

BIODIVERSITY AND RELATIONSHIP ROSE APPLE (*Syzygium aqueum* Burm.f. Alston) MORPHOLOGICAL APPROACH THROUGH NATURE IN PLANTATION Bhakti, PASURUAN

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ABSTRACT

The aims of this study were to examine whether there is diversity of morphological from variety of rose apple (*Syzygium aqueum* Burm.f.Alston), analyze their relationship and find out the characteristics that effects the classification of these rose apple. This study itself is using the descriptive approach. Sampling is taken at some sites Plantation Bhakti Alam Ngembal Village Tukur Subdistrict Pasuruan Regency, East Java. The result of the research finds four varieties Camplong, Citra, Black Diamond, and Pink Rose Apple. Parts of the plants to be studied are 55 characters, including plant high, leaf side, corolla high, and corolla width. Morphological of variety of rose apple were analyzed by SPSS programme. This programme used simple matching coefficient that use to form dendrogram. The dendrogram resulted two main groups of rose apple group A and group B. Group A consisted of variety of Pink Rose Apple with 75,1% similarity value. In the PCA (Principal Component Analysis) analysis of characters that effect the grouping of variety of rose apple leaves thickly, high plants, leaf type, leaf edge, leaf point, leaf wide, leaf length, stalk leaf length, leaf distance accompany , distance bone leaves, calyx shape, high corolla, corolla width, high fruit, fruit diameter, fruit skin surface, fruit flavor, seed color, number of seed, form of seed, diameter of seed, and long seed.

Keywords

Syzygium aqueum Burm.f.Alston, Morphology, Dendrogram, PCA

INTRODUCTION

Indonesia has been designated as the second largest country in the world megadiversitas (Mittermeier and Mittermeier, 1997). Indonesia is a country megadiversitas, including the wealth of flora (plants). The diversity of plants in Indonesia has between 30,000 to 35,000 plant species (Wendra, 2012).

Guava is a water plant in syzygium tribe or family Myrtaceae originating from Southeast Asia (Bambang, 1993). Cashew nut water is actually different from

Semarang (*Syzygium samarangense*), close relatives who have trees and fruit are similar. Some kultivarnya even difficult to distinguish ,so that both are often named after the common guava or guava only.

Rose apple comes from the Indo China and Indonesia, spread to Malaysia and the islands of the Pacific (Sarwono, 1990). During this time still concentrated as garden plants for family consumption. Guava fruit water is not just sweet and refreshing, but it has diversity in an attractive appearance. Water rose

categorized as one type of fruit a lot of potential that has not been touched pembudidayannya for commercial purposes. Perishable nature becomes an important issue that needs to be solved. The fruit can be said not skinned, so the slightest physical damage to the fruit will speed up the process of decay.

Besides being used as food, water guava can be used as a remedy them, when the water rose fruit seeds are dried and crushed, then it can be used as medicine for diarrhea, asthma, and reduce fever (Leonard, 2006). Fresh fruit seeds can help cure dysentery, cataracts, and diabetes (Morton, 1987). Pink flower water is usually used to help reduce fever. Water guava leaves can be used as an eye medicine and digestion. Rose apple aroma sticks as fruit, used to treat any disease associated with breathing, ranging from asthma, bronchitis to strep throat problem. Guava root water can be used as a drug to cure epilepsy. Guava fruit useful to help cope with diabetes, fiber and vitamin C in guava can help reduce cholesterol in the body (Yuliani et al, 2003).

Compounds contained in fruit guava, among others, proteins, carbohydrates, calcium, Fe or iron, magnesium, potassium, zinc, copper, citric acid, phosphorus, fiber, vitamin C and vitamin A, niacin, riboflavin, thiamin and many others (Darwono, 2012). This water contains a variety of guava which makes quite complex also benefits for the human body.

Guava is a plant that has economic value is high enough and have efficacy in the treatment of various diseases because they contain nutritional value and have high levels of vitamin C which is very beneficial

to the human body (Dalimartha, 2008). Although the water rose long been known in the world of agribusiness, but water and fruit rich in this vitamin newly cultivated since five years ago. The increase in demand of cultivation occurred since the last two years, demand for water rose could rise up to 200%. This is because the water rose has a very sweet taste, the water content is abundant compared to other fruit, as well as the number of seeds that very little or almost nothing. Especially guava most demanding public water is the water rose varieties.

Citra. Increasing public demand not only from the sale of fruit, but also from the sale of seeds and not only in Indonesia but in Malaysia and Singapore (Hermansyah et al, 2005).

Research is often done on the water rose focused on chemical constituents and breeding in agriculture (Indriana, 2011), other studies are still focused on one of the varieties the varieties Citra only to find out the benefits both in terms of treatment (Lutterodt et al., 1999) , clothing and food (Yuniarti, 2008). Until now, research has been done using morphological approach that analyzes fenetik diversity in the genus, such as *Syzygium samarangense*, *Syzygium cumini*, *Syzygium aromaticum*, *Syzygium malaccense*, *Syzygium Jambos*, *Syzygium polyanthum*, and *Syzygium aqueum* (Mudiana, 2010). Research on the relationship fenetik varieties within species *Syzygium aqueum* still not widely practiced, especially in Indonesia. In relation fenetik, the overall level of taxa classified by persamaan or inequality possessed against another individual (Saupe 2005 in Prayekti, 2007). The closer the kinship between two



Therefore, it is necessary to study the varieties of the species *Syzygium aqueum* to determine the kinship of all four varieties by analyzing the relationship

RESEARCH METHODS

The tools used in this study include the meter, calipers, shears/blades, plastic bags of various sizes, trays, rulers, digital cameras, paper labels, and stationery. Part observed were morphological characters such as stature, leaves, stems, flowers, fruits, and seeds. The study, carried out a descriptive study and is generally divided into the preparatory phase of research, taking and collecting specimens, character data collection, and data processing.

Table 1. The results of the analysis of the varieties of the species *Syzygium aqueum*

[illegible]

DISCUSSION

The description of each variety can be created Syzygium aqueum an identification key as follows:

1.a. Warna whitish brown stems with rough stem surface. Tapered tip of the leaf and the leaf base tapering Camplong

b. The color of dark chocolate bars with a smooth stem surface. Tip pointed leaves with blunt leaf base2

2.a. Calyx long funnel shape with the color yellow calyx. Color red fruitCitra

b. Calyx short funnel shape with the color yellow calyx. Color red fruit blackish 3

3.a. Astringent fruit flavor with fruit rough skin surface and do not have seedsBlack Diamond

b. Astringent taste sweet fruit with coarse rind and has a seedPink Rose Apple.

Kinship analysis Camplong varieties, Citra, Black Diamond, and Pink Rose Apple Using SPSS Program 16:00.

After analyzing descriptive data to determine any differences in plant species studied, then all the data characteristics of the four varieties of the species Syzygium aqueum reprocessed using the computer program SPSS 16:00. The process of data analysis can be used as evidence supporting the existence of kinship based on morphological characters among the four varieties of plants of the species Syzygium aqueum used in this study. Data processing with SPSS this is grouping based on common characteristics of the morphological characters of every sample. Classify using hierarchical cluster grouping

is done on the distribution of external morphological characteristics of each type of plant samples that were previously transformed first into numerical form and set down in Annex 6 is based on the values specified in annex 5.

Table 2 is a similarity index between 12 OTU plant varieties aqueum Syzygium the greater the value shown in the table , the greater the similarity possessed by each OTU varieties of the species Syzygium aqueum.

So that, when analyzed using cluster analysis, crop varieties of the species Syzygium aqueum that have greater similarity to each other crops will tend to be closer .

Similarity index smallest in table 4.2 is 374 which indicates that CIT2 and PINK1 with CIT3 and PINK1 has a level of equality that are small in the sense CIT2 have morphological characters that differ with PINK1, and CIT3 also has a character different morphologies with PINK1, meaning CIT2 with PINK1 has distant kinship, as well as CIT3 and PINK1 has kinship away, while correlated with the value of 1 means that the plants compared have many values in common is high. Figures in bold are the values at the top $\geq 0,7$ meaning that the higher the value, the more similarities between 1 OTU with the other OTU (OTU compared), whereas values below 0.7 or less, the OTU 1 with OTU being compared have in common a low value. The greater the similarity values indicate more variables in common. This means that the closer kinship (Wahyudi, 2007).

Table 2. Similarity index samples with simple matching coefficient

Case	Correlation between Vectors of Values											
	1:CA M1	2:CA M2	3:CA M3	4:CI T 1	5:CI T2	6:CI T 3	7:BLACK 1	8:BLACK 2	9:BLACK 3	10:PIN K1	11:PIN K 2	12:PIN K 3
1:CAM1	1.000	1.000	1.000	.734	.707	.707	.605	.601	.601	.395	.400	.392
2:CAM2		1.000	.1.00 0	.734	.707	.707	.605	.601	.601	.395	.400	.392
3:CAM3			1.000	.734	.707	.707	.605	.601	.601	.395	.400	.392
4:CIT1				1.00 0	.987	.987	.643	.633	.633	.399	.459	.426
5:CIT2					1.00 0	.1.00 0	.664	.655	.655	.374	.496	.434
6:CIT3						1.00 0	.664	.655	.655	.374	.496	.434
7:BLACK 1							1.000	.989	.989	.515	.669	.569
8:BLACK 2								1.000	.1.000	.533	.683	.586
9:BLACK 3									1.000	.533	.683	.586
10:PINK1										1.000	.857	.978
11:PINK2											1.000	.920
12:PINK3												1.000

Description: The numbers printed in red is the similarity index value is the smallest . Figures are not in bold is the inde

similarity ≤ 0.7 , while the number in bold is the similarity index value of ≥ 0.7 .

Results of the data analysis by SPSS 16 o'clock generate proximity matrix table which is an index of similarity (Table 1) , table agglomeration schedule (Table 2) , and the dendrogram (Figure 5) between 12 OTU plant varieties of the species *Syzygium aqueum* overall .

Description:

Stage : stage grouping

Group 1: individual 1 are compared (number of individuals in accordance with dendrogram)

Group 2 : 2 individuals were compared (number of individuals in accordance with dendrogram)

The similarity coefficients : the value of similarity between individual plant varieties of the species *Syzygium* compared aqueum

After the merger or grouping values obtained in Table 2 then the next value grouping is visualized in the form of a dendrogram in FIG . In the grouping table (Table 2) explains the large comparison value similarity on each OTU varieties of the species *Syzygium aqueum* were compared . Grouping by the first order is a group that has the closest kinship , while the value of the last sequence shows a much kinship between varieties of the species *Syzygium aqueum* used as samples in this study .

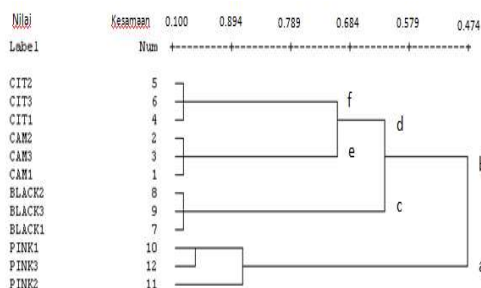


Figure 1. Dendrogram kinship between Camplong varieties , Citra , Black Diamond , and Pink Rose Apple of the species *Syzygium aqueum*

Description:

CAM1 = Camplong 1 BLACK 1 = Black Diamond 1

CAM2 = Camplong 2 BLACK 2 = Black Diamond 2

CAM3 = Camplong 3 BLACK 3 = Black Diamond 3

CIT1 = Image 1 PINK 1 = Pink Rose Apple 1

CIT2 = Image 2 PINK 2 = Pink Rose Apple 2

Image 3 PINK CIT3 = 3 = Pink Rose Apple 3

In the image display dendrogram (Figure 1) to clarify the kinship between OTU in one variety and between varieties within a species. The dendrogram was able to explain that the smaller the value of

similarity (scale 0100-0474) of the line connecting between one individual to another individual, the greater the difference between the individual possessed. This means that the more distant family links.

The first grouping preceded by two main groups, namely group A and group b. A group consisting of varieties of Pink Rose Apple while group B consists of varieties of Black Diamond, Camplong, and image. Both of these groups have in common value of 47.4. A group has been able to break into individual members, ie varieties of Pink Rose Apple itself with the similarity value of 75.1. While the group b break into 2 groups: group C and group D which consists of varieties of Black Diamond, Camplong, and image. The group is separate from the similarity value of 51.4. D group split into groups E and F group consisting of varieties Camplong and image. The group is separate from the similarity value of 65.1. Grouping is based on equality morphological characteristics shared by organisms compared. In Table 4.4 will explain the characteristics which have an influence in the grouping between varieties.

REFERENCE

- Alvin, K. L., Dalby, D. H., dan Oladele, F. A., 2013, *Numerical analysis of cuticular characters in Cupressaceae*, Department of pure and applied biology, Imperial college of science and technology, London
- Dalimartha, 2008, *Resep Tumbuhan Obat Untuk Asam Urat*, Penebar Swadaya Hal. 3-4, 33-35, Jakarta



- Dina, I., 2001, *Ragam Alat Bantu Media Pengajaran*, Diva Perss, Yogyakarta
- Hamidah, 2009, *Biosistematika Annona muricata L., Annona squamosa L., dan Annona reticulata L. dengan Pendekatan Numerik, Disertasi*, Fakultas Biologi, Universitas Gadjah Mada, Yogyakarta
- Hariyanto, P. Bambang., 1993, *Jambu Air Jenis, Perbanyakan dan Perawatan*, Penebar swadaya, Jakarta
- Pramono, S., 1988, *Identifikasi Kandungan Kimia Tanaman Obat Melalui Pendekatan Kemotaksonomi Kaempferia galanga, Laporan Penelitian PPOT-LIT-UGM*, Universitas Gadjah Mada, Yogyakarta
- Wendra, 2012, *Aplikasi SMS Gateway Untuk Monitoring Ruangan Ber-AC Menggunakan Bio-Electric Potensial Pada Tanaman Chrysanthemum*, Skripsi, Fakultas Sains dan Teknologi Jurusan Teknik Informatika, Universitas Islam Negeri Maulana Malik Ibrahim, Malang
- Whitten, T.J., Whitten, C.G., Mittermeier, J., Supriatna., dan R. Mittermeier., 1997, *Megadiversity: Earth's Biologically Wealthiest Nations*, Hlm 75-107, Cemex Corp, Canada