CHARACTERIZTIC MORPHOLOGY ON SEEDS OF FOUR COLLECTION PLANT THAT HAVE BEEN CULTIVATED IN PURWODADI BOTANICAL GARDEN

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ABSTRACT

Background: The seeds are main breeding on spermatophyte. Plant can retain its kind and spread into various places caused by the seeds. Purwodadi Botanical Gardens have various collection plants as a conservation action. Based on IUCN 2012, the conservation status of *Parmentiera cereifera* Seem, listed as endangered plant. *Instia bijuga* (Colbr.) Kuntze *and Dillenia philippinensis* Rolfe listed as vulnerable plant. *Protium javanicum* Burm F is a protected plant under the Agriculture Minister Decree's No 54/Kpts/Um/2/1972. **Objectives:** The purpose of this research is to know the pattern of morphological characters of the seeds. Several parameters were observed in morphology seeds characterization include size (length and width; cm), diameter or thickness (cm), weight (g), color, surface and shape. One hundred seeds have been observed every plant. **Results:** This research shows every seed have different characters. The colors brown, black and orange. Seeds have wringkled smooth and hairy surface and have many type of shape such as 3 dimention, plateriform, irregular, and pyriforrm. **Conclusion:** This character can be used to complement the seed character data that not listed by Beacker on Flora of java.

Keywords

morphology, characteristic, seed

INTRODUCTION

The seeds are main breeding on spermatophyte. Plant can retain its kind and separated into various places caused by the seed .Characterization of morphology on the seeds can be used to the identification process. Study of the characteristics of seeds and seedlings can provide information on necessary to identify species in the field and among seed samples [1]. The character of morphology can be seen by identifying the nature of seeds, with some measure as seeds range in size from dustlike orchid seeds that can contain up to 1 million seeds in one gram, to the giant Coco de Mer or *Lodoicea maldivica* (Poles, 2009). Characters most frequently used for taxonomic purposes are seed surface, seed shape and presence or absence of a shiny surface [4].

Purwodadi Botanic Garden as an ex-situ conservation organization has the unit of seeds collection. It has an assignment of conserve seed lowland dry.

Characterization of external morphology in 48 species of selected seeds in Purwodadi Botanic Garden showed that there are variations in size, diameter, weight and shape of selected seeds. Seed color ranged between white, brown, and black up to red. Surface tends to smooth, some are rough and coarse. Many seeds spread by wind, animals, water and explosion [5].

Purwodadi Botanic Garden have large various of endemic plant such as *Protium javanicum* Burm.f., *Parmentiera cereifera* Seem., *Instia bijuga* (Colbr.) Kuntze, dan *Dillenia philippinensis* Rolfe. Based on IUCN 2012 conservation status of living plant collection, *P. cereifera* classified as endangerd plant, *I. bijuga* dan *D. philippinensis* classified as vulnareable plant. Protium javanicum Burm. F as living collections protected under the Agriculture Minister Decree's No. 54/Kpts/Um/2/1972. From that plant, the seed haven't characterized. The aim of this study is to know external morphology character of some seeds from endemic species that have been cultivated in Purwodadi Botanic Garden.

METHODOLOGY

This research was done from Mei until Juni 2015 in seed laboratory of Purwodadi Botanical Garden, Pasuruan, East Java. The tools used were digital scales, ruler, graph paper, digital camera, digital caliper, seedbed and stationery. Materials used are one hundred seeds of four species that have been cultivated in Purwodadi Botanical Garden such as *Protium javanicum* Burm.f., *Parmentiera cereifera* Seem., *Instia bijuga* (Colbr.) Kuntze, dan *Dillenia philippinensis* Rolfe. Several parameters were observed in external morphology seeds characterization include size (length and width; cm), diameter or thickness (cm), weight (g), color, shape, and surface,. Size of the seeds observing used graph paper. Diameter or thickness was measured using digital caliper. Weight of seed was measured by digital scale. Observation of seed surface differentiated into smooth, glabrous, wrinkled, ribbed, hairy, winged, pulpy, coarse and rough. Seed shape differentiated into symmetrical globular, obconical, reniform, oblong, obpyriform, napiform, ovoid, conical, campanulate, ellipsoid, globose, plateriform, pyriform, heart-shaped, semi-circle, 3-dimension, irregular and rhomboid.

RESULTS AND DISCUSSION

From observing the size, diameter, weight, color, shape, and surface of one hundred seed, the result shown in data table 1.

Table 1 Characteristic Of External Morphology From Seed Samples

Species	Size (cm)	Thick (cm)	Weight (gr)	Color	Surface	Shape
Protium javanicum Burm.f.	0,9 x 0,7	0,3	0,12	Brown	Wringkled	3 dimension
Parmentiera cereifera Seem.	0,35 x 0,3	0,09	0,01	Brown	Smooth	Plateriform
Instia bijuga (Colbr.) Kuntze	2,7 x 2,2	0.75	2,5	Black	Smooth	Irregular
Dillenia philippinensis Rolfe	0.4 x 0.2	0.2	2,4	Orange	Hairy	Pyriform

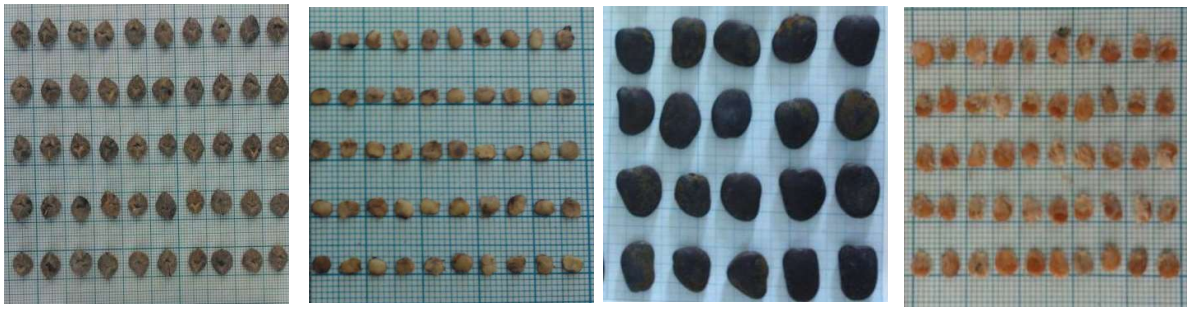

Figure 1: Characterization on seeds. A. Seeds of *Protium javanicum* Burm.f., B. Seeds of *Parmentiera cereifera* Seem., C, Seeds of *Instia bijuga* (Colbr.) Kuntze, and D. Seeds of *Dillenia philippinensis* Rolfe

According to Schmidt, 2000, some characters can be used for identify the seed such as weight, size, color, shape, and surface. Surface of seed also have structure that formed from fruit such as raphe and hilum. Morphological fruit and seeds often reflect a pattern of the spread of the seed. Figure 1.a shows *Protium javanicum* Burm F. seed characters on size 0.9- 0.7 cm, thick 0.3 cm; weight 0.12 gr; brown color, wringkled surface, and 3 dimensions on shape. In addition resulting smelling strongly of turpentine or being bruised that indicated can be propagated by animal night having the olfactory sharp as the wild boar (Pijl, 1982 in Schmidt , 2000).

Beacker, 1965 reported that *Parmentiera cereifera* having small seeds, wingless, seed ellipsoid, compresses, 2.5 – 3.5 mm in length. From table 1 completing data in size, color, surface and the shape could be says plateriform because of platy

shape (figure 1B). *Instia Bijuga* included in Fabaceae family, from this observing known that the seed have 2.7 x 2.2 cm in size, 2.5 cm in thickness, and 0.75 gram in heavy. According to Beacker, 1963 Dillenia have seeds with fleshy aril. Mahadi, 2010 completed the shape of *Dillenia philipinensis* Rolfe, round and flattened oval, with white aril this aril can be used as a marker of the seeds. Figure 1.c shows that *Dillenia philipenensis* have pyriform (pear shape) and fleshy aril. Aril is an appendage growing at or near the hillum of a seed; fleshy thickening of the seed coat (Harris, 2011).

CONCLUSION

The results of this research shows every seed have different characters. The colors brown, black and orange, have wringkled, smooth and hairy surface and also have many type of shape such as 3 dimention, plateriform, irregular, and pyriform. This character can be used to complement the seed character data that not listed by Beacker on Flora of java.

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