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Morphological Characterization of *Etlingera Elatior* (Jack) Explored in Sukabumi, West Java, Indonesia

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Abstract. *Etlingera elatior* (Jack), local Honje, is an underutilized species in Zingiberaceae family which is potentially used as resources of secondary metabolite compound for medicines, cosmetics, bio-insecticides and antioxidant needs. The recent research and report for this species in Indonesia, particularly its genetic diversity, pharmaceutical utilization as medicines, and conservation effort, still have limited access. Less attention and interest for this species will threat the existence of this potential species. Morphological characterization and study of genetic diversity is needed to increase its value and conservation efforts. This research aims to obtain the accessions as elder resources for plant development and the accessions which able to be used as medium compound. This research used descriptive explorative survey by choosing area based on altitude; low, medium, and high lands in Sukabumi District, West Java. Approximately 20 accessions of plant were collected from each location. Morphological character was observed according to Descriptor list of Zingiberacea and modified for *Etlingera elatior* (Jack). The exploration obtained 39 accessions of Honje and they were morphologically characterized. These 39 Honje accessions showed large genetic diversity with value of phenotypic variances are larger than two standard deviations in almost all agronomic characters. Cluster analysis between Honje accessions was showed in dendrogram output with Euclidean coefficient by 3.30. TIN001 accession had the furthest genetic relationship with REN001 and REN002 thus these accessions are potential to be used as the mother in breeding program of Honje.

1. Introduction

Ginger plant (Zingiberaceae family) is one of the main sources of traditional medicinal materials. However, only a few species whose potentials have been searched as sources of drugs, including Ginger (*Z. officinale*) and Curcuma. Indonesia is one of the centers for spreading gingers (Anderson et al., 1952; Ravindran et al., 2005), which are rich in indigenous knowledge.

Etlingera elatior or in Sundanese is known as honje is a traditional medicinal plant species which is potential to be developed. In addition, these plants can be grouped into underutilized crop because of its reducing use. Until now, scientific reports on this species are still very limited, especially for accession originating from Indonesia. Morphological characterization is an early stage that can be done to preserve genetic resources and science, as well as to enhance the economic value of the traditional medicinal plants. Conservation efforts should also be carried out along with genetic diversity studies and their



utilization. The purpose of this research is the formation of core collection as a plant development material as well as information on the diversity of the crops. Sukabumi is one of the central areas in the planting of ginger plants. This can be seen from the distribution map of this ginger plant issued by BPOM in 2005.

2. Methods

This research was conducted by exploration method in 22 sub districts to collect *honje* accession in Sukabumi district. The method used is the roaming method on individual plants by using direct observation method for the measurement of morphological characters descriptively, namely in the research of an object with the aim of making the character systematically, factually and accurately about the characteristics and the relationship of the observed phenomena. From any *Honje* accessions found, the morphological characters and the number of population will be observed and the roots will be collected. The collected data was equipped with various supporting information that will be included into the data collection passport.

3. Results and discussion

The results of *honje* exploration (*Etlingera elatior jack*) which was conducted in Sukabumi district showed that *honje* growth was influenced by several factors, i.e. height of place, temperature, soil type, and habitat in the area or place used as harvesting of *honje* as revealed by Sitompul and Guritno (1995) that plants require optimum environmental conditions to fully express their genetic factors.

The sampling of *honje* (*Etlingera elatior jack*) from various districts in Sukabumi resulted in 39 plant accessions from dry land originating in the moor or in the yard of the house. *Honje* plants are more common in middle and low lands than in high lands. The *honje* plants found in the low lands are mostly green *honje* and in the highlands, most plants grow are red *honje*.

Cluster analysis which was implemented on 39 *Honje* accessions aims to group the similar elements into distinct and mutually exclusive groups (*clustesting*) therefore the objects within one cluster will be similar to each other (Santoso, 2014).

Based on the cluster analysis, the distance of *Euclidian* 39 *Honje* accessions in Sukabumi district is in the range of 0.00 to 3.28 (Figure 1). The range states that the non-incidence coefficient in *honje* accession population in all locations is large. A huge inequality suggests that the variations within the population are wide.

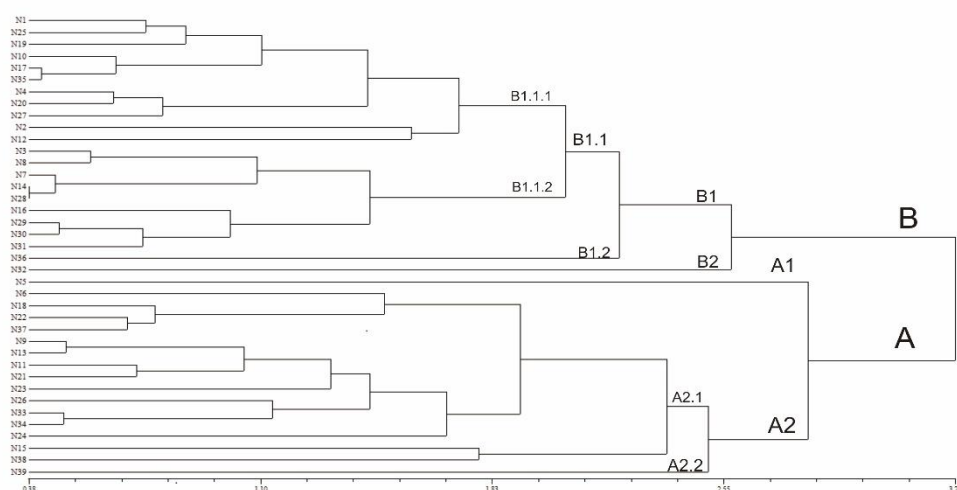


Figure 1. Dendrogram of 39 *Honje* (*Etlingera elatior Jack.*) accessions in Sukabumi District.

From dendrogram of 39 *honje* accessions formed two clusters, they are clusters A and B, these clusters form sub-clusters. In Cluster A cluster, A1 on sub cluster N5 shows this *honje* is different in phenotypic way from other *honje* accessions. At this accession, *honje* has a height of 531 cm, stem diameter of

4.414 cm, leaf length of 82.5 cm and leaf width of 22.4 cm. Cluster B consists of two clusters and forms sub-clusters. In cluster B1 of N36 sub cluster there are phenotypic differences with other *honje* accessions with height of 486 cm, stem diameter of 2,94 cm, leaf length of 60,1 cm and leaf width of 14,5 cm. In cluster B2 there is one accession that has a very striking phenotypic difference that is on sub cluster N32 with plant height of 251cm, stem diameter of 2,71cm, leaf length of 70,9 cm and leaf width of 12,7 cm. From the accessions N5, N32 and N36 obtained show that this *honje* accession shows a huge non-incidental coefficient among the other 39 *honje* accessions. This suggests that these three *honje* accessions have a wide variation in each of the genotypes.

4. Conclusions

Relationship between the patterns of kinship between accession *honje* plants from various regions in Sukabumi District showed three *honje* accessions have a very distant kinship pattern that is on accessions *honje* N5, N32 and N36.

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