

Identification Of Morphological Characteristics Ground Ferns (*Pteris vittata* L.) in The Wisdom Park UGM Area

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Abstract: Morphological characteristics of plants are one of the easiest ways to determine the type and diversity of species. Ferns are found in many areas except deserts and snowy areas, and morphological variations are common. The body structure of ferns is divided into three main parts: roots, stems and leaves. One of the areas that has a variety of ferns is Wisdom Park UGM, which is 6 hectares of green open space that will encourage the growth of various species of ferns, including *Pteris vittata* or ground ferns. Morphological diversity in ferns can be influenced by environmental factors such as light, temperature, humidity and soil pH. The aim of this research is to identify the morphological characteristics of ferns (*Pteris vittata*) that grow in Wisdom Park UGM, so that they can contribute to the study of fern diversity and become reference material for conservation and development efforts of ferns in this area. The research method was carried out in three stages, namely land preparation, sampling and morphological identification through observing leaves, roots and stems. Research has revealed that *Pteris vittata* has brown fibrous roots, round, grooved brownish-green stems, and pinnate leaves of various sizes and shapes. This morphological variation indicates the existence of two infraspecific groups, namely *Pteris vittata* (subspecies *vittata*) and *Pteris vittata* (subspecies *emodi*). This research aims to be a reference for the development and conservation of ferns on campus and provide more insight into the diversity of ferns that exist in Indonesia.

Keywords: Diversity, Ferns, Identification, Morphology, *Pteris vittata*, , Wisdom Park UGM.

Introduction

Pteridophytes, or ferns, are plants that grow widely throughout Indonesia. More than 10,000 species of *Pteridophytes* have been identified, and an estimated 4,000 species have the potential to grow in Indonesia (Kusmana & Hikmat, 2015). Ferns are also known as spore-bearing plants, a characteristic of *Pteridophytes*, and can live in various habitats, whether as epiphytes, terrestrial, or aquatic (Betty et al., 2015). Ferns have distinct morphological characteristics for each species. Morphological characteristics are the easiest way to identify species characteristics and diversity. various thing. Morphological characters it is said easiest For recognize The characteristics of species and diversity are easily observed compared to other characteristics (Rifai 2011). Variations in morphological characteristics are often found in

ferns. Ferns are distributed throughout the world except in desert and snowy areas (Luckita et al., 2021). Ferns are cormus plants, meaning their bodies can be divided into three main parts: roots, stems, and leaves (Arini & Kinho, 2012). Variations in morphological characteristics can occur due to the influence of differences in ecology, polyploidy, and genetics. Height location grow can cause variation in phenotype plants (Vitasse et al. 2009). The role of chromosomes as carriers of inherited genes traits in offspring contribute to change phenotype (Sharp 1943).

Plant nail spread across various type place so that easy For One of them is Wisdom Park UGM. Wisdom Park is a green open space owned by Gadjah Mada University and managed by UGM Residence. Wisdom Park UGM covers an area of 6 hectares, which is quite large for a park in an urban area, because the area is Which wide Wisdom Park

UGM own source Power natural plant Which abundant. One example of a natural plant resource is ferns. Wisdom Park UGM has supportive environmental factors so that ferns are widely distributed in the park . varied environments can cause morphology that different . Environmental factors Which influence between other intensity light , height place , temperature and humidity air , pH and humidity land , and speed wind . Environmental factors that exist in the area Wisdom Park UGM strongly encourages plant nail grow in area the due to plant nails really like places that have high humidity (A'yuningsih , 2017).

One of type from diversity plant The fern found in UGM's Wisdom Park is the Ground Fern (*Pteris vittata*) . According to Yolla (2023) , *Pteris vittata* L. has classification as following :

Kingdom : Plantae
 Subkingdom : Tracheobionta
 Division : Pteridophyta
 Class : Pteridopsida
 Subclass : Polypoditae
 Order : Polypodiales
 Family : Pteridaceae
 Genus : Pteris
 Species : *Pteris vittata* L.

Pteris vittata L. is one of the plant nails in the area Wisdom Park UGM, *Pteris vittata* L. life in rock, cliffs , walls , and land . Characteristics *Pteris vittata* L. Which found in Wisdom Park UGM part big grow in the place that open like on the ground , between rocks and walls . *Pteris vittata* L. has characteristics character distinctive morphology compared to with type from the genus *Pteris* others , namely edge its simple leaves with stalk short leaves , so that as if attached to the stem , and children long leaves . This type own stem short , upright or equipped reclining scales that when Still young will colored green young and when mature will colored chocolate young . Long stalk leaf Can reaching 40 cm and covered by scales when Still young , part leaf widest be on top leaf overall , the more to on the more tapered , child the base of the leaf sized small . Pinnate leaves one time, child leaf many , ends child leaf tapered until blunt and base leaf shaped heart until even, base child leaf usually more wide and has lobe on one side or second base

. Bone child leaf fork , sorus located along outskirts leaves , however No reach end and base leaves (Holttum 1966; Edie 1978).

Wisdom Park UGM is a Wrong One area Which own diversity plant enough nails many . However , the existence of plants in Wisdom Park UGM are dominant Not yet identified in a way comprehensive , one of them is Ground Fern (*Pteris vittata*) . Therefore that , research This aim For identify Ground fern (*Pteris vittata*) in Wisdom Park UGM and it is hoped that can become reference addition For learn plant level low , especially in the *Pteridophyta division* . Research this is also expected can investigate diversity plant nail Which there is in Wisdom Park UGM And as references to development And preservation charged plants ethnobotany especially in the plant division level low .

Materials And Methods

Types of research conducted is descriptive exploratory research This was conducted in the Wisdom Park area of UGM (Figure.1). The sampling sample Ground fern (*Pteris vittata*) uses method explore along point Location . Time and Place Study Study conducted on December 24 , 2024 at 10:00-12:00 WIB. The tools used For study This among others sheet observation , tool write , paper white manila , ruler , lensbong (lens dismantling) , mini microscope , and cell phone. The materials used that is Ground fern (*Pteris vittata*).



Figure 1. Wisdom Park UGM Area.

Procedure study done with 3 stage that is stage preparation , stage taking samples , as well as stage identification stage preparation covering determination location observation and preparation tools and materials research . Stage taking sample that is sample taken Then documented . Stage identification Ground fern (*Pteris vittata*) with identify morphology outside

plant the like leaves , roots , and stems . Identification plant done with method observation in a way direct character morphology plant covering leaves (color) leaves , long leaf and leaf width), root (form root, type root, and color root) and stem (form stem and characteristics morphological characteristics). Data analysis was carried out descriptively qualitatively, by sampling, documenting, and identifying.

Results And Discussion

Results

Morphological Characteristics of Ground Ferns (*Pteris vittata* L.)

Table 1. Morphological Characteristics of Ground Ferns (*Pteris vittata* L.)

No.	Aspect Observation	Description
1.	Root	Type rhizome own fiber branched , monopodial. Root length 2-3.5 cm, with color chocolate dark form root thin And rough .
2.	Stem	Shaped round, long, And upright. Spread on the surface stem. Colored green brownish, located on land, its size ± 23 cm.
3.	Leaf	Stalk leaf Which short , leaf arranged compound pinnate single with varying lengths, namely around 2-8 cm, and green in color.
4.	Spores	Shaped round, there is in lower leaf, parallel on the edge leaf on part lower .

Study This done with approach descriptive exploration conducted at Wisdom Park UGM on morphology plant nail land (*Pteris vittata*) (Table 1). The findings listed in table on give description about structure root, stem, leaf, and spores. This

observation aims to facilitate understanding of the morphological characteristics plant nail land (*Pteris vittata*). Results study This Also can served in form picture. Next are the pictures morphological of the Ground Ferns (*Pteris vittata*) :



Figure 2. Root



Figure 3. Stem



Figure 4. Leaf



Figure 5. Spores



Figure 6. Sorry

Discussion

Root

People often equate rhizomes with roots. This fern root is a rhizome with unbranched, or monopodial, fibers. The rhizome spreads along the rock surface and the roots penetrate into crevices (Moertolo, 2004). The roots reach 2-3.5 cm in length. form root thin And rough colored chocolate dark. Location root *Pteris vittata* that is on base rhizome Which upright . Root fern generally textured thin And rigid as well as grow in throughout stem. This root absorb water and nutrients as well as help secure ferns on the substrate .

Stem

The stem of *Pteris vittata* is shaped round , long , and upright . The stem Can spread short and long with leaf Which spread across throughout stem . On the stem own color in the form of green brownish . Surface base stem hairy smooth . The stem located on land And towering up . The trunk No branched . Size the stem usually around ± 23 cm (Wulandari, 2014).

Leaf

The leaves are sporophylls (fertile leaves), which are leaves that produce spores. *Pteris vittata* leaves are characterized by short petioles, making them appear to be attached to the stem. on stem. Leaf arranged in a way compound pinnate single with long Which varies, namely around 2-8 cm. End child leaf shaped tapered until blunt And base leaf Heart-shaped to flat. The leaf surface is smooth and thin. Both the upper and lower surfaces of the leaf are green. old. Leaves *Pteris* sp. classified as anisophilic that is the leaves consist of two sizes that is Which one is larger than the other. The

widest part of the leaf is at the top of the whole leaf, the further up it gets the wider it gets. tapered, child leaf Which most base sized small. Base child leaf usually wider and has lobe on the wrong One side or both bases. Bones child forked leaves, sori located on throughout leaf edges, however not reached tip and base of the leaf (Holttum 1966; Edie 1978).

Spores and Sorry

Plant nail can differentiated become two part main that is organ vegetative Which consists of from roots , stems , rhizomes and leaves . Meanwhile, the generative organs consists of on spores , sporangia, antheridia and archegonium . Plant sporangia nail generally is at in the lower leaf as well as form cluster colored black or brown . This cluster of sporangia known as sorus. Position the sorus against bone leaf is characteristic Which very important in classification plant nails . Sorus in pteridophytes is one of the characteristics special For differentiate taxonomy . Sorus has the characteristics Which different on every type pteridophytes. Sorus own color, form, And various locations. Sorus are also distinguished based on the presence or absence of indusium. Sorus is defined as part of the reproductive apparatus of ferns (Pterydophyta) for regeneration which has an important role to protect the spore boxes of ferns until the spores are ready to be released. In *Pteris Vittata*, the sorus found is linear, brown, located on the lower surface edge along the edge of the leaf, but does not reach the leaf tip. (Arini, and Kinho, 2012:18). Sori are units of sorus, namely groups of sporangia that contain spores. Sori usually found in part lower blade. Sorry young usually covered by

folds network a protective covering called indusia (singular: indusium).

Conclusions

Based on the results of morphological research on ground ferns (*Pteris vittata*) that has been carried out, it can be concluded that the main parts of the fern are divided into two important organ parts. namely vegetative organs and generative organs. Vegetative organs consist of roots, stems, and leaves. The roots are monopodial, thin, rough, and dark brown. The stems are round, long, upright, colored green brownish, And No branched. The leaves shaped pinnate The fern is single, dark green, and has sori on the edge of the leaf surface. The generative organs consist of spores, sporangia, antheridia, and archegonium. Fern sporangia are generally found on the underside of the leaf and form black clusters. or chocolate. Cluster this sporangium known as sorus.

Conflict of Interest: The authors declare that there is no conflict of interest regarding the conduction, analysis, and reporting of this study

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