

Morphological Characteristics of the Fern *Pyrrosia longifolia* (Burm. f.) Morton

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Abstract: Plant morphology is a branch of biology that studies the development of physical form and structure in plants based on the similarity of the form and structure of the plant itself. Plant morphology itself focuses only on the study of the external part that appears on plants. *Pyrrosia longifolia* is a species of *Pteridophyta* that is widely distributed in almost all parts of Indonesia. Wisdom Park area of Gadjah Mada University is one of the open areas covered by *Pyrrosia longifolia*. This study aims to identify the characteristics of *Pyrrosia longifolia*. The sampling method will be exploratory descriptive. Each plant found was documented and observed. The observation results show that *Pyrrosia longifolia* has a sorus that is round and covers the entire lower and upper sides of the leaf or all parts of the leaf. Individual leaves are green, elongated, and young leaves are hairy. It has fertile and sterile leaves; scaly rhizome stems that are elongated and spreading. It is an epiphytic plant that grows attached to other plants. It has rhizomeids that function to adhere to the substrate. The research data were analyzed by a descriptive method equipped with photographs of observation results. This research was carried out on December 24, 2024.

Keywords: Identification, Morphology, Purposive Sampling, *Pyrrosia longifolia*, Wisdom Park UGM.

Introduction

Plant morphology is a branch of biological science that studies the physical form and external structural features of plants. The term "morphology" comes from the Latin word *morphologi*, derived from *morphus* meaning "form" and *logos* meaning "science" (Aronoff et al., 2022). In general, plant morphology is defined as the study of the development of plant form and structure, emphasizing similarities in the origin of form and the arrangement of plant organs. Plant morphology differs from plant anatomy, in which morphology focuses on external structures, while anatomy examines the internal structure of plants. By studying plant morphology, we can identify various plant species based on their morphological characteristics, understand the function of each plant organ, and recognize plant development as well as adaptations to their environment. Thus,

plant morphology serves as an important foundation in botanical and biological studies.

One of the main benefits of plant morphology is species identification and classification. By observing morphological characteristics such as leaf shape, flower arrangement, or root structure, taxonomists can systematically classify plants (Sastria & Setiawan, 2023). In addition, an understanding of morphology supports agricultural fields such as crop breeding, vegetative propagation, and pest control, as plant structure is closely related to function. In ecology and conservation, plant morphology helps explain plant adaptations to environmental conditions, such as modified cactus leaves that reduce water loss or mangrove roots that develop in muddy areas. Morphological data is also used in phylogenetic studies to trace evolutionary relationships among species, including through molecular biology approaches. According to Wyatt (2016), understanding the morphology of each

purposive sampling is a technique in which samples are selected based on specific considerations or predetermined criteria. In this research, sampling focused specifically on *P. longifolia* within Wisdom Park UGM.

Morphological Observation.

Morphological observation began by examining visible structures and recording characteristics such as length, diameter, thickness, and other notable traits. The observed parts included roots, rhizomes, leaves, and spores. Spores were collected using a needle, placed on a slide, and moistened with water to facilitate observation under a mini microscope.

Data analysis

The research data were analyzed descriptively and supported with photographs and observational results by documenting the morphological features of the plant. Morphological characteristics of *Pyrrosia longifolia* were examined after sample collection, accompanied by photographs and detailed descriptions of root morphology (root system, root type, root length), stem morphology (features, stem length, stem type), leaf morphology (features, shape, size, leaf surface, leaf type), and spore morphology. The morphological and micromorphological characteristics were documented and presented in the form of tables

and figures, then analyzed descriptively following the approach of Haou et al. (2011).

Results And Discussion

Based on the research conducted on the fern *Pyrrosia longifolia* in the Wisdom Park area of Universitas Gadjah Mada, the data indicate that *Pyrrosia longifolia* is an epiphytic fern belonging to the family Polypodiaceae, typically growing attached to tree trunks or rocks in shaded environments (Zhang et al., 2013). This species possesses a dark brown creeping rhizome covered with dense scales that are oblong-ovate in shape, with a broadened base and entire margins. The leaves are simple and incomplete, supported by a short, blackish-brown petiole. The lamina is linear with entire margins, and the apex tapers without becoming acuminate. The adaxial leaf surface is smooth and glossy, whereas the abaxial surface is covered with fine hairs. The venation is parallel, and the leaf texture is thin, fleshy, and somewhat rigid, with an average length of approximately 46.5 cm and a width of 2.3–3 cm (Hovenkamp, 1986).

Pyrrosia longifolia bears both sterile and fertile leaves (sporophylls). Its sori are oval or circular, brown in color, and located on the abaxial leaf surface without an indusium. The roots consist of fibrous rhizoids measuring 2–3.9 cm in length, functioning to anchor the plant to the substrate as an adaptation to its epiphytic lifestyle (Hovenkamp, 1986).

Table 1. Description of *Pyrrosia longifolia*.

Plants parts	Description
Leaves	<i>Pyrrosia longifolia</i> has linear leaf blades with an average leaf length of approximately 46.5 cm and an average width of 2.3–3 cm. The leaf margin is entirely and slightly incurved. The leaf apex tapers but are not acute, and the leaf surface is smooth and glossy with parallel venation. The leaves have a thin, slightly rigid succulent texture and are classified as incomplete leaves with a simple leaf type. The petiole is dark brown to blackish, erect, cylindrical, relatively short, and non-woody.
Stem	The stem type is a rhizome, dark brown in color, creeping, branched, cylindrical in shape, and its surface is covered with scales.
Root	The root system consists of rhizoids, exhibiting a fibrous structure, with an average length of 2–
Spores	3.9 cm. The sori is located on the abaxial surface of the fertile leaves, circular to oval in shape, and brown in color.

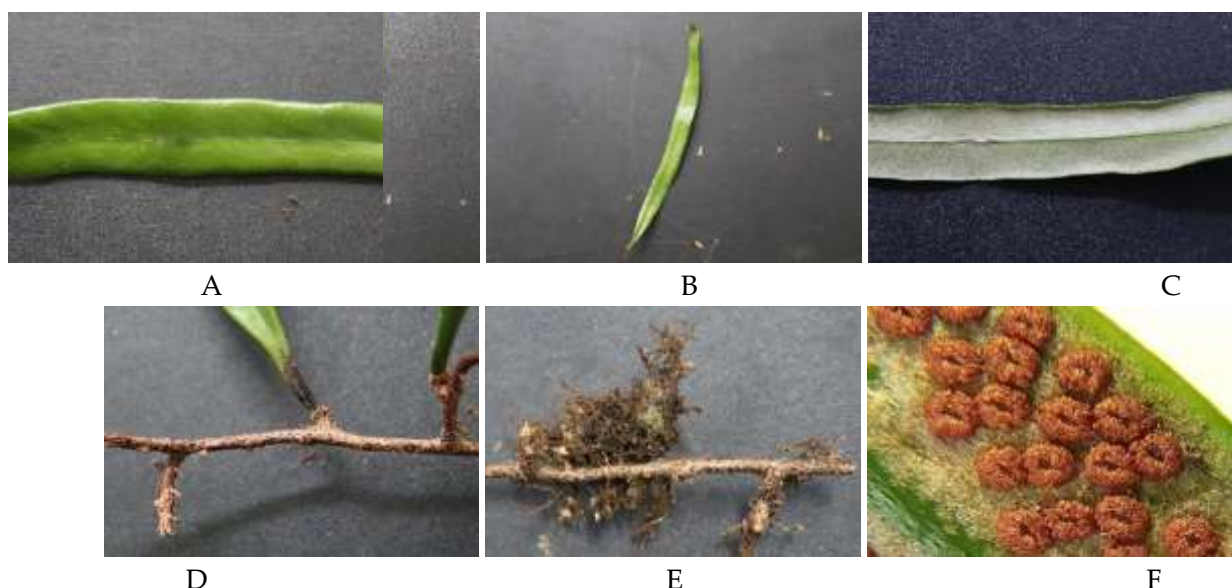


Figure 2. Morphological characters: (A). Overall image of *P. longifolia*; (B). Leaves of *P. longifolia*; (C). Abaxial side of *P. longifolia* leaf; (D). Scaly rhizomes of *P. longifolia*; (E). Rhizoid *P. longifolia*; (F). Image of sori in *P. longifolia*.

Discussion

Observations conducted in the Wisdom Park area of Universitas Gadjah Mada showed that the fern *Pyrrosia longifolia* is generally found in shaded environments and predominantly grows epiphytically by attaching to tree trunks. This finding is consistent with Zhang et al. (2013), who stated that the genus *Pyrrosia* comprises epiphytic ferns belonging to the family Polypodiaceae. The stem of *P. longifolia* is a creeping rhizome (Piggott, 1988). The rhizome is dark brown and covered with densely arranged scales. The presence of scales of varying forms on the rhizome is also a characteristic trait of the genus *Pyrrosia*. In *Pyrrosia longifolia*, the scales are oblong-ovate in shape, with a broadened base and entire margins (Sofiyanti et al., 2018). The petiole, which supports the leaf blade and is attached to the rhizome, in *P. longifolia* is relatively short and blackish brown in color.

Based on leaf type, *Pyrrosia longifolia* exhibits morphological characteristics of simple leaves, as each petiole supports only a single leaf blade. The leaves are classified as incomplete leaves. The leaf blade is linear with entire (integer) margins that are slightly curved inward. The apex tapers but is not acuminate. The adaxial leaf surface is smooth and glossy, whereas the abaxial surface is covered with fine hairs. The venation pattern is parallel, and the

leaf texture is thinly fleshy and somewhat rigid. Quantitative measurements showed that the average leaf length is approximately 46.5 cm, with a width ranging from 2.3 to 3 cm.

Pyrrosia longifolia possesses both sterile and fertile leaves (sporophylls). According to Hovenkamp (1986), this species has sori that are oval or rounded, brown in color, and located on the abaxial leaf surface. The sori of *Pyrrosia longifolia* are not protected by an indusium. Based on root observations, the roots of *P. longifolia* are classified as rhizoid-type roots measuring 2–3.9 cm in length. These fibrous rhizoids function to attach the plant to its substrate, supporting its epiphytic habit of growing on tree trunks or rocks.

Conclusions

The findings of this study indicate that *Pyrrosia longifolia* is an epiphytic fern belonging to the family Polypodiaceae, exhibiting strong adaptability to shaded environments by attaching to tree trunks and rocky substrates. Morphological observations revealed that the species possesses a creeping, dark brown rhizome covered with dense oblong-ovate scales; simple linear leaves with a thin, somewhat rigid texture; a glossy adaxial surface; and a finely pubescent abaxial surface.

The species forms both sterile and fertile leaves, with the fertile leaves bearing circular to oval brown sori distributed across the abaxial surface and lacking an indusium. Its fibrous rhizoid system, measuring approximately 2–3.9 cm in length, functions primarily for substrate attachment, supporting its epiphytic habit. Overall, the combination of rhizome characteristics, leaf morphology, and soral features provides clear diagnostic traits for identifying *Pyrrosia longifolia*. This study contributes to a more comprehensive understanding of the species' morphological attributes and its adaptive strategies within epiphytic habitats.

Conflict of Interest: The authors declare that there is no conflict of interest regarding the paper. No financial or personal relationships with other people or organizations have influenced the work reported in this study.

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