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MORPHOLOGICAL CHARACTERISTICS OF THE PITCHER PLANT (*NEPENTHES* SPP.) IN LAMPUNG, INDONESIA

D. ASADUDIN, MAHFUT*, S. WAHYUNINGSIH, N. NURCAHYANI, F.R. LUMBANRAJA, and B. IRAWAN

Department of Biology, Faculty of Mathematics and Natural Sciences, University of Lampung, Indonesia
*Corresponding author's email: mahfut.mipa@fmipa.unila.ac.id
Email addresses of co-authors: davidasadudin0@gmail.com, sri.wahyuningsih@fmipa.unila.ac.id, nuning.nurcahyani@fmipa.unila.ac.id, favorisen.lumbanraja@fmipa.unila.ac.id, bambang.irawan@fmipa.unila.ac.id

SUMMARY

Pitcher plants *(Nepenthes* sp.) have significant genetic diversity, necessitating their identification in Indonesia. Lampung Province provides suitable habitat for pitcher plants, specifically in the areas of Kebun Raya Liwa, West Lampung Regency, and Balik Bukit District, Indonesia. The specific species of pitcher plants in Kebun Raya Liwa have not reached identification. Therefore, this research aimed to identify the pitcher plants in the regions. Based on the study findings, 13 accessions of pitcher plants exhibited varied morphological characteristics, with the stem length, leaf shape, leaf length, pitcher shape, and pitcher color identified as the most influential traits. The study successfully classified these 13 accessions into three species: *N. reinwardtiana, N. mirabilis,* and *N. gracilis*.

Keywords: Pitcher plant (*Nepenthes* sp.), genetic resources, diversity, characterization, morphological traits, Lampung

Key findings: The 13 pitcher plant (*Nepenthes* sp.) accessions expressed considerable genetic variations based on morphological traits. In the identification of all the pitcher plant accessions, three types of species emerged, namely, *N. reinwardtiana, N. mirabilis,* and *N. gracilis*.

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INTRODUCTION

The pitcher plant (*Nepenthes* sp.) is a widely distributed ornamental across Indonesia and exhibits significant genetic diversity (IUCN, 2013). This plant possesses unique and beautiful shapes with modifications in the leaf tips, earning it the name 'pitcher plant' (Nainggolan *et al*., 2020). Indonesia is home to 64 pitcher plant species, of which 59 are endemic (Fitmawati *et al*., 2023). According to Amanda *et al*. (2019), pitcher plant distribution in Indonesia spread across several islands—Sumatra (34 species, 24 endemic); Java (three species, two endemic); Sulawesi (11 species, seven endemic); Maluku (three species); Papua (11 species, seven endemic); and Kalimantan in Indonesia (32 species).

To date, 103 species of pitcher plants have become known and documented (Mansur *et al*., 2023). In several previous studies carried out at the Sambas Botanical Garden, Subah District, Sambas Regency, the identified species included *N. ampullaria* Jack*, N. reinwardtiana* Jack*, N. rafflesiana* Jack*, N. x hookeriana,* and *N. mirabilis* Druce (Hairunnisah *et al*., 2018). The research conducted in Bukit Batu Village, Sungai Kunyit District, also revealed four species of pitcher plants, i.e., *N. ampullaria*, *N. bicalcarata, N. gracilis,* and *N. rafflesiana* (Kristianus *et al*., 2018). Furthermore, research on determining pitcher plant types (*Nepenthes* spp.) in the Mount Asuansang Nature Tourism Park area, Paloh District, Sambas Regency, identified five pitcher plant species. These are *N. ampullaria* Jack, *N. gracilis* Korth, *N. mirabilis* (Lour.) Druce, *N. rafflesiana* Jack, and *N. echinostoma* (Mardianto *et al*., 2015).

The presence of pitcher plants in the Liwa Botanical Garden, originating from their habitat in Lampung, faces conservation challenges primarily due to their insufficient identification and exploration. The immediate discovery and survey of these species are crucial. The identification method can proceed through morphological characterization (Aritonang *et al*., 2024; Putra *et al*., 2024), anatomical studies (Asadudin *et al*., 2024; Mahfut *et al*., 2023a;), and molecular analysis (Anbiya *et al*., 2024; Mahfut *et al*., 2024b; 2025a). According to Rasyid and Widya (2020), the initial identification of plants generally depended on morphological parameters.

Dancak *et al*. (2022) mentioned that morphological identification progressed by observing the structure and shape of the roots, stems, leaves, flowers, fruits, and seeds. Simbolon *et al*. (2021) reported the morphological recognition (Mahfut *et al*., 2021b; 2021c; 2023c; 2023d; 2025b) of pitcher plants continued by assessing the characteristics of the leaves, stems, and traps. Therefore, the following research sought to identify the types of pitcher plants in Lampung, Indonesia. Moreover, the outcome of this study could serve as the foundation for appropriate conservation (Mahfut *et al*., 2025b; 2025c; 2025d; 2025e) efforts based on their presence and environmental suitability (Nuraini *et al.,* 2024; Sari *et al.*, 2024).

MATERIALS AND METHODS

Morphological characteristics

The collection of pitcher plant accessions transpired at the Kebun Raya Liwa, Indonesia. The observations based on morphological characters of pitcher plants proceeded on 38 morphological characteristics of stems, leaves, and pitchers, following the methodology in past studies (Wardana, 2019; Fitmawati *et al*., 2023) (Table 1).

Data analysis

Data on the morphological characteristics of local Lampung *Nepenthes* accessions sustained qualitative and quantitative analyses. Qualitative data was in a descriptive presentation, while quantitative data resulted in scoring, converting into binary data, and then reconstructing a kinship tree based on the principal component analysis (PCA) using the Multivariate Statistical Package MVSP software (Mahfut *et al*., 2023a, 2023b, 2024a, and 2024b). The pitcher plant accessions' identification succeeded in matching their morphological traits with the *Nepenthes* plant book.

Table 1. Characterization of the *Nepenthes* accessions.

No	Characters	Information
Stem and leaf morphology		
1.	Stem growth direction	Climb (Scandens)
2.	Stem type	Monocaulis monocarpi
3.	Stem height	2.8 – 3 m
4.	Stem diameter	6.8 – 8.5 mm
5.	Stem shape	Round (teres)
6.	Bar surface	Slippery
7.	Leaf length	18 – 26 cm
8.	Leaf width	4.5 – 7 m
9.	Petiole length	4 – 6.5 cm
10.	Leaf shape	Lancet (lanceolatus)
11.	Leaf edges	Flat (integer), smooth hair
12.	Leaf tip	Acute (acutus)
13.	Leaf base	Tapered (acuminatus)
14.	Leaf growth	Pinnate (pinnatus)
15.	Leaf surface	Slippery (leavis)
16.	Color of the upper surface of the leaf	Green, reddish
17	Color of the lower surface of the leaf	Light green, reddish
18.	Petiole color	Green, reddish green
Pitcher		
1.	Pitcher shape	Waist
2.	Pitcher height	12 – 16 cm
3.	Pitcher color	Yellowish green with red stripes and green with red spots
4.	Shape of the pitcher lid	Oval (ovatus)
5.	Pitcher closure color	Red, green with red spots
6.	Pitcher closure length	2.3 – 3.5 cm
7.	Width of pitcher flap	1.8 – 3 cm
8.	Shape of the mouth of the pitcher	Heart (cordatus)
9.	Length of the mouth of the pitcher	2.8 – 3.5 cm
10.	Width of the mouth of the pitcher	2.5 – 3 cm
11.	Peristome thickness	0.3 – 0.4 cm
12.	Peristome color	Yellowish green with red stripes, green with red stripes
13.	Spur length	0.3 mm
14.	Spurs color	Redness
15.	Wing	Not yet
16.	Length of tendrils	8 – 16 cm
17.	Tendrils color	Yellowish green, and green
18.	Position of tendrils	Behind

RESULTS AND DISCUSSION

Morphological characteristics

The results based on field observations of the *Nepenthes* accessions collected in Lampung revealed several *Nepenthes* species lacked pitchers and, overall, expressed considerable genetic diversity. Furthermore, the 13 *Nepenthes* accessions' analysis used the following morphological characteristics:

Nepenthes-1 had the characteristics of a climbing stem, monocaulis monocarpi stem type, stem height of 60 + 4 cm, round stem shape, and smooth stem surface. The leaf length was 12 + 0.8 cm, and the width was 3 + 0.2 cm. The leaf descriptions are as follows: straight shape, flat edge, pointed leaf tip, tapered leaf base, pinnate leaf spine, smooth leaf surface, green upper leaf surface, and light green lower leaf surface on the green stem. The next description is on the waist of the

pitcher: height of 8 + 0.4 cm, green shade, with oval, green flap shape, pitcher flap length (2.8 + 0.2 cm), pitcher flap width (1.5 + 0.1 cm), tall pitcher mouth shape, pitcher mouth length (2.8 + 0.2 cm), and width at 1.5 + 0.1 cm.

Nepenthes-2 owned the characteristics of a climbing stem, monocaulis monocarpi stem type, stem height (35 + 2 cm), and round and smooth stem surface. The leaf description comprised length and width at 12 + 0.7 and 3 + 0.2 cm, respectively; a straight shape; a flat leaf edge; a pointed leaf tip; a tapered leaf base; a pinnate leaf spine; a smooth leaf surface; a green upper surface and light green lower surface of the leaf; and the color of the stem is green. The shape of the waist pitcher included the height at 8 + 1 cm, the green shade of the pitcher, the oval shape of the pitcher flap, the green pitcher flap, the pitcher flap length at 4 + 0.4 cm, the width at 3 + 0.2 cm, and the pitcher mouth shape is tall, with the length at 4 + 0.2 cm and the width at 3 + 0.2 cm.

The recorded *Nepenthes*-3 had the following characteristics: climbing stem, monocaulis monocarpi stem type, stem height (8 + 1 cm), and a round and smooth stem surface. The leaf length was 12.5 + 2 cm, the leaf width was 3.5 + 0.2 cm, and the leaf shape was lanceolate. The leaf edge was flat, with a pointed tip, tapered base, and pinnate spine. The leaf surface was smooth, with a green upper and lower surface, and the color of the leaf stalks was green. The shape of the waist pitcher consisted of a pitcher height (8.5 + 2 cm), a green pitcher, a pitcher flap shape oval, a green flap, a flap length (2.5 + 0.2 cm), and a flap width of 1.8 + 0.1 cm. Its mouth shape is tall, with a pitcher mouth length of 2.5 + 0.2 cm and a pitcher mouth width of 1.8 + 0.1 cm.

Nepenthes-4 characteristics were climbing stem, monocaulis monocarpi stem type, stem height (45 + 4 cm), and round and smooth stem surface. The leaf description has the following: the length was 13 + 2 cm, the width was 3 + 0.2 cm, the shape of the leaf was lanceolate, and the leaf edge was flat, with a pointed tip and tapered base. The leaf spine was pinnate, and the leaf surface was smooth, with a green upper surface, a light green lower surface, and a green stalk of leaves.

Nepenthes-5 characteristics consisted of climbing stems, monocaulis monocarpi stem type, stem height (115 + 6 cm), round stem shape, and smooth stem surface. The leaf length and width are 15 + 2 and 3 + 0.2 cm, respectively. The leaf shape is lanceolate, with a flat leaf edge, pointed leaf tip, and tapered base of the leaf. Moreover, the leaf spines are pinnate, the leaf surface is smooth, the color of the upper surface of the leaf is green, while the lower surface is light green, and there is a green leaf stalk. For the shape of the waist pitcher, the height is 14 + 2 cm, the pitcher color is reddish green, the shape of the pitcher cover is oval, and the pitcher cover is red. The length of the pitcher cover is 3 + 0.2 cm, the pitcher cover width is 1.5 + 0.1 cm, the shape of the pitcher mouth is tall, and the length and width are 3 + 0.3 and 1.5 + 0.1 cm, respectively.

Nepenthes-6 appeared with the following descriptions: climbing stem, monocaulis monocarpi stem type, stem height (156 + 8 cm), and round stem shape with smooth surface. The leaf features include length and width at 11 + 2 and 3 + 0.2 cm, respectively; a lanceolate leaf shape, a flat edge, a pointed leaf tip, and a tapered base of the leaf. Furthermore, the spine of the leaf is pinnate, the surface is smooth, the upper and lower surfaces are green, and the leaf stalk is also green. As for the shape of the waist pitcher, the height is 8 + 1 cm, the pitcher color is green, the pitcher flap shape is oval colored green, and the flap's length and width are 1 + 0.1 cm each. Additionally, the shape of the pitcher mouth is tall, with a length of 1 + 0.1 cm and a width of 1 + 0.1 cm.

Nepenthes-7 has distinct climbing stems, a monocaulis monocarpi stem type, and a round stem shape with a smooth surface. The leaf width is 4 + 0.8 cm, straight-shaped, flat-edged, with a pointed leaf tip, a tapered leaf base, pinnate leaf spines, and a smooth leaf surface, with green upper and lower surfaces of the leaves. For the waist pitcher, the height is 3 + 0.3 cm, and the color of the pitcher is red.

Nepenthes-8 comprised features of climbing stems, a monocaulis monocarpi stem type, and a round stem shape with a smooth surface. The leaf width is 5 + 0.2 cm, and the leaf shape is lanceolate, with a flat edge, a pointed leaf tip, a tapered leaf base, and pinnate spines. The leaf surface is smooth, with green upper and lower surfaces of leaves and a green leaf stalk. Descriptions for the shape of the waist pitcher are as follows: the height is 9 + 1 cm, the color is reddish green, the shape of the pitcher lid is oval, the pitcher flap color is red, and the length and width of the pitcher flap are the same at 1 + 0.1 cm. Meanwhile, the shape of the pitcher mouth is tall, with the length and width both at 1 + 0.1 cm.

Nepenthes-9 revealed the characteristics of a climbing stem, monocaulis monocarpi stem type, and round stem shape with a smooth surface. The leaf shape is lanceolate with a flat edge, a pointed tip, a tapered base, and a pinnate spine. In addition, the leaf surface is smooth, the upper surface is green, and the lower surface is light green, with a green leaf stalk. Describing the shape of the waist pitcher includes a height of 5 + 0.9 cm, a green color, an oval shape of the pitcher, and a colored green flap. The length and width of the pitcher flap are 2 + 0.1 and 1.5 + 0.1 cm, respectively, and the tall shape of the pitcher mouth has a length of 2 + 0.1 cm and a width of 1.5 + 0.1 cm.

Nepenthes-10 is descriptive of climbing stems, a monocaulis monocarpi stem type, and a round stem shape with a smooth surface. For the leaf, it has a lanceolate shape, flat edge, pointed tip, tapered base, and pinnate spine. Moreover, the leaf surface is smooth, the upper leaf surface is green, the lower surface is light green, and the leaf stalk is green. The shape of the pitcher's waist has a height of 4 + 0.4 cm, the color is reddish green, and the cover shape is oval and colored green. The pitcher cover's length and width measure 1 + 0.1 cm each, with a tall mouth shape with a length and width both at 1 + 0.1 cm.

Nepenthes-11 was visible with the following characteristics: a climbing stem, a monocaulis monocarpi stem type, and a round stem shape with a smooth surface. The leaf features comprised a straight shape, a flat leaf edge, a pointed tip, a tapered base, a pinnate spine, a smooth leaf surface, and the upper and lower green surfaces, with a green-colored stalk. Meanwhile, the pitcher's waist shape has a height of 7 + 1.5 cm, a green shade, an oval shape of the pitcher flap colored green, the flap length at 2 + 0.1 cm, and the flap width is 1.5 + 0.1 cm. The pitcher mouth shape is tall and has a length of 2 + 0.1 cm and a pitcher mouth width of 1.5 + 1.5 cm.

Nepenthes-12 owned characteristics of a climbing stem, a monocaulis monocarpi stem type, and a round stem shape with a smooth surface. Its leaf shape is straight, with a flat leaf edge, pointed leaf tip, tapered leaf base, and a pinnate leaf spine. The leaf surface is smooth, with green upper and lower leaf surfaces, and the leaf stalk is green. Moreover, the waist of the pitcher has a height of 8 + 1.5 cm, a green pitcher, an oval-shaped pitcher flap that is green, and a flap length and width of 1.5 + 0.1 cm each. The pitcher mouth shape is tall, with both length and width of 1.5 + 0.1 cm each.

Nepenthes-13 is distinct with a climbing stem growth direction, monocaulis monocarpi stem type, and round stem shape with a smooth surface. The leaf shape is straight, with a flat edge, pointed tip, tapered leaf base, and pinnate leaf spine. The leaf surface is smooth, colored green on the upper and lower surfaces of leaves, and a green leaf stalk. For the waist pitcher description, pitcher height is 6 + 1.2 cm, pitcher color is green, pitcher flap shape is oval colored green, pitcher flap length and width measure at 1 + 0.1 cm each, with a tall pitcher mouth shape, and both length and width of the pitcher mouth at 1 + 0.1 cm.

The observed variations in morphological characteristics among *Nepenthes* accessions could be due partly to environmental factors, such as sunlight, humidity, and temperature. According to Clarke (2001), some species of *Nepenthes* were notably capable of surviving in full and direct sunlight conditions. Furthermore, the altitude showed a close association with environmental temperature. In highland areas, the temperature tends to be lower than in

lowland areas. Mansur *et al*. (2021) reported that lowland *Nepenthes* typically live at temperatures ranging from 20 °C to 35 °C, while those in the highland, *Nepenthes* species prefer temperature ranges of 10 °C–30 °C. Morphological diversity in *Nepenthes* also revealed influences coming from various genetic factors. Lukmanasari *et al*. (2020) mentioned that morphological traits receive regulations from several genes, and each gene affects the traits' expression (phenotype) individually and collectively, resulting in substantial diversity in *Nepenthes*.

Kinship tree dendrogram based on morphological characters

The analysis of kinship relationships among different plant species can determine the degree of similarity by constructing a kinship dendrogram and calculating the correlation and coefficient of the similarity index and taxonomic distance through cluster analysis. In general, these measurements aim to quantify the similarity between the plant species compared on several characteristics (Yudaputra, 2021). Based on the morphological characteristics of 13 *Nepenthes* accessions, a kinship tree dendrogram construction was successful (Figure 1). The dendrogram displayed a considerable difference among each *Nepenthes* accession. *Nep* 12 was morphologically closest to *Nep* 9 because it is in one line. Meanwhile, the other *Nepenthes* accessions appeared on the different branches, possibly due to incomplete plant parts, such as missing pitchers or stems during sampling. A line drawn at a similarity value of two indicated four clusters, similar or <80% (Figure 1). Asadudin *et al*. (2024) similarly revealed that the kinship relationship among the 14 banana cultivars with the same genome has a coefficient value of <0.80, indicating a distant kinship relationship. Cluster 1 consists of *Nep* 13, *Nep* 7, and *Nep* 4. Cluster 2 comprised *Nep* 2, and cluster 3 consisted of *Nep* 5. Meanwhile, cluster 4 includes *Nep* 8, *Nep* 1, *Nep* 6, *Nep* 10, *Nep* 12, *Nep* 9, and *Nep* 3. Accessions grouped within the same cluster indicated a close relationship, while those in different clusters seemed distantly related (Figure 1).

Principal component analysis (PCA)

The principal component analysis (PCA) based on morphological characters of the different *Nepenthes* accessions appears in Figure 2. From the principal component analysis, the 13 *Nepenthes* accessions underwent further division into two clusters. Cluster I consisted of *Nep* 4, *Nep* 12, and *Nep* 7, while cluster II consisted of *Nep* 1, *Nep* 2, *Nep* 3, *Nep* 5, *Nep* 6, *Nep* 8, *Nep* 9, *Nep* 10, *Nep* 11, and *Nep* 13. The direction of the arrow toward a group indicates the most influential morphological characteristics in that group (Figure 2).

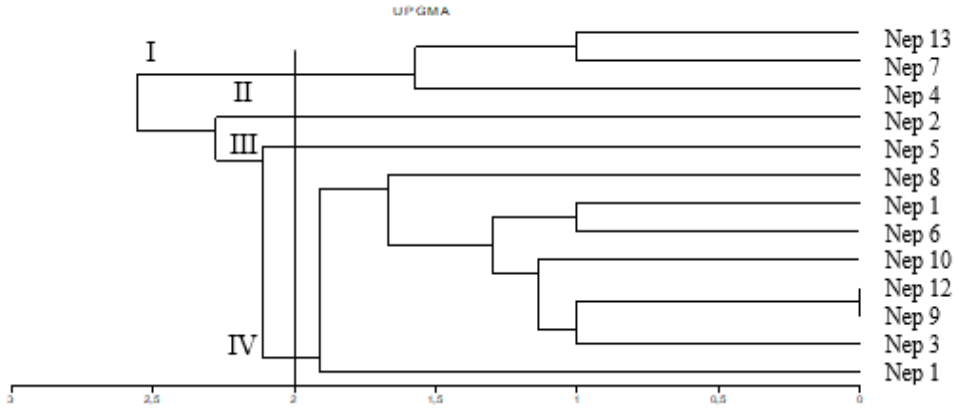

Figure 1. Dendogram of 13 *Nepenthes* accessions based on morphological characters.

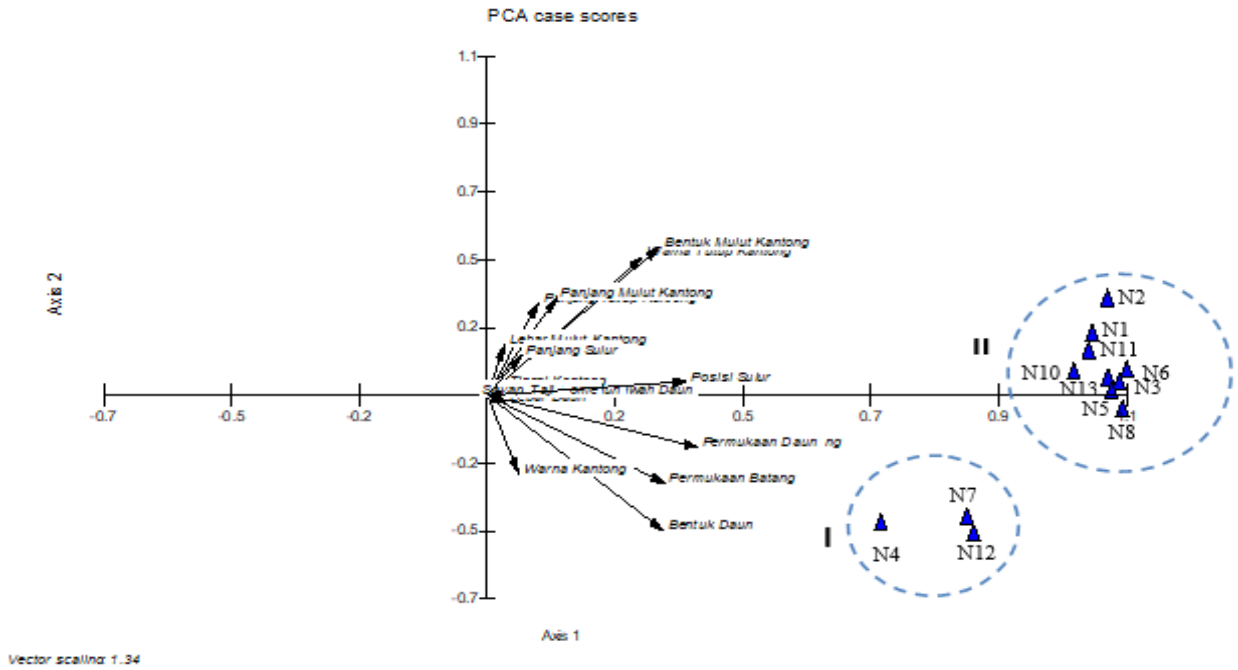

Figure 2. Principal component analysis (PCA) on 13 *Nepenthes* accessions based on morphological characters.

According to Putera *et al*. (2024), the morphological features that most influence a group are indicative of the length and direction of the arrow, where the length of the arrow is directly proportional to the morphological character. The morphological attributes significantly influencing the grouping of 13 *Nepenthes* accessions were the leaf shape, stem surface, leaf surface, pitcher lid color, and pitcher lid shape (Table 2). These morphological traits effectively distinguished the *Nepenthes* accessions on principal components PC1 and PC2.

The main component that has an eigenvalue (>2) contributes significantly to cluster differentiation (Mahfut *et al*., 2023a). Axis-I contributed 87.16% of the variation in the morphological characteristics, with an eigenvalue of 13.873, while axis-II contributed 91.825%, with an eigenvalue of 4.666 (Table 3). The size of the eigenvalue provides the influence of each character, which can be visible from the length of the projection formed (Table 2).

***Nepenthes* species identification**

Variation in pitcher shape and color among *Nepenthes* accessions can be effective as a basis for classifying different species. Each species has morphological traits that distinguish it from others (Selviana *et al*., 2018). After observing the morphological characteristics of the pitcher, stem, and leaves, identification proceeded based on the differences of their respective characteristics, with three types of species obtained. Then, validating the three identified species through clustering used the PCA analysis and kinship dendrogram (Septiana *et al.*, 2024; Simamora *et al*., 2024), which showed each was in a different cluster. The types of identification results are available in Table 3, and pictures of four different types of *Nepenthes* occur in Figure 3.

In this study, the species *N. reinwardtiana* was evident with the following characteristics: a stem length of 35 + 2 cm, lance-shaped leaves with a length of 3 + 0.4 cm, oval-shaped pitchers, and green-colored

Table 2. The characters' role in the grouping of *Nepenthes* accessions.

Characters	PCA 1	PCA 2
Stem growth direction	0.277	-0.129
Rod type	0.277	-0.129
Stem shape	0.277	-0.129
Bar surface	0.234	-0.219
Leaf width	0.023	-0.017
Leaf shape	0.232	-0.337
Leaf tip	0.277	-0.129
Leaf base	0.277	-0.129
Leaf repetition	0.277	-0.129
Leaf surface	0.277	-0.129
Pitcher shape	0.227	0.369
Pitcher height	0.023	0.024
Pitcher color	0.041	-0.195
Pitcher close shape	0.227	0.369
Pitcher close color	0.204	0.345
Pitcher close length	0.068	0.231
Pitcher lid width	0.023	0.126
Pitcher mouth shape	0.227	0.369
Pitcher mouth length	0.091	0.242
Pitcher mouth width	0.023	0.126
Eigenvalues	13.873	0.743
Percentage	87.159	4.666
Cum. percentage	87.159	91.825

Table 3. Types and differences in the various accessions of *Nepenthes*.

Accessions	Type	Stem length	Leaf shape	Leaf length	Pitcher shape	Pitcher color
Nepenthes 1	*N. reinwardtiana*	35 + 2 cm	lancet	3.0 + 0.4 cm	Oval	Green
Nepenthes 2	*N. mirabilis*	38 + 3 cm	lancet	12.5 + 0.7 cm	Oval	Red
Nepenthes 3	*N. gracilis*	30 + 1 cm	straight	11.0 + 0.8 cm	Waist	Red

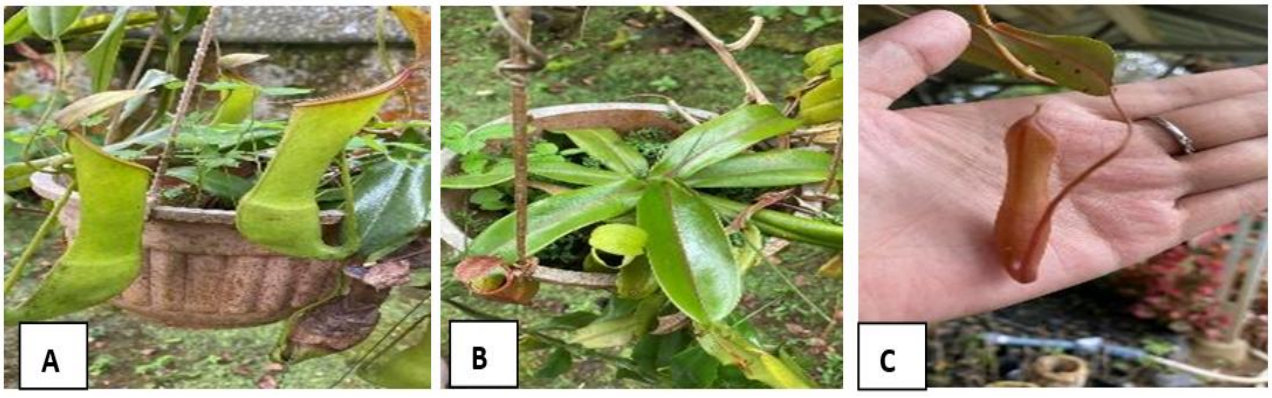

Figure 3. Identification of *Nepenthes* accessions in Lampung: A) *N. reinwardtiana*, B) *N. mirabilis*, and C) *N. gracilis.*

pitchers (Table 3). These results were in accordance with the research of Simbolon *et al*. (2021), which reported *N. reinwardtiana* has a small, green, triangular-shaped stem; green, lance-shaped leaves with smooth edges and green veins, without a leaf stalk. Gusdiarto *et al*. (2018) also stated *N. reinwardtiana* has a small, triangular-shaped stem, colored green. The leaves were green, with smooth edges, clearly visible veins, and a lance-shaped form.

Study results show the species *N. mirabilis* has the following characteristics: a stem length of 38 + 3 cm; lance-shaped leaves with a length of 12.5 + 0.7 cm; oval-shaped pitchers; and red-colored pitchers. These findings aligned with Wardhani (2019), who inventoried *N. mirabilis* (Lour.) in peatlands with the following characteristics: leaf length of about 15 cm, lance-shaped leaves with a stalk approximately 30 cm long, and red pitchers with an oval shape. Mardhiana *et al*. (2012) reported the sandy soil habitat showed that *N. mirabilis* has a cylindrical stem and thin leaves that were oval to lance-shaped and colored green. The leaves have petioles, smooth edges, and fine hairs, with a length of about 30 cm and a width of 7 cm. This *Nepenthes* has excellent adaptability, allowing it to prevail in various locations. Listiawati and Siregar (2008) declared the widespread distribution of *N. mirabilis* in Southeast Asia and in Indonesia, where it can be dominant in the regions of Sumatra, Java, Kalimantan, Sulawesi, Maluku, and Papua.

The observed *N. gracilis* has the following features: a stem length of 30 + 1 cm, lance-shaped leaves with a length of 11 + 0.8 cm, waist-shaped pitchers, and red-colored pitchers. These results agreed with the findings of Wardhani (2019), who stated *N. gracilis* has a triangular-shaped stem, lance-shaped leaves with a length of about 10 cm, cylindrical pitchers that were red, and flower colors ranging from light brown to dark brown. This *Nepenthes* can survive in lowland areas; however, it was also possible to grow in midland areas (Clarke, 2001).

CONCLUSIONS

The 13 *Nepenthes* accessions showed considerable varied morphological characters. The PCA analysis indicated the 13 accessions underwent further division into two clusters. The morphological traits with the highest influence were the stem length, leaf shape, leaf length, pitcher shape, and pitcher color. The identification results obtained three types of pitcher plant, namely, *N. reinwardtiana, N. mirabilis,* and *N. gracilis*.

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