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CHARACTERIZATION AND EVALUATION OF APPEARANCE RICE (Oryza sativa L.) LOCAL EAST TIMOR AND RICE INDONESIA

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Abstract

Rice is an important commodity for the majority of the population, especially in the continent of Asia use rice as a staple food. The state of Indonesia and East Timor, rice as the main food source that needs continue to increase because in addition to the population continues to grow at a rate of increase of about 2% per year, as well as the change in consumption pattern of the population of non-rice to the rice. Interest characterization and evaluation of the appearance of rice(Oryza Sativa L.) locally Timor Leste and Indonesian rice are getting Local rice genotypes Timorese suitable for cultivated in paddy fields. This research using a randomized block design (RBD) consisted of 9 treatments and 3 replications. The materials used are high-yielding rice varieties namely IR-3 64, Ciherang, Cimelati and 6 local rice genotypes Timor Leste, namely Hare Foam, Fafulu Hare, Hare Bauk Morin, Mean Hare, Hare and Hare Modok Fulan. Results showed that the highest plant length at the age of 10 MST contained in the local rice Hare Bauk Morin(134.67 cm), Number of tillers(40.30) the number of leaves(4.64).Flowering date and time of harvest shortest genotypes present in Morin namely Hare Bauk flowering date (39 days) and time of harvest (105 days). The highest number of panicles contained in Hare Mean genotype, high-yielding varieties IR64, Ciherang and Cimelati. The length of the longest panicle genotypes present in Foam Hare, Hare Hare Fafulu, and Fulan. The number of filled grains per panicle most contained in superior varieties IR64, Ciherang and Cimelati. The highest weight of 1000 grains contained in Cimelati varieties (vu3) with Hare Bauk Morin, IR64 and Cherang varieties. The highest rice yield for local rice genotypes present in Hare Bauk Morin (G3) of 9.79 $ton.Ha^{-1}$ while yielding varieties there exist varieties Cherang (vu2) of 9.74 $ton.Ha^{-1}$.

Keywords: Superior Rice; Genotype Local Rice East Timor.

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1. Introduction

Rice (Oryza sativa L.) is a staple food as a source of calories consumed by the people of Indonesia (BPS, 2014). Rice is generally consumed by the public as an important food source in Asia, particularly the East Timorese nation. Approximately 90% of the production and consumption of rice is in Asia. The average annual consumption per person in 2007 from 131 kg and the content of rice per 100 kg of material provides 360 kcal of energy, 79.34 g carbohydrates, 6.6 g protein and 0.58 g fat (FAOSTAT 2011). Particularly in Indonesia and East Timor, rice as a main food source that needs continue to increase, because in addition to the population continues to grow at a rate of increase of about 2% per year, as well as the change in the pattern of consumption of the population of non-rice to the rice and the increasingly limited capacity of rice production paddy varieties developed due to the very limited too (Sadimantara and Muhidin, 2013).

The average rice production in Indonesia in 2015 was 5.3 tonnes/ha, while the average consumption per capita rice Indonesian people per week reached 1,626 kg (CBS, 2015). Indonesian population growth rate from 2010- 2014 to reach 1.4% per year and projected to the total population of 2015 were approximately 255 million reached 296 million in 2025 (CBS, 2015). Until now rice production in Indonesia is still not comparable with the needs of the community rice prompted the government to always provide an increase rice production in sufficient quantities (Ministry of Agriculture, 2015). Increased rice production needs to be backed rice germplasm collection as its genetic material.

One of the factors that led to reduced production of rice is of the variety or the genetic makeups of the rice plants are not resistant to the environment. Environmental factors that can affect the growth and production of rice can be divided into two groups, namely: factors of the natural environment such as soil, climate and biological as well as factors of production inputs (fertilizers, pesticides, rice varieties excel and others), given by humans. While genetics can be determined by estimating the heritability value shows how much the tendency of characters genetic diversity of the plants or phenotypes to respond to the environment in which these plants are cultivated (Nugroho *et al*.,2017).

2. Materials and Methods

This study was conducted between July and October 2017, located in the garden village farmers Sumberbendo subdistrict Pare Kediri, East Java, Indonesia. Field trials at an altitude of 125 m above sea level, soil type Regosol grayed brown, the average maximum temperature of 30.7°C during the dry season and an average minimum temperature of 23.8°C, in the rainy season. The average air humidity of 85.5% per year, while relative humidity of 74%.

2.1. Samples

Materials used include 3-yielding varieties that IR64, Ciherang, Cimelati and 6 local rice genotypes Timor Leste, namely Hare Foam, Fafulu Hare, Hare Bauk Morin, Mean Hare, Hare and Hare Modok Fulan. Fertilizer use Urea, Phosphate, SP 36 and the pesticides used are Alfamex-Bamec-Numectin-Demolish (the active ingredient abamectin)

2.2. Research design

Research using a randomized block design (RBD) consisted of 9 treatments and 3 replications.

2.3. Statistical analysis

The data analysis was facilitated by the 2010 version of Microsoft Excel using analysis of variance (F-test with a 5% standard error) Followed by a least significant difference (LSD) approach.

3. Results and Discussion

3.1. Results

Based on the analysis of variance showed that the real treatment effect on plant length and the number of leaves at the age of 6 WAP, 8 WAP and 10 WAP (Tables 1 and 2).

Table 1: Average length of rice plants aged 6, 8 and 10 weeks after planting the varieties treatment.

Treatment	Plant Length (cm)		
	6 WAP	**8 WAP**	**10 WAP**
Hare Foam (G1)	89.50 b	116,83 c	125.90 cd
Hare Fafulu (G2)	91 , 63 bc	117.10 c	124.80 cd
Hare Bauk Morin (G3)	122.33 e	132.90 d	134.67d
Hare Fulan (G4)	100.00 c	115.67 c	123.53 c
Hare Modok (G5)	117,77 de	124.67 cd	129.13 cd
Hare Mean (G6)	110.93 d	124.00 cd	126.63 cd
varieties IR64 (VU1)	61.83 a	69.83 a	71.88 a
variety Ciherang (vu2)	70.27 a	76.00 ab	76.87ab
varieties Cimelati (vu3)	69.77 a	82,77 b	83.25 b
LSD 5%	10.04	9:14	10.33

Description: Numbers are accompanied by the same letter at the time of observation each showed no significant difference based on LSD 5%; cm = centimeter, WAP = weeks after planting.

Table 2: Average number of leaves of rice plants aged 6, 8 and 10 weeks after planting the varieties treatment.

Treatment	Leaf Number		
	6 WAP	**8 WAP**	**10 WAP**
Hare Foam (G1)	3.26 a	3.40 a	3.48 a
Hare Fafulu (G2)	3, 38 ab	3.60 ab	3.63 ab
Hare Bauk Morin (G3)	d4.33	4.62de	4.64 d
Hare Fulan (G4)	3.55bc	bc3.72	3.70 b
Hare Modok (G5)	3.77 c	3.89 c	3.91 c
Hare Mean (G6)	ab 3,48	3,75bc	3,78bc

variety IR64 (VU1)	4.52 de	4.57 d	4.60 d
Variety Ciherang (vu2)	4.69 e	4.75 de	4.79 d
Variety Cimelati (vu3)	4.73 e	4.78 e	4.80 d
BNT 5%	0.25	0.21	0.21

Description: Numbers are accompanied by the same letters at the same time observation showed no significant difference based on LSD 5%; WAP = weeks after planting.

Table 3: Average number of seedlings of rice plants is 2, 4, 6, 8 and 10 weeks after planting the varieties treatment

Treatment	Number of Tillers				
	2 WAP	**4 WAP**	**6 WAP**	**8 WAP**	**10 WAP**
Hare Foam (G1)	2.34 a	14.11 b	18.87 ab	20.23 a	20.41 a
Hare Fafulu (G2)	2.33 a	13.16 ab	21.57 b	24.40 ab	25.07 bc
Hare Bauk Morin (G3)	3.14 d	18.33 c	31 14 d	39.97 a	40.30 d
Hare Fulan (G4)	2.44 a	11.83 a	16.27 a	21.97 b	21.97 ab
Hare Modok (G5)	2.60 b	14.83 b	25, 13 c	26.90 b	26.90 c
Hare Mean (G6)	2.66 b	14.50 b	26.67 c	28.17 b	28.17 c
varieties IR64 (VU1)	3.10 d	22.11 d	43, 00 f	47.97 d	47.97 e
varieties Ciherang (vu2)	2.89 c	24.38 e	43.53 f	47.90 d	47.90 e
varieties Cimelati(vu3)	3.39 e	19.33 c	35, 47 e	41.03 c	41.20 d
LSD 5%	0.11	2:19	3.27	4.37	4.09

Description: Numbers are accompanied by the same letter at the same time observation showed no significant difference based on LSD 5%; WAP = weeks after planting.

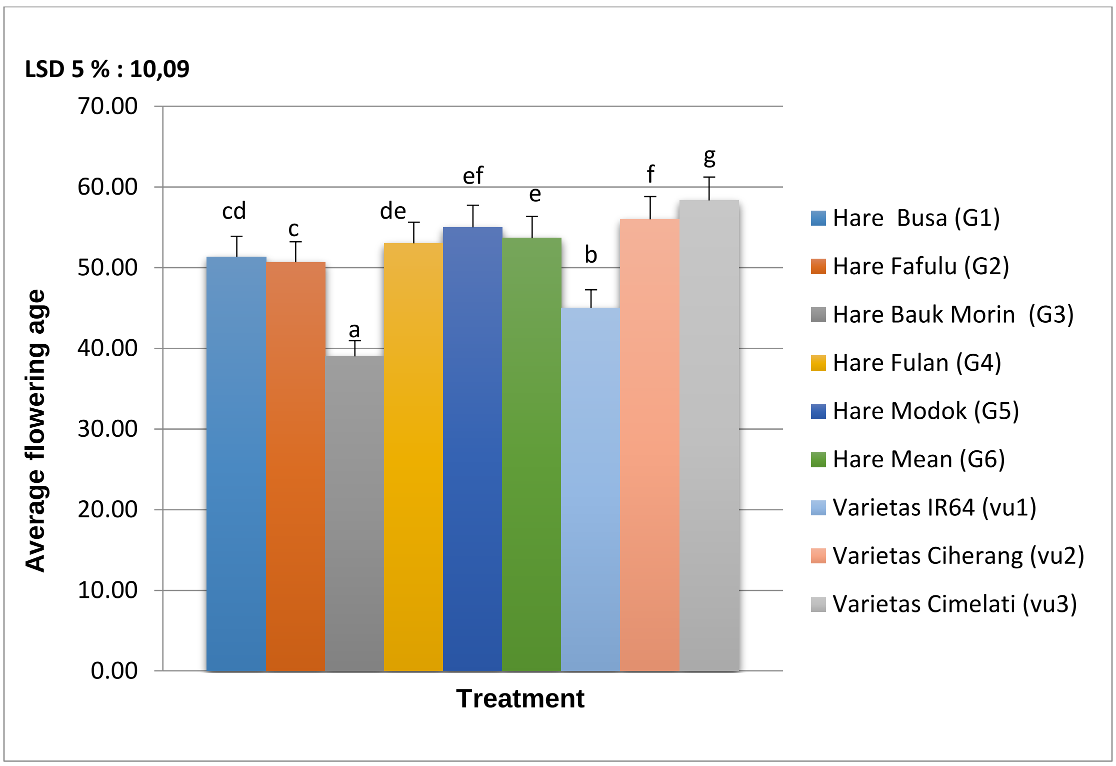

Figure 1: The Flowering Age

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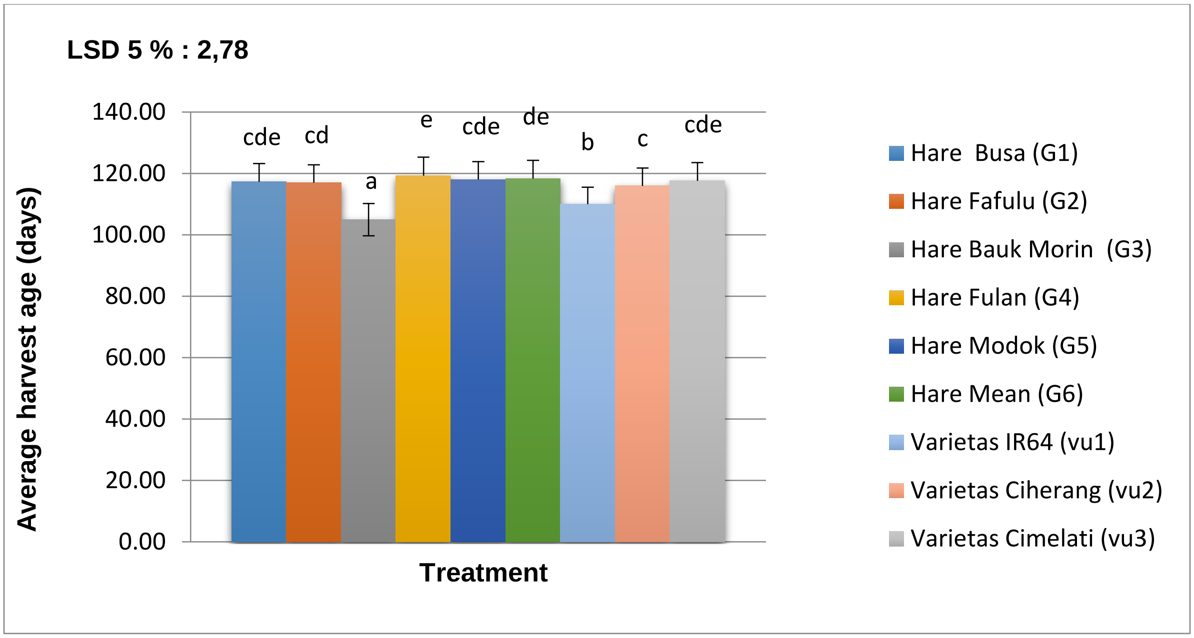

Figure 2: The harvest age

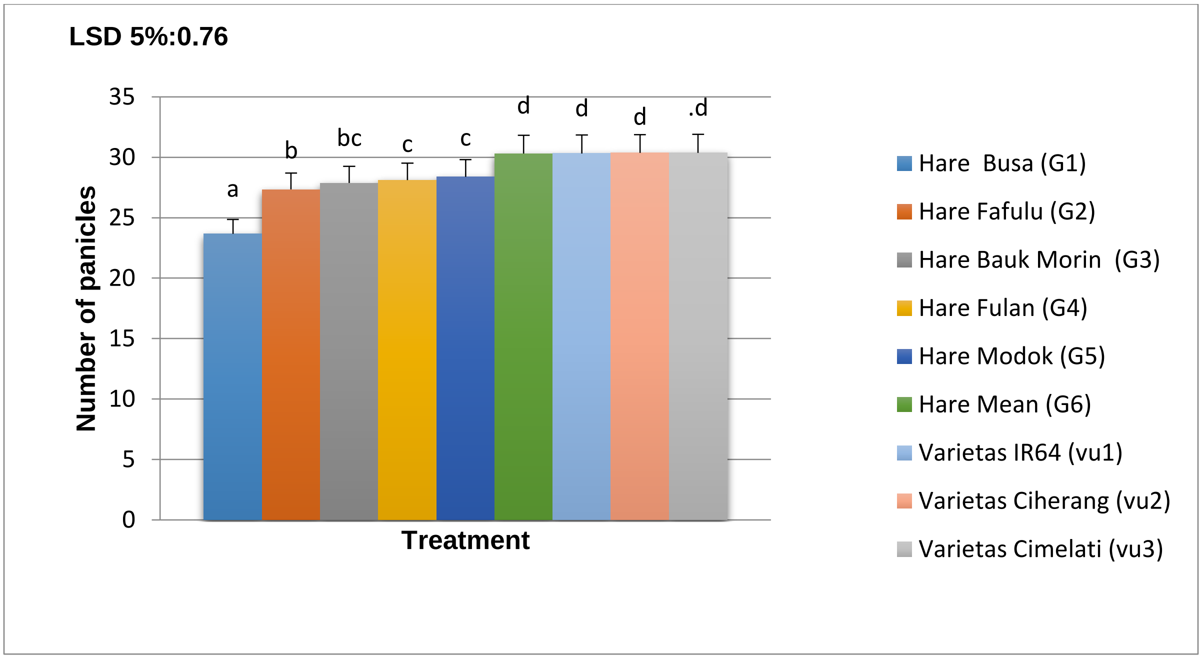

Figure 3: Number of panicles

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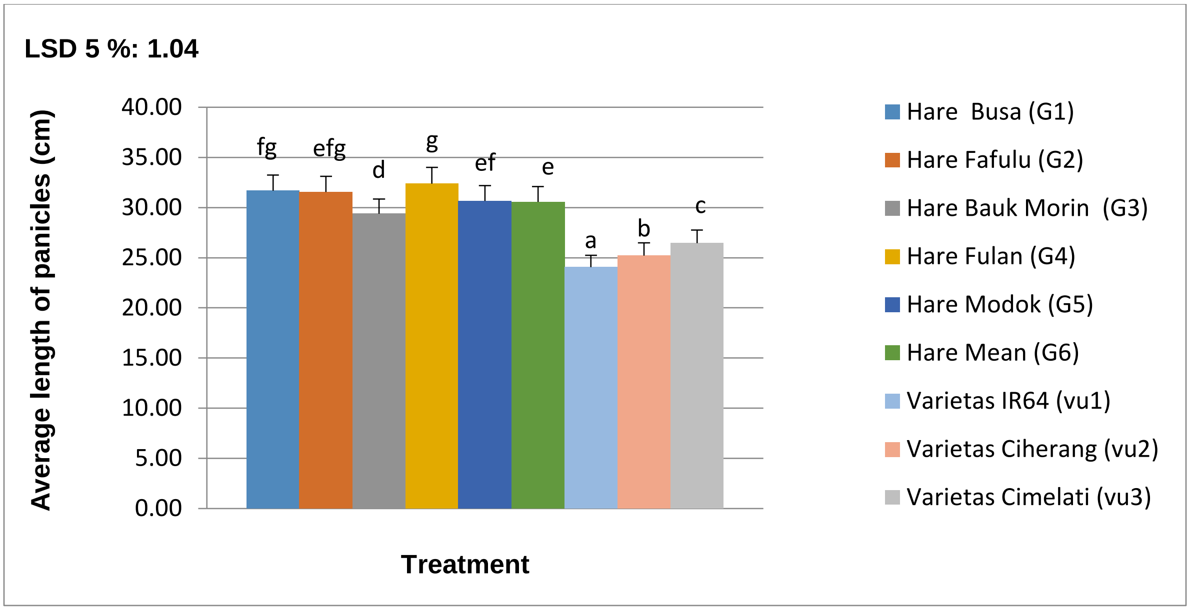

Figure 4: The length of the rice panicle

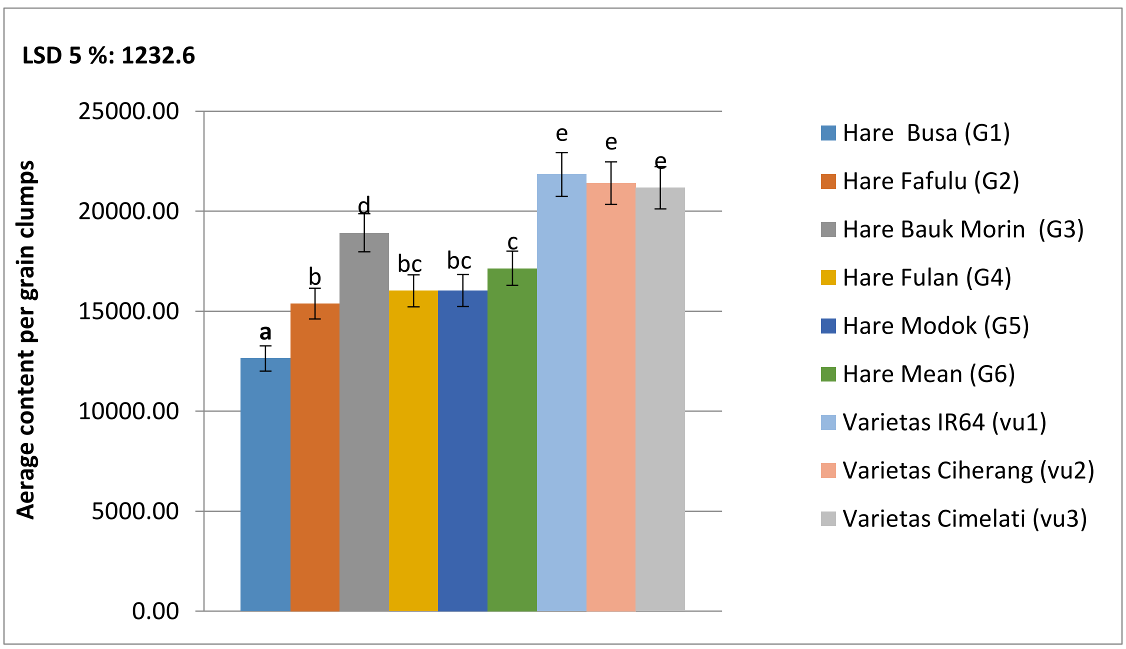

Figure 5: The average content per grain clumps

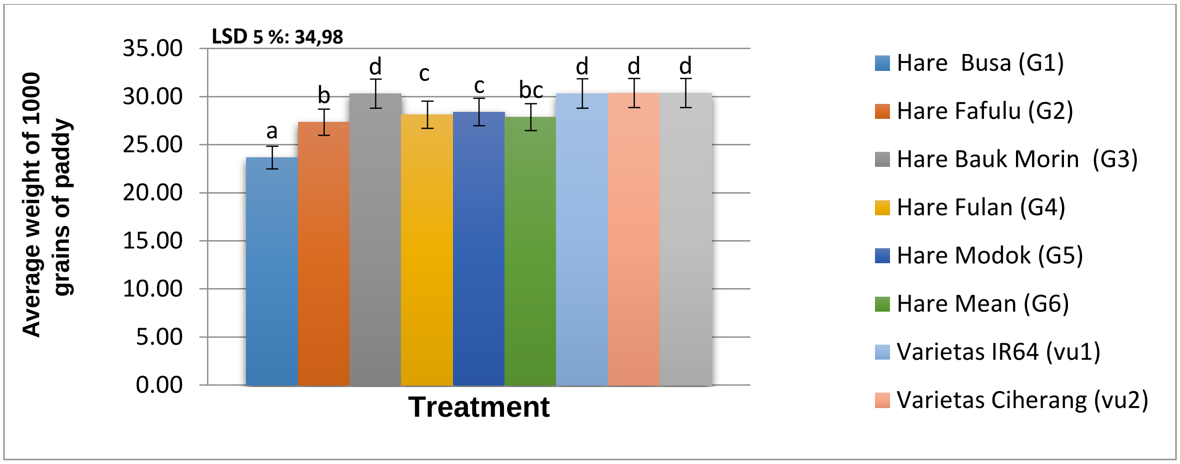

Figure 6: Weight of 1000 grains of grain

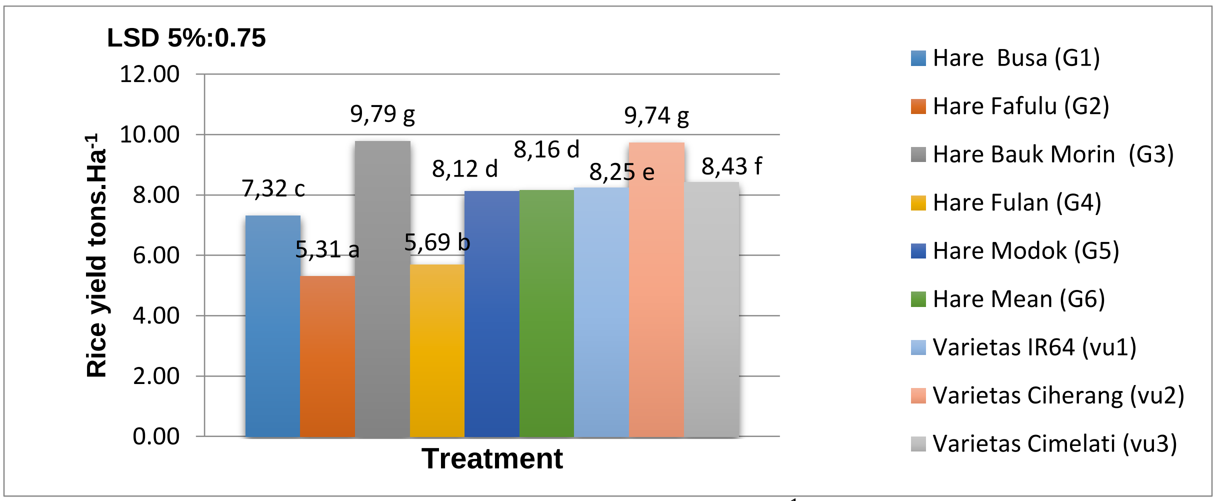

Figure 7: Rice yield tons.Ha^{-1}

4. Discussion

Plant growth can be interpreted as a quantitative change in the plant life cycle that cannot be returned (irreversible) or increase the size of the plant will not be back due to the division and cell enlargement. Changes in body size as well as increase overall plant represents a space or volume permanently or increase the volume of which cannot be returned (Irreversible Increase in volume).The growth process is controlled by two factors, namely plant genetic and environmental factors (Sitompul and Guritno, 2012).

The growth of rice plants has different responses to the growing environment. It is suspected that genetic factors and the environment that supports the growth could spur plant growth component that is higher than the growth environment that does not support. Lehar (2012) states that genetic factors are more dominant on the characters displayed plant for genetic factors contribute greater than environmental factors. Plants that have a high genetic diversity will greatly help a population to adapt to the changes occurring in the surrounding environment (Nugroho *et al.*, 2017). In addition to genetic factors, environmental factors around the place of growing plants are also the very important role in the growth and yield of the (Lehar *et al.*, 2017).

Photosynthesis is affected by two factors: genetic factors and environmental factors. Genetic factors include differences between the species, the influence of leaf age, and influence the rate of translocation fotosintat. Environmental factors include the availability of water, availability of CO2, the influence of light, as well as the influence of temperature (Lakitan, 2007). Chlorophyll formation is influenced by several factors such as plant genetic factors, an intensity of light, oxygen, carbohydrates, nutrients, water, and temperature (Dwijoseputro, 1992).

Local rice is generally grown in areas of dry land by the public in the State of East Timor and some people cultivate in the rainfed areas. Wetland and dry land are still many obstacles in improving rice growth both in terms of nutrients in the soil and rice varieties are used. One way to improve rice growth by the use of organic fertilizer chicken manure as fertilizer base will support the rice plants growing environment and selects local rice genotypes that can adapt to the wetlands. Alavan *et al*.,(2015) states that local rice grown in dryland or rainfed areas not everything can be adapted in the wetlands it is due to genetic factors of the plants cannot grow well in wetlands. Selanjuta Alavan *et al*.,(2015) stated that the rice plants grow well when the environment around where the plants grow to support the growth of these plants.

The rice plant local varieties and improved varieties can grow well if the nutrient and growing environment around the plant is very supportive. Doberman and Fairhust, (2000) suggest growing environment that supports and enough nutrients available will be easily absorbed by the plant so as to accelerate the growth of plants, in this case adds plant height, number of tillers, increase the size of leaves and large grain and improve the quality of crops and seeds, increase the protein content of rice, increase the number of grains and the percentage of filled grain. The wetlands with the state of soil texture and structure strongly support plant growth, in line with the opinions Osman (1996) states that the land with the state of texture and structure greatly to the success of farming soil to the desired crop is the soil structure loose has a pore space is filled with water and air, so that the absorption of nutrients can run optimally (linga 1998). Manure can add nutrients to the soil as a supply of humus that can improve soil structure and encourage the life of soil microorganisms (Lehar, 2012).

Environmental grow a plant needs to be considered in the cultivation of a plant, it is to ensure the growth of the plant. Osman (1996) states that the land with the state of texture and structure greatly to the success of farming soil to the desired crop is the structure of loose soil have pore spaces are filled with water and air so that the absorption of nutrients can run optimally (linga 1998). Manage water which can improve the circulation of air in the soil and manure as basal fertilizer to add nutrients in the soil as a supply of humus to improve soil structure and encourage the life of microorganisms soil to improve plant growth (Kato *et al*., 2009).

Rice productivity in the local commonly cultivated in dry land and when cultivated in the wetlands, the growth of the plant is not stable so that growth and the results are low, due to the effect of pressure abiotic puddles continuous and nutrients is not enough (Sarangi *et al*., 2014; Sarangi *et al*.,2016). Pressure abiotic delaying or reducing the growth of seedlings of rice inhibits root growth and elongation of shoots, produces components uneven growth, and ultimately lead to loss of crops (Sipaseuth *et al*.,2007; Guan *et al*.,2009; Ismail *et al*., 2009), One effort that can be done is through the test of the stability of the superior properties possessed by each variety produced in order to obtain improved varieties that are able to adapt and interact in a specific environment (Edi Mukhlis, 2000). It is a condition of the success of the selection of the nature/character of the desired plant (Burmana *et al*., 2017). Interaction with the environment varieties gets extra attention for plant breeders in an effort to get local varieties for high yield (Guan *et al*.,2009; Kumar, and Ladha, 2011; Wang *et al*.,2017). Important properties are targets for improvement of local rice varieties grown in wetlands, among others, high yield, tolerant to diseases, have a good quality of rice (Lopez *et al*., 2008; You *et al*., 2006.

5. Conclusion

The results of this study concluded that characterization and evaluation of the appearance of rice(Oryzasativa L.) local Timorese and Indonesian rice obtained the highest plant length at the age of 10 MST contained in the local rice Hare Bauk Morin(134.67 cm), number of tillers(40.30) the number of leaves (4.64),age flowering and harvesting the shortest contained in the genotype Hare Bauk Morin ie flowering date (39 days) and time of harvest (105 days), number of panicles highest in genotype Mean Hare, high-yielding varieties IR64, Ciherang and Cimelati. While the longest panicle length contained in the genotype Foam Hare, Hare Hare Fafulu and Fulan. the number of filled grains per panicle most contained in superior varieties IR64, Ciherang and Cimelati. A weight of 1000 grains is highest p there are varieties Cimelati (vu3) with Hare Bauk Morin, IR64, and varieties Cherang highest rice yield for local rice genotypes present in Hare Bauk Morin (G3) of 9.79 ton.Ha^{-1} while yielding varieties contained in Ciherang (vu2) of 9.74 ton.Ha^{-1}.

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