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Identification agronomic character of local durian parent trees as a step to develop a durian center in Sukowono and Sumberjambe

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Abstract. Most of the durian plants in Indonesia come from old and grow wild trees, not from tree selection. The durian developed by farmers in Sukowono and Sumberjambe is a local durian trees. This is a factor causing the erosion of germplasm, so that the existence and sustainability of local durian plants is threatened. This fact certainly requires attention from all parties in preserving the parent tree of germplasm, especially by knowing the diversity of durian variants and planting in collection gardens. The parent tree is an individual tree that has the requirements as a seed-producing tree. Steps to determine the diversity of durian can be done by mapping and identifying the character of the durian parent tree. The mapping was carried out through a series of exploration, inventory and characterization activities for durian plants. This activity will help efforts to develop durian fruit that has commercial value while also preserving its genetic resources from extinction. Activities will be held from August to December 2022 in Sukowono and Sumberjambe, Jember Regency. The parameters observed in this activity were tree age, tree height, stem circumference, petiole length, leaf shape, leaf length, leaf width, leaf color, and plant productivity in fruiting each season.

1. Introduction

Durian (*Durio zibethinus* Murr.) is an exotic tropical fruit plant that has a unique taste and aroma that is favored by various groups of people [1]. The obstacle in developing durian production in Indonesia is the low quality and productivity of durian. This is because there are still very few applications of technology and durian cultivation techniques applied in Indonesia. Most of the durian plants in Indonesia come from trees that are old and grow wild, not from the selection of superior crossbred trees. So far, the supply of durian in Jember district comes from local areas of Jember such as Panti, Garahan, and Sumberjambe. Whereas other areas also have the potential as suppliers of local durians from Jember, one of which is from the Sukowono District. However, the productivity of durian plants in Sukowono District is low compared to other sub-districts which produce fewer plants. This condition occurs because local Sukowono durian farmers are still not able to cultivate durian optimally. The Ministry of Agriculture has so far released 74 local superior durian varieties in each region whose quality is not inferior to imported durians. The advantages of this variety are thick flesh, small seeds, fine fiber, golden yellow flesh color, and delicious sweet taste [2] [3]. Therefore, local durian is an alternative consumption that is in great demand by the public because of its distinctive taste and the price is quite affordable for consumers [4].



In an effort to develop durian agribusiness, the support for the availability of quality seeds from superior varieties will determine its success. However, real conditions in the field show that the availability of quality seeds is still an obstacle, so that many farmers still use random seeds and come from local durian parent trees that are decades old [5]. This condition requires intensive attention and treatment. Therefore, efforts are needed to obtain superior seeds in order to maintain the quality and quantity of durian production. Efforts that can be made include conservation and plant breeding as soon as possible, either in situ or ex situ [6]. The five steps taken in ex-situ conservation include (a) determination of priority plant species, (b) mapping of population distribution, (c) collection of genetic material through exploration and characterization activities, (d) preparation of planting sites, and (e) development of crossbreeding gardens. [7]. Exploration activities are activities that go down to the field to collect data about the types of durians that exist in the area. The inventory and characterization activities of durian plants are expected to reveal the superior potential of this plant and the information obtained can be used as a reference to introduce the types of durians that exist in this area in a wider scope, for example as a source of plant breeding germplasm in order to obtain durian seeds. quality because durian is an annual plant if an error occurs in the selection of seeds, the losses incurred are very large [8].

2. Material and method

2.1 Time and Place of Implementation

This community service activity will be carried out in 2022 with a duration of eight months. The parties involved include the Jember State Polytechnic with the support of: (a) Center for Research and Community Service (P3M); (b) Business and Entrepreneurship Incubator Center (c) Seed Technology Laboratory; (d) Plant Laboratory. During the activity also involved 2 students as a form of MBKM implementation, empowerment program partners, other parties who played a post-activity role such as the Government and the surrounding community in Sukowono and Sumberjambe.

2.2 Tools and Materials

The tools used are stationery, ruler, meter, cellphone, GPS, camera, and scissors. The materials used include shoots, leaves, flowers and fruit from the identified local durian parent tree.

2.3 Implementation of Activities

This activity was carried out by looking for primary data obtained by conducting interviews with farmers who own local durian parent trees and service partners, namely Kelompok Tani Sri Sedono I. The activities were then continued in several stages as follows:

a. Pre-exploration

The pre-exploration stage was carried out by seeking information related to local durian plants found in Sukowono and Sumberjambe Districts. The information sought includes geographical conditions and location and local durian garden owners.

b. Exploration

The exploration stage was carried out by interviewing the owner of the durian-turmeric tree in order to obtain in-depth information about the local durian plant that is the mainstay of farmers.

c. Inventory

The inventory stage is carried out by recording the results of exploration and characterization, besides that each of these activities requires documentation activities, so that the results of the inventory can be in the form of pictures or tables as well as GPS coordinates of the location of the local durian parent tree that is inventoried.

d. Characterization

The characterization stage was carried out by observing the agronomic and morphological characteristics of plants.

2.4 Observation Variables

The variables observed in this activity are divided into two characters, namely characters at the agronomic and morphological level markings consisting of GPS coordinate markers.

2.5 Data Analysis

Data analysis was carried out descriptively with the stages of exploration, characterization and inventory of local durians found in Sukowono and Sumberjambe Districts, Jember Regency. Then proceed with recording and mapping the GPS coordinates of the parent tree distribution.

3. Results and Discussion

3.1 Exploration

Exploration activities carried out in Sukowono District provide information on local durian parent trees that are superior to durian farmers, namely Sukosari I, Sukosari II and Sukosari III. Meanwhile, exploration results of local durian parent trees found in Sumberjambe District include Rowosari I, Rowosari II, Rowosari III, and Rowosari IV.

3.2 Inventory

Sukosari Village is a village in Sukowono sub-district, Jember Regency, East Java Province which has an area of 535,888 Ha km² which is located at an altitude of 315 m above sea level [9][10]. The location of the distribution of the local durian parent tree is located at the coordinates of S 08°05' 10,0" E 113°50' 51,8", S 08°05' 10,4" E 113°50' 51,9", and S 08°05' 10,3" E 113°50' 51,9". Meanwhile Rowosari Village is one of the villages in Sumberjambe District which has a local durian mother tree which is located at the coordinates of S 08°04' 15,5" E 113°56' 11,4", S 08°04' 15,1" E 113°56' 10,1", S 08°04' 15,6" E 113°56' 10,3", and S 08°04' 16,1" E 113°56' 11,4".

3.3 Characterization

The stages of agronomic and morphological characterization were carried out based on two observational variables, namely quantitative variables and qualitative variables on 3 durian parent trees located in Sukowono Village and 4 durian parent trees located in Sumberjambe Village.

a. Quantitative Variables

Quantitative variables consist of several characters such as plant age, tree height, tree circumference, petiole length, petiole width, leaf blade length, leaf blade width (Table 1). However, when this paper was written, observations on flowering, fruit and seed had not been carried out because the period of flowering and fruiting was still ongoing and not at the same time. The parent trees of local durians in Sukowono District that were found have different plant ages, which are between 12 years, 20 years and 50 years. The oldest parent tree is Sukosari II which is located at GPS coordinates S 08°05' 10,4" E 113°50' 51,9". It has a height of 15 m, a stem circumference of 160 cm, an oval leaf shape and an annual productivity of 225 pieces. Meanwhile, the local durian mother tree in Sumberjambe District which was found to have almost the same plant age, which is between 40 years and 50 years. The oldest parent tree is Rowosari IV which is located at GPS coordinates S 08°04' 16,1" E 113°56' 11,4" has a height of 40 m, stem circumference 183 cm, oval leaf shape, annual productivity reaches 500 pieces. These results indicate that the older the parent tree of the local durian found, the greater the productivity of the tree in producing fruit each year. In addition, the older the local durian parent tree, the taller and larger the tree circumference. The same thing also reported by [11].

Table 1. Characters of Age, Height, Stem Circumference, Average of Petiole Length, Average of Leaf Blade Length, and Average of Leaf Blade Width of Local Durian in Sukowono and Sumberjambe Districts

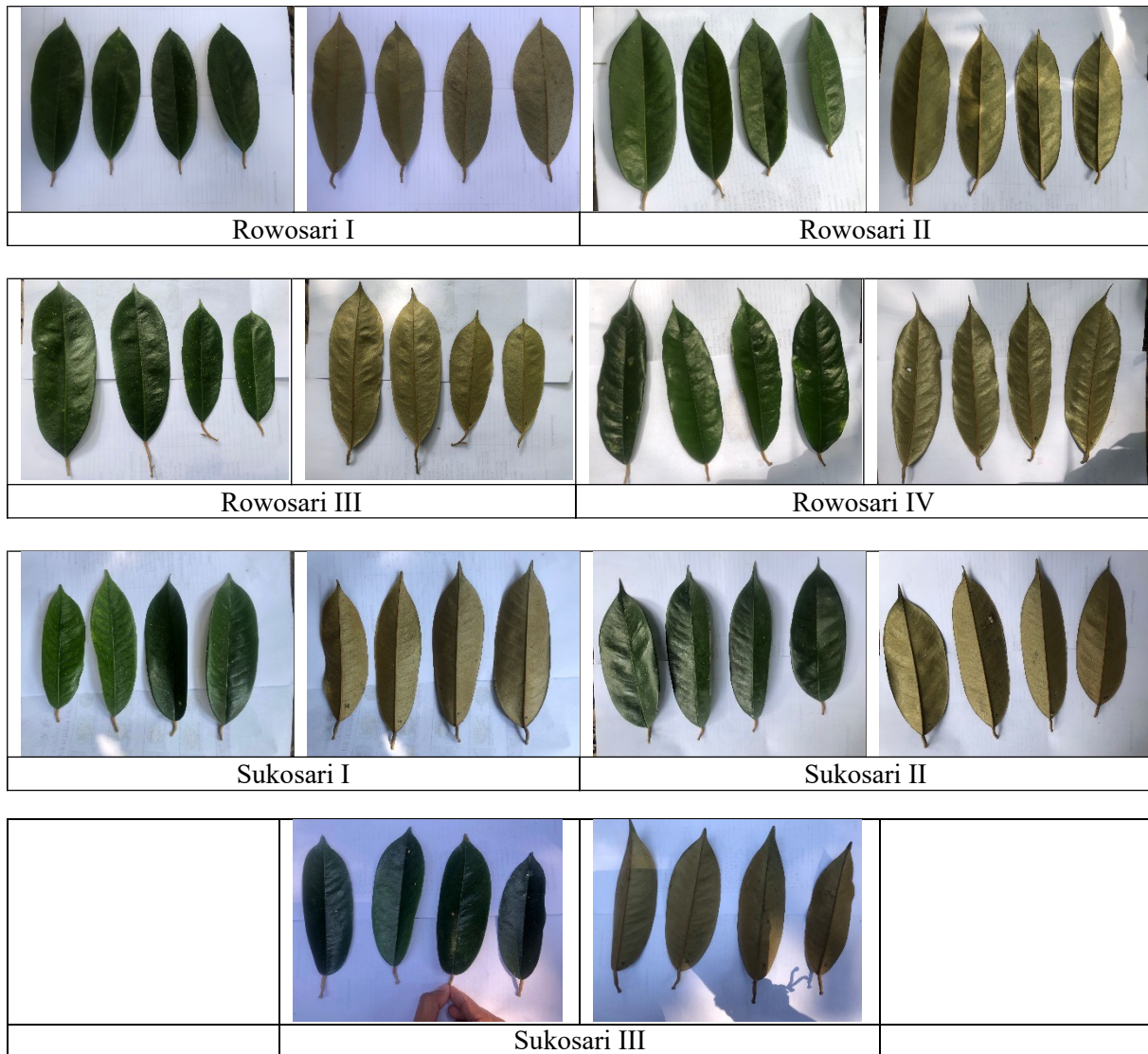
No.	Durian Name	Coordinate point of GPS	Age (years)	Height (m)	Stem Circumference (cm)	Average of Petiole Length (cm)	Average of Leaf Length (cm)	Average of Leaf Width (cm)
1.	Sukosari I	S 08° 05' 10,0" E 113° 50' 51,8"	12	12.5	80	1.93	17.25	6.08
2.	Sukosari II	S 08° 05' 10,4" E 113° 50' 51,9"	50	15	160	2.2	15	5.73
3.	Sukosari III	S 08° 05' 10,3" E 113° 50' 51,9"	20	17.5	125	1.7	18	6.4
4.	Rowosari I	S 08° 04' 15,5" E 113° 56' 11,4"	40	23.5	172	1.9	16.83	5.88
5.	Rowosari II	S 08° 04' 15,1" E 113° 56' 10,1"	40	30	162	1.7	20.3	6.05
6.	Rowosari III	S 08° 04' 15,6" E 113° 56' 10,3"	40	25	174	1.64	16.12	5.7
7.	Rowosari IV	S 08° 04' 16,1" E 113° 56' 11,4"	50	40	183	1.88	19.9	5.88

b. Qualitative Variables

Qualitative variables consist of several factors such as growth type, crown shape, lateral branching pattern, tree trunk color, upper leaf surface color, lower leaf surface color, leaf shape, leaf tip shape, leaf base shape, leaf edge shape. However, when this paper is written observations regarding, sepal color, petal color, pistil shape, pistil color, fruit shape, fruit base shape, fruit tip shape, thorn shape, fruit skin color, aril color, aryl texture, water condition in aryl, fruit aril taste, aryl fruit stickiness, fruit aril aroma, seed shape, and seed coat color have not been carried out because the flowering and fruiting periods are still ongoing and not at the same time.

The results of exploration activities in Sukowono and Sumberjambe Districts found that the type of plant growth came from seed or seedling. The crown of local durians from both Sukowono and Sumberjambe shows an irregular or irregular shape [12]. The shape of the leaves on each type of local durian tree that has been found has a similar shape, namely oval where at the end of the leaf there is an indentation. Each leaf has a uniform tip shape that has a long tip curve. The color of the upper leaf surface on local durians in Sukowono tends to be dark green and light green while those from

Sumberjambe tend to be dark green. The color of the lower leaves on local durians from Sukowono and Sumberjambe tends to be the same, namely silver brown (silvery brown).



4. Conclusion

There are 3 superior local durian parent trees found in Sukowono and 4 trees in Sumberjambe. There are similarities in the agronomic characters of the durian parent tree from the two sub-districts. The identification results also show that the older the parent tree of the local durian found, the greater the productivity of the tree in producing fruit each year. In addition, the older the local durian parent tree, the taller and larger the tree circumference.

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