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Morphological characteristics and habitat conditions of suweg (*Amorphophallus paeoniifolius*) around Mount Ciremai National Park, West Java, Indonesia

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Abstract. *Mutaqin AZ, Kurniadie D, Iskandar J, Nurzaman M, Husodo T. 2021. Morphological characteristics and habitat conditions of suweg (*Amorphophallus *paeoniifolius) around Mount Ciremai National Park, West Java, Indonesia. Biodiversitas 22: 2591-2600.* Indonesia is a country that has abundant biodiversity, especially the diversity of plant species. One of the plant species that widely distributed across Indonesia is *Amorphophallus paeoniifolius* (Dennst.) Nicolson, or locally known as suweg. This study aims to identify morphological characteristics of *A. paeoniifolius* and its habitat conditions around Mount Ciremai National Park, West Java Province, Indonesia. Several stages of the exploratory survey were randomly carried out followed by purposive intensive observations. The method used to collect and analyze data is qualitative methods combined with simple measurements of quantitative technique. The results showed that suweg in the studied areas had distinctive morphological characteristics, which are different from the rest of the species from Amorphophallus genus. The plant is found in 4 types of land, namely home gardens, gardens, rice fields, and pond edges, whether with open or closed canopy conditions. The density of suweg in the study area is generally low. The climatic and edaphic conditions of suweg habitat in several study areas showed that there are a lot of similarities of conditions with other references. There are also 156 species of plants found that grow around suweg, both in the category of cultivated and wild plants. This- study enriches the existing knowledge on the botanical and ecological information of *A. paeoniifolius* in the context of geographical area (i.e., Ciremai National Park, West Java, Indonesia).

Keywords: *Amorphophallus paeoniifolius*, botany, Ciremai, suweg

INTRODUCTION

Indonesia is among the countries with the richest biodiversity in the world. Therefore, it is called a mega-biodiversity country in the sense that it has a high diversity of species with a lot of genetic uniqueness, a high level of endemism, and a large variety of ecosystems (Sutoyo 2010). In terms of plant diversity, Indonesia is estimated to have around 30,000-40,000 species of vascular plant, or equivalent to 15.5% of the total number of vascular plant species globally. There are also about 80,000 species of fungi, 595 species of lichen, 949 species of Hepaticae, 1,510 species of Musci, and 2,197 species of ferns (Indonesian Institute of Sciences, 2014).

One of the endemic plant species in Indonesia is *Amorphophallus paeoniifolius* (Dennst.) Nicolson, which is locally known as suweg (Mutaqin et al. 2020a). The plant belongs to the Araceae family along with other genera, such as *Alocasia*, *Colocasia*, and *Xanthosoma* (Diazgranados et al. 2020). Yuzammi et al. (2017) state that the plant species is widely distributed across Indonesia, in addition to other species of the genus *Amorphophallus*, such as *Amorphophallus muelleri* Blume, *Amorphophallus variabilis* Blume, *Amorphophallus pranii* Hook. f., *Amorphophallus gigas* Teijsm. & Binn. Likewise, Supriati (2016) informs that several species of *Amorphophallus* are found in Indonesia, including *Amorphophallus variabilis* Blume, *Amorphophallus campanulatus* (Roxb.) Blume, and *Amorphophallus oncophyllus* Prain ex Hook. f.

Plants live and grow in certain areas which are generally known as habitat. Knox et al. (2010) explain that habitat is the environment of an organism; the place where it is usually found. Hickman et al. (2012) state that habitat is the place where an organism normally lives or where individuals of a population live, while Bamford and Calver (2014) explain that habitat is the environment of a species, and particularly those features that determine where the species occurs. Based on their habitat, there are plant groups that grow in aquatic or terrestrial, low or highland, tropical or sub-tropical, and being cultivated or wildly grow.

Habitat conditions can trigger certain adaptation and speciation. For example, there are plant groups called halophyte, xerophytic, hydrophytic, hygrophytic, and mesophytic plant. Halophyte is a terrestrial plant adapted morphologically and/or physiologically to grow in salt-rich soils and salt-laden air. Xerophyte is a plant that can grow in very dry conditions and can withstand any kind of period. Heterophyte is a plant that grows in a wide range of

habitats. Hydrophyte is a plant adapted morphologically and/or physiologically to grow in water or very wet environments. Mesophyte is a plant adapted to environments that are neither extremely wet nor extremely dry (Allaby 2010).

There are direct and indirect factors that affect the growth, distribution, and composition of plant species. Direct factors, for instance, are temperature and rainfall, while indirect factors for example are altitude. Indirect factors can only have an influence if it is correlated to some variables to the plant. The phylogeographic signature of each species is directly influenced by its surrounding environment and interactions among the biotic and abiotic factors (Kumar and Kumar 2018). Each plant will respond to various environmental conditions around the place where it grows through adaptation. Organisms will change themselves in terms of morphological, physiological, behavioral, and molecular levels to survive in a changing environment (Luo and Zhang 2014; Abobatta 2019). For example, altitude affects the net photosynthetic rate associated with the availability of CO_2 (Fujimara et al. 2010), while Kromer et al. (2013) inform that altitude influences plant species richness. Toledo et al. (2012) state that climate is a stronger driver of species distribution, while Fonge et al. (2011) state that rainfall, which is one of the elements of climate, affects plant growth. Also, the temperature is a primary factor affecting the rate of plant development with more extreme temperature events will impact plant productivity. For instance, pollination is one of the most sensitive phenological stages to temperature extremes across all species, and during this developmental stage temperature extremes would greatly affect production (Hatfield and Prueger 2015).

Apart from climatic variables, edaphic factors can also affect plants. Zuquim et al. (2020) state that soil conditions can affect plant habitats. For example, organic carbon, which is one of the main soil parameters, can affect vegetation establishment (Fonge et al. 2011). Other factors, such as soil pH, also affect plant occurrence and distributions, especially in the case of *Amorphophallus* (Hafsah et al. 2018).

Amorphophallus paeoniifolius is a species of plant that has its uniqueness or characteristics that may differ from other species in the genus of *Amorphophallus*. The phenomenon of uniqueness may also appear as a response to certain conditions, such as environmental conditions, which are expressed in several characters. Thus, this study aims to identify morphological characteristics of *A. paeoniifolius* and its habitat conditions in several areas around Mount Ciremai National Park, West Java Province, Indonesia. We expected the results of this study can bring a wider horizon of knowledge regarding the morphological characteristic of *A. paeoniifolius*, especially around Mount Ciremai National Park, West Java, Indonesia.

MATERIALS AND METHODS

Study period and area

This research was conducted in January-November 2020 in 11 villages around Mount Ciremai National Park, which is geographically located in the Cimanuk Watershed Region and administratively located at Cikijing Sub-District, Majalengka District, West Java Province, Indonesia. The villages studied were Bagjasari, Cidulang, Cikijing, Cilancang, Cipulus, Cisoka, Jagasari, Kancana, Sindangpanji, Sukamukti, and Sunalari (Figure 1).

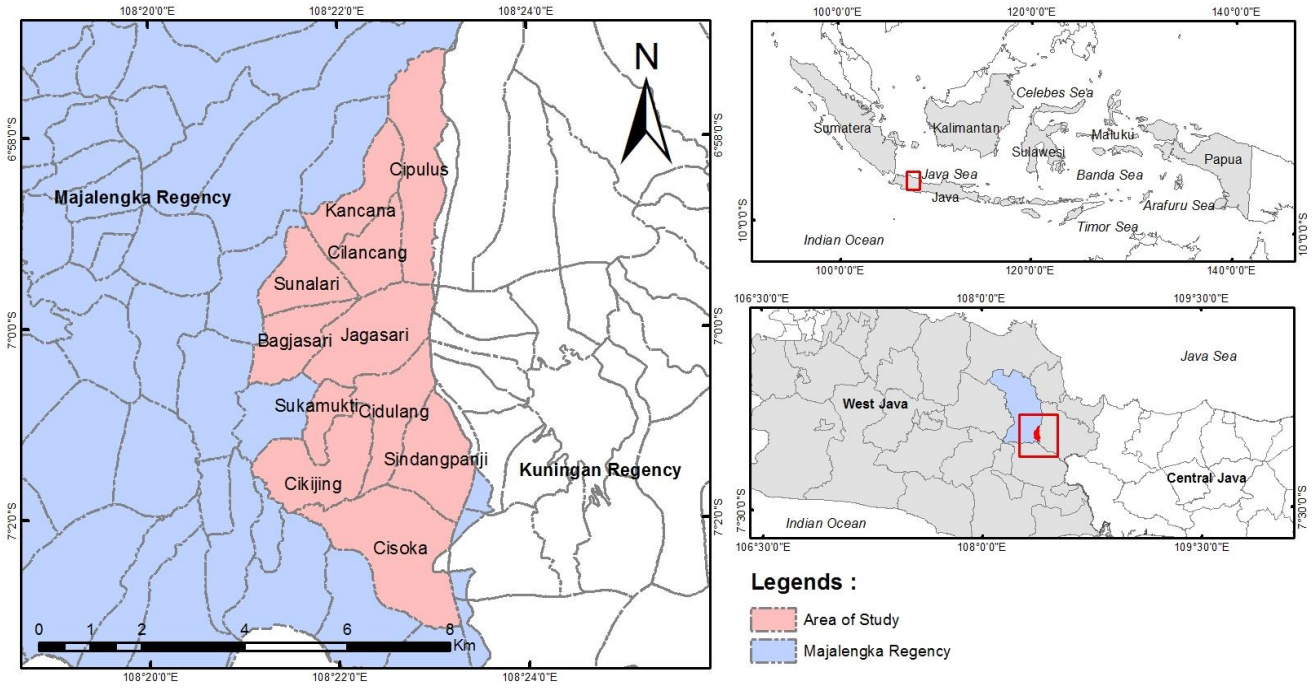

Figure 1. Map of study areas in Mount Ciremai National Park, Sub-District of Cikijing, District of Majalengka, West Java, Indonesia

Procedures

In general, the method used for this research is qualitative methods with simple quantitative techniques for data explanation purposes (Creswell, 2014). This research was conducted in two stages, which are preliminary survey and intensive observation. The preliminary survey aims to ensure the existence of suweg in the studied area and was done in a random and exploratory manner throughout the Cikijing Sub-District, Majalengka District.

The intensive observation was carried out to collect detailed information in a selected area that is purposively selected based on a preliminary survey. There are 3 types of data collected in intensive observation which are morphological and morphometric data of the suweg (leaf blades, petioles, flowers, and tubers) (Permatasari et al. 2014), abiotic factors around the suweg (such as soil pH and soil moisture, altitude, air temperature, air pressure, air humidity) and biotic factors as well as the population of the suweg and plants that grow around the suweg (Indriyani et al. 2011; Hidayat 2019).

The method used to collect vegetation data around suweg is a qualitative method that involves larger and fewer sampling units where the presence of all species is recorded. The recorded vegetation data then grouped based on village location to analyze what kind of plant species always exist near suweg.

Data analysis

The morphological characteristics (morphometric) of the suweg then descriptively analyzed and compared to reference from related literature. Meanwhile, ecological aspects of the suweg population are analyzed based on its density or the number of suweg individuals per unit area. Furthermore, the biotic and abiotic data that exist around the suweg, were also descriptively analyzed and compared to study literature.

RESULTS AND DISCUSSION

Results

Botanical characteristics

The results of the research showed that there are 5 morphological characteristics of suweg that visually analyzed in this research which are leaf blade, petiole, tuber, flower, and root. The morphological characteristics of suweg found around Mount Ciremai National Park are presented in Table 1 and showed in Figure 2.

Land type, condition, and population of suweg

Other results of the research showed that suweg were found in 11 villages around Mount Ciremai National Park which are Bagjasari, Cidulang, Cikijing, Cilancang, Cipulus, Cisoka, Jagasari, Kancana, Sindangpanji, Sukamukti, and Sunalari villages. The land type, land conditions, and suweg population are presented in Table 2 and showed in Figure 3.

Table 1. Morphological characteristics of suweg in villages around Mount Ciremai National Park

Part	Description
Leaf-blade	The leaf blade is found on the leaflets (petiololus); young leaf blades on growth periods are green, but when they are old, they are yellow, then wilt along with the petiole; hairless; gloomy (laevis) surface; pinnate leaf bones (penninervis); flat-leaf edge (integer); thin soft flesh (intervenum); tapered leaf tips (acuminatus); the widest part is in the middle; ellipticus/ ovalis; length reaches 31 cm; width 9 cm wide; the number of leaf blade reaches 816.
Petiole	Green petiole with white spots; round; the surface is slightly rough; gummy or slimy that is clear and itchy; height up to 204 cm; width of the canopy reaches 294 cm; diameter of the tip of the petiole reaches 11 cm; petiololus is 3.
Tuber	The outer skin of the tuber is dark brown-black in color; reddish-white or yellowish-white flesh; take root and sprout; gummy or slimy that is clear and itchy; flat round, grooved in the middle as a place where the petiole appears or grows; odorless.
Flower	Spathas are maroon or purple in color; threaded spadix; smell of carcass; bloom period of about 1 week
Root	Roots emerge from the tubers in large numbers; round shape; short size.

Figure 2. The morphological characteristics of suweg organs: A. Leaf blade; B. Petiole; C. Flower; D. Tuber

Table 2. Land type, land condition and suweg population in villages around Mount Ciremai National Park, West Java, Indonesia

Village	Land type	Altitude (m asl)	Land extent (m^2)	Amount of land	Suweg population	Suweg density (per m^2)	Canopy cover
Bagjasari	Garden	658-661	270	2	38	0.141	Shaded
Cidulang	Garden	676-687	336	2	50	0.137	Shaded
Cikijing	Garden	641-666	258	10	77	0.299	Shaded & opened
	Homegarden		55	1	4	0.073	Shaded & opened
Cilancang	Garden	819-860	476	14	92	0.193	Shaded & opened
	Homegarden		495	6	49	0.099	Shaded & opened
Cipulus	Garden	905-955	840	1	2	0.002	Opened
	Homegarden		361	7	100	0.277	Opened
Cisoka	Garden	598-658	247	19	318	1.288	Shaded & opened
	Homegarden		98	18	197	2.010	Shaded & opened
	Rice field		26	2	15	0.577	Opened
	Pond edge		136	2	21	0.154	Shaded
Jagasari	Garden	681-825	270	22	261	0.967	Shaded & opened
	Homegarden		138	15	185	1.341	Shaded & opened
	Rice field		120	1	10	0.083	Opened
	Pond edge		165	1	12	0.073	Shaded
Kancana	Garden	878	135	1	4	0.030	Shaded
Sindangpanji	Garden	649-778	194	7	140	0.722	Shaded & opened
	Homegarden		208	4	77	0.370	Shaded & opened
	Rice field		48	1	5	0.104	Opened
	Pond edge		108	3	19	0.176	Opened
Sukamukti	Garden	648	552	1	6	0.011	Shaded
Sunalari	Garden	779	171	1	4	0.023	Opened

Figure 3. Land type of the occurrence of suweg: A. Home gardens; B. Gardens; C. Pond edge; D. Rice fields

Climatic and edaphic factors of suweg habitat

This research collects climatic and edaphic factors of suweg habitat. The data collected consist of air temperature, air pressure, air humidity, soil pH, and soil moisture. The climatic and edaphic factors of suweg habitat can be found in Table 3.

Based on the data that have been collected, there are several information that obtained regarding the climatic and edaphic factors that collected in suweg habitat, which are the minimum temperature of suweg habitat is 19.2°C and 42.3°C maximum, air pressure between 937.8 hPa to 940.2 hPa, air humidity from 35% to 95%, soil pH varies between 6.2 to 7 and soil moisture from 25% to 90%.

Vegetation around suweg *habitat*

Based on the results of the research, suweg found in 11 villages around Mount Ciremai National Park and there are about 156 plant species that grow near suweg. The data regarding plant species found around suweg presented in Table 4. Based on Table 4, there are about 156 plant species that grow near suweg and 36 plant species that are always found living near suweg in every village where suweg grows. They are *Acalypha australis* Linn., *Ageratum conyzoides* L., *Amaranthus spinosus* L., *Axonopus compressus* (Sw.) P. Beauv., *Bidens pilosa* L., *Blumea balsamifera* (L.) DC., *Chloris barbata* (L.) Nash, *Chrysopogon aciculatus* (Retz.) Trin, *Commelina bengalensis* L., *Crassocephalum crepidioides* (Benth.) S. Moore, *Cyanthillium cinereum* (L.) H. Rob., *Cynodon dactylon* L., *Cyperus kyllingia* Endl., *Cyperus rotundus* L., *Digitaria ciliaris* (Retz.) Koeler, *Echinochloa colona* (L.) Link., *Elephantopus scaber* L., *Eleusine indica* (L.) Gaena, *Eragrostis unioloides* (Retz.) Nees ex Steud., *Eupatorium odoratum* L., *Euphorbia hirta* L., *Hedyotis corymbosa* (L) Lamk., *Hyptis capitata* Jacq., *Imperata cylindrica* (L.) P. Beauv., *Isotoma longiflora* Pres. L., *Mimosa pudica*, *Peperomia pellucida* (L.) Kunth, *Phyllanthus niruri* L., *Pluchea indica* L., *Portulaca oleracea* L., *Sida rhombifolia* L., *Sonchus arvensis* L., *Sporobolus berterianus* (Trin.) Hitchc. & Chase, *Stachyarpheta indica* (L.) Vahl, *Themeda arguens* (L.) Hack, and *Urena lobata* L. The plant species living near suweg vary from understorey to trees.

Table 3. The climatic and edaphic factors of *suweg* habitat *in* villages around The Mount Ciremai National Park

Village	Climatic and edaphic factors				
	Air temperature (°C)	Air pressure (hPa)	Air humidity (%)	Soil pH	Soil moisture (%)
Bagjasari	19.5-31.5	938.7-932.8	39-95	6.8-7	50-90
Cidulang	19.6-41.7	937.9-940.1	36-95	6.8	25-90
Cikijing	19.7-42.3	937.8-940.0	35-95	6.6-7	25-90
Cilancang	19.5-34.8	938.6-932.5	44-95	6.4-7	25-90
Cipulus	19.2-34.6	938.1-932.1	45-95	6.2-7	60-90
Cisoka	19.6-41.7	937.9-939.7	36-95	6.4-7	25-90
Jagasari	19.5-32.1	938.7-931.7	40-95	6.6-7	50-90
Kancana	19.5-34.7	938.2-932.2	45-95	6.6	60-90
Sindangpanji	19.6-41.8	937.9-940.2	36-95	6.4-7	25-90
Sukamukti	19.6-42.2	937.9-940.0	35-95	6.2	25-90
Sunalari	19.5-34.9	938.7-932.8	40-95	7	50-90

Table 4. Plant species in the habitat of *suweg* in villages around Mount Ciremai National Park

Scientific name	Local name	Village										
		Bgi	Cdl	Ckj	Clc	Cpl	Csk	Jgi	Kcn	Spi	Smi	Sli
Acalypha australis Linn.	Jukut kokosan	+	+	+	+	+	+	+	+	+	+	+
Ageratum conyzoides L.	Babadotan	+	+	+	+	+	+	+	+	+	+	+
Albizzia chinensisi (Osb)	Albasiah	+		+	+	+	+	+		+		
Albizzia procera (Roxb) Bth.	Kihiang						+					
Allium fistulosum L.	Bawang daun				+	+		+		+		
Alocasia macrrorhiza (L.) Schott, orth.	Sente						+	+				
Alocasia plumbea Van Houtte.	Taleus hias		+		+	+	+	+		+	+	+
Alpinia galangan L.	Laja							+				
Amaranthus spinosios L.	Senggang cucuk	+	+	+	+	+	+	+	+	+	+	+
Amomum compactum Sol. ex Maton	Kapol	+	+	+				+				
Ananas comosus (L.) Merr.	Danas	+			+	+	+					
Annona muricata L.	Nangka walanda	+	+	+	+	+	+	+		+		
Anredera cordifolia (Ten.) Steenis	Binahong				+							
Anthochepalus chinensis (Lam) A.Rich.exWalp.	Jati ambon	+										
Anthurium crystallinum Linden & Andre	Kuping gajah						+			+		
Apium graveolens L.	Saledri				+			+				
Arachis hypogaea L.	Suuk				+			+		+		
Archidendron pauciflorum (Benth) I.C. Nielsen	Jengkol						+	+				
Arenga pinnata Merr	Kawung	+										
Artocarpus altillis (Parkinson) Fosberg	Sukun	+			+	+	+	+		+		
Artocarpus heterophyllus Lmk.	Nangka	+	+	+	+	+	+	+		+	+	
Asparagus cochinchinensis (Lour.) Merr	Awi tali							+				
Averrhoa carambola	Buah bentang						+					
Axonopus compressus (Sw.) P. Beauv.	Jukut pait	+	+	+	+	+	+	+	+	+	+	+
Bambusa vulgaris Schrad. Ex J.C.	Awi ampel	+		+				+		+	+	
Bidens pilosa L.	Hareuga	+	+	+	+	+	+	+	+	+	+	+
Blumea balsamifera (L.) DC.	Sembung	+	+	+	+	+	+	+	+	+	+	+
Brassica juncea L.	Sesim					+			+	+		
Bridelia monoica Merr.	Kanyere				+							
Caladium bicolor (Aiton) Vent.	Taleus hideung						+					
Canna edulis Ker	Ganyol				+		+				+	
Capsicum annuum L.	Cabe				+							
Capsicum frutescens L.	Cengek			+	+	+	+	+		+	+	
Carica papaya L.	Gedang	+	+	+	+	+	+	+		+	+	+
Chloris barbata (L.) Nash	Kembang goyang	+	+	+	+	+	+	+	+	+	+	+
Chrysopogon aciculatus (Retz.) Trin	Jukut jarum	+	+	+	+	+	+	+	+	+	+	+
Citrus amblycarpa (Hassk.) Ocshe	Jeruk lemo		+			+		+				
Citrus aurantifolia Swingle	Jeruk mipis						+	+		+		
Citrus maxima (Burm. F.) Merr.	Jeruk bali				+		+	+	+			
Citrus sinensis (L.) Osbeck	Jeruk							+				
Cnidoscolus chayamansa McVaugh	Chaya				+		+			+		
Cocos nucifera L.	Kalapa	+		+	+	+	+	+		+	+	
Codiaeum variegatum (L.) A. Juss.	Puring							+				
Coffea arabica L.	Kopi	+		+	+	+	+	+		+		

Coix lacryma-jobi L.	Hanjeli							+					
Colocasia esculenta (L.) Schott	Taleus		+	+	+	+	+	+	+	+	+	+	
Commelina bengalensis L.	Gewor	+	+	+	+	+	+	+	+	+	+	+	
Cordyline fruticose (L.) A.Chev.	Hanjuang			+	+	+	+	+		+	+		
Crassocephalum crepidioides (Benth.) S. Moore	Sintrong	+	+	+	+	+	+	+	+	+	+	+	
Cucurbita moschata Durch	Waluh				+	+	+	+				+	
Curcuma domestica Val.	Koneng	+	+	+	+	+	+	+		+	+		
Cyanthillium cinereum (L.) H. Rob.	Leuleuncaan	+	+	+	+	+	+	+	+	+	+	+	
Cymbopogon citratus (DC.) Stapf.	Sereh			+	+		+	+					
Cynodon dactylon L.	Kakawatan	+	+	+	+	+	+	+	+	+	+	+	
Cyperus kyllingia Endl.	Jukut pendul	+	+	+	+	+	+	+	+	+	+	+	
Cyperus rotundus L.	Teki	+	+	+	+	+	+	+	+	+	+	+	
Dahlia rosea Cav.	Dahlia				+		+			+			
Digitaria ciliaris (Retz.) Koeler	Jalamparan	+	+	+	+	+	+	+	+	+	+	+	
Dioscorea alata	Hui kalapa			+	+			+		+			
Duranta erecta	Sinyo nakal			+			+			+			
Durio zibethinus Murray	Kadu	+				+	+	+			+		
Echinochloa colona (L.) Link.	Jajagoan leutik	+	+	+	+	+	+	+	+	+	+	+	
Elephantopus scaber L.	Jukut cancang	+	+	+	+	+	+	+	+	+	+	+	
Eleusine indica (L.) Gaena	Jampang	+	+	+	+	+	+	+	+	+	+	+	
Epiphyllum oxypetalum	Wijaya kusumah					+							
Eragrostis unioloides (Retz.) Nees ex Steud.	Jukut piit	+	+	+	+	+	+	+	+	+	+	+	
Etlingera elatior (Jack.)	Honje					+							
Eupatorium odoratum L.	Kirinyuh	+	+	+	+	+	+	+	+	+	+	+	
Euphorbia hirta L.	Nanangkaan	+	+	+	+	+	+	+	+	+	+	+	
Ficus benjamina L.	Caringin							+					
Flacourtia rukam	Rukem					+							
Garcinia mangostana L.	Manggu	+			+		+			+			
Gigantochloa pseudoarundinacea	Awi gombong			+									
Gnetum gnemon L.	Tangkil			+	+	+	+	+	+	+			
Graptophyllum pictum (L.) Griffith	Handeuleum									+			
Hedyotis corymbosa (L) Lamk.	Jukut siku-siku	+	+	+	+	+	+	+	+	+	+	+	
Hibiscus macrophyllus Robxb ex Horner	Tisuk	+			+	+	+	+	+	+	+		
Hibiscus rosa-sinensis L.	Kembang sapatu							+		+			
Hybiscus tiliaceus L.	Waru							+					
Hylocereus undatus (Haw.) Britton & Rose	Buah naga					+		+					
Hyptis capitata Jacq.	Jukut knop	+	+	+	+	+	+	+	+	+	+	+	
Imperata cylindrica (L.) P. Beauv.	Eurih	+	+	+	+	+	+	+	+	+	+	+	
Ipomea reptans Poir.	Kangkung				+	+							
Ipomoea batatas L.	Hui			+		+	+	+		+			
Isotoma longiflora Pres. L.	Ki korejat	+	+	+	+	+	+	+	+	+	+	+	
Ixora coccinea L.	Kembang soka							+					
Jatropha multifida L.	Betadine				+			+		+			
Justicia gendarussa Burm.	Handarusa		+	+				+					
Languas galangal (L) Stunz	Laja						+	+		+			
Lansium domesticum Correa	Pisitan	+				+		+					
Leucaena leucochepala Lamk.	Petaeuy selong						+	+		+	+		
Luffa acutangular (L.) Roxb.	Oyong							+					
Maesopsis eminii Engl.	Kayu Afrika	+		+	+	+	+	+					
Mangifera foetida Lour.	Limus			+				+					
Mangifera indica L.	Buah	+		+	+	+	+	+		+	+	+	
Manihot esculenta Cranzt	Sampeu	+	+	+	+	+	+	+	+	+	+		
Manilkara kauki (L.) Dubard	Sawo kecik						+						
Manilkara zapota (L.) P. Royen	Sawo									+			
Mimosa pudica	Jukut barong	+	+	+	+	+	+	+	+	+	+	+	
Momordica charantia L.	Paria					+	+			+			
Morinda citrifolia L.	Cangkudu									+			
Moringa oleifera L.	Kelor		+					+					
Musa paradisiaca L.	Cau	+	+	+	+	+	+	+		+	+	+	
Nephelium lappaceum L.	Rambutan			+	+	+	+	+		+	+		
Nicolaia hemisphaerica (Bl) Horan	Honje						+						
Ocimum basilicum L.	Surawung				+	+		+		+			
Orthosiphon aristatus (Blume) Miq.	Kumis ucing				+	+	+		+				
Oryza sativa L.	Pare						+	+					
Pandanus amaryllifolius Roxb.	Pandan			+		+	+	+		+			
Parkia speciosa Hassk.	Peuteuy	+			+	+	+	+		+	+		
Peperomia pellucida (L.) Kunth	Rangu-rangu	+	+	+	+	+	+	+	+	+	+	+	

Persea americana P. Mill.	Alpuket		+	+	+	+	+	+		+	+	
Phragmites karka (Retz.) Trin ex Steud.	Bayongbong	+	+	+	+	+	+	+	+	+	+	+
Phyllanthus emblica	Mareme						+					
Phyllanthus niruri L.	Memeniran	+	+	+	+	+	+	+	+	+	+	+
Physalis angulata L.	Cecendet							+				
Piper betle L.	Seureuh					+	+					
Piper nigrum L.	Sahang							+				
Pisum sativum L.	Kacang kapri							+	+	+		
Plectranthus scutellarioides R.Br.	Jawer kotok						+					
Pluchea indica L.	Baruntas	+	+	+	+	+	+	+	+	+	+	+
Polyscias scutellaria (Burm.f.) Fosberg	Mamangkokan			+								
Portulaca oleracea L.	Gelang	+	+	+	+	+	+	+	+	+	+	+
Psidium guajava L.	Jambu batu			+	+	+	+	+		+	+	+
Psopocarpus tetragonolobus (L) DC	Jaat			+			+					
Rosa gallica L.	Eros							+		+		
Saccharum officinarum L.	Tiwu							+				
Salacca edulis Reinw	Salak						+	+				
Sauropus albicus Wight.	Katuk							+		+		
Sechium edule (Jack.) Sw.	Lejet						+	+			+	
Sida rhombifolia L.	Sadagori	+	+	+	+	+	+	+	+	+	+	+
Solanum lycopersicum L.	Tomat			+	+	+		+		+		+
Solanum melongena L.	Terong				+		+	+				
Solanum nigrum L.	Leunca		+		+		+	+		+	+	+
Solanum torvum Sw.	Takokak							+		+		
Sonchus arvensis L.	Rayana	+	+	+	+	+	+	+	+	+	+	+
Spinacea oleracea L.	Bayem					+				+		
Spondias dulcis Parkinson	Kadongdong						+					
Sporobolus berterianus ((Trin.)Hitchc. & Chase	Nyenyerean	+	+	+	+	+	+	+	+	+	+	+
Stachyarpheta indica (L.) Vahl	Jarong	+	+	+	+	+	+	+	+	+	+	+
Strobilanthes crispus Blume	Pecah beling										+	
Swietenia mahagoni (L.) Jacq	Mahoni	+		+	+		+	+	+	+	+	
Syzigium aquaeum (Burm. f.) Alston	Jambu air					+	+	+				
Syzigium aromaticum (L) Merr and Perry	Cengkeh	+	+	+	+	+	+	+	+	+	+	
Syzygium polyanthum (Wight.) Walp.	Salam				+	+	+					
Tectona grandis L.f.	Jati	+				+	+	+		+		
Themeda arguens (L.) Hack	Memerakan	+	+	+	+	+	+	+	+	+	+	+
Theobroma cacao L.	Coklat			+								
Toona sureni (Blume) Merr.	Suren			+	+	+		+	+	+		
Urena lobata L.	Pungpurutan	+	+	+	+	+	+	+	+	+	+	+
Vigna cylindrica (L.) Skeels	Kacang panjang				+	+		+				
Xanthosoma sagittifolium (L.) Schott.	Taleus Padang	+	+	+	+	+	+	+	+	+	+	
Zea mays L.	Jagong				+		+	+		+		
Zingiber cassumunar Roxb.	Panglay			+	+	+	+	+		+		
Zingiber officinale Rosc.	Jahe		+		+	+	+	+		+		
Zinnia violacea Cav.	Kembang kertas							+				

Note: Bgi: Bagjasari; Cdl: Cidulang; Ckj: Cikijing; Clc: Cilancang; Cpl: Cipulus; Csk: Cisoka; Jgi: Jagasari; Kcn: Kancana; Spi: Sindangpanji; Smi: Sukamukti; Sli: Sunalari

Discussion

Regarding the morphological characteristics of suweg (*Amorphophallus paeoniifolius*), the results of this study (Table 1) are in line with several other studies. Generally, Sedayu et al. (2010) mention that morphological characters, such as sessile/non-sessile stigma, pollen opening mechanism, the shape of the main segments of the lamina, growth cycle, and berry color, supported some clades of *Amorphophallus* which reflect the biogeographical distribution. Sitanggang et al. (2017) state that in general, Angiosperms, including *Amorphophallus*, have pinnate leaves. In particular, Yuzami (2018) informs that *A. paeoniifolius* is a terrestrial herb; tuber depressed globose, dark brown with root-scars prominent, c. 30 cm in silence; petiole c. 2 m long, surface somewhat corrugate to strongly echinate-verrucate, pale to dark green or blackish green with large and small pale blotches and numerous tiny dark dots; leaf blade c. 3 meters in silence, highly dissected; inflorescence with short peduncle; spathe campanulate limb spreading strongly undulate.

Hetterscheid and Mangelsdorff (2006) explain that this plant has a peduncle much shorter than spathe, rounded or conical appendix; petiole rough; tuber with distinctly raised, annulate root scars. Kurniawan et al. (2011) inform that the plant has characteristics of tuber diameter of 25 cm and up to 30 cm, dark brown, rough with several nodes, and producing seasonal rhizomatous buds. Petiole height can reach 100-200 cm, diameter reaches 5-10 cm; strongly verrucose-echinate until shallowly corrugate surface, dark green to brownish green (wild species), slightly verrucose

to smooth surface, pale green to green (cultivated species); with whitish green spots either in wild or cultivated species. Lamina or blade 100-150 in diameter, deeply dissected, rachises winged; leaflets ovate to lanceolate, 3-35 cm x 2-12 cm. Peduncle 3-15 cm in height and elongating when fruiting until 75 cm, peduncle surface is similar with petiole both in wild and cultivated species; peduncle turns brownish green-brown when the fruit is ripening. The inflorescence is the biggest among two other *Amorphophallus*. Spathe 10-30 cm x 15-50 cm, limb spreading and strongly undulate, pale green to brown with pale green-whitish green spot outside, glossy dark brown to dark red-purple inside. Spadix is longer than spathe, 10-25 cm long. Inflorescence produces very unpleasing odors like carcass smell. Cylindric infrared; berry cylindrical, less than 2 cm, bright red. Jintan et al. (2015) inform that this plant has petioles, vagina, and lamina so that it can be called complete leafy. The leaves of this plant are compound, the leaf bones are pinnate with sharing edges, and the leaflets are 6-8. The leaf blade has an elliptical shape with a pointed tip, smooth surface, and is light green to dark green. Length of petiole can reach 75-100 cm, 3.3-10 cm in diameter, light green to dark and white spots, the surface is mottled, and divided into three secondary stems. The height of the petiole reaches 2 meters in an upright direction. Brownish-yellow tubers. Permatasari et al. (2014) inform that this plant has petiole that is light yellowish-green, dark green, and brownish-green in color. The diversity of the color of the petiole is thought to be due to the presence of various pigment combinations such as levels of chlorophyll, ß-carotene, and anthocyanin compounds. Sulistiyo et al. (2015) inform that this plant has special characteristics, which is not having a bulbil. The petiole has a slightly rough texture and a round patch shape. The tubers have bud eyes, a slightly smooth texture, yellow in the color of the surface, pink or white in the color of flesh, and are not itchy.

This study found that suweg occurred in several types of land use, such as home gardens, gardens, and rice fields (Table 2). This is in line with what Mutaqin et al. (2020a) that based on ethnobotanical studies, the community generally states that suweg can grow on non-cultivated lands, such as forests, also on land that is categorized as cultivated lands, such as home gardens, gardens, rice field edges, and pond edges. Also, Mandal et al. (2016) inform that the plant is grown on cultivated land by residents in several Asian countries, such as Indonesia and India. Likewise, Kumar et al. (2015) inform that this species of *Amorphophallus* has been traditionally cultivated by residents on lands in several rural areas in India.

Table 2 also informs that suweg is more common in home gardens than in gardens or rice fields. This may be related to community behavior or culture, where there is a public interest in planting certain species of plants and more often home gardens because the access to the land is closer than other types of land. Several scientific studies can be used as a comparison or basis for rationalizing this phenomenon. Iskandar and Iskandar (2011) state that every member who owns the home garden can generally participate actively in managing the family's home garden. Iskandar and Iskandar (2016) inform that the home garden as one of the traditional agroforestry systems has an important social, economic and cultural function for the community. Beyene et al. (2018) state that the home garden agroforestry system can provide economic benefits and ecological services to households.

In terms of population or density of suweg in various lands (Table 2), the percentage is categorized as low. This is possible because this plant is not the primary crop being cultivated by the local community, unlike chili, cayenne pepper, shallots, or other species of cultivated plants. This phenomenon may be compared or rationalized with the results of several scientific studies. Mutaqin et al. (2020b) state that suweg is a plant that is not cultivated intensively by the community because it has no economic value. Prihatini et al. (2018a) reveal that along with the development of the market economy, the home garden changes in function, which leads to a commercial function. The same thing is expressed by Mohri et al. (2013) that recent socio-economic changes are converting subsistence-oriented home gardens into commercial ones in Indonesia, Sri Lanka, and Vietnam. Jintan et al. (2015) state that the population of suweg is related to the level of shade of habitat and the lack of community activity that can affect the existence of the suweg. In addition, Prihatini et al. (2018b) state that plant groups in the form of herbaceous, shrubs, and vines are plants that are widely planted in the home garden system. More generally, Xu et al. (2019) inform that human activities have shaped large-scale distributions of many plant species, driving both range contractions and expansions.

The results of observations of environmental parameters of suweg are in line with several research results. In general, Angiosperms, including *A. paeoniifolius*, are found in areas with an altitude of up to 1,000m asl (Sitanggang et al. 2017). In particular, *A. paeoniifolius* is distributed inland with an elevation of up to 800 meters with area conditions that are shaded or exposed to full sunlight (Hetterscheid and Ittenbach 1996; Yuzammi et al. 2017). Mutaqin et al. (2020c) state that suweg lives in shaded or open areas in home gardens, gardens, and rice fields. Jintan et al. (2015) inform that suweg can be found at an altitude of 70 m asl. Heriyansyah et al. (2017) inform that this type of *Amorphophallus* is distributed in areas with an altitude of 50-846 m asl. Mulyati et al. (2017) report that this plant is found in areas with an altitude of 200, 400, and 600 m asl. Hidayat (2019) found suweg in areas with an altitude of 64-134 m asl and canopy cover between 40-100%. Trimanto and Hapsari (2016) found suweg in mountainous forest areas that have an altitude between 8-572 m asl.

Related to other environmental factors as listed in Table 3, this is in line with Jintan et al. (2015) that suweg grows at a temperature of 27.1-27.6ºC, rainfall of 23.6-108.4 mm, air humidity of 76-78%, the light intensity of 44-57%, and soil pH of 6-7.5. Hidayat (2019) found suweg in areas with temperatures of 33.4-33.9 ºC, air humidity of 58.5-65.8%, sunlight intensity of 80-226.9 lux, and soil pH between 5.8-6.5. Permatasari et al. (2014) state that the growing environment of this plant has a light intensity of 7500-

37700 lux, air temperature of 23-33 ºC, air humidity of 59-100%, soil pH of 7-7.4, clay soil, sandy clay, loose, and soil moisture of 10-80%. Heriyansyah et al. (2017) inform that suweg was found in areas with temperatures of 26-31°C. Meanwhile, Mulyati et al. (2017) found this plant in locations with soil pH of 7, the light intensity of 1180-1820 lux, air temperature of 30-33 ° C, and air humidity of 18-22%.

Table 4 informs that there are many species of plants around suweg, including those that being cultivated or grow naturally. This is in line with Mutaqin et al. (2020a) that suweg grows in areas with varied ranges, both open and closed areas of several types of vegetation. Jintan et al. (2015) inform that the plants that grow around suweg vary in species and strata of the crown. Hidayat (2019) informs that the plants that grow around suweg apart from teak also contain several other wild plants with herbaceous habitats, lianas, shrubs, epiphytes, and trees, especially from the Fabaceae, Compositae, and Zingiberaceae families.

In conclusion, this research gives and enriches information regarding suweg (*Amorphophallus paeoniifolius*) morphological and habitat conditions near Mount Ciremai National Park, West Java, Indonesia. Based on analysis, suweg can be found in 11 villages around Mount Ciremai National Park which are Bagjasari, Cidulang, Cikijing, Cilancang, Cipulus, Cisoka, Jagasari, Kancana, Sindangpanji, Sukamukti, and Sunalari villages. The morphological aspect of *A. paeoniifolius* found around Mount Ciremai has a lot of similarities with *A. paeoniifolius* from other areas obtained from the literature study. Suweg that found around Mount Ciremai National Park, West Java, Indonesia is usually found in four types of land which are home gardens, gardens, rice fields, and pond edges. There are also about 36 plant species that are always found living near suweg in every area.

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