BIOVALENTIA: BIOLOGICAL RESEARCH JOURNAL
e-ISSN: 2477-1392
Vol. 5 No. 2, Nov 2019

Efect of Leaf Fertilizer on Second Treatment to Three Genotypes Corn Efficient Crops in Tidal Land

Andesta[1], Munandar[2] and Yakup[3]

[1] *Crop Science Department, Graduate School of Agriculture, Sriwijaya University, Indonesia, Jalan Padang Selasa 524, Palembang, South Sumatra 30139, Indonesia.*
[2] *Department of Plant Protection, Faculty of Agriculture, Sriwijaya University, Indonesia. Jalan Raya Palembang Prabumulih km 32, Indralaya, Indonesia.*

*Corresponding author

E-mail address: andesta1987@yahoo.com (Andesta).
Peer review under responsibility of Biology Department Sriwijaya University

Abstract *:*
This study aims to determine the effect of leaf fertilizer on three nutrient efficient corn genotypes in tidal land. This research was coducted in Village Mulia sari, Sub-district Tanjung Lago, District Banyuasin, South Sumatra in the noble village of Sari Tanjung Lago sub-district from August to December 2017. This study uses the Split Plot Design consisting of 3 factors, namely the first factor of genotype, the second factor is the dose of urea A0 = 0 kg, A1 = 250 kg, A2 = 300 kg and the third factor of leaf fertilizer consists of: P0 = (control without spraying), P1 = 30 days of spray, P2 = 45 days of spray, P3 = 30 + 45 days of spray, P4 = 60 days of spray, P5 = 75 days of spray, P6 = 60 + 75 days of spray. repeated three times. Observation results used of 300 kg of urea fertilizer and leaf fertilizer had a good influence on the growth of G3 corn genotypes and the production of corn plants in tidal land. The combination of giving 300 kg of urea fertilizer + leaf fertilizer gives a pretty good influence on the growth of G3 corn genotypes with a production of 7.44 Ton/hectares

Keywords: leaf fertilizer, nutrient efficient corn, acid soil

Received: 03 August 2019, Accepted:22 October 2019

1. Introduction

Corn is a major commodity that has a strategic role in food needs after rice, aside from being consumed by humans, corn can also be used as animal feed, especially for poultry. Therefore the need for corn will increase, but if it is not matched by increased production will result in Indonesia having to import large amounts of corn [1]. The need for Indonesian corn in 2016 amounted to 21,417,035 tons. Which consists of for direct consumption of 404,458 tons and the need for feed reaches 16.18,000 tons. Therefore it is necessary to make efforts to increase domestic corn production.

Increased corn production is done by utilizing tidal land in Indonesia around 20.1 million hectares and around 9.53 hectares has the potential to be used as agricultural land. In southern Sumatra the tidal land area of more than 1.3 million hectares consisting of about 320.673 hectares (24.7%) has been reclaimed and around 278,000 hectares (32.4%) has been used for farming and settlement around 65.000 families of transmigration (Data and Information Center for the Swamp Area and Surt Surt, South Sumatra , 2011)[2]. The area of land that can be developed for corn in southern Sumatra is around 899.887hectares. This area consists of the area of intensification land (205,705 ha), extensification land (159.444 hectares) and diversified land (533.724 hectares) [3].

Problems that are often faced in the use of tidal land are excess water, high salinity and p h and relatively low nutrient content. Efforts are made by providing high-dose ameliorant and fertilizer to overcome soil fertility problems and increase corn production. because ameliorant materials such as organic fertilizer, manure, agricultural lime can also increase soil pH but this method is less effective if fertilizer prices are high and not available when needed by farmers [4]. One way is by the use of national varieties and hybrid varieties that can increase high yield but require

high doses of chemical fertilizer inputs that are difficult for farmers to fulfill. This is in line with the statement (5) that one way to overcome this problem is by the use of nutrient-efficient corn varieties that have high yields even though they are given low-dose chemical fertilizers.

Development of nutrient-efficient corn genotypes can reduce the need for fertilizer for plants, this is in line with the needs of small-scale farmers whose capital is limited. The efficiency of nutrient is usually defined by the difference in production when the plants are planted on land suboptimal have genot i pe efficient to produce higher yields of genot i pe else in the soil in certain limited circumstances toreduce the use of inorganic fertilizer by means of combining the use of organic fertilizers (6).

The use of organic fertilizer can increase the biological, chemical and physical activity of the soil so that it can increase soil fertility and good for plant (7) growth according to nutrient efficient corn is able to give good results on the second fertilizer with a dose of 225 kg ha of urea fertilizer. Therefore in this study a trial was conducted by reducing the second fertilizer dose and leaf fertilizer the by reducing inorganic fertilizers and add fertilizer d aun the second fertilization can increase the production of crops of corn in the tidal area?

The research objective was to determine the effect of leaf fertilizer on the growth of three nutrient-efficient corn genotypes in tidal land. It is suspected that giving a second fertilizer dose of 200 kg ha of ur fertilizer added with 20 grams of leaf fertilizer will have a good effect on the productivity of nutrient-efficient corn plants in tidal land.

2. Materials and Methods

Research was carried out in Mulia Sari Village, Tanjung Lago District, Banyuasin District. The research began from August to December 2017. The materials used were A-40 (G 1) strain, B-35 (G 2) strain and C-33 (G 3) strain, Leaf Fertilizer, KCL Fertilizer, NPK Fertilizer, SP36 Fertilizer , Urea Fertilizer. The study used a Split Split Plot Design with three replications. The main plot was three genotypes of maize: A40 (G1) strain B35 (G2) strain, C33 strain (G3) Then the second plot consisted of a good fertilizer dose consisting of A 0: 0Kg.ha 1 Urea fertilizer, A 1 : 250 Kg.ha Urea Fertilizer, A2: 300Kg.ha -1 Urea Fertilizer. Children - leaf fertilizer plots (P), namely: P0: Without leaf fertilizer P 1: Leaf fertilizer. The treatment was repeated three times with a total of 24 combinations.

Land Preparation

Land processing is carried out mechanically, seeds are planted by using two wood seeds / planting holes with a spacing of 75 cm x 20 cm, leaf fertilizer is given on the second fertilization by spraying it using a spray on the leaves 6 times ie 30 times , 45, 30 + 45, 60, 75, 60 + 75 days. Chemical fertilizers are given in the form of Urea fertilizer at doses of 0, 250, 300 / ha. Maintenance activities include thinning using a hoe, watering using a bucket, controlling weeds, controlling pests and diseases. Harvesting is done after the plants show the characteristics: cob or klobot start to dry with a marked layer of black on the seeds of the institution (black layer). Dry, hard and shiny seeds when pressed do not imprint. Observation was carried out on 5 sample plants from each experimental unit. Observed characters: plant height (cm2) using a meter, leaf chlorophyll (mg / g leaves) using a chlorophyll meter, cob length (cm) using the bar, cob diameter (cm), number of rows per cob (rows) and number of seeds / cobs (grains) manually, shell weight / cobs (g) using ordinary scales and yields / hectares (tons). The effect of the treatment was tested on the observed variables and the data obtained from observations were analyzed statistically with the help of the SPSS V.16 computer program and continued with the LSD test.

3. Results and Discussion

The results of diversity in table 1 show that the treatment of single factor urea (U) has a very significant effect on all observations and does not significantly affect other single factors and the interaction between genotypes and urea (GU) significantly affects the number of row lines.

Table. 1 The results of the analysis of the diversity of the effect of the treatment of leaf fertilizer and urea fertilizer as well as a combination of treatments to the observed variables.

Observed variables	Treatment									
	G	U	P	GU	GP	UP	GUP	KKa (%)	KKb (%)	KKc (%)
Plant height	tn	**	tn	tn	tn	tn	tn	17	10	8
Corn leaf chlorophyll	tn	**	tn	tn	tn	tn	tn	15	18	24
cob length (cm)	tn	**	tn	tn	tn	tn	tn	76	59	27
COB Diameter (cm)	tn	**	tn	tn	tn	tn	tn	11	21	10
Number of lines per cob	tn	**	tn	*	tn	tn	tn	33	28	20
Number of seeds	tn	**	tn	tn	tn	tn	tn	5.54	40	32
cropping weight	tn	**	tn	tn	tn	tn	tn	10	8	10
Production	tn	**	tn	tn	tn	tn	tn	15	27	11

** = Very significant influence; * = Significant influence; tn = no influence G = genotype U = Urea; P = leaf fertilizer; GU = Genotype + Urea; GP = Genotype + leaf fertilizer ; UP = urea + leaf fertilizer; GUP = Genotype + Urea + Leaf fertilizer; KK = Diversity Coefficient.

The results of diversity in table 1 shows that the administration of various doses of urea (U) single factor treatment (U) has a very significant effect on plant height, leaf chlorophyll, ear length, ear diameter, number of rows per ear, number of seeds, grain weight per plant and production . The interaction between genotype and urea (GU) significantly affected the number of row of collusion, leaf fertilizer did not significantly affect other single factors and all observations. This is in line with the results of the study [8]. That the use of high doses of urea fertilizer will be able to increase this result because plants need high nutrients for the growth process. The availability of N, P and K nutrients is important to meet the growth needs of corn plants mainly in acidic pH areas where most P nutrients are mostly bound by Al and Fe metals, especially in tidal land areas. Therefore the application of N, P and K fertilizers to plants plays a role in accelerating flowering, seed and fruit development and helps assimilation and breathing for plants.

Based on Table 3, the effect of A2 treatment gives the best effect on the growth and production of corn. The effect is seen from several observed variables such as: plant height reaching 179.3 cm 2 / plant, leaf chlorophyll 42.36 mg / g leaves, cob length 13.93 cm, cob diameter 6.21 cm, number of rows per cob 16 , 5 rows, the number of seeds / cob 557.6 grains, shell weight / cob 1.73 g and yield 7.44 tons / ha) . This is because the availability of nutrients in sufficient and balanced quantities is a major factor that largely determines the maximum success rate of plant growth and production and added by [10] that plants will flourish if nutrients needed by plants are available in sufficient quantities and balanced.

Table 2. The effect of the use of corn genotypes on observational variables

Genotype	Plant height (cm)	Klorofil Leaf	Cob Length (cm)	Diameter COB (cm)	Number of Lines / Cob	Number of seeds / cob	Pipilla weight n / cob (g)	Production i/ha (ton)
G1	139.6a	35.54a	13.0a	6.01a	15.2a	499.7b	1.61a	7.04 a
G2	139.3a	35.56a	12.9a	6.02a	15.0a	486.8a	1.63a	7.06 a
G3	138.9a	35.43a	12.8a	6:00 a	15.1a	490.3a	1.61a	7.05 a
BNT 0.05	5.75	1.26	2.11	0.39	1.16	60.55	0.14	0.14

The numbers followed by the same letters in the same column mean that they are not real different

Based on Table 2, the use of corn genotypes was not significantly different for all observational variables. This is because the maize genotype used is genotype which has nutrient-efficient properties and is a genotype of maize that has better genetic growth and production traits and is able to adapt well in dry land (9) where according to the ability to use nutrients efficiently is genetically controlled and nutrient uptake by roots plays an important role in nutrient efficiency.

Table 4. Correlation between number of consecutive rows to other parameters.

No	Observation Parameters	Correlation Coefficient (r)
1	Plant height	0.764 **
2	Corn leaf chlorophyll	0.319 * *
3	cob length (cm)	.889 **
4	COB Diameter (cm)	.341 **
5	Number of seeds	0.967 **
6	cropping weight	0,193tn
7	Production	0827 **

information: tn = not real, * = real, ** = very real

Table 3 . The effect of urea fertilizer dose on the observation variables.

Fertilizer Treatment Urea	Plant height (cm)	Klorofi l Leaf	Cob Length (cm)	Diameter COB (cm)	Number of Lines /Cob	Number of Seeds	Pipeline Weight n (g)	Production i/ha (ton)
A0	105.3a	22:00 a	11.79a	5.71a	14.0a	429.4a	1.45a	6 .44 a
A1	133.2b	42.17b	13.13b	6.10b	14.9b	490.7b	1.66b	7 .27 b
A2	179.3c	42.36b	13.93c	6.21c	16.5c	556.7c	1.73c	7 .44 c
BNT 0.05	28.0	1.19	1.38	0.22	0.77	35.04	0.09	0. 24

The numbers followed by the same letters in the same column mean that they are not real different

Based on the correlation analysis (Table 4) the crop shell weight is not significant with the number of row row, this is because the weight of the cob in corn plants is influenced by nutrient nitrogen and phosphorus that are dependent in the corn plant tissue. The role of phosphorus nutrients is more dominant in producing corn production which is indicated by the weight of the cob and to obtain the formation of good and full cob with high quality corn results can be obtained by administering phosphorus nutrients . Plant height, corn leaf chlorophyll, cob length, ear diameter, number of seeds and production correlate very significantly with the dry shell weight of plantations according to the opinion of (11). that the yield of seeds shown on crop shell weight has a genetic variability which is high on the dry shell weight of cropping but does not correlate with the number of row consoles(12).

4. Conclusion

The higher the use of doses of urea fertilizer , the greater the results obtained and the treatment between the use of genotypes and urea dosages of 300 kg / ha had a significant effect on the number of rows per cob on plants.

5. Acknowledgement

We wish to thank Mr. Suratman and his family in Jalur 6 Village Sumber Mulya, Muara Telang Subdistrict, Banyuasin District, South Sumatera for helping.

References

[1] Moelyohadi, Y., Harun, M.U., Munandar, Hayati, R., dan Gofar, N. 2012. Pemanfaatan berbagai jenis pupuk hayati pada budidaya tanaman jagung (Zea mays L.) di lahan kering marginal. J. Lahan Suboptimal. Marschner, H, 1986. Mineral nutrition of higher plants. Academic Press Inc., London.

[2] Pusat Data dan Informasi Daerah Rawa dan Pasang Surut, Sumatera Selatan. http://www. Pusdatarawa. or.id /indek php/tentang –pusat –data rawa (diakses tamggal 2 maret 2017), www.pusdatarawa.or.id /indeks. php/tentang data - rawa.

[3] Soehendi R. dan Syahrini. 2013. Potensi Pengembangan Jagung di Sumatera Selatan, Jurnal Lahan Suboptimal (2),1:81-92, April 2013.

[4] Subiksa, IGM., K. Nugroho, Sholeh, and IPG. Widjaja - Adhi, 1997. The effect of ameliorans on the chemical propertis and productivity of peat soil. Pp:321-326. In Rieley adn Page (Eds)

[5] Munandar dan Renih Hayati. 2012. Genotif jagung yang efisien hara, pupuk organik dan pupuk hayati dapat mengurangi dosis pupuk kimia di lahan marginal.Prosiding Simposium dan Seminar Bersama Peragi – Perhorti- Peripi-Higi. IPB Internasional Convention Center.Bogor, 1-2 Mei 2012. Dept.Agronomi dan Hortikultura Fakultas Pertanain IPB.

[6] Marschner, H, 1986. Mineral nutrition of higher plants. Academic Press Inc., London

[7] iodiversity and Sustainability of Tropicaal Peatlands. Samara Publishing Limited, UK.Sinarmata, S.K. 2016. Pengaruh Pemberian Pupuk Urea pada Pemupukan Kedua Terhadap Produktivitas Jagung (Zea mays L.) Di Lahan Bekas Kacang Tunggak. Skripsi. Program Studi Agroeteknologi Fakultas Pertanian Universitas Sriwijaya.

[8] Lingga, P., dan Marsono, 2001. Petunjuk Penggunaan Pupuk. Penebar Swadaya, Jakarta..

[9] Presterl, T., G. Seitz, M. Landbeck, E.M . Tiemt, W. Schimdt, and H.H. Geiger. 2003. Crop breeding genetics and citology improving nitrogen- use efficiency in european maize : estimation of quantitavie genetic parameters. Crop Sci.43;1259-1265

[10] Saleh, GB., D. Abdullah and A.R. Anuar. 2002. Performance, heterosis and heritability in selected maize single, double and three way cross hybrids. J. Agrics. Sc. 138:21-28

[11] Warisno. 2007. Jagung Hibrida. Kanisius. Yogyakarta. Hlm 43-56

[12] Witanto, W. 2005. Pengaruh Konsentrasi Pupuk Daun Gandasil D Dengan Ukuran Benih Terhadap Perkecambahan dan Pertumbuhan Semai Jati (Tectona grandis Linn. F). Department of Forestry - student-research.umm.ac.id