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The Identification of Five Coconut Cultivars (Cocos nucifera L. var typical) as Coconut's Main Descendant in Composite

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Abstract
The study was conducted to gain the objective of morphologically identifying five cultivars of coconuts i.e. Mapanget Coconut (DMT), Bayuwangi Coconut (DBG), Tenga Coconut (DTE), Lubuk Pakam Coconut (DLP), Palu Coconut (DPU) as the main descent in the object composites. Fruit component and production component became the main studied objects.Statistical data analysis was used as the method of the study by counting the average point (X), deviation standard (Sd), and diversity coefficient (KK). The evaluation of five coconut cultivar sites was done to analyze ten samples of coconut trees that were randomly determined from every cultivar's population of coconut, then marking/numbering the samples by using phlox.The result of study shows that the identification toward five Coconut cultivars performs various appearances; the example is the highest production component diversity was performed by Mapanget coconut with the character of fruit number was 27.94%. It is followed by Lubuk Pakam Coconut 23.80%, and Bayuwangi Coconut 22.96%. Meanwhile, the highest production for each coconut tree in a year was Tengah Long-aged Coconut with 126 unit/tree/year, and the highest fruit component diversity was from Bayuwangi Coconut for the intact weight with 25.82%. From the measurement of fruit weight without its fiber, the variety which has bigger size was from Bayuwangi Long-aged Coconuts with 26.18%, and from the weight of the fiber, the variety which has the bigger percentage of fiber weight is Tenga Long-aged Coconut with 40.42%. If it is observed from the production component and fruit component, the best variety that becomes the most suitable to be the descendant is Tenga Long-aged Coconuts since it has the highest production value of the coconuts in a year.
Keywords : Identification, Cultivar, Long-aged Coconuts, Coconut Descendant in the Composite

Introduction

Background

There are about 11.7 million hectares of coconut plantation in the world. It is spread in 85 countries, and it produces 4.6 million tons copra each hectare in a year. It involves 10 million farmer families or 50 million people of farmers. Generally farmers prefer to breed and plant long-aged coconuts. Although the production of long-aged coconuts is lower that the production of hybrid coconuts, long-aged coconuts have better resistance toward rotten tip disease and have better resistance toward drought condition (Novarianto, 2005).

The evaluation of the genetic diversity of plasma can be done based on the characteristic of morphology, cytology, bio-chemistry, and biology molecular. Quantitative genetic study in coconut trees has been done by several researchers to investigate genetic diversity and correlation among characters as well as guessing the heredity of several characteristics of Long-aged Coconut trees (Novarianto dan Kamaunang, 1999). In order to revitalize the potency of Long-aged coconuts, selection, hybridization, synthetic variation engineering, and composite variety can be done as the ways. The variety of long-aged coconut in the composite has several good points compared to other long-aged coconut varieties as well as hybrid coconuts other than its high production. The variability from long-aged coconut composite that has been used is very various with their particular genetic composition (Kumaunang, 2006).

The objective of the study is to morphologically identify five cultivars of long-aged coconuts that consist of Mapanget Long-aged Coconuts (DMT), Bayuwangi Long-aged Coconuts (DBG), Tengah Long-aged Coconuts (DTE), Lubuk Pakam Long-aged Coconuts (DLP), Palu Long-aged Coconuts (DLP) as the descendant of the coconuts in the composite. The objects observed are fruit component and production components.

Research Method

The activity of the research was conducted in Tissue Culture Laboratory, Research Centre of Coconuts and Other Palm Trees in Manado, North Sulawesi. The tools that were used were scale, gage, sigmat, chopping knife, phylox, marker, stationary, and camera. The materials used were Mapanget Long-aged Coconuts, Tenga Long-aged Coconuts, Bayuwangi Long-aged Coconuts, Lubuk Pakam Long-aged Coconuts, Palu Long-aged Coconuts which is 607 years old. The method used was statistically data analysis by counting the average score (X), deviation standard (sd), and diversity coefficient (KK) of the evaluation of five cultivars of long-aged coconuts. The observation was done to ten samples of coconut trees that had been determined randomly in every cultivar population of long-aged coconut, and it was marked by giving number/mark using phylox. The observed variables were (a) production component including the number of the bunches, (b) fruit component including fruit weight, fiber weight, shell weight, water weight, fruit flesh weight, and fruit flesh thickness.

RESULT AND DISCUSSION

Production Component of Five Cultivars of Long-aged Coconuts

Variation component a particular characteristic describes great different characters among samples observed. The differences can be observed from deviation standard (sd) toward average value (x), or it can be observed from the percentage of various coefficient (KK). The value of diversity coefficient above 20% from particular characteristic can be considered as a great value to fulfill selection need inside particular population or inter populations. According to five cultivars of the coconuts which are Mapanget Long-aged Coconuts, Tenga Long-aged Coconuts, Bayuwangi Long-aged Coconuts, Lubuk Pakam Long-aged Coconuts, Palu Long-aged Coconuts, the characteristic of the number of fruits in Mapanget Long-aged Coconuts has diversity coefficient value above 20%. Here it is Table 1 which presents production component of five Long-aged Coconuts cultivars.

Table 1. Production Component of Five Long-aged Coconut Cultivars

No	Coconut Cultivars		Observed Characters			
			Number of Leaves	Number of Bunches	Number of Fruits	Number of Fruits/Trees/Years
		X	30.00	15.50	6.97	
1	**DMT**	**Sd**	9.77	1.50	1.95	108.03
		KK	**32.56**	11.07	**27.69**	
		X	30.60	14.80	8.53	
2	**DTA**	**Sd**	2.67	1.32	1.39	126.24
		KK	8.74	8.90	16.28	
		X	25.90	14.20	4.80	
3	**DBG**	**Sd**	1.79	1.55	1.10	68.16
		KK	6.92	10.91	**22.96**	
		X	29.70	13.80	6.17	
4	**DLP**	**Sd**	4.50	1.69	1.47	85.146
		KK	15.15	12.12	**23.80**	
		X	28.80	15.60	6.67	
5	**DPU**	**Sd**	2.35	1.51	1.20	104.05
		KK	8.15	9.65	18.10	

Source: Research Centre of Coconuts and Other Palms in Manado (2009)

The highest diversity was achieved in Mapanget Long-aged Coconuts for the character of fruit number with value 27.94%, followed by Lubuk Pakam Long-aged Coconuts with 23.80%, and Bayuwangi Long-aged Coconuts with 22,96%. The value of diversity coefficient represents characteristic variation in a particular population (Novarianto et. al, 1999). The diversity of production component is considered normal if the value can reach more than 20%. It is because generative characteristic that is considered as the weight of the fruit is controlled by quantitative gene and is influenced by the environment. Based on the observation to more than 10 variation of samples the has been analyzed, the highest production of fruit number for each tree in a year is Tenga Long-aged Coconuts with 126,24 fruit/tree/year, and the lowest production is Bayuwangi Long-aged Coconuts with 68,16 fruit/tree/year. Based on the result of the identification of five Long-aged Coconut cultivars, if it is observed from the production component above, the best variation of the coconut cultivar type that can be descendant is Tenga Long-aged coconut because it has production value with the highest number of fruit production for each tree in a year.

Fruit Component

The result of the analysis shows that six characteristics from seven characteristics observed show the diversity of fruit component above 20%; those are the weight of the whole fruit, weight of the fiber, weight of the shell, weight of coconut water, weight of the fruit flesh. The result of the observation can be seen in Table 2.

Table 2. Fruit Components of Five Long-aged Coconut Cultivars

No	Coconut Cultivar		Observed Characteristics						
			Fruit Weight	Fiber Weight	Fruit Weight without Fiber	Shell Weight	Coconut Water Weight	Flesh Weight	Flesh Thickness
		X	1601.00	421.000	1059.00	240.00	332.00	459.00	1.12
1	DMT	Sd	395.10	91.22	224.32	44.22	125.86	58.96	0.10
		KK	**24.60**	**21.67**	**21.18**	18.43	**37.91**	12.85	9.22
		X	1459.00	482.00	1031.00	225.00	325.60	443.00	1.19
2	DTA	Sd	276.42	194.81	220.43	33.75	99.96	65.33	0.06
		KK	18.95	**40.42**	**21.38**	15.00	**28.35**	14.75	4.77
		X	2023.00	614.00	1239.00	312.00	426.00	504.00	1.12
3	DBG	Sd	522.32	156.22	324.33	56.92	147.96	119.18	0.13
		KK	**25.82**	**25.44**	**26.18**	18.24	34.73	23.65	11.76
		X	1679.00	576.00	1164.00	254.00	404.00	486.00	1.16
4	DLP	Sd	241.96	154.65	211.04	44.46	81.13	78.34	0.10
		KK	**14.14**	**26.85**	**18.13**	17.49	**20.08**	16.12	8.33
		X	1848.00	562.00	1248.00	415.00	5.15.00	697.00	1.24
5	DPU	Sd	192.34	135.14	156.40	25.50	146.00	78.61	0.15
		KK	10.41	24.05	12.53	6.14	**28.35**	11.28	12.14

Source: Coconut and Other Palm Tree Research Center in Manado (2009)

The highest diversity is obtained from Bayuwangi Long-aged Coconuts for the character of whole coconut weight with 25.82%. From the measurement of the fruit weight without its fiber, the variety which has bigger weight without its fiber is Bayuwangi Long-aged Coconuts with 26.18%. Meanwhile, the variety with bigger fiber weight is from Tenga Long-aged Coconuts with 40.42%. The analysis result of diversity coefficient showed that from seven characteristics of fruit component appearance, all of the varieties have almost similar with KK value above 20%. However, Mapanget Long-aged Coconut has bigger water weight for its characteristics related to water weight with 37.19% because it was influenced by the size of the fruits. The characteristics of the appearance of fruit component that is quite similar resembles with the observation result of long-aged coconut in Inlika Pakuwo. This issue explains the characteristics of the appearance of fruit component that is influenced by its environment.

Based on the observation result from production aspect and the analysis both production aspect and fruit component, the observation result shows that five varieties of long-aged coconuts especially Mapanget Long-aged Coconuts and Lubuk Pakam Long-aged Coconuts are proper to be the descendant of long-aged coconuts because of its high diversity which reaches until 126.24 pieces/tree/year and also having high variety. The composite of long-aged coconuts that has been made from different varieties of coconuts is expected to have wide adaptation effort and high production.

Conclusion and Suggestion

Conclusion

1. The identification toward five cultivars of long-aged coconuts shows various appearance
   a) The highest production of various components was obtained by Mapanget long-aged coconuts, with the characteristics of the number of fruits 27.94%. It is followed by Lubuk Pakam long-aged coconuts with 23.80% and Bayuwangi long-aged coconuts with 22.96%. Meanwhile, the highest number production of the fruit for each tree in a year was performed by Tengah Long-aged Coconut with 126 pieces/tree/year.
   b) The highest variety component of the fruit is obtained by Bayuwangi Long-aged Coconuts for its whole fruit with 25.82%. From the analysis of fruit weight without its fiber, the variety which has bigger fruit is Bayuwangi Long-aged Coconuts with 26.18%, and for the variety which has bigger size with its fiber is Tenga Long-aged Coconut with 40.42%.
2. Based on the identification result of five cultivars of long-aged coconuts, if it is observed from the production component and fruit component, the best variant that can become the descendant of the long-aged coconut is Tenga Long-aged coconut because it has the highest production of the fruit for each tree in a year.

Suggestion

It is suggested to be able to use other cultivars of long-aged coconuts especially Tenga Long-aged Coconuts that is suitable to be used as the descendant of Long-aged Coconut Composite.

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