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Research Article

Diversity of orchids (*Orchidaceae*) and host trees at Padang, West Sumatra, Indonesia: A preliminary step towards germplasm conservation

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ABSTRACT

Orchid exploration brings numerous benefits, including the conservation of rare species, ecological insights, medicinal and horticultural applications, economic opportunities, cultural appreciation, and scientific advancement. These benefits underscore the importance of continued exploration and conservation efforts to safeguard orchid diversity. This study aimed to explore the diversity of orchids at Universitas Andalas, Padang, West Sumatra. The research involved a comprehensive survey of orchid species in various habitats, documenting their distribution and abundance. We used a systematic sampling method to collect plant specimens and record relevant ecological data. The research indicated a remarkable diversity of orchid species at Universitas Andalas. We found 21 species of orchids, including 19 epiphytes and two terrestrial species. Filicium desipiens was the most dominant host, with 13 species of orchids found on 15 trees. Dendrobium crumenatum was the most common orchid found on 13 host trees. The results highlighted the importance of preserving these unique orchid populations. This research contributes to the understanding of orchid diversity at Universitas Andalas. The findings can inform policymakers, conservationists, and local communities in developing effective strategies for the preservation and sustainable use of orchid resources. Future studies should focus on further exploration, taxonomic studies, and conservation initiatives to ensure long-term survival.

Keywords: conservation; diversity; epiphytes; exploration; terrestrial

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INTRODUCTION

Indonesia is a mega biodiversity country with natural wealth in both fauna and flora. One of the flora groups with a high level of diversity in Indonesia is the orchid (*Orchidaceae*). Orchids are highly sought after due to their unique flower patterns and colors. They are also used as raw materials for perfumes and traditional medicines. The abundance of orchid species in Indonesia is estimated at 5,000 species, or approximately 23% of the global total, scattered across the forests of Sumatra, Kalimantan, Sulawesi, Java, and Papua (Irawati et al., 2021). Several genera of orchids have been found, including *Dendrobium, Cymbidium, Vanda, Oberonia, Bulbophyllum, Phalaenopsis, Grammatophyllum, Coelogyne,* and *Agrostophyllum* (Effendi et al., 2019; Nugroho et al., 2019; Amalia et al., 2023).

Natural orchid populations have decreased due to several factors, including deforestation for settlements, land preparation for agricultural expansion, mining, forest fires, natural disasters, and over-exploitation. Conservation efforts are needed to protect orchids, including exploration, identification, characterization, and inventory. During this process, information on distribution, habitat, life behavior, and morphological and genetic

aspects is collected and analyzed. This research provides an understanding of orchid diversity in a region. It is crucial to protect endangered orchid species and maintain the sustainability of their populations. Additionally, it provides information about genetic diversity in orchids that can be used in plant breeding programs to produce superior varieties (Handini et al., 2016; Mursyidin et al., 2022). Research on orchid diversity exploration has been carried out in several areas in Indonesia, such as Mount Liangpranin East Kalimantan (Effendi et al., 2019), the Bromo TenggerSemeru area (Wulanesa et al., 2017), Manokwari (Bieth & Arobaya, 2020), Mount Batuah in Jambi (Nursanti et al., 2020), Bukit Lawang in Langkat (Azhar et al., 2021), Mount TumpaTahura in Manado (Karoy et al., 2022), Bangka Island (Prayoga et al., 2022), and Mount Cibunar in Sumedang (Amalia et al., 2023).

Exploring germplasm serves as a crucial preliminary step in inventorying the abundance of orchid species. This process involves assessing the diversity and distribution of various orchid species, which provides essential data for subsequent collection and propagation efforts. By systematically documenting the genetic resources and natural variability within orchid populations, researchers can create a comprehensive database that supports the development of effective conservation strategies. This initial exploration not only enhances our understanding of orchid biodiversity but also aids in establishing sustainable collection practices and developing propagation programs aimed at preserving and expanding orchid varieties. The collected germplasm and associated data form the foundation for future conservation efforts, ensuring the protection and availability of these species for both research and horticultural purposes.

Despite much research, specific geographic areas still need thorough exploration. One such area is West Sumatra, especially the Karimunting Hill at Universitas Andalas. Universitas Andalas is a tertiary institution located in Padang, with the third-largest land area among Indonesian universities, covering 500 hectares of tree vegetation, green open land, and experimental gardens adjacent to the Bukit Barisan forest (Andalas University, 2024). Based on these conditions, the Universitas Andalas area is suspected to have a high diversity of orchids. Research exploring the diversity of orchid species in the Universitas Andalas area has not been reported. This study aimed to be the first step in supporting the conservation and breeding of orchids in this region.

MATERIALS AND METHODS

Study area

This research was conducted from September to December 2022 in the Universitas Andalas area, Limau Manis, Pauh, Padang City, West Sumatra. The coordinates are latitude -0.914518, longitude 100.459526, 0° 54’52.2648” S, 100° 27’34.2936” E (Figure 1). The altitude in this area is 200-250 meters above sea level (masl), with an average temperature range of 26-33°C, annual rainfall of 3.076 to 5.603 mm, humidity of 80-90%, and most of this area consists of ultisol soil. The tools and materials used in the research included a camera, tripod, caliper, ruler, PictureThis software (Play Store), Munsell color chart, and ornamental plant characterization guidebook.

Procedures

Data were collected using the exploratory or roaming method with line transects. The exploration involved tracking to find, collect, and identify orchid species in Universitas Andalas, observing an area approximately 10 meters to the right and 10 meters to the left of the line, and the length of the exploration line was about 3.400 m. The samples were observed, and data were collected and documented using photographs. Unidentified orchids were collected as herbarium specimens for further identification.

Data analysis

Data collection was conducted on all orchid species found at the observation site, including their species, habitus, growth type, and morphology (roots, stems, leaves, flowers, and fruits). The orchids were identified by comparing the morphological

characteristics of the orchids observed in the field with reference materials. This included using the PictureThis software from the Play Store and several key reference books: Guideline for the Characterization of Ornamental Plants: Orchids and Anthuriums (Kartikaningrum et al., 2004), Orchids of Sumatra (Comber, 2001), Orchids of Java (Comber, 1990), and Orchid (Cultivated Indonesian Orchid Species) Catalog (Irawati et al., 2021). This method was strictly descriptive, aiming to document and compare the observed characteristics rather than conducting experimental procedures. It relied on visual comparison and matching observed specimens with established descriptions and images from the software and literature.

Figure 1. The green quadrant is the map location of orchids exploration.

RESULTS AND DISCUSSION

Based on the observation, 21 species of orchids, 19 species of epiphytes, and two species of terrestrials were found. Epiphyte orchids generally grow on large trees with dense, shady crown cover. There were 15 trees that hosted epiphyte orchids. 13 species of orchids were found on the *Filicium desipiens* tree, namely *Acriopsis liliifolia*, *Agrostophyllum bicuspidatum*, *Agrostophyllum laxum*, *Bulbophyllum apodum*, *Bulbophyllum omerandrum*, *Ceratostylis radiata*, *Cylindrolobus mucronatus*, *Cymbidium bicolor*, *Dendrobium concinnum*, *Dendrobium crumenatum*, *Liparis condylobulbon*, *Thelasis capitata*, and *Thescostele alata*. Meanwhile, the host trees with the fewest orchid species were *Tamarindus indica* and *Nephelium lappaceum*, each hosting only one species, namely *Dendrobium crumenatum* (Table 1).

Dendrobium crumenatum was the most common orchid and grew on 13 host trees. *Dendrobium crumenatum* thrives on various host trees due to several ecological and biological factors. This orchid exhibits remarkable adaptability to different environmental conditions, such as varying light levels and humidity, enabling it to flourish on diverse host trees. Its prolific and efficient reproductive system produces many small seeds easily dispersed by the wind, thereby increasing the likelihood of landing on suitable host trees. Furthermore, *Dendrobium crumenatum* forms symbiotic relationships with mycorrhizal fungi. Research reports that 101 different fungal operational taxonomic units (OTUs) are known to be mycorrhizal in orchids, found in symbiosis with the genus *Dendrobium* (Xing et al., 2020), which aid in seed germination and nutrient acquisition. The orchid's lack of strict requirements for specific host species and its minimal dependence on the chemical or physical properties of the host's bark allow it to grow on a wide range of host trees. This ecological flexibility and resilience contribute significantly to its widespread distribution and success in various habitats.

In comparison, the rarest orchids found were *Agrostophyllum bicuspidatum*, *Bulbophyllum apodum*, *Pomatocalpa diffusum*, and *Eulophia spectabilis*, each with only one discovered point. Nurfadilah (2015) stated variations in host trees for epiphyte orchids, from one to several host tree species. For example, *Appendicula elegans* grew on only one host tree, while *Appendicula angustifolia* grew on four different host tree types. According to Rasmussen and Rasmussen (2018), the specific relationship between epiphyte orchids

and their hosts is related to the physical and chemical properties of the host tree bark, and changes in microclimatic conditions cannot be explained in detail. A tree becomes a host if the orchid completes all life cycle stages, from seed germination to flowering and fruit production.

In this study, most of the host trees where the orchids were growing were in the vegetative phase, except for *Areca catechu*, which was observed to be in the reproductive phase. Additionally, these host trees generally exhibited lush and healthy growth, providing a supportive environment for the orchids. This finding highlighted the adaptability of orchids in selecting host trees with various physiological stages and growth conditions. The fact that orchids can attach and thrive on trees in different growth phases reflects their versatility and ability to exploit diverse ecological niches within their environment.

Interestingly, most host trees had trunks covered by epiphytic mosses such as *Hypnum cupressiforme* and *Sphagnum sp.* These mosses provide a favorable substrate for orchid root attachment. Mosses often play a crucial role in creating a microenvironment that retains moisture and nutrients, facilitating the survival of epiphytes like orchids. The presence of moss on the trunks of trees suggests that the surface texture and moisture retention capacity of these trees may offer ideal conditions for orchid growth. On the other hand, a notable exception was found on *Archidendron pauciflorum*, where orchid roots were attached directly to the bare trunk without any moss present. This suggests that orchids can grow on different substrates, even in the absence of moss. The bark texture, whether smooth or rough, along with its ability to retain humidity, may still provide sufficient support for orchid attachment and growth.

The contrast between moss-covered and non-moss-covered trunks offers insights into the potential preferences or tolerances of orchids for different microhabitats on host trees. Understanding these interactions is crucial for orchid conservation efforts, particularly in selecting appropriate host trees for reintroduction programs and habitat restoration. This information also contributes to a broader understanding of the ecological dynamics between orchids and their host trees in various growth stages, environmental conditions, and the fertility of the host trees. Studying the habitat preferences of orchids is important for orchid conservation because orchids have a wide range of environmental factors and habitats (Prayoga et al., 2022). Understanding orchid biology is essential for effective orchid conservation, and more study is required in areas like pollination, population genetics, mycorrhizal relationships, and demographics (Fay, 2018).

Notes on the species found in the study location:

1. *Acriopsis liliifolia*

Acriopsis liliifolia is also called the onion orchid because it has pseudobulbs resembling onion bulbs. It grows as an epiphyte with a sympodial growth type. It has very elongated leaves with acute tips. Each pseudobulb has 2-4 bright green leaves that are stiff, thin, and tend to be slightly curved semi-erect. The leaves are about 15-20 cm long and 1-2 cm wide, with a smooth surface. The pseudobulbs are ovoid and grooved, about 2-4 cm long, dark green with slightly gray streaks. The flowers are small and racemose, with flower panicles about 20-40 cm long emerging at the end of the pseudobulb. The petals and sepals are white with bright purple variations and a red stripe at the ends and in the middle. The tips of the sepals and petals are rounded, about 0.4 cm long and 0.2 cm wide. The labellum is wide at the base and narrow at the tip, white with purple variations in the center (Figure 2a). The fruit is round, about 1.5-2 cm long and 1.5-1.8 cm wide. According to Lok et al. (2009), *A. liliifolia* is widely distributed in Myanmar, Thailand, Laos, Cambodia, Vietnam, Malaysia, Indonesia, the Philippines, Papua New Guinea, the Solomon Islands, and Australia.

Table 1. List of orchid species found in Universitas Andalas, Padang, West Sumatra.

No	Species	Habitus	Host tree	Number of discovered points
1	*Acriopsis liliifolia*	Epiphyte	*Filicium desipiens* *Swietenia mahagoni* *Pterocarpus indicus*	4
2	*Agrostophyllum bicuspidatum*	Epiphyte	*Filicium desipiens*	1
3	*Agrostophyllum laxum*	Epiphyte	*Filicium desipiens* *Swietenia mahagoni*	4
4	*Bulbophyllum apodum*	Epiphyte	*Filicium desipiens*	1
5	*Bulbophyllum sp.*	Epiphyte	*Filicium desipiens*	2
6	*Ceratostylis radiate*	Epiphyte	*Filicium desipiens* *Swietenia mahagoni*	2
7	*Coelogyne rockhusneii*	Epiphyte	*Tectona grandis* *Areca catechu*	3
8	*Cylindrolobus mucronatus*	Epiphyte	*Filicium desipiens* *Gmelina arborea*	3
9	*Cymbidium bicolor*	Epiphyte	*Samanea saman* *Filicium desipiens* *Elaeis guineensis* *Tectona grandis*	5
10	*Dendrobium concinnum*	Epiphyte	*Filicium desipiens* *Terminalia catappa*	4
11	*Dendrobium crumenatum*	Epiphyte	*Pterocarpus indicus* *Samanea saman* *Filicium desipiens* *Elaeis guineensis* *Tectona grandis* *Swietenia mahagoni* *Terminalia catappa* *Gmelina arborea* *Naphelium lappaceum* L. *Duriozibethinus* Murr *Tamarindus indica* *Areca catechu* *Hyophorbe lagenicaulis*	**
12	*Dendrobium lobulatum*	Epiphyte	*Gmelina arborea* *Duriozibethinus* Murr	2
13	*Eulaphia spectabilis*	Terrestrial	Land	1
14	*Grammatophyllum stapeliiflorum*	Epiphyte	*Pterocarpus indicus* *Toona sinensis* Roem	3
15	*Liparis condylobulbon*	Epiphyte	*Filicium desipiens* *Hyophorbe lagenicaulis* *Areca catechu*	3
16	*Oncidium sphacelatum*	Epiphyte	*Archidendron pauciflorum*	2
17	*Pomatocalpa diffusum*	Epiphyte	*Gmelina arborea*	1
18	*Renanthera elongata*	Epiphyte	*Tectona grandis* *Pterocarpus indicus*	3
19	*Spathoglottis plicata*	Terrestrial	Land	2
20	*Thelasis capitata*	Epiphyte	*Tectona grandis* *Filicium desipiens*	2
21	*Thescostele alata*	Epiphyte	*Filicium desipiens*	1

Note: ** uncountable

2. *Agrostophyllum bicuspidatum*

Agrostophyllum bicuspidatum is an epiphyte orchid with a sympodial growth type. It has dark green leaves elongated with emarginate tips and a slight split. The leaves are semi-drooping, about 1.5-2 cm long and 0.2-0.3 cm wide. The stem is about 20-30 cm long. The flowers are single and grow between the leaf axils. The petals are oval and yellowish-white, with triangular sepals having yellowish-white pointed tips (Figure 2b).

3. *Agrostophyllum laxum*

Agrostophyllum laxum is an epiphyte orchid with a sympodial growth type. It has very elongated leaves with emarginate tips. The leaves are erect, dark green, 10-15 cm long, and 1-2 cm wide. The stems grow elongated, reaching more than 50 cm. It does not have a pseudobulb, and the roots are attached. *A. laxum* has small, single-flowered clusters on the shoots. The sepals are round and pointed at the tip, and the petals are yellowish-white (Figure 2c).

4. *Bulbophyllum apodum*

Bulbophyllum apodum is an epiphyte orchid with a sympodial growth type. It has very elongated leaves with sharp tips. The leaves are semi-erect, and the plant has no pseudobulbs. The roots are sticky. The sepals and petals are ribbon-shaped with pointed ends, yellowish-white in color (Figure 2d).

5. *Bulbophyllum sp.*

Bulbophyllum sp. could not be identified as it had not yet entered the generative phase during observation. It grows as an epiphyte with a sympodial growth type. It has thick, small leaves that grow at the end of the pseudobulb, with each pseudobulb having only one leaf. The leaves are moderately elongated with acute tips and dark green. The pseudobulb is ribbon-shaped, small, about 2.8 cm long and 0.6 cm wide, lighter in color than the leaves (Figure 2e).

6. *Ceratostylis radiata*

Ceratostylis radiata is an epiphyte orchid with a sympodial growth type. It has very elongated leaves with obtuse tips. The leaves are semi-erect, light green, about 8-12 cm long and 0.5-1 cm wide. The pseudobulb is very slender, brownish-green, ribbon-shaped, about 8-10 cm long and 0.4-0.8 cm in diameter. The flower is single and appears at the base. The sepals and petals are ribbon-shaped with pointed tips and white (Figure 2f). This species is widely distributed in Assam, Borneo, Java, Malaysia, Myanmar, Sumatra, Thailand, Tibet, and Vietnam (Kurniawan et al., 2021).

7. *Coelogyne rockhusneii*

Coelogyne rockhusneii is an epiphyte orchid with a sympodial growth type. It has slightly elongated leaves with flat edges, parallel spines, a smooth surface, and acute tips. The leaves are erect and dark green. They appear in pairs at the tips of the pseudobulb, about 15-23 cm long and 5-8 cm wide. The pseudobulb is ribbon-shaped, light green with indentations, about 10-14 cm long and 2-4 cm in diameter. The flowering type is a raceme with long flower stalks reaching more than 30 cm. Bunches of flowers emerge from the base of the pseudobulb, with each bunch having 8-20 flowers. The sepals and petals are light yellow ribbons and grooved (Figure 2g).

8. *Cylindrolobus mucronatus*

Cylindrolobus mucronatus is an epiphyte orchid with a sympodial growth type. The leaves are very elongated with sharp tips and dark green. The plant is erect with no pseudobulbs. The stems are hanging, up to 1 m long, with flat ends. The leaves are lanceolate and pointed, about 5-11.5 cm long and 0.4-1 cm wide. The inflorescence grows laterally next to the leaves, is short, and usually supports two flowers. The petals are red. The flowers are relatively large but do not fully open when blooming. They are yellowish-white in color, with dorsal sepals that are oblong and obtuse, 1.5-1.9 cm long. The petals are ovate, truncate, and apiculate, 1.6-1.9 cm long (Figure 2h).

9. *Cymbidium bicolor*

Cymbidium bicolor is an epiphyte orchid with a monopodial growth type. The leaves are very elongated, with emarginate edges, thick, and semi-erect, dark green. The flowering type is a raceme that appears hanging at the base of the stem. The petals and sepals are ribbon-shaped with sharp tips, reddish-purple in the center, and pale yellow at the edges (Figure 2i). This species is widely distributed in the Andaman Islands, Borneo, Cambodia, Java, Malaysia, Nicobar Islands, the Philippines, Sulawesi, and Sumatra (Kurniawan et al., 2021).

10. *Dendrobium concinnum*

Dendrobium concinnum is an epiphyte orchid with a sympodial growth type. The leaves are very elongated with acute tips, green, and erect with no pseudobulbs. The flowering type is single, appearing between the leaves. The petals and sepals are spoon-shaped with blunt ends and dark red (Figure 2j).

11. *Dendrobium crumenatum*

Dendrobium crumenatum, known as the pigeon orchid, grows as an epiphyte with a sympodial growth type. It has a high level of adaptability, thriving in both highland and lowland areas, making it easy to find on trees (Puspitaningtyas, 2017). Due to its density, it grows in clumps, making it difficult to count the number of individuals. The leaves are moderately elongated with emarginate ends, semi-erect, and dark green. The pseudobulb supports a single elongated and narrow leaf stalk. The pseudobulb ranges from 5-12 cm in length with a diameter of about 1-2 cm, light green with reddish-purple, and covered with scale-like leaves. The flowering type is a raceme, with flowers appearing at the base of the stem. The flower stalk can reach more than 50 cm, and the diameter of the flower when it blooms is about 3 cm. The petals and sepals are pure white with slightly rounded tips and flat edges. The lateral petals are larger than the dorsal petals and form wings. The dorsal petals have the same shape as the sepals (Figure 2k). The labellum is white with bright yellow variations in the center, and the blooms last only 1-2 days. The distribution of this species is extensive, from Southeast Asia (India, Sri Lanka, Andaman, Myanmar, Indo China, Peninsular Malaysia, Sumatra, Java, Borneo, Sulawesi) (Kurniawan et al., 2021) to the Philippines and Taiwan (Leong & Wee, 2013). Sandrasagara et al. (2014) reported that *D. crumenatum* has potential as an antimicrobial due to alkaloids and flavonoids. The stem extract of *D. crumenatum* effectively inhibits the growth of *Staphylococcus aureus*, *Klebsiella pneumoniae*, and *Enterobacter aerogenes*.

12. *Dendrobium lobulatum*

Dendrobium lobulatum is an epiphytic orchid with a sympodial growth type. It has thick, moderately elongated leaves with sharp green tips. The leaves are erect and lack pseudobulbs. These orchid flowers are in racemes, with flowers appearing on the side of the leaves. The petals and sepals are pale yellow on the edges and reddish-purple on the inside (Figure 2l). This species is endemic to Indonesia and is widely distributed in Kalimantan, Java, Maluku, and Sumatra (Kurniawan et al., 2021).

13. *Grammatophyllum stapeliiflorum*

Grammatophyllum stapeliiflorum is an epiphytic orchid with a sympodial growth type. It has moderately elongated leaves with acute tips. The leaves are erect and accompanied by round, flat, light green pseudobulbs. The flowers are racemose, appearing at the base of the stem. Petals and sepals are rounded with blunt ends and are purple-black (Figure 2m). Wirmasari and Isda (2019) stated that *G. stapeliiflorum* is rare in nature and requires conservation efforts.

14. *Liparis condylobulbon*

Liparis condylobulbon is an epiphytic orchid with a sympodial growth type, generally growing in dense clumps. It has two thin, very elongated leaves with acute tips, which appear at the end of cuff-shaped pseudobulbs. The leaves and pseudobulbs are light green. The flowers are racemose, appearing at the base of the stem. Petals and sepals are round

with blunt ends and are yellowish-white (Figure 2n). Rahayu and Putri (2019) reported that this species is commonly found on *Barringtonia racemosa* L. Spreng trees in zone 5 of the tree outside branching. It is distributed in Borneo, Fiji, Java, Lesser Sunda Island, Maluku, Myanmar, New Caledonia, New Guinea, the Philippines, Queensland, Samoa, Santa Cruz Island, Solomon Island, Sulawesi, Sumatra, Taiwan, Thailand, Vanuatu, Vietnam, and Wallis-Futuna Island (Kurniawan et al., 2021).

15. *Oncidium sphacelatum*

Oncidium sphacelatum is an epiphytic orchid with a sympodial growth type. It has very elongated leaves with acute tips erecting on the stem. Yellowish-light green leaves appear in pairs at the tips of pseudobulbs. The pseudobulbs are flat and yellowish-green, about 8 cm long and 2.7 cm in diameter. The flowers are racemose, appearing at the base of the pseudobulb. The petals and sepals are bright yellow with a slight brown tint in the middle (Figure 2o).

16. *Eulaphia spectaabilis*

Eulophia spectabilis is a terrestrial orchid with a sympodial growth type. It has moderately elongated leaves with acute tips, which are green and semi-drooping. The flowers are racemose, appearing at the base of the plant. Petals are white with yellow stripes, and sepals are yellowish (Figure 2p). This species is also valuable as a biopharmaceutical for disease therapy. Subedi et al. (2013) reported that *E. spectabilis* tuber flour is used to treat intestinal worms, bronchitis, and to increase appetite.

17. *Pomatocalpa diffusum*

Pomatocalpa diffusum is an epiphytic orchid with a monopodial growth type. It has moderately elongated leaves with emarginate tips. The dark green leaves are semi-erect, with split tips, flat edges, and parallel veins. The aerial roots are mostly attachment roots with a few hanging. Leaves cover the stem. Flower stalks emerge from the leaf axils, about 30 cm long. Keikis emerge from the lower trunk. The flower stalks, emerging between the leaves, bear 10-20 flowers. The flowers are panicles, with yellow sepals and petals spotted with red, and the labellum is yellowish-white (Figure 2q). This orchid grows well at temperatures of 26-31°C and 100% light intensity, with a flowering period from March to August (Siregar et al., 2005).

18. *Renanthera elongata*

Renanthera elongata is an epiphytic orchid with a monopodial growth type. It has thick, dark green, very elongated leaves with emarginate edges. The leaves are semi-erect. The flowers are panicles, appearing between the leaf axils, with bright red petals and sepals (Figure 2r). *R. elongata* is distributed across Thailand, Peninsular Malaysia, Sumatra, Java, and Borneo, usually found at 250-1,000 m above sea level. *R. elongata* is also known as *Aerides elongata* BI., *Saccolabiumreflexum* Lindl., and *Renanthera micrantha* BI (Hartini & Puspitaningtyas, 2005).

19. *Spathoglottis plicata*

Spathoglottis plicata is a terrestrial orchid with a sympodial growth type. The leaves are dark green, thin, and very elongated with acute tips. The leaves are semi-drooping. The flowers are racemose, emerging from the base. The petals and sepals are bright purple (Figure 2s). This species is found on the Andaman Islands, Assam, Bangladesh, Bismarck Archipelago, Borneo, Cambodia, Caroline Island, Cook Island, Eastern Himalayas, Fiji, India, Java, Laos, Lesser Sunda Island, Malaysia, Maluku, Marianas, Myanmar, Nansei-shoto, New Caledonia, New Guinea, Nicobar Island, Niue, Philippines, Queensland, Samoa, Santa Cruz Island, Solomon Island, Sri Lanka, Sulawesi, Sumatra, Taiwan, Thailand, Tonga, Vanuatu, Vietnam, and Wallis-Futuna Island (Kurniawan et al., 2021).

20. *Thelasis capitata*

Thelasis capitata is an epiphytic orchid with a sympodial growth type. Each pseudobulb has one light green, moderately elongated leaf with an acute tip positioned erect above the pseudobulb. The pseudobulbs vary in shape, each individual having a

unique round form. The pseudobulbs are lighter in color than the leaves, ranging from 1-3 cm in length and 1-2.5 cm in width. The flowers are racemose, appearing on the shoots. Petals and sepals are ribbon-shaped with sharp ends and are yellowish-white (Figure 2t).

21. *Thecostele alata*

Thecostele alata is a sympodial epiphytic orchid with pseudobulbs growing in clumps and close together. Each pseudobulb, derived from a single node, bears one leaf. The pendulous inflorescences emerge from the base, are unbranched, and are many-flowered. The flowers open widely, about 1.5 cm broad, and are white with dark crimson blotches and spots (Figure 2u). This species generally grows at 600-1,000 m above sea level and is spread across Southeast Asia, Sumatra, Java, Borneo, and the Philippines (Comber, 2001). It often grows on tree trunks at altitudes above 300 meters above sea level (Puspitaningtyas, 2020).

Figure 2. Orchid species in the Universitas Andalas, a) *Acriopsis lilifolia*, b) *Agrostophyllum bicuspidatum*, c) *Agrostophyllum laxum*, d) *Bulbophyllum apodum*, e) *Bulbophyllum* sp., f) *Ceratostylis radiata*, g) *Coelogyne rockhusneii*, h) *Cylindrolobus mucronatus*, i) *Cymbidium bicolor*, j) *Dendrobium concinnum*, k) *Dendrobium crumenatum*, l) *Dendrobium lobulatum*, m) *Eulaphia spectaabilis*, n) *Grammatophyllum stapeliiflorum*, o) *Liparis condylobulbon*, p) *Oncidium sphacelatum*, q) *Pomatocalpa diffusum*, r) *Renanthera elongate*, s) *Spathoglottis plicata*, t) *Thelasis capitata*, u) *Thecostele alata*.

CONCLUSIONS

Based on the research, 21 species of orchids were identified, comprising 19 epiphytes and two terrestrial species. The most dominant host tree was *Filicium desipiens*, which supported 13 different species of orchids across 15 individual host trees. Among the orchid species, *Dendrobium crumenatum* emerged as the most prevalent, thriving on 13 distinct host trees. The diversity of orchid species discovered highlighted the rich biodiversity present in the region. The findings of this study not only contribute to the understanding of orchid diversity in West Sumatra but also underscore the significance of preserving the natural habitats that support such biodiversity. The identification of *Filicium desipiens* as a key host tree for multiple orchid species highlighted its ecological importance and the need for its conservation.

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