Jurnal Pertanian Tropik
ISSN NO: 2356- 4725/p- ISSN : 2655-7576
Vol.10.No.1. 2022 (1): 1- 6
DOI: 10.32734/jpt.v10i1, April.11663

Exploration of Local Durian (*Durio zibethinus* Murr.) from Semen Sub- District, Kediri, East Java Based on Morphological Character and Geograpical Factor

Rasyadan Taufiq Probojati[1]*, Nugraheni Hadiyanti[1], Nina Lisanty[2], Agustia Dwi Pamujiati[2], Muhammad Riza Firdausi[3]

[1]Program Studi Agroteknologi, Fakultas Pertanian, Universitas Kadiri
[2]Program Studi Agribisnis, Fakultas Pertanian, Universitas Kadiri
[3]SMPI Tahfidzul Qur'an, Catakgayam, Mojowarno, Jombang
Corresponding author : *Corresponding author*: rasyadantaufiq@unik-kediri.ac.id

ABSTRACT

The purpose of this study is to identify morphological characters and determine the local durian distribution map in Semen District, Kediri Regency. This study uses a purposive sampling method to collect data. Local durian coordinates analyzed using QGIS version 3.6 software. Morphological character is examined by observing morphology. Micro climate factors measured are height, intensity, temperature and humidity of the soil and air, soil pH. The results show that local durin morphology in Semen District Kediri Regency has diversity. There are 10 local durian plants found based on their geographical character. The dendogram results show that local durian has similarities based on its morphological character. This morphological variation dependent to light intensity, altitudinal, the velocity of wind and soil nutrient factors.

Keywords. Morphological character, Geographical factor, Durian local

INTRODUCTION

Durian (*Durio* spp.) belongs to a tropical fruit plant that is spread across Indonesia and Malaysia (Orwa et al., 2009). Durian is also an exotic plant and has various variations spread across several countries. Around 27 types of durian spread in the world, in Indonesia there are approximately 20 types of durian. In fact, Indonesia is the center of durian distribution in the world. Furthermore, around 18-20 types of durian can be found in Borneo, while seven of them grow in Sumatra and the rest are scattered throughout Indonesia (Santoso, 2012; Sundari et al., 2019). However, the nature of the durian plants that grow in the area provides a variety of different type (Yuniastuti et al., 2018a). Thus, local durians in Indonesia have a variety of different names according to the region where they grow.

The spread of durian in East Java has been distributed in various regions with different geographical conditions. Kletak Village, Semen District is one of the durian centers in Kediri Regency. The area has geographical conditions and climatic conditions that meet the requirements for growing durian. There are differences in the location where local durians grow, one of which is the altitude.

The differences in geographical conditions However, the introduction of local types of durian has not been carried out widely. While, if an inventory of local durian species is carried out, it can be used as a basic reference in determining the superior types of local durian. Inventory activities include exploration and identification which are field activities to collect data on types of durian in the area (Yuniastuti et al., 2018a; Yuniastuti et al., 2018b). Inventory and characterization of the durian genotype morphology is expected to reveal the superior potential of this plant for development in other regions. Inventory and characterization of the durian genotype morphology is expected to reveal the superior potential of this plant for development in other regions. The information obtained is used as a reference to introduce all types of durian in this area to a wider scope (Yuniarti, 2011). The present study aims to analyze the diversity, grouping and distribution map of local durian from Kletak, Semen District, Kediri Regency, and provide clear information about the types of local durians found. It is also expected to be used as reference in the wider development of durian cultivation and as a basis for further research in the development of genetic resources.

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MATERIALS AND METHOD

Area Study and Plant materials

The research sample was conducting in Semen Sub-District, Kediri Regency, East java, Indonesia. While, data analysis was carried out at the Biology Laboratory, Faculty of Agriculture, University of Kadiri. Samples were collected by purposive sampling method. Ten local durians were collected in this study (Table 1). Determination of the sample based on criteria including being mature, having an age of more than 10 years, regularly bearing fruit, having the required plant parts and based on recommendations from the surrounding community.

Table 1. Samples of durian used in this study

No	Local name	Location
1.	Durian Le	Kanyoran, Semen
2.	Tokong	Kanyoran, Semen
3.	Kerucut	Kanyoran, Semen
4.	Bajul Cokelat	Kanyoran, Semen
5.	Musang King	Kanyoran, Semen
6.	Mentega	Kanyoran, Semen
7.	Duri hitam	Kanyoran, Semen
8.	Segitiga madu	Kanyoran, Semen
9.	Kani	Kanyoran, Semen
10.	Bawor	Kanyoran, Semen

Morphological characterization

Observations were made on the vegetative and generative organs of plants, i.e.: leaves, flowers, fruit, fruit length, fruit weight, fruit shape, flesh color, flesh thickness, flesh taste, flesh color, fruit aroma and seed shape. Then, the data from the identification results were then tabulated to obtain data regarding the characteristics of superior durian accompanied by documentation. Observation of morphological characteristics of durian plants was carried out using the Descriptor characterization guide for durian (Bioversity, 2007). Meanwhile, in order to record the location of the durian plant found, it is marked with the coordinates of the GPS (Global Positioning System). Furthermore, local durian planting locations recorded data on physical environmental factors (altitude, pH, temperature, rainfall intensity, and light intensity) (Sundari et al., 2019).

Data analysis

Morphological description scoring data were analyzed using the UPGMA cluster technique (Unweight Pair Group Method with Arithmatic Mean), with the Paleontological Statistics (PAST) program version 3.0. The analysis will produce a dendogram then analyzed with synapomorphy, autopomorphy and apomorphy characters to determine the distinguishing character of the local durian from Semen, Kediri. Meanwhile, the relationship between the spatial distribution of durians found was visualized using QGIS software version 3.6.

RESULTS AND DISCUSSION

Morphological Diversity of Durian (*Durio zibethinus* Murr.)

The results of exploration of durian plants in the Semen sub-district area with different heights have been identified based on their respective characters. Furthermore, based on observations of the morphological characters of durian genotypes in Semen Sub-District, Kediri Regency, it shows that there is diversity in the morphological characteristics of trees, leaves, fruit and seeds.

Based on observations of the morphological characters of the trees, 5 types of crown shapes were found from 10 types of durian plants identified i.e. pyramidal, oblong, spherical, semi-circular, elliptical and irregular shapes (Figure 1). Whereas durian leaves in Semen sub-district include elliptical shape, with the color of the upper surface of the leaf being dark green, the color of the lower surface of the leaf being silvery

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brown and copper brown, the condition of the petiole is round, the shape of the leaf blade is long round, the shape of the base of the leaf is rounded and blunt. However, according to Setiawan (2015) states that durian leaves are generally oblongus with a tapered tip, which is alternately located and grows singly after that the leaf structure is rather thick with the upper leaf surface being shiny green and the lower part brown or golden yellow.

Figure 1. Vegetative characters of Durian in Semen Sub-district, Kediri Regency. A. Crown shape (1. duri hitam-irregular; 2. musangking- irregular; 3. segitiga madu-pyramidal; 4. mentega-oblong; 5. bajul cokelat-pyramidal; 6.bawor-pyramidal), B. Trunk surface (1. bawor-smooth; 2. musangking-rough; 3. duri hitam-smooth; 4. segitiga madu-very rough; 5. kerucut-smooth; 6. bajul cokelat-rough).

Morphology of durian plants found to have diversity. This depends on where it grows or geographical places. In addition, the results of the characterization are visualized in the form of dendograms to determine the level of similarity between durian cultivars (Figure 2.). Relationship analysis is used to determine the close relationship between plants using the morphological properties

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of a plant. Morphological nature can be used for recognition and describe the relationship of the type.

The level of differences in similarity and irregularity is due to differences in morphological character between accessions in the first and second groups, the differences are both qualitatively and quantitatively. Qualitative characters that cause these differences such as the shape of the canopy, the shape and color of the leaves, flowers, fruit and seeds. Quantitative characters in the form of plant height, length and width of leaves, flowers, fruit and seeds. The difference in morphological character between durian plants is also influenced by genetic and environment. Plants need certain environmental conditions, namely the optimum environmental state to express their genetic programs in full.

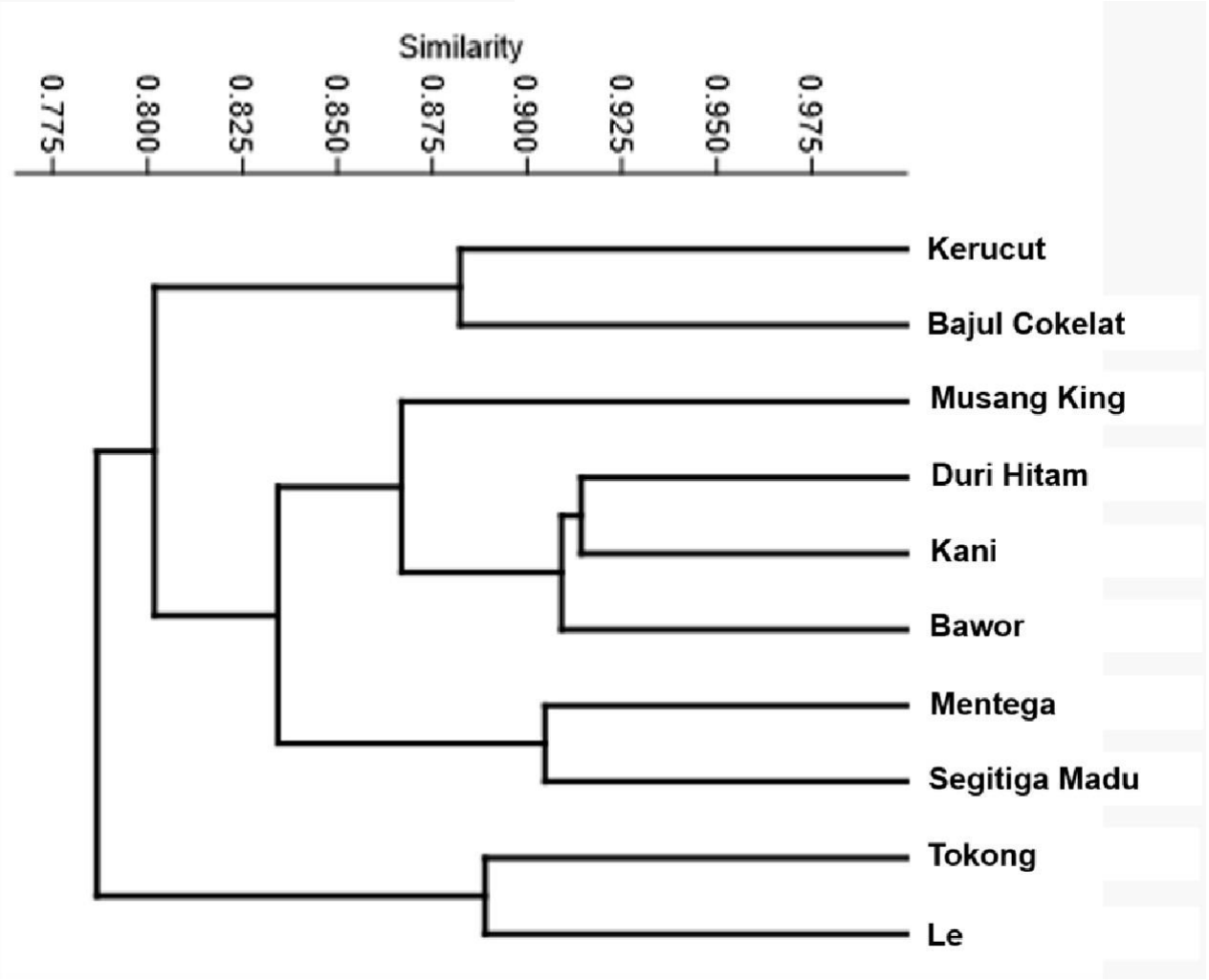

Figure 2. Dendograms of 10 types local durian plants in Semen Sub-district, Kediri Regency

Furthermore, this research succeeded in mapping the location of the local durian distribution center in Semen District, Kediri Regency. Horizontal distribution shows that local durian grows in all these fields (Figure 3).

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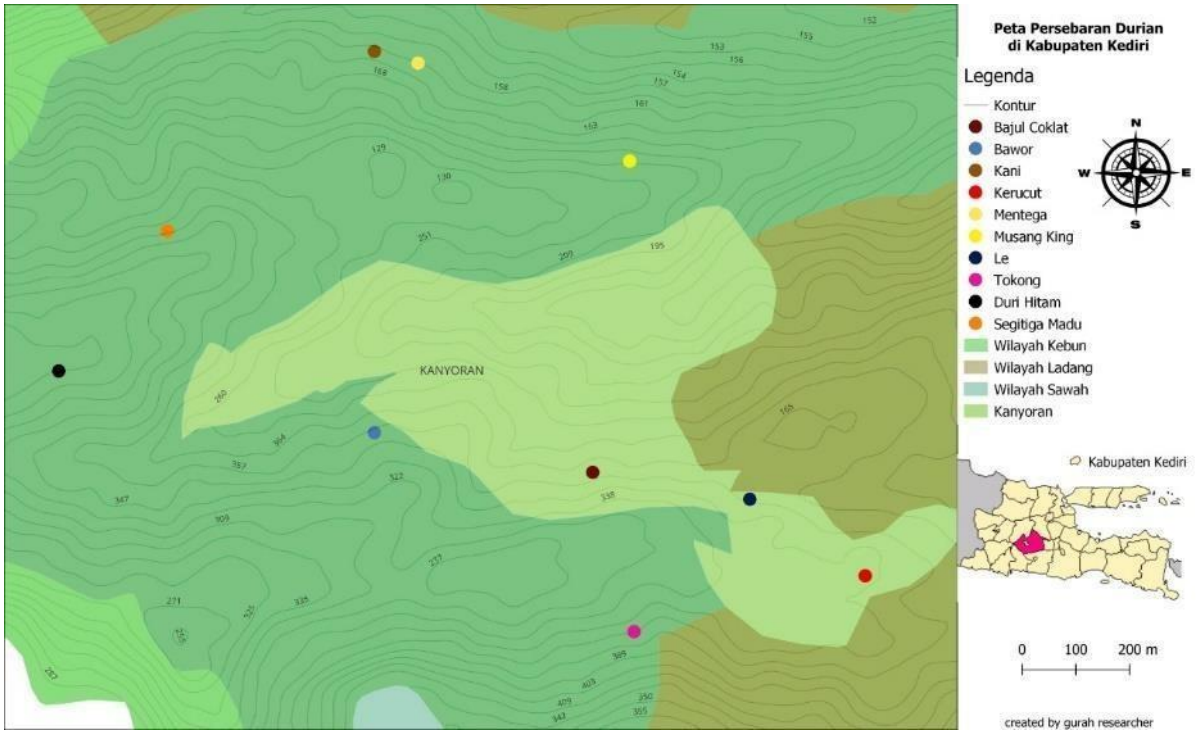

Figure 3. Map of durian tree distribution from Semen Disrict, Kediri (source: personal document)

CONCLUSIONS

This study concluded that the local durian in Semen District Kediri Regency had morphological diversity and was successful in the form of dendograms. Furthermore, the spatial distribution in the local durian of Semen District, Kediri Regency is visualized.

ACKNOWLEDGEMENT

We would like to say thank you to LP3M Kadiri University as our affiliation that support our research operational and publication. Sincere thanks also dedicated to our colleagues Muhammad Riza Firdausi, Yusup, Rizki, Andreas, Luluk, Dektiansyah, Hana, Abidin and Diyah.

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