

# The Diversity Of The People's Coffee In The Sekarkijang Area (Besuki And Lumajang) As A Source For Learning Biology Of High School

Sawitri Komarayanti<sup>1\*</sup>, Latifa Mirzatika Al-Rosyid<sup>1</sup>, Maylisa Ika Febriyanti<sup>1</sup>, Silva Nafisa<sup>1</sup>, Yunitasari Dwi Retnowati<sup>1</sup>

<sup>1</sup> Universitas Muhammadiyah Jember; [sawitrikomarayanti@unmuhjember.ac.id](mailto:sawitrikomarayanti@unmuhjember.ac.id) ; [latifa@unmuhjember.ac.id](mailto:latifa@unmuhjember.ac.id) ; [maylisa@gmail.com](mailto:maylisa@gmail.com) ; [silva@gmail.com](mailto:silva@gmail.com) ; [yunitasari@gmail.com](mailto:yunitasari@gmail.com)

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\* Correspondence:

Sawitri Komarayanti

Email:

[sawitrikomarayanti@unmuhjember.ac.id](mailto:sawitrikomarayanti@unmuhjember.ac.id)

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**Abstract:** This study aims to identify and analyze the diversity of morphological characters from the collection of Robusta, Arabica, and Liberica coffee types in Bondowoso Regency and their use as a source of high school biology learning in the form of encyclopedias. The research was conducted in 6 sub-districts in Bondowoso Regency. Determining the location of research using Purposive sampling and interview techniques using Snowball sampling. The experiment was carried out by morphological characterization of 14 Robusta clones, 13 Arabica varieties, and 2 Liberica varieties using a descriptor list that was modified for coffee plants. Qualitative data were analyzed using triangulation and tabulated based on morphological tables of coffee plants. The morphological identification results Robusta, Arabica, and Liberica coffee plants showed that there were many differences, especially on the morphology of the leaves, fruits, and seeds. The product of this research is in the form of the Encyclopedia of Coffee Plant Diversity in Bondowoso Regency as a source of learning biology for SMA/MA grade X.

**Keywords :** Coffee diversity, Bondowoso Regency, Internet access, Biology learning resources.

## INTRODUCTION

Coffee is one of the main plantation commodities in the Sekarkijang area. There are two kinds of coffee cultivation, namely that which is cultivated by the people (people's coffee) and that which is cultivated by PT Perkebunan Nusantara XII based on Purwatiningsih & Ismanto [1]. People's coffee is coffee planted by the people on land owned by Perhutani with the condition that 1/3 of the harvest is handed over to Perhutani. Types of people's coffee include Arabica coffee (*Coffea arabica*) and Robusta coffee (*C. canephora* Pierre var. *robusta* Chev.).

In 2018 there were 10 coffee-producing provinces in Indonesia. These provinces include South Sumatra, Lampung, East Java, North Sumatra, Aceh, Bengkulu, South Sulawesi, East Nusa Tenggara, West Java, and West Sumatra. East Java Province occupies the 3rd position with a total production of 71,551 tons. In East Java Province, there are 21 regencies/cities that produce the largest coffee. The regencies/cities include Jember, Banyuwangi, Malang, Bondowoso, Pamekasan, Blitar, Probolinggo, Lumajang, Kediri, Situbondo, Pacitan, Ponorogo, Madiun, Jombang, Ngawi, Tulungagung, Magetan, Trenggalek, Nganjuk, Mojokerto, and Sumenep according to BPS, East Java Province [2].

In studying the diversity of plants, especially coffee, learning resources are needed that can explain the diversity of coffee which not only includes descriptive explanations, but also there must be appropriate supporting images. Based on this, the appropriate learning resources are learning resources in the form of an encyclopedia. Encyclopedia is a collection of information based on certain

scientific studies according to Prastowo [3]. One form of learning resource that can contain pictures as well as a broader explanation is the encyclopedia. Because encyclopedias are able to provide visualizations that can attract students' interest and are able to broaden students' insight into the surrounding environment based on Fatimah [4].

This research was also carried out in the midst of the Covid-19 pandemic outbreak where there were several appeals based on this Covid-19 protocol. So that in collecting data in this study, it was done via telephone and based on internet access. Based on the description above, it is necessary to conduct research on the diversity of Robusta coffee varieties, Arabica and Liberica coffee clones in the Sekarkijang area based on internet access as a source for high school biology learning. The output of this research is a learning resource in the form of an encyclopedia.

## METHOD

This type of research is descriptive qualitative. The research data are in the form of facts and written data about the diversity of Robusta coffee clones, Arabica varieties, and Liberica in the Sekarkijang area. Sources of data in this study in the form of primary data from interviews and secondary data obtained from the official website of the relevant agencies in this study. The locations in this study include the Besuki residency areas, namely: Jember, Bondowoso, Situbondo, Banyuwangi and Lumajang. Data collection techniques were obtained through library research, interviews via whatsapp, and documentation. Data collection instruments in the form of research tools, research materials, coffee plant characteristics instruments used in the form of morphological characterization descriptors of coffee plants that have been modified previously according to Al-Rosyid [5]. Data analysis was processed by tabulation by registering all the characteristics of each identified clone and variety in the form of tables, photos and described descriptively. The data validity technique was carried out by testing the validity of the research data, namely by triangulating sources.

## RESULTS AND DISCUSSION

In Banyuwangi, Robusta coffee clones dominate because smallholder coffee plantations are not too high and the productivity level is higher than coffee with other varieties (Fig. 1). In the type of Robusta coffee clones in Banyuwangi Regency, there are 9 types of coffee that dominate people's coffee plantations, namely Brazilian Robusta clones, Tugusari Robusta clones, Mumbulsari Robusta clones, Kalibendo Robusta clones, Bangelan Robusta clones, Robusta clones BP 358, Robusta clones BP42, clones Robusta BP 939, Robusta BP912 clone. Of the 9 Robusta clones they have differences and different levels of productivity, in other types of coffee, namely Arabica and Liberica varieties that dominate coffee plants in people's coffee plantations, there is only one Arabica variety in Banyuwangi Regency, namely the Andongsari variety, for the Liberica variety there is two types, namely Liberica Ekselsa and Liberica Konuga Kliris, for Liberica Ekselsa coffee most coffee farmers use it as the main stem (main tree) because Liberica Ekselsa has the advantage of being resistant to pests and has strong roots compared to other types but has low coffee productivity. Coffee farmers in Banyuwangi use it as a mother tree in the upper part of the tree connected to Robusta clones which have good selling prices and productivity according to Komarayanti [6]

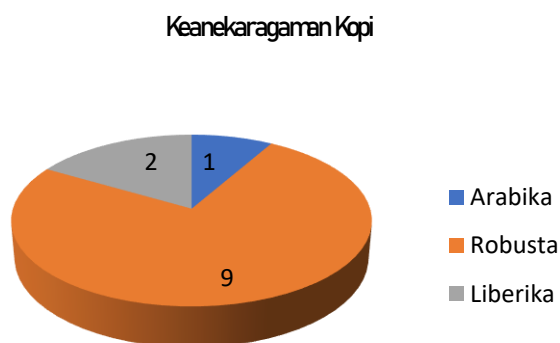


Fig.1. Diversity of Coffee Types in Banyuwangi Based on Varieties and Clones

The percentages of coffee plant species that have been described in Fig. 2. are in Arjasa Subdistrict and Sumbermalang Subdistrict as much as 36% or as many as 9 types of coffee plants. Meanwhile, in Jatibanteng District, it has a percentage of 28% or 7 types of coffee plants. The district with the least number of coffee plant species found is in Jatibanteng District, this is because in the Jatibanteng sub-district there are still not too many farmers who cultivate coffee and are still in the learning phase of cultivating coffee so that fewer clones and varieties are planted. The famous coffee product in Situbondo Regency is from Arjasa District, precisely in Kayumas Village, besides PTPN XII Kayumas which cultivates coffee, there are also smallholder coffee farmers who cultivate it first compared to Sumbermlang District and Jatibanteng District. So that the Kayumas coffee product market is also more famous than other areas in Situbondo Regency.

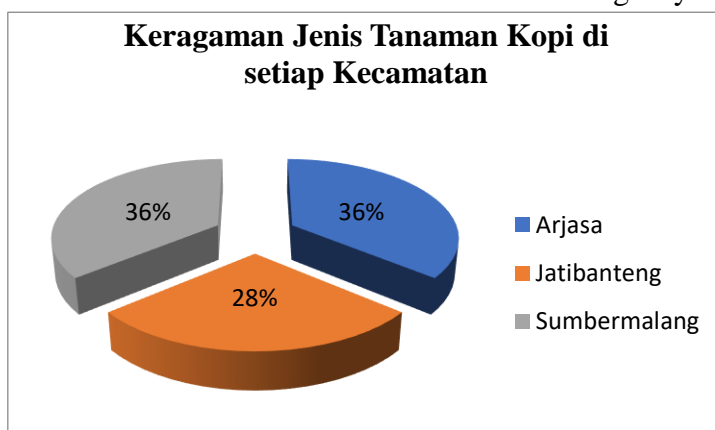


Fig.2. Percentage of Diversity of Coffee Plants in Each District

The percentage of coffee plant population in 4 sub-districts shows that the highest coffee plant population is in Pasrujambe sub-district with a percentage of 55%, this is because the total area is around 756.0 ha with productivity levels reaching 550.0 kg/ha (Fig. 3). Based on interviews with farmers in the Pasrujambe sub-district, the coffee plants in this sub-district have very good quality because the farmers are very good at taking care of their coffee plants so that they can produce higher productivity levels than other sub-districts based on Anggraini [7]. Meanwhile, the lowest population of coffee plants is in Senduro sub-district with a percentage of 5%, this is due to

the large number of coffee plantations that intercrop and switch functions to plant cardamom so that coffee plantations experience a narrowing of plants but not with a narrowing of land.

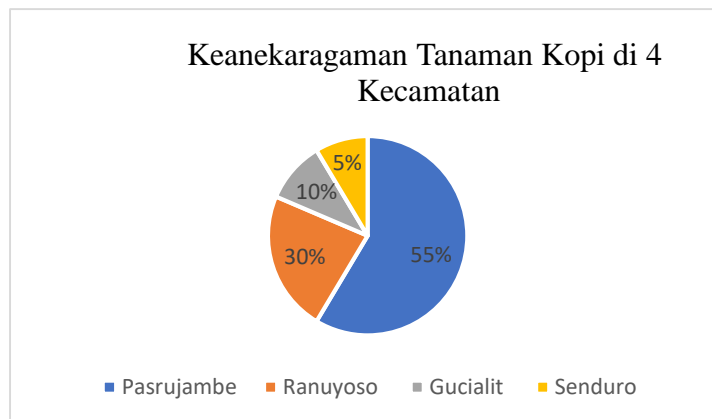


Fig. 3. Percentage of Diversity of Coffee Plants in 4 Districts

The percentage of coffee plant diversity that has been found in 13 sub-districts is at most in Jelbuk District as much as 20% or 11 varieties and clones (Fig. 4). This is because in this disability there is an experimental garden and the land is suitable for planting several varieties and clones of coffee. Sukorambi District as much as 15% or 8 varieties and clones, this is due to land suitable for several varieties and clones of coffee plants. Silo Subdistrict as much as 9% or 5 types of coffee, because in this disability only grows coffee with good productivity. 7% or 4 types of coffee plants, namely in the sub-districts of Ledokombo, Sumberbaru, Garahan and Panti. 4% or 2 types of coffee plants, namely in Sumberjambe, Bangsalsari, Mayang, Arjasa and Patrang sub-districts. Some sub-districts only plant a few types of coffee, this is because some of these sub-districts grow coffee plants that have good productivity.

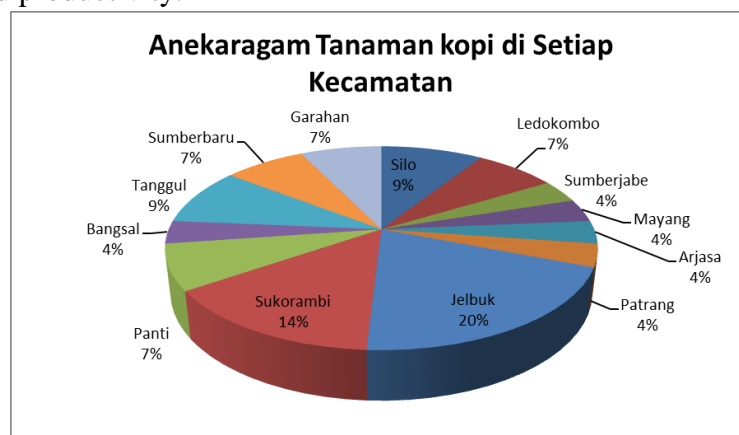


Fig. 4. Percentage of Variety of Coffee Plants in Jember.

All information found through research activities and literature study on the diversity of coffee plants found in the Sekarkijang area can be used as a source for learning Biology for SMA/MA curriculum 2013 especially for class X in the form of an encyclopedia. Because the diversity of coffee plants is related to KD 3.2 regarding the analysis of various biodiversity in Indonesia and their threats and conservation referring to Wardhani [8]. The product resulting from this research activity is in the form of an encyclopedia that has been designed in its preparation. Based on the product design as a result of this research, it can be used as a learning resource because it meets 6 criteria

for learning resources referring to Al-Rosyid [9] namely clarity of potential, conformity with learning resources, clarity of targets, clarity of information that can be disclosed, clarity of exploration guidelines, and clarity of gains obtained.

## CONCLUSION

The diversity of coffee in the Sekarkijang area was found in the Besuki residency, namely Jember, Bondowoso, Situbondo, Banyuwangi and Lumajang. Liberica coffee varieties. The diversity in vegetative characters includes plant stature, leaf morphology, fruit morphology, seed morphology, and flower morphology. In addition, there is also a good diversity of Robusta clones, Arabica varieties, and Liberica from superior coffee to local coffee. Based on the results of the research, it can be developed as a source for learning Biology for SMA/MA class X at KD 3.2 regarding the analysis of biodiversity in Indonesia and its conservation in the form of an encyclopedia.

In addition to the types of coffee plants found, there are still many coffee plants that have not been identified. Researchers hope that there will be further research to identify the remaining coffee plant species. In addition to Robusta and Arabica coffee, which currently have high value quality to the world level, Liberica coffee has also begun to be cultivated to compete in the marketing world. Therefore, the researcher hopes that smallholder coffee farmers in the Sekarkijang area will receive training and facilities from both the Research Center and related institutions regarding the cultivation of the Liberica coffee plant.

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