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Diversity and Usability Study of Plants in Islamic State School (MAN) 4 Jakarta (Preliminary Inventaritation and Conservation for Supporting Biology Learning)

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Keanekaragaman dan Kajian Potensi Tumbuhan di Kawasan Madrasah Aliyah Negeri 4 Jakarta (Inventarisasi Awal dan Konservasi untuk Menunjang Pembelajaran Biologi Kelas X MA)

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Abstract

An exploratory and inventory research was conducted to document the species of plant diversity in the school area for the purpose of environmental education and conservation. The research location is in the area of MAN 4, South Jakarta. Exploration was carried out by purposive sampling, taking all types of plants encountered herbs and trees. Data analysis was made by explaining the exploration data descriptively. Based on the research, found 43 species of plants, consisting of 40 types of spermatophytes and 3 types of pteridophytes. The plants with the highest frequency were *Syzygium oleana* and *Codiaeum variegatum* which were used as garden fences and garden ornaments. ornamental plants, some food, medicine and as an air purifier. Species description, can be used as a reference source for learning biology material or practical activity on biodiversity, LO 4.3 composes a cladogram based on the principles of classification of living things (for national curriculum) and LO 18.1.1 discusses the meaning of the term species, limited to the concepts of biological species, morphology and ecological species (cambridge curriculum). Its potential can be used as information for students for environmental education and conservation of plant species in schools.

Abstrak

Penelitian eksplorasi dan inventarisasi dilakukan untuk mendokumentasikan jenis keanekaragaman tumbuhan yang ada di kawasan sekolah dengan tujuan pendidikan lingkungan dan upaya konservasi. Lokasi penelitian adalah di kawasan MAN 4 Jakarta Selatan. Eksplorasi dilakukan dengan purposive sampling, mengambil seluruh jenis tumbuhan yang ditemui (terna, herba, pohon. Analisis data dibuat dengan menjelaskan data hasil eksplorasi secara deskriptif. Berdasarkan hasil penelitian, ditemukan 43 jenis tumbuhan, yang terdiri dari 40 jenis spermatophyta dan 3 jenis tumbuhan pteridophyta. Tumbuhan yang memiliki frekuensi tertinggi adalah jenis *Syzygium oleana* and *Codiaeum variegatum* yang digunakan sebagai pagar taman dan ornamen taman. Dari jenis yang ditemukan, rerata tumbuhan lebih banyak berpotensi sebagai tumbuhan hias, beberapa makanan, obat dan sebagai pemurni udara. Data awal informasi jenis dan deskripsi, dapat digunakan sebagai sumber acuan untuk pembelajaran biologi materi keanekaragaman hayati KD 4.3 menyusun kladogram berdasarkan prinsip-prinsip

klasifikasi makhluk hidup (for national curriculum) and LO 18.1.1 discuss the meaning of the term species, limited to the biological species concept, morphological and ecological species concept.. Data kelimpahan jenis dan potensinya dapat dijadikan informasi bagi siswa untuk pendidikan lingkungan dan konservasi jenis tumbuhan di sekolah.

Keywords: ***diversity, plant, school, man4jkt***

Introduction

School is a place for students to obtain learning experiences and prepare students' future (UNICEF, 2009). School can be a significant place for students to start knowing their environment. The environment is one of the most important learning resources and has very valuable values in the student learning process. The environment can enrich learning materials and activities. By taking learning materials from the student's environment, the skills and intelligence of students can be practiced in social life. Learning activities in schools are very influential on increasing students' knowledge. Effective learning is influenced by several factors, one of which is the availability of learning resources used by teachers (Ramdhayani, 2019). There are several components that affect the success of learning such as teacher and students, content, and the learning process. Learning situation (Dangara *et al,* 2019). Let us focus on the content and biology as the subject.

Biology is the study of living things and the natural environment, the objects being studied are things that are often encountered in real life. One of the chapters that we can use and relate with the environment in the learning process is a chapter for biodiversity, especially for plant biodiversity. We know that Indonesia is a mega biodiversity country with many species of organisms inside. But lately, there are many ecological destruction and disrupts biodiversity, therefore environmental care is needed. Suryani *et al* (2019), reported that environmental actions should be immediately taken since environment destruction means decreasing human life quality. Thus, preparing the young generation may reduce the future potential natural damage as well as sustain the environment. One of the activities that we can go through is inventorisation.

Inventaritation is an activity to identify species to reveal or determine the identity of a plant. Through this inventory activity students can recognize plants, and know how to treat plants and classify plants. There is research about plant inventory at school (Ayatussaadah (2017), Lestari *et al*, (2019) and Wardati (2020)) but still limited to the one family only or one class. This study seeks to record and search for as many types as possible without limiting certain classes of plants.

MAN 4 Jakarta is a school with a good and adequate learning environment, it is a school with a beautiful environment with various types of plants. Learning outdoor activities can support knowledge and learning competences for students (Sunarmi, 2014). The aim of the research are to collect plant species information and usability in school for early database diversity. Species data information can be used as material for environmental education and conservation effort for students. Species diversity data can be used to be related with learning objectives in supporting biology learning in school.

Material and Methods

This is a descriptive explorative research. This research was conducted from July to September 2021 at MAN 4 Jakarta. Diversity of plant species was explored in 5 locations with high plant density using purposive sampling (Rugayah *et al.,* 2004). Observations of morphological characters and identification of specimens were carried out at the Biology Laboratory of MAN 4 Jakarta and independently or remotely at home.

Plant observation and identification using references Plant for School (Steenis, 1975), The Mountain Flora of Java (Steenis, 2007), www.plantlist.com and www.plantoftheworldonline.com.

Identification data species found then presented in a form of species description.

Figure 1. Research site and exploration route MAN 4 Jakarta (1. Front face school. 2. garden area, 3. Near mosques, 4. Gazebo, and 5. Multimedia area)

Result and Discussion

Based on the results of exploration carried out in the Man 4 area of Jakarta, 93 collection numbers were identified. There were 43 plant species with 40 species belonging to the spermatophytes group and the other 3 species being the pteridophytes group (Aspleniaceae, Dryopteridaceae, Polypodiaceae) as can be seen in Table 1.

Table 1. Species diversity found in MAN 4 Jakarta

No.	Local Name	Scientific Name	Famili
1	Pepaya	*Carica papaya*	Caricaceae
2	Lee Kuan yew	*Vernonia elliptica*	Asteraceae
3	Sabrina/ Rombusa	*Tabernaemontana corymbosa*	Apocynaceae
4	Spathiphyllum/ Peace Lily	*Spathiphyllum kochii*	Araceae
5	Brokoli Kuning	*Euodia ridleyi*	Euphorbiaceae
6	Kamboja Jepang	*Adenium obesum*	Apocynaceae
7	Cocor Bebek	*kalanchoe waldheimii*	Crassulaceae
8	Puring (var 1)	*Codiaeum variegatum*	Euphorbiaceae
9	Puring (var 2)	*Codiaeum variegatum*	Euphorbiaceae
10	Puring (var 3)	*Codiaeum variegatum*	Euphorbiaceae
11	Puring (var 4)	*Codiaeum variegatum*	Euphorbiaceae
12	Puring (var 5)	*Codiaeum variegatum*	Euphorbiaceae
13	Kembang Sepatu	*Hibiscus x rosa sinensis*	Rosaceae

14	Kenikir	*Cosmos caudatus*	Asteraceae
15	Lili Paris	*Chlorophytum comosum*	Asparagaceae
16	Bunga Kertas	*Nyctagina spectabilis*	Nyctaginaceae
17	Sirih Gading	*Epipremnum aureum*	Araceae
18	Bunga Asoka	*Ixora javanica*	Rubiaceae
19	Pandan Bali	*Cordyline fruticosa*	Asparagaceae
20	Gelombang Cinta	*Anthurium plowmanii*	Araceae
21	Monstera	*Monstera sp*	Araceae
22	Takokak	*Solanum torvum*	Solanaceae
23	Melati	*Jasminum sambac*	Rubiaceae
24	Adam Hawa Ungu	*Tradescantia pallida*	Commelinaceae
25	Daun Jadam	*Rhoeo discolor*	Commelinaceae
26	Pisang-pisangan	*Heliconia* sp	Heliconiaceae
27	Bunga Kencana Ungu	*Ruellia simplex*	Acanthaceae
28	Pucuk Merah	*Syzygium oleana*	Myrtaceae
29	Pisang	*Musa x paradisiaca*	Musaceae
30	Bunga Telang	*Clitoria ternatea*	Fabaceae
31	Rambutan	*Nephelium lappaceum*	Sapindaceae
32	Jambu Air	*Syzygium* sp	Myrtaceae
33	Palem Kuning	*Dypsis lutescens*	Araceae
34	Tapak Dara	*Catharanthus roseus*	Apocynaceae
35	Mangga	*Mangifera indica*	Anacardiaceae
36	Bunga Euphorbia var 1	*Euphorbia milii*	Euphorbiaceae
37	Bunga Euphorbia var 2	*Euphorbia milii*	Euphorbiaceae
38	Bunga Euphorbia var 3	*Euphorbia milii*	Euphorbiaceae
39	Ubi	*Manihot esculenta*	Euphorbiaceae
40	Kunyit	*Curcuma domestica*	Zingiberaceae
41	Paku Sarang Burung	*Platycerium* sp	Aspleniaceae
42	Paku Tanduk Rusa	*Asplenium nidus*	Polypodiaceae

43	Paku Pedang	*Nephrolaepis cordifolia*	Dryopteridaceae

Based on exploration, the most common groups found were groups from the families Araceae and Euphorbiaceae. Based on the results of the exploration, the species found were generally ornamental and medicinal plants which were used as garden decorations in schools. The species found varied from lower plants to higher plants (Figure 2). The species with the highest frequency found was a plant with local name Pucuk Merah (*Syzygium oleana*) which was found in almost all exploration areas. This species is generally used as a guardrail or decoration in the garden. Furthermore, based on the results of exploration, several types of plants were also found that varied but in 1 species, the first was Puring which has the scientific name *Codiaeum variegatum*, found 5 types of variations, and Euphorbia found 3 variations.

Figure 2. Species biodiversity in MAN 4 Jakarta

Based on the analysis of plant diversity in MAN 4 Jakarta, the zone that is most varied and has the potential to be used as a diversity zone is zone 2 (Figure 1), where zone 2 has the most species diversity, amounting to 24 species in an area. 1 zone has 15 species, zone 3 has 4 species, and zone 5 has 5 species (Figure 3). This zone is a small school garden where many useful plants are planted by both students and the school community.

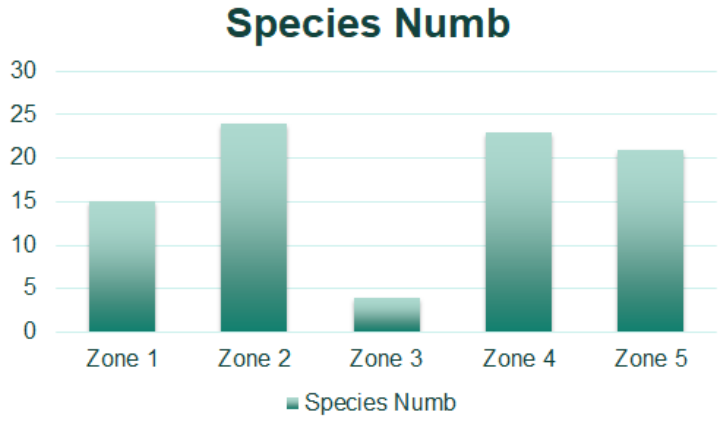

Figure 3. Frequency graphics species in 5 exploration zone MAN 4 Jakarta

The study of the potential use of plants was reviewed using literature studies, the types found showed that the most use of plants was as ornamental plants (Figure 4). About 28 species of all species found can be used as ornamental plants.

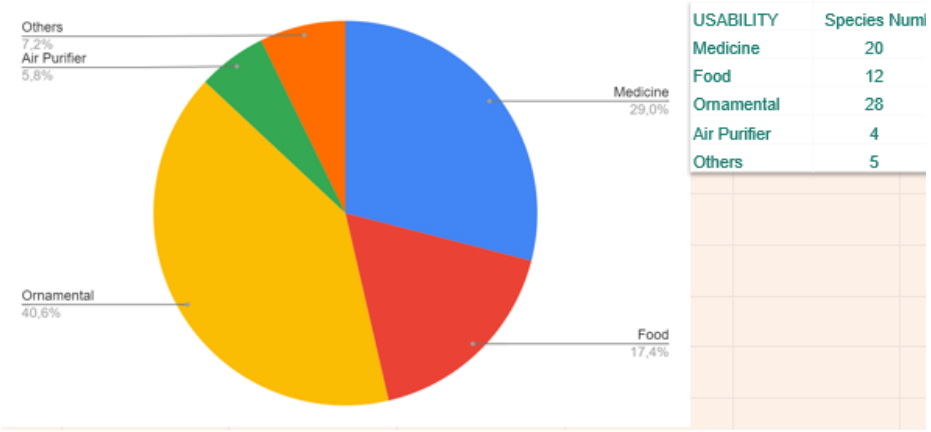

Figure 4. Usability potent plants in MAN 4 Jakarta

This research is the initial activity of a series of programs to promote meaningful learning for students. Therefore, the researcher plans to use this as initial data for the launch of the diversity module and worksheets for outdoor biology learning practicum activities. The data on the results of this type of diversity can be used to support biology learning for Class X SMA in dual curricula, both national and cambridge. In the national curriculum, data types, and their descriptions can be used to learning objectives LO 4.3 composes a cladogram based on the principles of classification of living things and for cambridge curriculum LO 18.1.1 discusses the meaning of the term species, limited to the concepts of biological species, morphology and ecological species. Plant module Discovery Learning model is effective for improving student learning outcomes on cognitive aspects for Identification species activity (Shofiyati, 2019).

Humans are the active determining agents. They have power and capacity to change and develop their natural Environment (Suryani *et al.*, 2019) Thus, human's attitudes towards the environment are vital. Human behavior and activities towards the environment are significant in determining the quality of the environment, however educating people to care for the environment is important (Moreno *et al.* 2011). Environmental education drives people's perceptions on the environment as well as environmental treatment and management.

Conclusion

Species found 43 species of plants, consisting of 40 types of spermatophytes and 3 types of pteridophytes. The plants with the highest frequency were *Syzygium olean*a and *Codiaeum variegatum* which were used as garden fences and garden ornaments.The usability of plants are for ornamental plants, food, medicine and as an air purifier. Species description, can be used as a reference source for learning biology material or practical activity on biodiversity, LO 4.3 composes a cladogram based on the principles of classification of living things (for national curriculum), LO 18.1.1 discusses the meaning of the term species, limited to the concepts of biological species, morphology and ecological species (cambridge curriculum).Its potential can be used as information for students for environmental education and conservation of plant species in schools.

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