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Morphology and Molecular Characterization of Four Types of Ramies (*Boehmeria nivea* (L.) Gaud) Collection Experimental Farm Faculty of Agriculture Andalas University

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Abstract**—** *The purpose of this study was to collect and determine the morphological and molecular character of the ramies in West Sumatra. This study was conducted in May-October 2018 Experimental Farm, Faculty of Agriculture, University of Andalas Padang. This activity also used the clone Padang 3 and Ramindo 1 as a comparison. The results of this study indicated that the ramie plant could grow to a height of 1058 meters above sea level to the point where the coordinates 0 ° 15'30 "South Latitude and 100 ° 15'45" east longitude. Ramie highest Situjuah accession 150.03 cm and the lowest at 91.7 cm Matur accession. The longest and widest leaf observations contained in the accession Situjuah while the shortest and smallest obtained at Matur accession. On accession Situjuah, Matur, and clones Ramindo 1 had male and female flowers but clone Padang 3 only had female flowers. Harvesting fastest in clones Ramindo 1 was 123 days and the longest in clones Padang 3 was 133 days. The numbers of banding pattern resulting from PCR amplification were 74 tapes (68 a polymorphic bands while the rest was the number of monomorphic bands).*

Keywords**—** ***Morphology, Molecular, characterization, Boehmeria nivea.***

I. INTRODUCTION

Indonesia is an agricultural country which has a quite extensive forest area with the greatest biodiversity primarily on the varieties of plants, with the number of the existing plant that is equal to 55%, Indonesia occupied the top five in the world (Amin *et al*., 2014). The varieties of plants give several benefits for humansuch as foodstuffs, building materials, traditional ceremonies, industrial materials of drugs and materials of textile.

Along with development of the textile industry in Indonesia, the need for raw materialsof cotton fiber also continued to increase. However, to fulfill the needs of these raw materials, Indonesia has to import cotton fiber annually. According to the Directorate General of Estate Crops (2017), in 2013 Indonesia imported cotton fiber amounted to 676.682 ton with a value of US$ 1.3 million, while in 2014 an increase in imports amounted to 711.747 ton of cotton fiber with a value of US$ 1.4 million.

One of the efforts to overcome the dependence on raw materials of the textile industry is by using other natural fibers. Natural fibers that have the potential to be used as raw materials in the Indonesian textile industry is the ramie (*Boehmeria nivea* (L.) Gaud). This is because the ramie's has the characteristics and quality of high fiber (Angelini and Tavarini, 2013).

Ramie's (*Boehmeria nivea* (L.) Gaud.) is a perennial plant that has many benefits. This plant is known for fiber from the bark is used as a raw material in the textile industry, raw material pulp, paper, conservation of land (Mitra *et al*., 2013), compost, animal feed, roots are used as traditional medicine (Huang *et al*., 2015), and various other industrial products.

Productivity of ramie depends on fiber height and diameter, thick-thin bark and fiber yield. Ramie harvested for fiber production every 2 months so the first year can be 5-6 harvests (Liu *et al*., 2009).According to Sarkar *et al*. (2010),fibers of the ramies are two times more powerful than all plant-based fibers.

Ramie fiber also has another advantage such as the resistance to bacteria and a higher tensile strength under conditions of hygroscopic (Satya *et al*., 2013). According to Liu *et al*. (2015) ramie plant height is a major determining factor for the results of the fiber, because fiber ramie is extracted from the bark so that if the ramie is shorterthe fibers produced results also less. Even the results of Liu *et al*. (2014) the results of ramie fibers is largely determined by the number of stems per plant, fiber

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yield per plant, stem length, stem diameter, and thickness of the skin.

Meanwhile, Indonesia is very good country for the cultivation of ramie because according Suryanah *et al*. (2017) ramies are easy to grow in the tropics and will produce high when planted on the altitude 1310 meters above sea level. In West Sumatra, the variety of vegetation is still very high around the forest so that theunknown typeof ramie is still found. Knowledge of genetic diversity is very important in plant breeding activities to determine the pace of improvement in the quality, quantity and competitiveness of ramie fiber.

Based on the statement above, the conservation work with a ramie crop germplasm morphological observation and molecular characterization is done, which the result of conservation materials is used as comparison of two other clones of the ramies. Information on morphological characters is required to differentiate between plant accessions and probe distance or dissimilarity genetic kinship analysis so that it can be used as a base material improvement of the ramies. The farther the genetic distance elder in one species, the opportunity to produce new varieties are very large (Govindaraj *et al*., 2015). The purpose of this study is to collect and know the morphological and molecular character of the ramie's in West Sumatra.

II. MATERIALS AND METHODS

This research was conducted in May-October 2018 at Experimental Farm Faculty of Agriculture Andalas University. For morphology characterization were observed in the stems, leaves, flowers, and the production of ramie's. This morphological characterization refers to descriptor Mitra *et al*. (2013) and Aiguo (2018). While the molecular conducted DNA isolation, PCR amplification, and DNA electrophoresis. Primers used in the PCR amplification is OPF 04 OPF 05, OPH 07, OPX 02, and OPX 17.

The data collection was based on observation of morphological and molecular. The data were followed by analysis of phenotypic variability and similarity analysis using the Unweighted Pair Group Methods Aritmathic Average (UPGMA) version 2.02 at NTSYS software.

III. RESULT

3.1 Exploration and Collection of Ramie

The determination of two locations was based on the results of a preliminary survey in district. Based ontwo districts which have been designated as areas of research, there were 20 accessions of the ramies got. All ramies that had been explored, and then carried out ex situ conservation in the Experimental Farm Faculty of Agriculture,Andalas University, by means planted and characterized the important characteristics of it. The details of the ramie's accession number per district, sub district, coordinates and elevation can be seen in Table 1.

3.2 Morphology Characterization of Ramie

Based on quantitative terms,the result of morphological observations on two accession and two clones of the ramies showed that there are any differences between population of the plant height, stem diameter, and number of tillers per hill. Qualitative characters showed different results which was found only in the parameters of the surface of the stem, while the stem color parameters for young and old trunks colors do not show different results. The results showed that the height of varieties of plant with the average at 150.03 cm Situjuah accession, acceding Matur is 91.7 cm, Padang 3 as high as 108.03 cm Ramindo 1 is 129.72 cm. Therefore, the highest ramiewasin Situjuah accession and for the lowest plant was contained in the accession Matur.

Based on the results of this research, it can be concluded thatthe largest trunk diameter obtained by accession Situjuah compared to other clones and the smallest trunk diameter obtained byaccession Matur. For Situjuah accession,the average of trunk diameter is 10.37 mm and the diameter of the rod accession to Matur is 6.05 mm then the average diameter of the rod clones Padang is 3 of 8.3 mm and a trunk diameter average at Ramindo 1 is 9, 08 mm. Meanwhile, according to Yang *et al*. (2010) and Bene *et al*. (2011) ramie plant stems cylindrical stem diameter ranging from 11 to 38.5 mm, but does not cover possible if the diameter of ramie only the range of 8 to 16 mm because it will depend on the environmental conditions of the plant growth.

The observations done on the parameters of the number of tillers per hill showed that the average chicks that appear on the accession Situjuah is 14.2 tillers and number of tillers on the accession Matur is 30.4, while the average number of tillers in Padang 3 clones is 9.8 tiller and tiller number in clones Ramindo 1 is 14. From the explanation above, it can be concluded that the highest number of tillers obtained by accession Matur while the lowest number of tillers obtained by Padang 3.

The variety of the height parameters plant, stem diameter, and number of tillers per hill and also the differences of stem surface, it is suspectedthat the plant is affected by inconstant environmental conditions during the research. According to Verdaguer *et al*. (2017), the factors affecting plant height beside the requirements of a place to grow and environmental conditions related to

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climate and weather in the cultivation area are genetic and nutrient. In accordance with the results of research and Angelini and Tavarini (2013), there was variation among plant height, stem diameter, and number of tillers per hill which is controlled by several or polygenic so strongly influenced by environmental conditions. Genetic factors will not show the character that brought exception with the environmental factors that meets the needs of a plant (Andrew *et al*., 2010). In connection with nutrients, Mitra *et al*. (2013) and Sharma *et al*. (2014) states the ramie is a plant which greedy of nutrients, because these plants have a rapid vegetative growth so that it can be harvested every two months.

Based on the observations of qualitative character on the surface of the rod, there are variations of accession on Matur, but not for Situjuah, Padang 3, and Ramindo 1. In general, the surface of the ramie's stem is hairy, but there are also ramie with thin hairy, rare, and thick. The surface of Matur and Padang 3 population israrely hairy whereas the surface of steminSitujuah and Ramindo 1 is woolly. There is no differences between color parameter of yound and old ramies population The color of Young stem is green and the color of old stem is brown. The color differences between young and old stem can be seen in Figure 1.

In observation of leaf length showed that the average for the accession Situjuah is 18.15 cm and Matur is 12.47 cm meanwhile average lengthof leaves Padang 3 is 14.15 and Ramindo 1 is 12.92 cm. From those data, we knowthat the longest leaf contained is Situjuah and the shortest is Matur. The growth of the ramie's leaf of accession Situjuah has an average 14.94 cm and Matur is 9.69 cm, while Padang 3 is 12.01 cm and Ramindo 1is 11.5 cm. For the average,the widest leaves contained in the accession Situjuah and for narrowestcontained in accession Matur. Based on data from the measurement of leaf length, it is obtained the result of the observations of leaf measure type, in Situjuah and Ramindo 1 is medium type while in Matur and Padang 3 is narrow type.

The average length of leaf petiole in Situjuah accession is 9.55 cm and Matur is 6.67 whereas in Padang 3 is 8.42 cm and the average length of petiole at Ramindo 1 is 7.33 cm. Therefore, it was found the average length of the longest leaf petiole is Situjuah while the shortest petiole length contained is Matur (Figure 2).

This is consistent with Jose *et al*. (2017) that ramie leaves has a characteristic heart-shaped and smooth jagged edges, then the length of 7-20 cm, while width of 6-15 cm. For the length of petiole, ranges from 3-12 cm long and even longer petioles also shorter than the length of the leaf, but everything depends on the clones. According toLiu *et al*. (2014) derived from the ramie plant stem and wide leafy little usually produce puppies are not much different with the parent.

The observation on leaf shape, leaf edge shape, the shape of the tip of the leaf, the leaf base shape, and the shape of the leaf growth showed that there is no difference among the four ramies populations. On leaves hair on Situjuah, Matur, and Ramindo 1. Most ofpopulation is medium type, while in Padang 3, all populationis medium type.

Ramie leaf shaped like a heart wide, with a relatively large size compared to other similar leaves. Ramie leaves had short hair so it seems a bit rough, but it is relatively soft and not woody (Munawar *et al*., 2007; Hwang, 2010).Mitra *et al*.(2013) adds theramie leaf stems in the stem and located alternately, and downy leaf surface. Leaf photosynthetic active only at the top stem, the position of the leaf shoots growing near. The leaves are actively growing at the old plant occupies one-third of the top of the stem to the tip.

There is no different color of the petiole leaf in the population Situjuah, Matur, and Ramindo 1, that is reddish green color, while in Padang 3 clones is green. Furthermore, most of the color of the upper surface of the leaves also did not show any variation in Situjuah, Matur, and Ramindo 1, that is dark green,while for clones Padang 3,the all colors are dark green. There is also no different color betweenunder surface of the leaves and bone leaf, the colors are silvery white and green. Then the leaf color of Situjuah and Ramindo 1is yellowish green but Matur is more dominant yellowish green and Padang 3 is green.

The according to Sharma *et al*. (2014) that the top surface of the leaf color is the dark green ramie and leaf color is silvery white underneath surface. Ramieleaf colored light green to dark green, depending on variety, age, care and cultivation systems.

Ramie flower is compound interest, every stick in one clump. The layout of the male flowers isunder stem segments while the female flowers are on the top of stem segments. Male flowers appear earlier than the female flowers. Observations obtained flowering date of average of Situjuah is 57.6 days,Matur 66 days, Padang 3 is 76.2 days and Ramindo 142.8 days. Therefore, the fastest flowering is Ramindo 1 and the longest is Padang 3. Speed flowering can also be controlled by genetic factors and environmental factors.

Gender flowers on each population Situjuah, Matur, and Ramindo 1 does not show the variety. In that population have sex male and female flowers on one plant, while Padang 3 has only female flowers in one

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plant. This is consistent with Mitra *et al*. (2013) which states that in certain clones and the female flowers are male flowers on one stem.

Male flower color in Situjuah, Matur, and Ramindo 1 did not show any variations, all of them only have green color. There are varieties of Character color of female flowers on the ramie's populations. For Situjuah is yellowish green,Matur is reddish, Padang 3 is green and Ramindo 1 is red.

Type of ramie flowering is different,there are many flowers in clone Situjuah and Ramindo while there is few flower in Matur and Padang 3. According to Mitra *et al*. (2013), a lot or little depending on that clones. It is also suspected nothing to do with the power of adaptation to altitude somewhere. The variety of the interest amount on each accession and clone ramie can be seen in Figure 3.

The fastest of harvesting namely is in clones Ramindo only 123 days than the longest harvesting in Padang 3 is 133 days. The period of harvest time affects the quality of the fibers from the ramies. Old or rapid harvest time can also be caused by altitude, soil fertility and plant growth conditions or factors of the seeds used (Mayerni, 2018).

Plant fresh weight showed that accession Situjuahis the heaviest fresh weight, thatis 632.48 grams then the lightest is in Padang 3, thatis 251.78 grams. Similar to the results of the fresh weight of the heaviest rod is Situjuah, thatis 372.46 grams and the lightest is Matur, with 181.11 grams. As for the weight of crude fiber in clones Ramindo 1 is a coarse fiber heaviest weight (43.83 grams) and for the lightest is Padang 3 (31.51 grams). Value of weights on the parameters of plant fresh weight, stem fresh weight, and the weight of crude ramies fiber is influenced by the number of tillers, plant height, stem diameter.

3.3 Phenotypic Variability Analysis

Based on the value of variability in Table 2, in comparison between the value and the character is seen that the value of the narrow variability does not have much difference between its value. As for the wide variability values show much difference between its value, so the phenotypic variance is less than twice the standard deviation.

Value variability in morphological characters can be influenced by genetic factors and environmental factors. Qualitative character can be controlled by simplegenic with little environmental impact. Environmental factors related to other factors that cause the appearance varies so that a plant has genetic diversity. For the quantitative character is influenced by polygenic and highly influenced by the environment around the plant (Andrew *et al*., 2010). Mulder *et al*. (2016) said that a population has a wide phenotypic variability is not necessarily wide genetic variability, due to genetic via phenotypic appearance is influenced by environmental factors.

3.4 Similarity Analysis

The results of dendogram based on qualitative character or the mixing of quantitative and qualitative character indicate that each variant of ramie found has a different kinship. The Dissimilarity was caused by the different morphological characters between the ramies, both quantitative and qualitative character. All qualitative characters and 2 quantitative characters (trunk diameter and length of the leaf petiole) showed similarities.

Based on dendogram in qualitative characters showed four relationship patterns of ramie's population which had an alliance with the kinship coefficient from 0.29 to 1.00, or 29% -100% (Figure 4). The dendogram had two major groups, namely group 1 contained Situjuah, Ramindo 1, and Matur, whilefor group 2 is only Padang 3. Both of these groups are divided on the point of similarity coefficient of 0.29 or 29%. Then the group 1 is divided at the point coefficient of approximately 42.25%, there is a population group Situjuah 1a and Ramindo 1 and for group 1b is population Matur. Population Situjuah and Ramindo 1 separated at similarity range of values abour 51.5%. Coefficient 100% on the value contained in the fourth of the population with a sense of the value of having close coefficient diversity. For Situjuah population, Ramindo 1, and Padang 3 that the coefficient value of 100% is divided into three groups while the Maturpopulation is divided into 2 groups.

The similarity coefficient value based on the combination of qualitative and quantitative characters shows that the four populations of ramie plants that have been characterized are divided into two major groups, namely group 1 (Situjuah, Ramindo, and Matur) and group 2 (Padang 3). This happens because of the similarity in the character of each population. The relationship pattern of the ramie plant population has a similarity with the similarity coefficient of 17% -75% (Figure 5). In Situjuah and Matur accessions and Ramindo 1 clones are included in group 1 which is divided into groups 1a and 1b, where 1b is only Matur accession whereas 1a consists of Situjuah accession and Ramindo 1 clone. The group is in a coefficient of about 28% or 0.28 . Then in group 1a again split into 2 subgroups, namely groups 1a1 and group 1a2 at a coefficient of around 33.5% or 0.335. Group 1a1 consisted of accession Situjuah 1 to Situjuah 10 while in group 1a2 consisted of Ramindo 1 1 clones to Ramindo 1 10. In Ramindo 1 5 clones with Ramindo 1 8 and Padang

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3 1 with Padang 3 5 had close kinship relations with coefficient values around 70%. Ramie plants in one variant have the same morphological character, so the kinship is relatively close. In other words, the diversity of morphological characters in the same variant is quite low. This event occurred only on the access of MTR-3 with MTR-5 which has a 75% similarity relationship.

Relationships between populations classified as close are found in the same location. According to Alemu *et al*. (2018) the similarity coefficient values showed similarities of cultivars in a crop population, where the higher the similarity coefficient values between individuals showed that the genetic kinship of the cultivar was getting closer. The similarity of characters is also thought to be closely related to the location of growth that is relatively the same geographically. While hemp plants in the same similarity coefficient value but come from different regions and have different morphological characters, the two ramie plants have a kinship relationship that is farther than those that grow in the same environment.

From the results of the morphological characters observed and from the dendogram image it is known that the more morphological characters are the same, the closer the kinship relationship or the fewer the morphological characters are the same, the more distant kinship is. In accordance with the statement from Szenejko and Rogalski (2015) that if the higher the coefficient value, the higher the level of similarity, or if the lower the coefficient value, the lower the level of similarity.

3.5 Molecular Characterization of Ramie

Primary primers who were able to show the closeness of the relationship between accession and ramie plant clones were indicated by the presence of different banding patterns at the same distance using five primers in PCR amplification. The results of primary amplification using the RAPD technique for four populations of ramie plants in detail are shown in Table 3.

Based on Table 3, the number of ribbon patterns produced from PCR amplification is 74 bands. From the number of bands it is known that 68 of them are polymorphic bands. While for the number of monomorphic bands as many as 6 bands. Each one of the primers used is able to get 11 to 20 DNA fragments so that using the RAPD technique is able to select the level of polymorphism in a fast period of time. Products from PCR amplification using five primers give a high polymorphism value, indicated by a percentage value of 90%. According to Garg et al. (2015) the tested plants have a fairly high diversity so as to provide a high value of polymorphism.

DNA bands that appear on DNA samples analyzed are closely related to or not the primary primers of RAPD used to amplify DNA accession of ramie plants by comparison. The number of bands produced by each primer depends on the distribution of homologous sites with primary sequences in microsatellite regions.

3.6 Similarity Analysis

The results of the analysis of the similarities of the four ramie plant populations resulting from PCR amplification using the NTSYS version 2.02 software program are presented in the form of a dendogram (Figure 6).

From Figure 6, it is known that there are two large groups between four populations of ramie plants with a coefficient of similarity equal to 25% to 51%. Large groups have kinship relationships between individuals in very remote populations or very small genetic similarities at the coefficient point of 25%. Group 1 is access to Situjuah and Padang 3 clones, where the coefficient points are at 51%. From the coefficient point, it is known that among the population of accession in Situjuah and Padang 3 clones has the closest kinship relationship among all. Then in the second group divided at the coefficient point 42.5% or equal to 0.425. In this second group there are Matur accessions and Ramindo 1 clones. Close kinship relationships show low genetic diversity and vice versa if the long kinship relationship shows high genetic diversity.

IV. FIGURES AND TABLES

Table 1. Details of Plants Accession Number Rami per District, Sub district, Coordinates, and Altitude

Locations		Accession	Coordinate		Altitude
Districts	Sub district	Code	South Latitude	East Longitude	(masl)
Agam	Matur	MTR 1	0 ° 15'28 "	100 ° 15'46 "	1053
Agam	Matur	MTR 2	0 ° 15'28 "	100 ° 15'46 "	1053
Agam	Matur	MTR 3	0 ° 15'28 "	100 ° 15'46 "	1053
Agam	Matur	MTR 4	0 ° 15'28 "	100 ° 15'46 "	1053
Agam	Matur	MTR 5	0 ° 15'28 "	100 ° 15'46 "	1053
Agam	Matur	MTR 6	0 ° 15'30 "	100 ° 15'45 "	1058
Agam	Matur	MTR 7	0 ° 15'30 "	100 ° 15'45 "	1058

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Agam	Matur	MTR 8	0 ° 15'30 "	100 ° 15'45 "	1058
Agam	Matur	MTR 9	0 ° 15'30 "	100 ° 15'45 "	1058
Agam	Matur	MTR 10	0 ° 15'30 "	100 ° 15'45 "	1058
50 Kota	Situjuah Limo Nagari	STJ 1	0 ° 18'19 "	100 ° 35'32 "	588
50 Kota	Situjuah Limo Nagari	STJ 2	0 ° 18'19 "	100 ° 35'32 "	588
50 Kota	Situjuah Limo Nagari	STJ 3	0 ° 18'19 "	100 ° 35'32 "	588
50 Kota	Situjuah Limo Nagari	STJ 4	0 ° 18'19 "	100 ° 35'32 "	588
50 Kota	Situjuah Limo Nagari	STJ 5	0 ° 18'19 "	100 ° 35'32 "	588
50 Kota	Situjuah Limo Nagari	STJ 6	0 ° 18'19 "	100 ° 35'30 "	608
50 Kota	Situjuah Limo Nagari	STJ 7	0 ° 18'19 "	100 ° 35'30 "	608
50 Kota	Situjuah Limo Nagari	STJ 8	0 ° 18'19 "	100 ° 35'30 "	608
50 Kota	Situjuah Limo Nagari	STJ 9	0 ° 18'19 "	100 ° 35'30 "	608
50 Kota	Situjuah Limo Nagari	STJ 10	0 ° 18'19 "	100 ° 35'30 "	608
Total Accession		20			

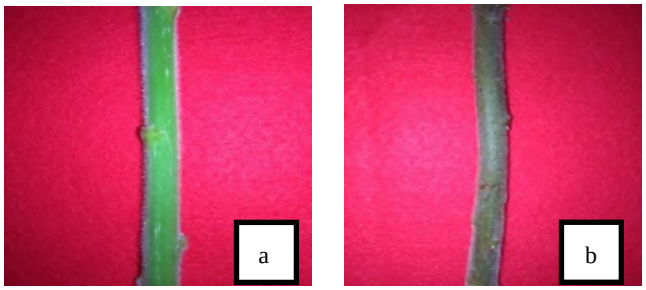

Fig.1. Color Stem Ramie, a) Color Young Stem, b) Color Old Stem

Fig.2: Measurement of Leaf Length and Leaf Petiole Length

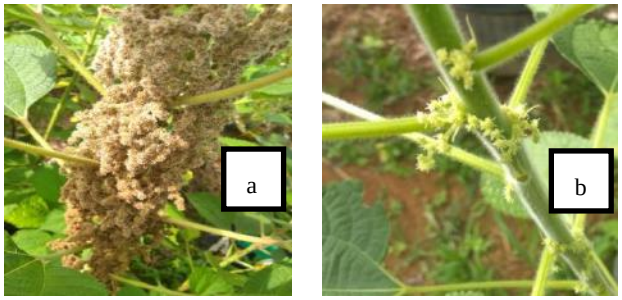

Fig.3. Number of Flowers on Ramie, a) MoreFlower, b) Less Flowering

Table 2. Phenotypic Variability based Quantitative and Qualitative Characters Ramie Plants

No.	Character	S2	St Dev	2 X St Dev	Criteria
1	Leaf outline	0	0	0	Narrow
2	Leaf margins	0	0	0	Narrow
3	Leaf apex	0	0	0	Narrow
4	Leaf Base	0	0	0	Narrow

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5	Color of leaf petiole	1.68	1.29	2,59	Narrow
6	Color of the upper surface of leaf	0.16	0.4	0.8	Narrow
7	Color of the under surface of leaf	0	0	0	Narrow
8	Color of shoot leaf	0.59	0.76	1.53	Narrow
9	Leaf measure type	0.18	0.43	0.86	Narrow
10	Color of midrib	0	0	0	Narrow
11	Shape of midrib	0	0	0	Narrow
12	Leaf hairs	0.21	0.46	0.93	Narrow
13	Type of flowering	0.25	0.5	1	Narrow
14	Color of female flower	1.25	1.11	2.23	Narrow
15	Color of male flower	0.75	0.86	1.73	Narrow
16	Gender of flowers	0.18	0.43	0.86	Narrow
17	Stem surface	0.25	0.5	1	Narrow
18	Color young stem	0	0	0	Narrow
19	Color old stem	0	0	0	Narrow
20	Plant height	647.00	25.43	50.87	Large
21	Stem diameter	3.36	1.83	3.67	Narrow
22	Leaf length	6.39	2.52	5,05	Large
23	Leaf width	4.34	2.08	4.16	Large
24	Leaf petiole length	2.09	1.44	2.89	Narrow
25	Number of tillers per plant	73.74	8.58	17.17	Large
26	Harvest time	14.75	3.84	7.68	Large
27	Plant fresh weight	32751.2	180.97	361.94	Large
28	Stem fresh weight	10127.08	100.63	201.26	Large
29	Crude fiber weight	143.52	11.98	23.96	Large

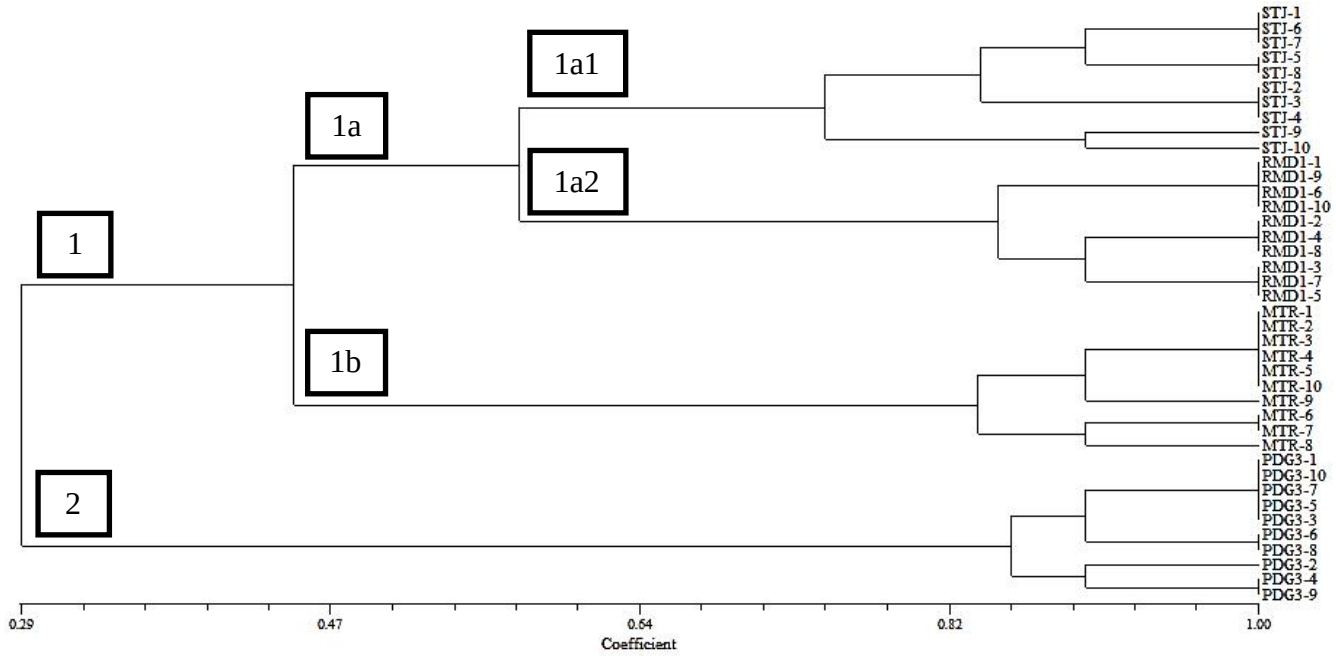

Fig.4: Dendogram with 40 Sample Ramie based on Qualitative Characters

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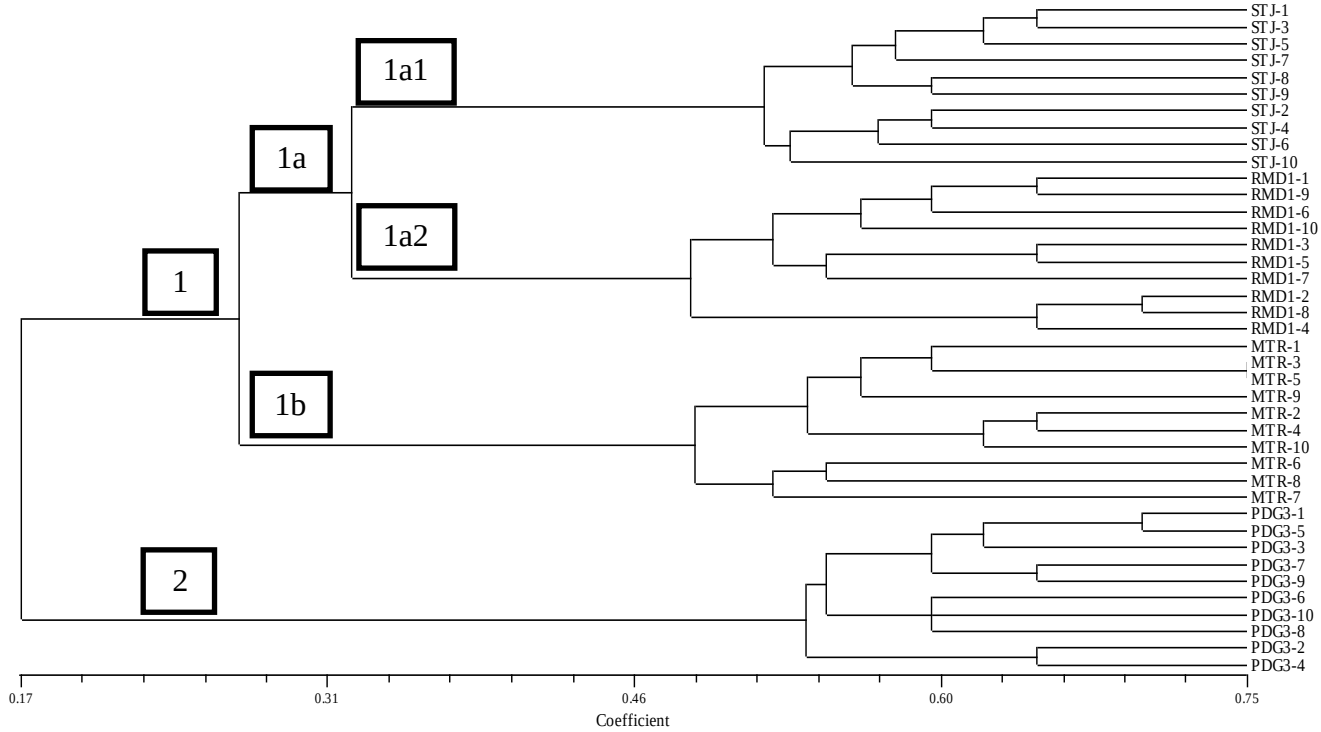

Fig.5: Dendogram with 40 Sample Ramie based on Quantitative and Qualitative Characters

Table 3. The primers used in RAPD and band profiles generated from four populations ramies

No.	Primary	Number of monomorphic band	Number of polymorphic band	Total of band	Polymorphism percentage (%)
1	OPF 04	0	17	17	100
2	OPF 05	1	13	14	93
3	OPH 07	0	20	20	100
4	OPX 02	2	9	11	82
5	OPX 17	3	9	12	75
Total		6	68	74	90

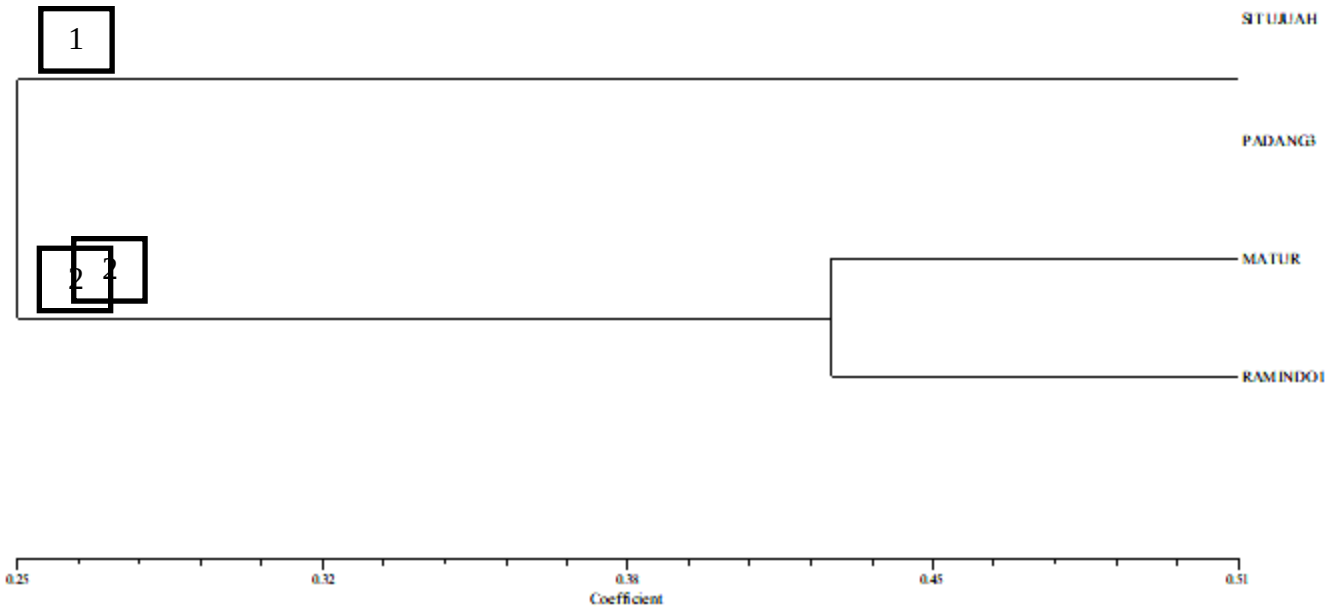

Fig.6: Dendogram with Four Populations Ramie's based on Molecular Characterization

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V. CONCLUSION

The spread of the ramies are in two districts of Agam and 50 Kota. All qualitative cahracters and two quantitative characters (stem diameter and leaf petiole length) were observed in the ramies showed no variety. While eight out of ten quantitative characters who observed that there are variations.

Ramie's are divided into two groups based on morphological characters were observed at the level of the lowest coefficient of 17%. Group 1 (Situjuah, Ramindo, and Matur) with the level of similarity 28%, for group 2 (Padang 3) the level of similarity 52.5%. This grouping occurred because of the similarity in the character of each kind.

Number of banding pattern resulting from PCR amplification is as many as 74 bands (68 a polymorphic band while the rest is the number of monomorphic band). Each primer used could get 11 to 20 DNA fragments so that using RAPD technique is able to select the degree of polymorphism within a short time.

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