

Exploration of Planting Areas and Organoleptic Tests of Pineapple (*Ananas comosus*) in Central Aceh, Indonesia

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ABSTRACT

Pineapple (*Ananas comosus*) is a tropical fruit plant that is in great demand and has many benefits. Pineapple has a sweet taste slightly sour and fresh, and contains many vitamins and nutrients. Gayo pineapple is a variety originating from Central Aceh that has been certified as a national superior fruit. The problem is that the Gayo pineapple planting area is still low. This is caused by people does not know the advantages and disadvantages of Gayo pineapple compared to other national varieties of pineapple. The purpose of this study was to determine the distribution of various types of pineapple in Central Aceh as well as the level of people's preference for Gayo pineapple. This research was conducted in Pegasing District, Central Aceh Regency and at the Laboratory of Basic Agricultural Sciences, Faculty of Agriculture, Universitas Malikussaleh. the study was conducted from March to May 2022. The research used descriptive method with purposive sampling. The results showed that there were two varieties of pineapple cultivated in 5 locations in Pegasing District and its surroundings in Central Aceh, namely Gayo and Madu. Organoleptic test results showed that Gayo and Simalungun Pineapple were highly favored by consumers. Consumer preference is based on the color of the fruit flesh, aroma, taste, water content and texture of the flesh, with a score of 4.0 - 4.1 (from a standard maximum score of 5).

Keywords: Morphology, Qualitative, Quantitative, Texture

1. INTRODUCTION

Pineapple (*Ananas comosus* L. Merr.) is one of tropical fruit plants that are in great demand by people in the country and abroad. This plant has many benefits, especially in the fruit section. Pineapple has a fresh, sweet and slightly sour taste with various vitamins and nutrients in it, which are protein, fat, carbohydrates, calcium, vitamin A, vitamin C, and vitamin B. Pineapple contains water, sugar, organic acids, minerals, nitrogen and all vitamins in small amounts, except vitamin D [1]. Pineapple is generally consumed in fresh form or in the form of juice. In addition, pineapple can also be processed into jam, toffee and other types of preparations. Apart from the fruit, other parts of this plant can also be used as processed materials such as paper and textiles using pineapple fiber. Pineapple skin can also be processed into syrup or animal feed extracted from the skin liquid [1].

Pineapple production in Central Aceh District in 2018 was 458.0 quintals [2], while in 2019 the pineapple production increased to 1 537.9 quintals [3]. Pineapple fruit production in Aceh Province in 2018 was 12 026 quintals and decreased in 2019 to 11 432 quintals [4]. National pineapple production in 2018 was 1 805 499 tons, while in 2019 the production increased to 2 196 456 tons [5].

Many types of pineapple have a good taste. The types of pineapple that are widely cultivated by the community are Cayenne and Queen pineapples. Pineapple with the Cayenne type is also called Subang pineapple, while the Queen type is known as the honey pineapple. Queen pineapple (honey) has higher levels of vitamin C compared to Cayenne pineapple (Subang) [6].

Aceh province has a type of pineapple with a fresh and delicious taste called Gayo pineapple. Gayo pineapple comes from Central Aceh and has a large fruit size, sweet taste, fine fiber, and edible core. Gayo pineapple can produce as much as 69 tonnes/ha [7].

In 2020, the Gayo pineapple has been registered and received a national superior fruit certificate. The problem is that the planting area of Gayo pineapple is still low. This may be due to the lack of public knowledge of the

advantages and benefits of Gayo pineapple. Lack of information regarding the character and quality of Gayo pineapple will also prevent the development and utilization of Gayo pineapple plants.

In addition, people generally cultivate pineapple plants based on habitual factors. They prefer to use the type of pineapple they often plant compared to the type of Gayo pineapple. If this continues, it is feared that the Gayo pineapple species will become extinct. Therefore, it is necessary to conduct research to explore the types of pineapples commonly cultivated in Central Aceh and compare the level of people's preferences.

Sources of plant diversity and development can be obtained by analyzing the relationship through analysis of morphology and fruit quality. Information about diversity is needed in plant breeding as the availability of the information makes it easier to determine the position or relationship between the varieties [8].

Research on superior local plant species has been started by the fruit plant research team at the Faculty of Agriculture, Malikussaleh University. Types of plants that have been studied to reveal the advantages of local Aceh plants are durian [9];[10]; [11], mangosteen [12], and avocado [13];[14].

The purpose of this research was to determine the distribution of various types of pineapple in Central Aceh and the level of public preference for Gayo pineapple compared to the other types of pineapple. The success of this research will be very beneficial for science, plant development and protection of the genetic resources of superior plants from Aceh.

2. RESEARCH METHODS

This research was conducted in Pegasing District, Central Aceh Regency and Agroecotechnology Laboratory, Faculty of Agriculture, Malikussaleh University, Aceh, Indonesia. The implementation of this research starts from March to April 2022.

The materials used are the pineapple plants and fruit of the Gayo, Simalungun, Pak-Pak and Honey. The research began with exploring pineapple plants throughout Central Aceh district and then continued with organoleptic tests.

Exploration was done using a descriptive method which is purposive sampling. Inventory activities from pineapple production centers in Central Aceh began with preparations before field surveys, including the preparation of survey tools such as GPS and altimeter. Data recording in the research was done on various demographic data and central coordinate points of the distribution of pineapple plants. The data obtained from the exploration results were then analyzed descriptively by recording things that are related to the demographic data of farmers which were displayed in the form of tables and figures.

Organoleptic test was done using descriptive method. The panelists selected were semi-trained panelists which consist of 40 students from the Faculty of Agriculture, University of Malikussaleh. The criteria of the pineapple fruit used as sample is a healthy fruit and not attacked by pests or diseases. Organoleptic test or sensory test is a way of testing using the human senses as the main tool for measuring the acceptability of products. The selected panelists were semi-trained panelists with a total of 40 people. Each panelist gets various fruits that must be tasted and give an assessment according to their level of preference. The score ranges from 1 (strongly disagree) to 5 (strongly agree). Each panelist who will evaluate other fruit is required to drink mineral water to prevent biased data. Observations of organoleptic tests included various fruit characters, which are fruit color, aroma, typical sweet taste of pineapple, water content, texture of fruit flesh and level of preference.

3. RESULTS AND DISCUSSIONS

3.1. Exploration and Mapping of Pineapple Planting Areas in Central Aceh

Exploration and mapping of the area of pineapple planting was done in Pegasing District, Central Aceh District. Two types of pineapple were found cultivated by farmers in Pegasing District at different location points, which are honey pineapple and Gayo pineapple. Exploration data for honey pineapple in Pegasing District is presented in Table 1.

Based on Table 1, it can be seen that there are 15 farmers who cultivate honey pineapple in the Pegasing sub-district. Honey pineapple cultivation that is done by farmers is found at 5 different location points, these are at Kung, Belang Bebangka, Kayu Kul, Jerusen and Simpang Kelaping. The land area of each farmer is between 0.01 to 0.48 ha with an altitude of 1000 meters above sea level to 1234 meters above sea level. The age of the honey pineapple plants found in 4 location points is 1 year to 53 years old with a production of 50 to 1500 fruits per harvest. Gayo pineapple exploration data in the Pegasing sub-district is presented in Table 2.

Table 1. Honey Pineapple Exploration Data in Pegasing District, Central Aceh

No	Name of Farmer	Location			Plant age (year)	Production (fruit)	
		Name of Location	Coordinate	Land Area (ha)			Height (masl)
1.	Kamaluddin	Kung	4°35'2.00"N, 96°48'45.00"E	0.3	1197	28	1500
2.	Hendra	Kung	4°35'15.46"N, 96°48'51.18"E	0.2	1181	1.5	100
3.	Ramlan	Kung	4°35'0.14"N, 96°48'37.69"E	0.25	1193	2	50
4.	Helmi S.	Belang Bebangka	4°35'50.14"N, 96°48'48.87"E	0.25	1200	4	400
5.	Agussalim	Belang Bebangka	4°36'2.00"N, 96°48'56.00"E	0.25	1222	10	400
6.	Aidi	Belang Bebangka	4°36'2.75"N, 96°48'51.38"E	0.25	1220	5	400
7.	Denimar	Belang Bebangka	4°36'11.26"N, 96°48'50.14"E	0.25	1220	5	400
8.	Al Hudri A.	Kayu Kul	4°36'24.17"N, 96°48'57.38"E	0.1	1228	15	100
9.	Bely Sari M	Kayu Kul	4°36'35.93"N, 96°48'53.88"E	0.01	1230	3	100
10.	M. Yunus	Kayu Kul	4°36'25.09"N, 96°49'2.76"E	0.48	1234	53	200
11.	Alda	Jurusen	4°36'17.81"N, 96°48'47.85"E	0.12	1230	30	100
12.	Ramdan	Kayu Kul	4°36'36.71"N, 96°49'0.81"E	0.125	1215	30	200
13.	A. Rahman	Sp. Kelaping	4°35'43.03"N, 96°48'46.44"E	0.25	1000	1	100
14.	Rahmaddin	Sp. Kelaping	4°35'34.02"N, 96°48'53.87"E	0,032	1213	3	500
15.	Halimah	Sp. Kelaping	4°35'37.40"N, 96°48'46.12"E	0,016	1200	2,5	500

Table 2. Gayo Pineapple Exploration Data in Pegasing District, Central Aceh

No.	Name of Farmer	Lokasi			Plant Age (year)	Production (fruit)	
		Name of Location	Coordinate	Land Area (ha)			Height (mdpl)
1.	Ila Sari	Kung	4°35'8.00"N, 96°48'55.00"E	0,5	1170	6	150
2.	Rahman	Kung	4°35'8.00"N, 96°48'55.00"E	0,4	1100	5	150
3.	Zubaidah	Kung	4°35'12.00"N, 96°48'58.00"E	0,2	1181	2,5	150
4.	Maryam	Kung	4°35'16.00"N, 96°48'45.00"E	0,5	1168	20	500
5.	Ir. Tagore Abu Bakar	Kung	4°35'11.00"N, 96°48'47.00"E	1	1176	2	100
6.	Sempeno	Kung	4°35'6.44"N, 96°48'58.25"E	0,25	1189	4	150
7.	Jasadi	Belang Bebangka	4°35'57.73"N, 96°48'49.09"E	0,25	1200	6	500
8.	Sapriga	Belang Bebangka	4°35'48.29"N, 96°48'54.18"E	0,25	1223	10	300
9.	Mursid	Belang Bebangka	4°35'52.50"N, 96°48'51.00"E	0,75	1219	10	400
10.	Amri	Belang Bebangka	4°35'47.91"N, 96°48'51.80"E	0,25	1220	5	400
11.	Apriandi	Belang Bebangka	4°35'51.84"N, 96°48'48.84"E	0,25	1224	5	400
12.	Munjir	Belang Bebangka	4°36'3.62"N, 96°48'54.12"E	0,25	1220	5	300
13.	Julianto	Kayu Kul	4°36'26.32"N, 96°48'57.22"E	0,3	1245	3	50
14.	Jul Rahmah	Kayu Kul	4°36'30.50"N, 96°48'56.98"E	0,3	1231	10	60
15.	Hanipan	Kayu Kul	4°36'33.33"N, 96°48'57.41"E	0,65	1224	25	250
16.	Sunardi	Kayu Kul	4°36'28.38"N, 96°49'1.74"E	0,32	1243	12	200
17.	Muahiri	Kayu Kul	4°36'21.74"N, 96°49'0.56"E	0,08	1231	2	150
18.	Ishak	Kayu Kul	4°36'37.41"N, 96°48'56.43"E	1	1230	30	200
19.	Ainun Sari	Jurusen	4°36'18.22"N, 96°48'44.10"E	0,1	1200	5	100
20.	Ikbal	Jurusen	4°36'22.01"N, 96°48'45.86"E	0,2	1200	35	400
21.	Gustini	Jurusen	4°36'30.51"N, 96°48'43.34"E	4	1227	10	300
22.	Yusramuddin	Jurusen	4°36'21.80"N, 96°48'48.05"E	0,375	1227	37	350

23.	Aluseri	Jurusen	4°36'26.78"N, 96°48'49.44"E	0,0625	1227	2.5	300
24.	Surya	Sp. Kelaping	4°35'41.40"N, 96°48'48.70"E	0,2	1100	2	100
25.	Amri	Sp. Kelaping	4°35'42.52"N, 96°48'43.34"E	0,5	1100	6	100
26.	Iwan	Sp. Kelaping	4°35'32.11"N, 96°48'44.32"E	0,25	1100	6	800
27.	Udin	Sp. Kelaping	4°35'35.02"N, 96°48'46.79"E	0,25	1100	5	500
28.	Salam	Sp. Kelaping	4°35'41.46"N, 96°48'46.18"E	0,032	1200	3	500
29.	Repli	Sp. Kelaping	4°35'36.95"N, 96°48'52.55"E	0,016	1211	2	500
30.	Sadikin	Sp. Kelaping	4°35'31.96"N, 96°48'53.44"E	2,5	1200	2	500
31.	Mahidin	Sp. Kelaping	4°35'39.00"N, 96°48'49.00"E	0,032	1212	2	500
32.	Sartika	Sp. Kelaping	4°35'34.42"N, 96°48'50.48"E	0,072	1211	2	500

Table 2 explains that there are 32 farmers cultivating Gayo pineapples in the Pegasing sub-district. Gayo pineapples cultivated by farmers are found at 5 different location points, which are Kung, Belang Bebangka, Kayu Kul, Jerusen and Simpang Kelaping. The land area of each farmer varies from 0.01 to 4 ha and at an altitude of 1100 meters above sea level to 1245 meters above sea level. The age of the Gayo pineapple plants found in each location is different, which are 2 years to 37 years old with a production of 50 to 800 fruits per harvest. Based on the exploration results, it can be seen that the number of farmers cultivating Gayo pineapple is greater than that of honey pineapple. The results of exploring pineapple plants show that farmers in Central Aceh District only grow two types of pineapples, which are Honey and Gayo pineapples. Pineapple planting distribution data is presented in Figure 2.

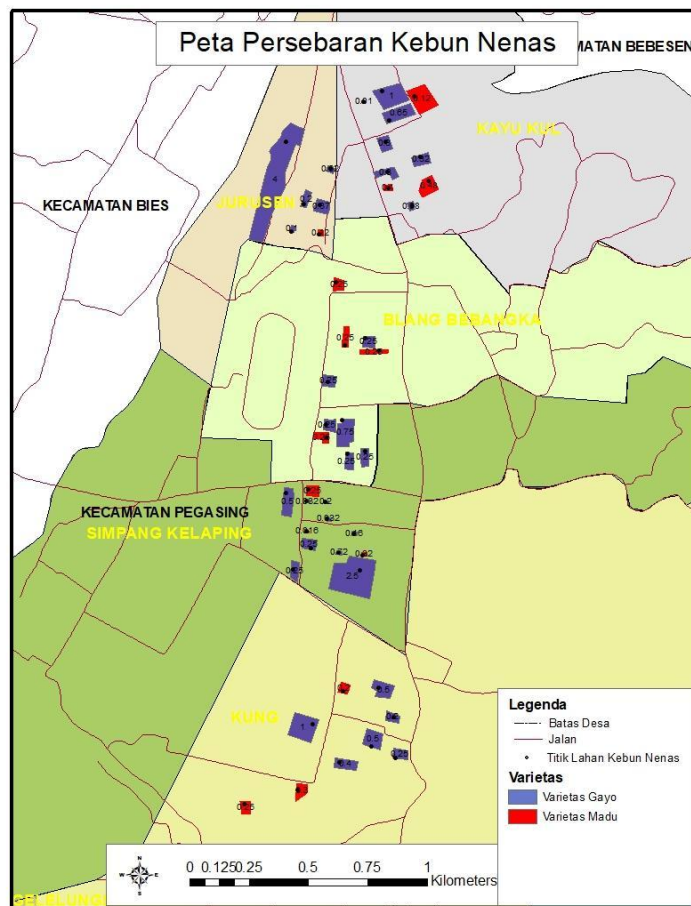


Figure 1. Pineapple Planting Distribution Map in Pegasing District, Central Aceh

Figure 1 shows that Pegasing District is the largest pineapple producing center in Central Aceh. The distribution of pineapples is also found in other sub-districts in Central Aceh with a smaller amount. Pegasing District has a stretch of land with loose sandy soil types which are mostly found in the areas of Kayu Kul, Blang Bebangka, Simpang Kelaping and several other areas which are very suitable for the conditions for growing pineapple plants. Honey and Gayo pineapples are planted in Kung Village, Belang Bebangka, Kayu Kul, Jerusen, and Simpang Kelaping.

3.2. Pineapple Organoleptic Test

Organoleptic test is a method of testing using the human senses as the main tool for measuring the acceptability of a product. The average organoleptic test results for several types of pineapple from 40 panelists are presented in Table 3.

Table 3. Average Value of Organoleptic Tests on Several Kinds of Pineapples

Type of Fruit	Flesh Color	Aroma	Flavor	Water Content	Fruit Flesh Texture	Levels of Preference
Gayo	3,9	2,2	3,6	3,5	2,8	4,0
Simalungun	4,0	3,8	3,9	3,6	2,6	4,1
Pak-pak	3,9	3,8	2,2	3,1	3,0	3,5
Madu	2,6	2,8	1,9	3,3	2,2	3,1

Based on Table 3, it can be seen that the panelists really liked the color of the flesh of the Simalungun pineapple compared to other types of pineapple, with an average score of 4.0. Panelists also liked the color of the pineapple flesh of the Pak-pak and Gayo types with an average score of 3.9. Honey Pineapple has the lowest average value of flesh color which is 2.6. The aroma of the Pak-Pak and Simalungun pineapple type smells better than the other types of pineapple and have a score of 3.8. Gayo and Honey pineapples have a slight aroma with an average score of 2.2 and 2.8. The aroma of the Pak-Pak and Simalungun pineapple type smells better than the other types of pineapple and have a score of 3.8. Gayo and Honey pineapples have a slight aroma with an average score of 2.2 and 2.8.

Simalungun and Gayo pineapples have a sweet taste with scores of 3.9 and 3.6. Pak-pak pineapple has a slightly sour taste with an average score of 2.2. Whereas the honey pineapple, based on the results of the organoleptic test, has a sour taste with an average score of 1.9. According to the panelists, all types of pineapple studied had a lot of water content, which has the average score of 3.1 for Pak-Pak pineapple, 3.6 for Simalungun pineapple, 3.5 for Gayo pineapple and 3.3 for Honey pineapple. Pak-pak pineapple has a fibrous flesh texture with an average score of 3.0. While the Simalungun pineapple has a slightly fibrous flesh texture with an average score of 2.6. Gayo Pineapple and Honey also have a slightly fibrous meat texture with an average score of 2.8 and 2.2.

Organoleptic tests showed that panelists really liked Simalungun and Gayo pineapples with an average score of 4.1 and 4.0. Panelists also liked Pak-pak and Honey pineapples with an average score of 3.5 and 3.1. The level of panelists' preference for several types of pineapple was based on the aspects assessed, which are the color of the fruit flesh, aroma, taste, water content, and texture of the fruit flesh.

The taste of pineapple fruit is a very important factor for consumers. This is in accordance with the research of Fauzi (2021)[15] which states that the attribute that is considered the most important for consumers when buying honey pineapple is the taste attribute. Consumers prefer pineapple with a dominant yellow color and a sweet taste.

4. CONCLUSIONS

The conclusions obtained from this research are:

1. There are two types of pineapple cultivated in 5 locations in Pegasing District, Central Aceh, which are honey and Gayo pineapples. Gayo pineapples cultivated by farmers are found at 5 different location points, which are Kung, Belang Bebangka, Kayu Kul, Jerusen, and Simpang Kelaping.
2. Gayo and Simalungun pineapples are highly preferred by the community based on the color of the fruit flesh, aroma, taste, water content and texture of the flesh, with a score of 4.0-4.1 (from a standard maximum score of 5).

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