus heterophylla (Jackfruit)	Tree
			Ficus benjamina (Banyan)	Tree
			Ficus racemosa (Loa)	Tree
			Ficus septica (Awar-awar)	Shrub
Magnoliophyta	Magnoliopsida	Myrtaceae	*Pimenta racemosa* (West Indian Gulf)	Tree
			Syzygium aqueum (Water apple)	Tree
			Syzygium cumini (Jamblang)	Tree

		Syzygium paniculatum (Red shoots)	Shrub
	Nyctaginaceae	*Bougainvillea spectabilis* (Bougainvillea flower)	Shrub
	Onagraceae	*Ludwigia octovalvis* (Water Lawum)	Bush
	Phyllanthaceae	*Phyllanthus urinaria* (Meniran)	Herbs
		Sauropus androgynus (Cough)	Bush
	Piperaceae	*Peperomia pellucida* (Overlay Water)	Herbs
	Portulacaceae	*Portulaca oleraceae* (Purslane)	Herbs
	Rubiaceae	*Ixora coccinea* (Red Ashoka)	Shrub
		Morinda citrifolia (Noni)	Tree
		Richardia scabra (Coarse Mexican Clover)	Herbs
	Rutaceae	*Citrus aurantifolia* (Lime)	Tree
	Santalaceae	*Santalum album* (Sandalwood)	Tree
	Sapotaceae	*Mimusops elevate* (Cape)	Tree
	Solanaceae	*Solanum melongena* (Eggplant)	Herbs
	Thymelaeaceae	*Aquilaria malaccensis* (Gaharu)	Tree
Liliopsida	Agavaceae	*Agave angustifolia* (Mexican agave)	Bush
		Agave neglecta (Sisal agave)	Bush
		Agave sisalana (Gletang Warak)	Bush
		Sansevieria trifasciata (Tongue-in-law)	Herbs
	Amaryllidaceae	*Hymenocallis littoralis* (Spider lily Beach)	Herbs
	Araceae	*Alocasia indica* (Taro)	Herbs
		Calla palustris (Water arum)	Herbs
		Dieffenbachia seguine	Herbs

			(Sri Fortune)	
			Epipremnum aureum (Betel ivory)	Herbs
			Syngonium podophyllum (American Evergreen)	Tree
		Arecaceae	*Cocos nucifera* (Coconut)	Tree
			Cyrtostachys lakka (Red Palm)	Tree
			Dypsis lutescens (Yellow Palm)	Tree
			Dypsis onilahensis (Palm)	Tree
			Ptychosperma macarthurii (Japanese Palm)	Tree
			Rhapis excelsa (Finger Palm)	Tree
			Roystonea regia (King's Palm)	Tree
			Trachycarpus fortunei (Windmill Palm)	Tree
			Trachycarpus martianus (Lady Palms)	Tree
			Wodyetia bifurcate (Squirrel tail palm)	Tree
Magnoliophyta	Liliopsida	Asparagaceae	*Beaucarnea recurvata* (Nolina)	Tree
			Cordyline fruticose (Red Andong Flower)	Shrub
			Cordyline terminalis (Hanjuang)	Shrub
			Dracaena fragrans (Sri Gading)	Shrub
			Dracaena marginata (Dragon tree)	Shrub
			Dracaena reflexa (Song from India)	Shrub
			Yucca aloifolia (Spanish bayonet)	Shrub
		Cannaceae	*Canna indica* (Tasbih Flower)	Herbs
		Commelinaceae	*Rhoeo discolor* (Adam Eve)	Herbs
		Cyperaceae	*Kyllinga monocephala*	Herbs

				(Jukut Pendul)	
			Heliconiaceae	*Heliconia psittacorum* (Heliconia Flower)	Shrub
			Iridaceae	*Iris pseudacorus* (Yellow Iris)	Herbs
			Marantaceae	*Maranta arundinacea* (Arrow leaf)	Herbs
			Musaceae	*Musa paradisiaca* (Banana)	Shrub
			Poaceae	*Bambusa vulgaris* (Bamboo)	Tree
				Cymbopogon citratus (Lemongrass)	Bush
				Cymbopogon nardus (Serai Fragrant)	Bush
				Eragrostis amabilis (Jukut Karukun)	Bush
				Lophatherum gracile (Bamboo Grass)	Shrub
				Pennisetum purpureum (Elephant Grass)	Bush
			Pontederidaceae	*Eichhornia crassipes* (Water hyacinth)	Herbs
			Zingiberaceae	*Curcuma domestica* (Turmeric)	Herbs
2	Pinophyta	Coniferopsida	Pinaceae	*Pinus mugo* (Mountain spruce)	Tree
		Cycadopsida	Cycadaceae	*Cycas rumphii* (Pakis haji)	Shrub
			Zamiaceae	*Zamia curcas* (Dollar Flower)	Bush

Table 1 shows the data on plant species found in the UNM Gunung Sari Campus area, where as many as 121 plant species were found spread across several faculties. The planting of these plants in several areas of the UNM Gunung Sari Campus was done intentionally, or plants that have existed since the beginning, both as shade plants and as decorations in parks in the campus area. The existence of a green area on the Gunung Sari UNM campus does not only provide beauty, protection, but also provides benefits to students as a source of learning and the community around the campus, such as creating a comfortable campus area.

Generally, the plants found in the UNM campus area are the plants that were deliberately chosen to be planted because they have aesthetic and ecological values. The selection, arrangement, and combination of each species found in the area is really considered in terms of diversity, nature, and physical characteristics of plants so as to create a more functional environment and beautiful views (Syamsiah, Junda, & Ikbal,

2022). This is in accordance with research conducted by Qomah, Hariani, & Murdiyah (2020) where the presence of plants not only provides benefits for maintaining comfort around the campus environment, but is also able to absorb solar radiation which can help the plants themselves carry out the photosynthesis process.

These species belong to 51 families consisting of 3 families of open seed plants (Pinophyta/Gymnosperm) and 48 families of closed seed plants (Magnoliophyta /Angiosperm). The Magnoliophyta group is divided into 2 class, namely Magnoliopsida (Dicotyl) with 35 families and Liliopsida (Monocotyl) with 13 families.

The large number of species from the Magnoliophyta is probably due to the fact that this group of plants dominates terrestrial ecosystems and has the ability to attract insects to help with the breeding process (Huda, Amrul, & Soesilo, 2020). In addition, the species from Magnoliophyta are widely used by the community as ornamental plants because they have a variety of appearances or are used as road shade plants (Qomah, Hariani, & Murdiyah, 2020)

Based on the number of plant species found in the UNM Gunung Sari Campus area, it can be seen in the following Figure 1.

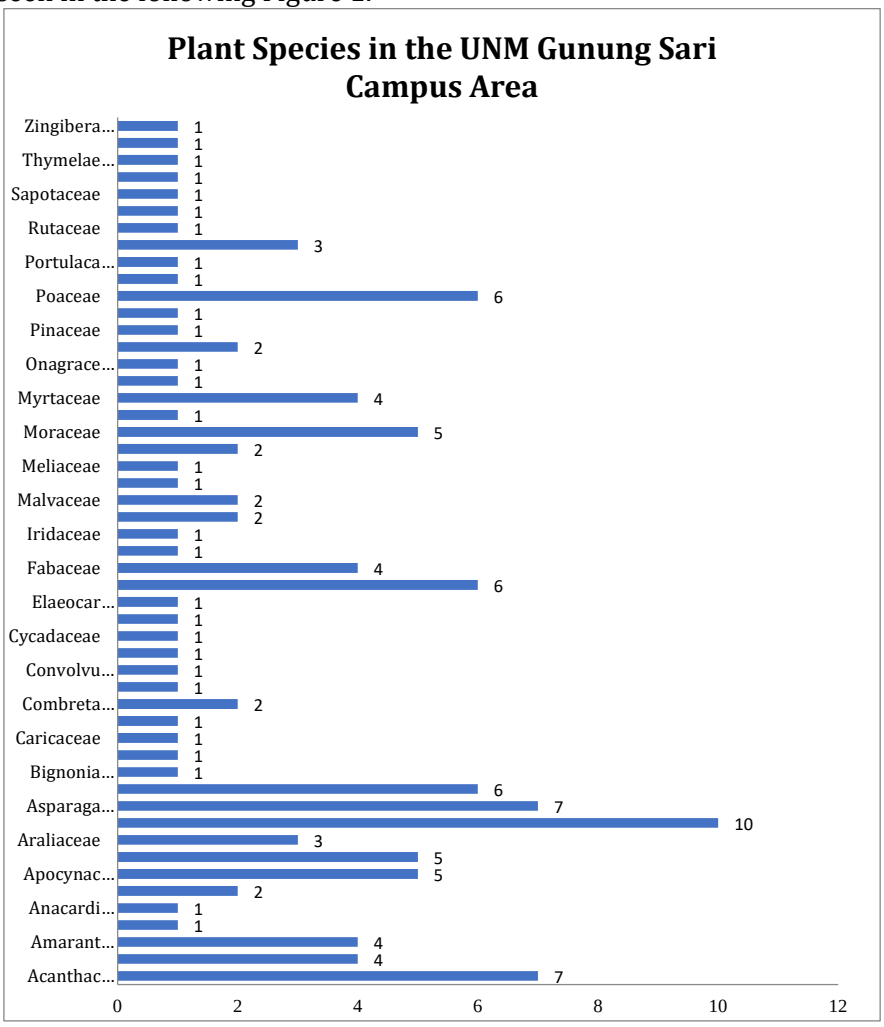

Figure 1. Graph of Plant Species in the UNM Gunung Sari Campus Area

Figure 1 shows the number of plant species found in the UNM Gunung Sari Campus area which is dominated by the Arecaceae family (10 species) followed by the Acanthaceae and Asparagaceae families (7 species); Asteraceae, Euphorbiaceae, and Poaceae (6 species); Apocynaceae, Araceae and Moraceae (5 species); Amaranthaceae, Agavaceae, Fabaceae, and Myrtaceae (4 species); Araliaceae and Rubiaceae (3 species); Familia Annonaceae, Combretaceae, Lauraceae, Malvaceae, Mimosaceae and Phyllanthaceae (2 species); while the other 30 families consist of only 1 species.

The dominance of the existence of species from the Arecaceae family in the UNM Gunung Sari Campus area is due to the fact that the species from this family can grow in the areas that have an annual average temperature of around 25℃ with sufficient sunlight. In addition, the species from the Arecaceae family can grow well on peat soil types, sandy soil, rocky soil, and limestone soil (Siregar, 2005). Several species of Arecaceae can be used by the community both as ornamental plants, traditional medicines, foodstuffs and so on (Fitrianti, Sari, & Rahmawati, 2022). Likewise, in general, people like the palms to be used as ornamental plants because of the beauty of the canopy on the leaves that form a rosette of stems.

Familia Euphorbiaceae also has the third highest number of species along with species from Agavaceae. According to Hartono, Adlini, & Ritonga (2020), the number of species from the Euphorbiaceae family found in various places is due to the fact that the dispersal process of plant seeds in that family is quite easy to grow and develop in a suitable place with a suitable habitat.

The types of plants from each family found in UNM Gunung Sari Campus area have various habitus (stature). For more details, regarding the percentage of plant habitus in the area can be seen in Figure 2 below.

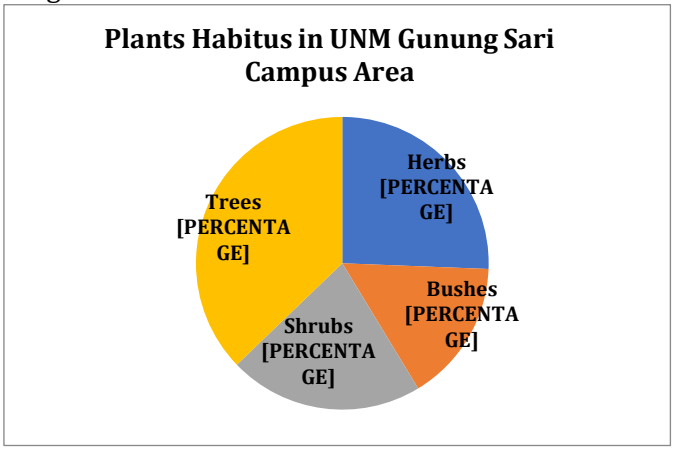

Figure 2. The Percentage of Plant Habitus in the UNM Gunung Sari Campus Area

Figure 2 shows the percentage of plant habitus found in the UNM Gunung Sari Campus area, where it can be seen that the plant habitus is dominated by tree habitus with 45 species (37%), followed by herbs habitus with 31 species (26%), shrubs with 26 species (21 %), and bushes as many as 19 species (16%).

The large number of trees found in UNM Gunung Sari Campus area is reserved as a landscape plant, namely as erosion control, climate control or temperature, and it is able

to contribute to the abundance of oxygen in the area (Tobondo, Koneri, & Pandiangan, 2021). Given that UNM Gunungsari campus area is in an open location with full sunlight intensity levels, it requires trees as protection both in campus gardens and on roadsides.

The small number of shrub species in the UNM Gunung Sari Campus area is due to the fact that the campus community generally considers some of the bush species to be weeds that can be harmful so they must be destroyed and the lack of direct sunlight on the ground floor. According to Wahyuni, Syamsiah, & Wahidah (2017) shrubs are the plants that can grow in open places with intense direct sunlight or in humid areas. In addition, the rain pattern in Makassar City area occurs every 6 months, so that during the dry season the plants do not get enough water (Maulidani, Ihsan, & Sulistyawati, 2015).

The campus area is a home for many trees, herbs, and shrubs that grow naturally (Dar, 2019). The flora in campus area provides a unique opportunity for the campus community to learn about botanical and outdoor ecology. The study of flora on campus area are considered as a backbone of studying biodiversity, conservation, management, and sustainable use (Parthipan, Rajeeswari, & Jeeva, 2016).

The importance of collecting the data on flora that grows in the campus area can be used as a basic data to recognize the plant diversity, both in their identification or their distribution in the campus area (Gul, Ahmad, & Khan, 2018). Besides that, there are several reasons why floristic studies are very important as a source of learning botany specifically helping college students to build a basic knowledge of plant types and their morphological characteristics, providing to understand about the number of species (whether the protective plants, shade plants, decorative plants, and endemic or endangered plants), assist in the process of classification and taxonomy of plants, and effort that need for plant conservation.

The plant data found in UNM Gunung Sari campus area will be summarized into a learning resource book for the Higher Plant Botany course which can be used by the Biology students on the UNM campus, the high school students, and the general public. The book will be equipped with a classification of each plant species from regnum to species level, morphological description of the species, picture of the species, general description, and the difference between these plant species and another species in the same family.

CONCLUSION

The flora found in UNM Gunung Sari Campus area is quite diverse consisting of 121 species belong to 51 families, representing all higher plant groups, namely the open seed plant group (Division Pinophyta) and the closed seed plant group (Division Magnoliophyta) included in the class Magnoliopsida (Dicotyl) and class Liliopsida (Monocotyl), included in all forms habitus, both herbs, bushes, shrubs, and trees. Therefore, the floristic data on Gunung Sari UNM Campus area can be used as a learning resource for Higher Plant Botany courses.

REFERENCES

Agmalaro, M. A., Kustiyo, A., & Akbar, A. R. (2013). Identifikasi Tanaman Buah Tropika Berdasarkan Tekstur Permukaan Daun Menggunakan Jaringan Syaraf Tiruan. *Jurnal Ilmu Komputer Dan Agri-Informatika*, *2*(2), 73–82. https://doi.org/10.29244/jika.2.2.73-82.

Dar, M. H. (2019). Floristic Diversity at Hamedia College Campus of Bhopal, Madhya Pradesh. *Our Heritage*, *67*(5), 520–528. https://www.researchgate.net/publication/341203474_Floristic_diversity_at_Hamedia_College_Campus_of_Bhopal_Madhya.

Fitrianti, R. H. D., Sari, M. A., Rahmawati, N. I., & Murtini, I. (2022). Identifikasi Morfologi Tumbuhan Famili Arecaceae di Lingkungan Universitas PGRI Ronggolawe Tuban. *Prosiding Seminar Nasional Penelitian Dan Pengabdian Masyarakat*, *7*(1), 551–556.

Gul, B., Ahmad, I., Khan, H., Zeb, U., & Ullah, H. (2018). Floristic Inventory of Wild Plants of Peshawar University Campus. *Acta Ecologica Sinica*, *38*(6), 375–380. https://doi.org/10.1016/j.chnaes.2018.04.005.

Hartono, A., Adlini, M. N., Ritonga, Y. E., Tambunan, M. I. H., Nasution, M. S., & Jumiah. (2020). Identifikasi Tumbuhan Tingkat Tinggi (Phanerogamae) di Kampus II UINSU. *Jurnal Biolokus*, *3*(2), 305–312. https://doi.org/10.30821/biolokus.v3i2.755.

Huda, M. K., Amrul, H. M. Z. N., & Soesilo, F. (2020). Keanekaragaman Tumbuhan Berbunga di Kawasan Malesia. *Jurnal Biologi Lingkungan, Industri, Kesehatan*, *6*(2), 162–170. https://doi.org/10.31289/biolink.v6i2.2762.

Kaplan, D. (2001). The Science of Plant Morphology, Definition, History adn Role in Modern Biology. *American Journal of Botany*, *88*. https://pubmed.ncbi.nlm.nih.gov/21669604/.

Maulidani S, S., Ihsan, N., & Sulistyawati. (2015). Analisis Pola Dan Intensitas Curah Hujan Berdasakan Data Observasi dan Satelit Tropical Rainfall Measuring Missions (Trmm) 3B42 V7 Di Makassar. *Jurnal Sains Dan Pendidikan Fisika*, *11*(1), 99. https://doi.org/10.35580/jspf.v11i1.1472.

Parthipan, B., Rajeeswari, M., & Jeeva, S. (2016). Floristic Diversity of South Travancore Hindu College (S. T. Hindu College) Campus, Kanyakumari District (Tamilnadu) India. *Bioscience Discovery*, *7*(1), 41–56. https://www.researchgate.net/publication/311886732_Floristic_Diversity_of_South_Travancore_Hindu_College_S_T_Hindu_College_Campus_Kanyakumari_District_Tamilnadu_India_Parthipan_B1_M_Rajeeswari_1_and_Solomon_Jeeva2.

Qomah, I., Hariani, S. A., & Murdiyah, S. (2020). Identifikasi Tumbuhan Berbiji (Spermatophyta) di Lingkungan Kampus Universitas Jember. *Jurnal Bioedukasi*, *XIII*(2). https://jurnal.unej.ac.id/index.php/BIOED/article/view/4519.

Siregar, E. B. M. (2005). *Inventarisasi Jenis Palem (Arecaceae) pada Kawasan Hutan Dataran Rendah di Stasiun Penelitian Sikundur (Kawasan Ekosisitem Leuser) Kab. Langkat*. Universitas Sumatera Utara.

Syamsiah, Junda, M., & Ikbal, I. (2022). Identifikasi Spesies Pohon di Wilayah Kampus UNM Parang Tambung. *Bionature*, *23*(1), 43–51. https://doi.org/10.35580/bionature.v23i1.32832.

Tjitrosoepomo, G. (2009). *Taksonomi Umum*. Yogyakarta: Gadjah Mada University Press.

Tjitrosomo, S. S. (1983). *Botani Umum 3*. Bandung: Angkasa.

Tobondo, V. E., Koneri, R., & Pandiangan, D. (2021). Keankeragaman dan Pemanfaatan Tanaman Pekarangan di Desa Taripa, Kecamatan Pamona Timur, Kabupaten Poso, Sulawesi Tengah. *Jurnal Bios Logos*, *11*(1), 54–67. https://doi.org/10.35799/jbl.11.1.2021.32135.

Wahyuni, A. S., Syamsiah, & Wahidah, B. F. (2017). Identifikasi Jenis-Jenis Tumbuhan Semak di Area Kampus 2 UIN Alauddin dan Sekitarnya. *Agroprimatech*, *1*(1), 32–39. http://jurnal.unprimdn.ac.id/index.php/Agroprimatech/article/view/433.