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The Kinship Analysis of 10 Corn (*Zea Mays* L.) Populations through Morphological Characteristics in the City of Tidore Islands North Mollucas Province

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***ABSTRACT**: The existence of corns is one of the major commodity crops in Indonesia in terms of aspects of the exploitation and utilization of the products, namely both as food and feed. The opportunities for corn development in the North Mollucas Province to support national food security are prospective as it is supported by the availability of extensive dry land as well as the technology. This study aims to determine the differences in the characters of morphology, similarity index value and clusters (groups) formed in 10 populations of corns (Zea mays L.) in Tidore Islands of North Mollucas Province. The data were collected through descriptions technique, phylogeny analysis to 10 corn populations based on the morphological characters, both generative and vegetative organs. Based on the results of a study to the 10 corn populations, it was found a number of characters from a population of 49 character traits of the general and special corn plants. This shows that the morphological characters of the observed corns that some of which are highly related in terms of their fenotips. In terms of the cluster similarity (group) populations (3, 4, and 8), those corn plants have high similarity, so it is hard to be differenciated in the level of similarity. The cluster population that has very high similarity index values are those in the population (3, 4, and 8) with the similarity index value of = 87.21 % obtained from the Tadupi, Lola, and Koli villages; this population similarity index values is approaching 100 %. Based on the analysis of the dendogram, it was obtained the widest similarity in cluster population 2 derived from Yehu village. The similarity index value of this population group is very low, amounting to = 61.17 %.*

***KEYWORDS:** kinship, corn population, morphological characters, Tidore Islands.*

I. BACKGROUND

A corn (Zea mays L.) is the second carbohydrate food source, just after rice. In addition, the corn has been used as fodder (feed) as well as for industrial raw materials. The utilization of corns as feed ingredient for poultry shows the tendency of increasing in every year, with the increase rate of more than 20%. On the other hand, the utilization of the corns as food ingredients decreases. Unlike with soy, in terms of of self-sufficiency in corn production actually has been fulfilled here. However, due to the continuing demand so that we should import it, even though at any certain moment it is exported (Adisarwanto and Widyastuti, 2004).According to Susanto and Srappa (2005), corn is one of the major commodity crops in Indonesia in terms of both the exploitation aspect and utilization of the products, namely as food and feed Corn that needs to meet the needs of both domestic and international emand until 2010 is still very large. The development of corn opportunities in the North Mollucas Province to support national food security is prospective because as it is supported by the availability of extensive dry land and the technology.

According to Sembiring (2007), the difference in genetic characterisics is one of the causes of plant diversity. The other factor such as the conditions of the environment which vary from one place to the others, in which the plants will need special crtain condition, may also cause the plant or species diversity. Phenotype is the interaction between the genotype with the environment. This means the amount of the phenotype is partly determined by the influence of genotype as well as the environment conditions. To determine the role of the genotype and environment might be calculated through a diversity of the phenotypes in such population.The quantitative characters controlled by major genes have a major contribution and easily recommended by other characters in each individual plant. To study the phylogenetic relationship of a population of organisms may be done by using the marker as a tool for genetic characterization. However, the genetic characterization based on phenotypic markers is usually influenced by the macro and micro environment, as well as the life of an individual. Another difficulty in this method would occur if the quantitative character governed by many genes that are expressed at the end of the growth of certain plants, such as the character of the results. Therefore, the characterization of the phenotype that needs to be supported by the characterization is conducted through molecular markers.

Molecular markers may give an accurate picture of similarities between species and other varietas as it is clearly agreed that the analysis of DNA as the genetic material is not affected by environmental conditions. Genetic variation can be seen through a DNA polymorphism. Genetic similarity in plants can be multiplied by using data from morphological traits (Azrail, *et al*., 2003).Kinship may occur at multiple levels, namely the kindship in the individual, in the population, or within a single species. Seed crop productivity may be also determined by the magnitude of the secondary kinship plants, including corn population. Kinship corn plants observed secondary is a character that might impact on the amount of the weight of corn seed. The existence of varying characteristics can be identified visually from the morphological appearance (phenotype) and the deeper analysis is through the variation in molecular, relating to variations in the protein and the genetic material (DNA), both variations in DNA and proteins (Sutoro, et al, 2007).

This research aims at:

1. Observing the difference in the character of morphology on 10 corn populations (*Zea mays* L.) in Tidore Islands of North Mollucas Province.
2. Observing the similarity index (similarity), corn (*Zea mays* L.) in 10 corn populations in Tidore Islands of North Mollucas Province.
3. Observing the clusters (groups) formed on 10 corn populations (*Zea mays* L.) in Tidore Islands of North Mollucas Province.

II. METHOD

This study was conducted in April 2013 in the City of Tidore Islands of North Mollucas Province. The research was conducted on 10 places of 10 corn populations studied as follows: corn population in Tagalaya village and Lifofa village located in the District of South Oba, population in the Koli and Tadupi villages located in District of Oba, population in Yehu and Sumae villages located in District of Center Oba, population in Kaiyasa and Kusu villages located in District of north Oba, and population in Togeme and Akeguraci villages located in District of Oba.Research Procedures were as follows: (1) preparing for all the tools and materials needed for research both for morphological observation; (2) determining the 10 corn populations appointed as the objects of the research; (3) determining the morphological characters that would be used as the reference in the research in relation to corn such as the differences in morphological characters, plant height, crop length, leaf length and the width, and leaf sheath length; (4) providing the value for each character, a character possessed by the population given the values 1 and 0 for the absence of the characters; (5) making table for similarity index both in the form of matrix and dendogram. The data were collected through descriptions of kinship analysis of 10 corn populations based on the morphological characters.

III. RESULT AND DISCUSSIONS

Result

Based on the result of the kinship analysis of the 10 corn populations based on morphological characters in Tidore Islands of North Mollucas Province, the analysis employed 49 morphological characters and the observational data obtained is presented in Table 1, with processing in the form of binary data.

Table 1 Data for morphological characters of corns (*Zea mays* L.) of 10 corn populations based on 49 morphological characters markers.

Ref.	Morphological characters	Population *n*:									
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1.	The number of stamens at least < 8	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**
2.	The number of stamens at least ≥ 8	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**0**	**0**
3 .	The number of stamens at most < 15	1	**0**	**1**	**1**	**0**	**0**	**1**	**1**	**0**	**0**
4	The number of stamens at most ≥ 15	0	**1**	**0**	**0**	**1**	**1**	**0**	**0**	**1**	**1**
5.	The color of stamens (white)	**1**	**0**	**1**	**1**	**1**	**1**	**1**	**1**	**0**	**1**
6.	The color of stamens (red)	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**
7.	The color of leafs (green)	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
8.	The least length of leafs < 30 cm	**1**	**1**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**1**
9.	The least length of leafs ≥ 30 cm	**0**	**0**	**1**	**1**	**0**	**1**	**0**	**1**	**1**	**0**
10.	The length of leafs at most < 40 cm	**1**	**0**	**0**	**1**	**0**	**1**	**1**	**0**	**0**	**1**
11.	The length of leafs at most ≥ 40 cm	**0**	**1**	**1**	**0**	**1**	**0**	**0**	**1**	**1**	**0**
12.	The witdth of leaf at least < 3.5 cm	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**
13.	The witdth of leaf at least ≥ 3.5 cm	**0**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**0**
14.	The witdth of leaf at most < 4.5 cm	**1**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**

15.	The witdth of leaf at most ≥ 4.5 cm	**0**	**1**	**1**	**1**	**1**	**0**	**1**	**1**	**1**	**0**
16.	The color of leaf surface (green)	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
17.	The color of leaf bottom surface (green)	**1**	**0**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**0**
18.	The color of leaf bottom surface (yellowish green)	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**
19.	Distance within the shortest leafs < 6 cm	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**
20.	Distance within the shortest leafs ≥ 6 cm	**0**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**0**	**1**
21.	Distance within the longest leafs at most < 9 cm	**1**	**1**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**
22	Distance within the longest leafs ≥ 9 cm	**0**	**0**	**1**	**1**	**1**	**1**	**0**	**1**	**1**	**0**
23.	The length of the shortest leaf midrib < 6 cm	**1**	**0**	**1**	**0**	**0**	**1**	**1**	**0**	**1**	**0**
24.	The length of the longest leaf midrib ≥ 6cm	**0**	**1**	**0**	**1**	**1**	**0**	**0**	**1**	**0**	**1**
25.	The width of the shortest leaf midrib < 3 cm	**1**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**
26.	The width of the shortest leaf midrib ≥ 3 cm	**0**	**1**	**1**	**1**	**0**	**0**	**1**	**1**	**1**	**1**
27.	The width of the longest leaf midrib < 5cm	**1**	**0**	**0**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
28.	The width of the longest leaf midrib ≥ 5 cm	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
29.	Leaf tip (tapered)	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
30.	The shortest plant height < 74 cm	**1**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**1**
31.	The shortest plant height ≥ 74 cm	**0**	**0**	**1**	**0**	**1**	**1**	**1**	**1**	**0**	**0**
32.	The tallest plant height < 101 cm	**1**	**1**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	**1**
33.	The tallest plant height ≥ 101 cm	**0**	**0**	**1**	**1**	**1**	**1**	**0**	**1**	**0**	**0**
34.	The color of bark (green)	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
35.	The texture of bark (raw)	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
36.	The least diameter of the plant < 2.5 cm	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**
37.	The least diameter of the plant ≥ 2.5 cm	**0**	**1**	**1**	**0**	**1**	**1**	**1**	**1**	**1**	**1**
38.	The longest diameter of the stem < 4.5 cm	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**
39.	The longest diameter of the stem ≥ 4.5 cm	**0**	**1**	**1**	**1**	**0**	**1**	**1**	**1**	**1**	**0**
40.	The color of fruit skin (green)	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
41.	The number of corncob per plant 1-3	**1**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**1**	**0**
42.	The number of corncobs per plant 2-3	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
43.	The color of corncob seed (yellow)	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
44.	The shortest corncorbs < 8.5 cm	**1**	**1**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**
45	The shortest corncorbs ≥ 8.5 cm	**0**	**0**	**0**	**1**	**1**	**1**	**0**	**1**	**1**	**1**
46	The longest corncorbs < 12 cm	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**
47	The longest corncorbs ≥ 12 cm	**0**	**1**	**1**	**1**	**1**	**1**	**0**	**1**	**1**	**0**
48	Corn flavor (sweet)	**1**	**0**	**1**	**1**	**1**	**1**	**1**	**1**	**0**	**1**
49	Corn flavor (not sweet)	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**
The number of characters for each population		**28**	**27**	**28**	**28**	**27**	**28**	**27**	**27**	**28**	**27**

(Source: The Result of Research in Morphological Characters of corn (*Zea mays* L.), 2013)

Based on the results of the binary data above, the value 1 and 0, where 1 = when the samples or population meet the characters observed, while 0 = when the sample or the population do not have a character that is observed. Based on Table 1 above, it can be inferred that the number of characters that obviously appear from the outside consists of 49 characters. The similar characters of all 10 corn populations cover the color of leaf and the leaf surface, leaf-shaped of tapered-end, the color green bark with a rough bark texture, green color of corncob skin and yellow seeds. Of the 10 corn populations have the same 7 characters from the 49 characters being observed. Thus there are 42 characters spread over 10 corn populations, giving rise to differences in morphology that will be used to determine the kinship among the 10 corn populations. Of 49 characters is observed by using Sorenson similarity index, where the obtained two major groups contained in Table 2.

Table 2. Sorenson's Similarity Index Value from 49 characteristics observed on the 10 corn populations.

I (%)	II (%)
(3,8) =87.21	(3,8) =87.21
(4.8) =87.21	(4.8) =87.21
(3,8,6) =81.10	(3,8,7) =81.10
(3,8,6,7,9) =71.21	(3,8,7,6,9) =71.21
(3,8,6,7,9,10) =70.58	(3,8,7,6,9,10) =70.58

(3,8,6,7,9,10,5) =70.47	(3,8,7,6,9,10,5) =70.47
(3,8,6,7,9,10,5,4) =61.67	(3,8,7,6,9,10,5,4) =61.67
(3,8,6,7,9,10,5,4,1) =61.67	(3,8,7,6,9,10,5,4,1) =61.67
(3,8,6,7,9,10,5,4,1,2) =61.17	(3,8,6,7,9,10,5,4,1,2) =61.17

This similarity index would be used to compare the same individuals in the population based on the number of characters being observed (phenotypes). The similarity index in the form of the above figures indicates that the degree of similarity or kinship in a growing population approaching 100% or a very high similarity. Here is the description of the degree of similarity in the form of a dendogram similarity index of 10 corn population. The kinship analysis based on Kinship Index Value and morphology seen drawing 1.

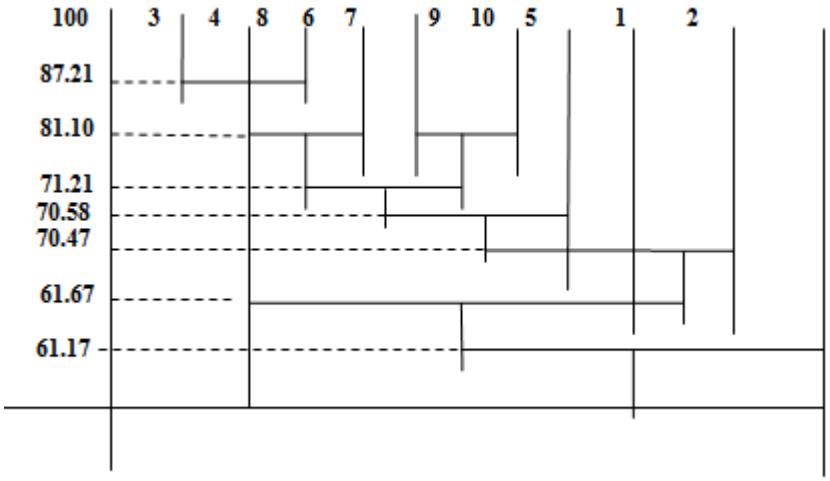

Figure 1. Dendogram I for kinship of 10 corn population based on morphological characterictics

Kinship analysis based on similarity index values and morphology as presented on Figure 2.

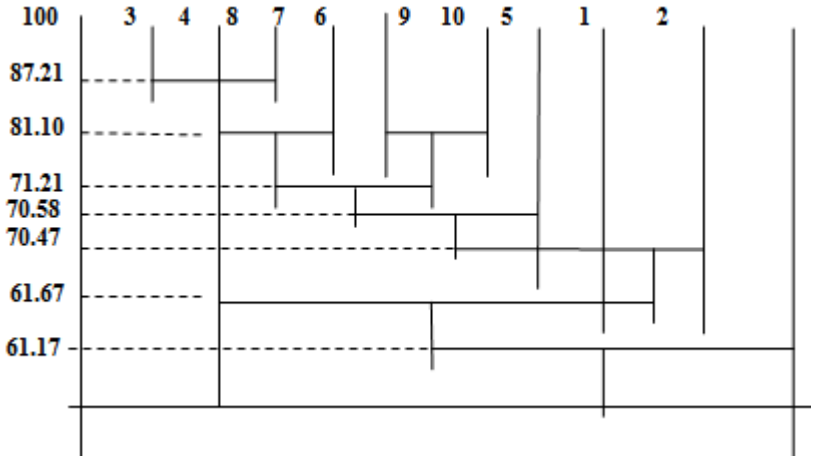

Figure 2. Dendogram II kinship of 10 corn populations based on morphological characteristics

III. DISCUSSIONS

Based on the results of in-depth analysis above by using 49 characters that have been presented in the form of binary data, then it was calculated the Sorenson similarity index described in terms of a phylogenetic tree in the from of dendogram or fenogram, then obtained six clusters (groups), those are the kinship among 10 corn populations. The six clusters can be described as follows:Cluster (group) I consists of corn population (3, 4, and 8) that has a high degree of similarity compared with other population groups. This can be condluded from the similarity index value of the same three populations, amounting to 87.21 %. All of three populations are considered to have similar morphological aspects of 24 characters of which th similarities include: stamens at least ≥ 8 and staments at most < 15 and white color; green leaf color with leaf tip end-shape (tapered); the

shortest leaf is ≥ 30cm while the longest leaf is 40 cm;vthe width leaf is ≥ 3.5 cm while the longest leaf ≥ 4.5 cm; the top and bottom surface of leaf are green; the shortest distance between leafs is ≥ 6 cm while the longest distance is ≥ 9 cm; the length of the longest leaf midrib is the same; the color of corncob skin is green; the color of bark with a rough texture is green; the seed color with sweet fruit flavor is yellow; the shortest plant height ≥ and the tallest is 101 cm height; the stem diameter is ≥ 2.5 cm while shortest and longest are ≥ 4.5 and ≥ 12cm for the longest corncob length .Cluster (group) population II in which the similarity index value is approaching to 100 %, consisted of the population (3, 8, and 6) and (3, 8, and 7) where the similarity index value of = 81.10 %. The group population (3, 8, and 6) has 20 similar characteristics include: the number of stamens at least ≥ 8 with the color of the stamens is white; the shortest leaf length ≥ 3 cm, the shortest leaf width ≥ 3 - 5cm, the upper and lower leaf surfaces is green. The distance between the longest leaf ≥ 9 cm, leaf tip shape is tapered, the shortest plant height ≥ 74 cm and the highest is ≥ 101 cm. The color of bark is green with rough texture, the shortest stem diameter ≥ 2.5 cm and the longest ≥ 4.5 cm; green color fruit skin and yellow seeds. The longest corncob length ≥ 12 cm and the fruit flavor is sweet. The population (3, 8, and 7) has 19 similar characters within the other things consisting: the number of stamens at least ≥ 8 with white color, the leaf color is green, the shortest leaf width ≥ 3.5 cm, and the leaf surface color is green, the color of the lower surface of the leaf is green. The shortest distance between 6 cm and the longest is ≥ 9 cm, leaf tip shape is tapered, the shortest plant height ≥ 74 cm and the tallest ≥ 101cm; the color of bark is green with rough texture, the shortest stem diameter ≥ 2.5 cm and the longest ≥ 4.5 cm; the color fruit skin is green with yellow seeds that has a different length of the corncob with sweet fruit flavor.

Cluster (group) population III in which the similarity index value is approaching 100%, consisted of group population (3, 8, 6, 7, and 9) and (3, 8, 7, 6, and 9) that has a similarity index value of = 71.21 %. This group population has 19 similar characters include: the color of leaf is green; the shortest of leaf length ≥ 30 cm, the shortest leaf width ≥ 3.5 cm and the longest ≥ 4.5 cm, the color of the upper and lower surfaces of leaf is green. The longest distance between the leafs ≥ 9 cm, the shortest of leaf midrib width ≥ 3 cm and the longest ≥ 5 cm. The shape of the leaf tip pointed; the shortest plant height < 74 cm. The color of the bark is green with rough texture, the longest stem diameter ≥ 4.5 cm. The fruit skin color is green with the yellow seeds and the number of corncobs is 1-3 per plant, the shortest corncob length ≥ 8.5 cm and the longest ≥ 12cm. The differences lie in the flavor of the fruit, the color of the stamens, and the number of stamens.Cluster (group) population IV in which the similarity index value is approaching 100%, consisted of group populations (3, 8, 6, 7, 9, and 10) and (3, 8, 7, 6, 9, and 10) that similarity have index values of = 70.58%. These group populations have 15 similar characters such as: the color of stamens is white with green leaf; the longest leaf length < 40 cm, the color of leaf surface is green; the distance distance between the shortest leaf ≥ 6 cm and the length of the shortest leaf midrib > 3 cm, the shape of leaf tip is pointed; the color of the bark is green with rough texture and the fruit skin color is green, the height of the shortest plant < 74 cm, the shortest corncob length ≥ 8.5 with yellow seeds and sweet fruit flavors.

Cluster (group) population V in which the similarity index value is approaching 100%, consisted of group population (3, 8, 6, 7, 9, 10, and 5) or (3, 8, 7, 6, 9, 10, and 5) that also has similarity index value of = 70.47% have also a high degree of similarity. These group populations have 17 similar characters include: the number of stamens at least ≥ 8 and the number of stamens at most ≥ 15; the color of leaf is green with the distance between the shortest leaf ≥ 6 cm, and the length of the shortest leaf < 30 cm and the longest ≥ 40cm; the shortest leaf width ≥ 3.5 cm and the longest ≥ 4.5 cm; the surface leaf color is green, the length of the longest leaf midrib ≥ 6 cm, the pointy end of the leaf-shaped with fruit skin is green, the texture of bark is rough, the shortest stem diameter ≥ 2.5 cm, the fruit skin color is green with yellow seeds and the longest corncob length ≥ 12 cm.Cluster (group) population VI in which the similarity index value is approaching 100 %, consisted of group populations (3, 8, 6, 7, 9, 10, and 4) or (3, 8, 7, 6, 9, 10, 5, 4, and 1) that also have the similarity index value of = 61.67 % have a high degree of similarity. Group populations (3, 8, 6, 7, 9, 10, 5, and 4) have 16 similar characters, consisting of: the number of stamens at least ≥ 8cm, the color of leaf is green with the shortest leaf width ≥ 3.5 cm and the longest leaf width ≥ 6cm; the shortest leaf midrib width ≥ 3 cm, the shape of leaf tip is pointed, the shortest highth < 74 cm; the color of bark bark is green with rough texture; the longest stem diameter ≥ 4.5 cm; the fuit skin color is green with yellow seeds and the longest corncob length ≥ 12 cm. While the group populations group (3, 8, 7, 6, 9, 10, 5, 4, and 1) have the same 14 similar characters as follows: the number of stamens at least ≥ 8 and at most < 15 with the color of stamens is white. The color of leaf is green, and the lower and upper leaf surfaces are green; the length of the longest leaf midrib < 6 cm, the shape of leaf tip is tapered; the color of bark is green with rough texture; the color of fruit skin is green with yellow seeds and the length of the shortest corncob is < 8.5 cm with sweet fruit flavor.

For the corn population number 2 or populations (3, 8, 7, 6, 9, 10, 5, 4, 1, and 2) are the population with the level similarity compared with the other populations is rather wide. This is becayse it has 13 characters similar character of the available 49 characters. This population group has several differences with other population groups, the difference lies in the nature of characters only between the other: the color of stamens is red, while the other is white color, with sweet fruit flavors while the other is not sweet corn. The fewer the number of population in such cluster (group) the more similar characters occur, for example in population groups (3,4,8) that have the highest similarity index value = 87.21% similarity index value, this is close to the value of 100%. Conversely, when the number of population in the cluster is bigger, the smaller the number of characters that are similar, for example in the cluster populations 2 (3, 8, 7, 6, 9, 10, 5, 4, 1, and 2) that has similarity index value of = 61.17%.The corn population (3, 4, and 8) from the Tadupi, Lola, and Koli villages which has the highest similarity index among other 10 corn populations of the studied corns is considered of sweet corn varietas (*Zea Mays saccharata*). While the population 2 or from Jehu village, the corn is considered varietas where the flavor is not sweet or commonly called regular / pearl corn (*Zea mays indurate*).

According Rukmana and Yudirachman (2007) that the characteristic of sweet corn (*Zea Mays saccharata*) consists of young luminous-colored seeds, as clear like glass, while the ripen seeds are dry and will become wrinkled. The color of the stamens and the hair of sweet corncob are white and sweet. On the other hand, the characteristics non-sweet corn or pearl corn (*Zea mays indurate*) seeds are roundish in shape and the size is little smaller than the sweet corn; the seed color varies from white, yellow, and even red. The seed surface is rather bright and harded, the seeds are not wrinkled when they dry, the color of hair and stamens are red.The morphology of corn (*Zea mays* L.) of the 10 corn populations in Tidore Islands, there are variations in terms of the length of leaf, plant height , fruit flavor, the color of stamens, corncob length, the number of corncobs per plant, stem diameter, leaf midrib length, leaf length. The 10 corn populations observed shows 6 kinship groups in a row from the closest to the widest in terms of phenogram (dendogram) analysis in which the cluster (3, 4, and 8) is a closely related group with the similarity index value of 87.21 %, having a very close kinship from Tadupi, Lola, and Koli villages. While the widest kinship in the populations 2 (3, 8, 7, 6, 9, 10, 5, 4, 1, and 2) of Jehu village (Martasari *et al*., 2009).

If a population is grown in the same environmental conditions, the variations of the plants that emerge is due to the differences in genetic composition if other factors are constant. The diversity of the plant phenotype due to the differences in genetic compositions is always possible even the planting material used comes from the same plant species (Sembiring, 2007).The emergence of the variations might be caused by two factors: the environmental and genetic factors. If the genetic factors have stronger influence than the environmental factors, the living things in different environment would not show any morphological variations. At the level of the organism, the phenotype is something visible, observed, measured, something nature or character. The vegetative and generative nature of the differences is determined by the analysis of variance. The differences between cultivars seem to vegetative and generative characters, namely: the number of leaves, number of fruits, and corncob diameter. On the other hand, the characters are like the plant height, corncob position and length, although the number of leaves, number of panicles, and corncob diameter are different between cultivars. For the other characters require further selection (Tanty Yunita *et al*., 2013).

IV. CONCLUSIONS

Based on the result of this research, there are some conclusions as follows:

[1] Based on the research on the 10 corn populations, it is reveal any number of characters of a population consists of 49 characters derived from the general and specific characteristics of corn plants. This shows that the population of each morphological character observed some of which are highly related in terms of phenotype appearance.

[2] Kinship cluster of corn population (3, 4, and 8) all have high similarity so that cannot be easily distinguished in terms of the level of kinship. The cluster populations that have a very high similarity index values are those of the population (3, 4, and 8) with a similarity index value of = 87.21 % obtained from the Tadupi, Lola, and Koli villages. This population similarity index value is approaching 100 % similarity index value.

[3] Based on the analysis of phenogram, it is obtained that the widest kinship contained in cluster population 2 was derived from Jehu village. It is referred to the similarity index value of this population group that is very low, amounting to 61.17 %.

REFERENCES

[1] Adisarwanto. T, & Widyastuti. Y.Increase Corn Production dilahan Dry , Rice , And The ups and downs. PT. Penebar Swadaya Jakarta. 2004

[2] Anonimous. Kinship corn type. Retreived at 12 December 2012. http://www .Google.co.id, kekerabatan types of corn grown.pdf. 2012a

[3] Anonimous. Types of corn Pictures, Retreived at 12 December 2012. http://pustaka.litbang.deptan.go.id.pdf. 2012b

[4] Anonimous. Kinship in Fenetik. Retreived at 2 June 2013. http//Pustaka.litbang.deptan.go.id.pdf . 2013

[5] Argo Nuning S. Plant Morphology and Growth Phase Jaguang , Corn Production Engineering and Development, Cereal Crops Research Institute, Maros. 2009

[6] DPKP North Mollucas Province. Maize cultivation. Ternate. 2003

[7] Hidaya Ismatul. Feasibility Analysis of Productivity Improvement of Food Technology, Food Technology Center Penkajian Mollucas. 2010

[8] Rukmana & Yudirachman. Corn Cultivation , Post Harvest , Food And Diversification.

[9] CV. Aneka Ilmu, Semarang. 2007

[10] Martasari, et al. Fenetik approach Taxonomy Species Kinship in Identivikasi Anthorium.

[11] *Malang University*. J Hort, 19 (2) 155-163. 2006.

[12] Azrail Muhammad, et al. Identification of Character Resistance Locus in Maize Using downy mildew Marka RFLP. Journal of Agricultural Biotechnology, Vol. 8, No. 1, pp. 8-14. 2003

[13] Rukmana. Cultivation of Sweet Corn Postharvest. CV, Aneka Ilmu, Semarang. 2007

[14] Sembiring. Study of Some Characteristics of Corn Varieties *(Zea mays* L). Unpublished thesis, North Sumatera University. 2007

[15] Subekti, et al. Morphology of Corn. Retreived at 12 December 2012. http://www .Google.co.id, Produksi dan Pengembangan.pdf. 2009

[16] Susanto & Sarappa. Corn Development Prospects and Strategies to Support Food Security, BPTP Mollucs. 2005

[17] Sutoro, et al. Population genetic parameters Bhishma Corn On The Different Variety of Surfaces and Genetic Correlation of Secondary Characters .Center for Genetic Research and Development .Journal of Agro Biogen 3(1) 9-14 vol 3. Bogor. 2007

[18] Tanty Y., et al. Use of Genetic Components, Combining, and Segregation Bijpi In Sweet Corn Yellow Horned. J Agrotek Tropika Vol 1, No 1: 25-31, January 2013.

[19] Umasangaji. Assessment Form and Number of Objects Ergastik Powder (Starch) In Plant Cassava (Manihot utilisma Phol), and Corn *(Zea mays* L) Unpublished thesis of Biolody Education Program, Ternate. 2012