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Yield and Biomass Performance of Corn (Zea mays L) to the Application of Agrofer Organic Fertilizer

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Abstract

A trial generally aimed to generate information on the agronomic effectiveness of 10 bags per hectare AGROFER to mm. Specifically, the objectives of the study was to evaluate the marketable yield response of com to different rates and combination of AGROFER and inorganic fertilizers and to determine the effects of AGROFER on the biomass production of com. This was laid-out in Randomize Complete Block Design at Catalunan Pequefio, Davao City, during the period July to October, 2000. The combination of full inorganic fertilizer (2 bags per ha Ammophos + 1 bag/ha Muriate of potash + Urea 1 1/2 bags/ha) plus 10 bags/ha AGROFER (T6) gave the highest biomass yield of com (20.050 t/ha). Marketable yield of com (5,950 kg/ha) treated with 10 bags/ha AGROFER alone (T5) was comparable with the marketable yield of corn applied with one half recommended rate of inorganic fertilizer (1 bag/ ha Ammophos + 1/2 bag/ha Muriate of potash + % bag/ha Urea) (T3) (5,550 kg/ha). Yield in T5 was higher than the yield of com in Tl (no fertilizer applied) (5,000 kg/ha). Much better economic yield was observed when 10 bags/ha AGROFER was mixed with 2 bags/ha Ammophos + bag/ha Muriate of potash + 1 1/4 bags/ha Urea (T6) and applied to com (7,050 kg/ha).

Keywords: Performance, organic fertilizer, agronomic effectiveness, yield, test product and reference product

Introduction

Organic farming is one of the basic steps in achieving sustainable agriculture. The use of organic fertilizers in the farming systems of various agricultural communities is encourage by Philippine Department of Agriculture in order to realize the implementation of organic agriculture program in the country.

A product named AGROFER produced by Southern Philippines Development Authority (SPDA) in Catalunan Pequeho, Davao City is an organic fertilizer with

material origins came from decomposed farm wastes. AGROFER was found to increase yield in paddy rice. This time a test was conducted to prove if it can also booster the biomass and marketable yield of corn.

Objectives

General:

To generate information on the agronomic effectiveness of 10 bags per hectare AGROFER to corn.

Specific:

1. To evaluate the yield response of corn to different rates and combinations of AGROFER and in-organic fertilizers.
2. To determine the effects of AGROFER on the biomass production of corn.

Methodology

a) Date and Place of the Study

This study was started on July 2000 and terminated on October 21, 2000. It was laid-out inside the 1.5-hectare farm of SPDA at Catalunan, Pequeño, Davao City.

b) Site Description

Location — The study was conducted at Catalunan Pequeño, Davao City.

Soil type — The soil type in the site is sandy clay loam.

Topography — It was slightly undulating of which drainage was not a problem.

c) Description of Product and Standards

AGROFER organic fertilizer

- Provide plants with needed nutrients for plant growth and development.
- Increases water-retaining power of soil thus inhibiting soil losses.
- Improves aeration especially on heavier soils thus producing a better soil structure or tilth.
- AGROFER is derived from high quality farm wastes materials and special additives that contain macro-nutrients (N-P-K) and micro/trace elements such as: B, Ca, Mg, Mn, Zn, S, Al, MO, and Na. Other essential vitamins, some growth hormones and antibiotics are also present.

Reference product fertilizer

- It is usually made of chemical and synthetic materials, which makes it into inorganic fertilizer. Urea (46-0-0), Ammonium Phosphate (16-20-0) and Muriate of potash (0-0-60) were inorganic fertilizers used as recommended by the Soils Laboratory of the department of

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Agriculture per result of the soil analysis.

- Inorganic fertilizers are believed to have quicker effect than organic

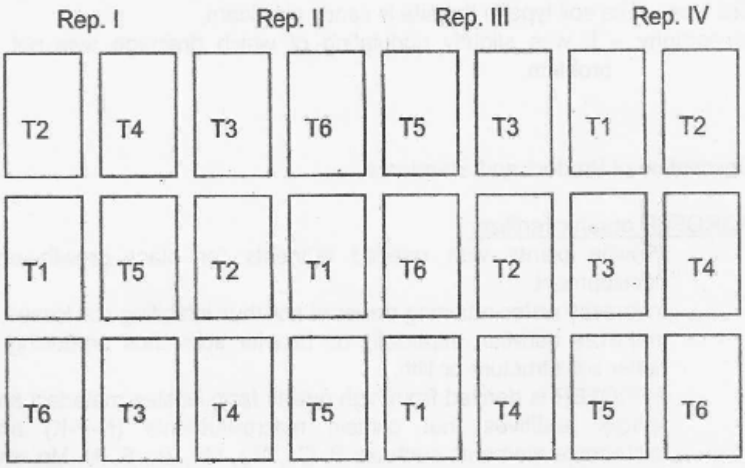
d) Test Crop

Crop — A Pioneer hybrid white corn (P3012) was used in this trial.

e) Experimental Design and Treatments

Six treatments were arranged in Randomized Complete Block Design (RCBD) replicated four times (Please see Fig. 1). The six treatments were the following:

Fig. 1. Experimental lay-out
Design-RCBD



Test crop = Corn (Pioneer hybrid – P3012)
No. of rows per plot – 5
Plant spacing - .75x.25 meters
Ave. no. of plant per plot – 100
Plot size – 4x5 m = 20 square meters
Ave. no. of plants per row = 20

T_1 – Control (0-0-0), no fertilizer applied
T_2 – Recommended Rate in-organic fertilizer based on soil analysis:
Reference Product
- Ammophos = 2 bags per hectare

- Muriate of potash = 1 bag per hectare
- Urea = $1^{1/2}$ bags per hectare (sidedressing)

T_3 – ½ Recommended Rate:

Reference Product

- Ammophos = 1 bag per hectare
- Muriate of potash = 1/2 bag per hectare
- Urea = 3/4 bags per hectare (sidedressing)

T_4 – ½ Recommended Rate plus full manufacturers' recommended rate of organic fertilizer:

Reference Product	Test Product
- Ammophos = 1 bag per hectare	+ 10 bags per hectare
- Muriate of potash = 1/2 bag per hectare	
- Urea = 3/4 bags per hectare (sidedressing)	

T_5 – Full organic fertilizer: 10 bags per hectare Agrofer.

T_6 – Recommended Rate plus full recommended organic fertilizer:

Reference Product	Test Product
- Ammophos = 2 bags per hectare	+ 10 bags per hectare
- Muriate of potash = 1 bag per hectare	
- Urea = $1^{1/2}$ bags per hectare (sidedressing)	

f) Treatment Application

a) Test product

The recommended rate of the test product (10 bags Agrofer per hectare) was quantified and applied appropriate enough for the plot size (20 sq.m.) of the test crop (corn).

b) Reference product

Reference products were also quantified and applied appropriate for the plot size (20 sq.m.) of the test crop (corn) based on the soil analysis.

c) Time and mode of application

The time of application of the test product and reference products were done during planting and vegetative stage of the test crop.

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Basal and side dressing application were the mode of application.

g) Data gathered

a) Main data

Biomass and marketable yields of com were gathered from 20 randomly collected sample plants per plot. The average weight (Kg.) of 20 sample plants per plot were then computed to per hectare basis using 50,000 corn plants population per hectare.

b) other data

- Soil analysis (from DA RFU-XI, Soils Laboratory)
- Fertilizer analysis (Agrofer) (from DA RFU-XI, Soils Laboratory)
- Rainfall data (from the nearest source - PCA-DRC, Bago Oshiro, Davao City

h) Statistical analysis

The data obtained from this study were analyzed through statistical procedures of RCBD. The treatment comparisons were done using Duncan's' Multiple Range Test (DMRT) / at 1% level of significance.

Results and Discussion

Average weights of the following: biomass, fresh ears with husk, fresh ears without husk, dried ears and dried kernel per ear of corn are shown in Table 1.

a. **Biomass yield**

The application of 10 bags per hectare Agrofer (T_5) gave only 15,050 kilograms computed per hectare which was significantly lower than T_2, T_4 and T_6 with 16,200 kg., 17,350 kg. and 20,050 kg. biomass yield computed per hectare. respectively. However, T_5 was significantly higher than the control (T_1) with 12,450 kg. biomass yield computed per hectare and comparable with T_3 with 14,000 kg. biomass yield computed per hectare. The combination of full inorganic and full organic fertilizer (T_6) gave the highest biomass yield computed per hectare.

b. **Yield of fresh ears with husk**

Similar trend shown in this parameter with the biomass yield of corn. Where, the computed yield of fresh corn ears with husk in T_5 (1 1 ,400 kg. / Ha.) differed significantly with T_6 (13,200 kg/ha), T_4 (12,500kg. /ha), T_2(12, 100 kg. /ha) and Tl (9,950 kg. /ha) except Ta (11,000 kg. /ha). The yield of T_5 was comparable with the computed yield per hectare of T_3. Treatment 6 and 4 gave the highest computed yield per hectare of ears with husk. While T_2 obtained significantly lower computed yield per hectare of ears with husk compared to T_6. Computed yield per hectare of fresh ears with husk in T_5 was significantly higher compared with the computed yield fresh corn ears per hectare in control (T_1).

Table 1. Summary table on the biomass and marketable yield per plant of corn from the average weight (kg.) of 20 sample plants per plot computed per hectare.

Treatment	Wt. of Biomass		Wt. of Ears w/ husk		Wt. Of ears w/out husk		Wt. Of dried ear		Wt. of Dried grains	
	Ave. / plt.	Compt d./ ha.	Ave. / plt.	Comptd. /ha.	Ave. /plt.	Comp td./ha.	Ave. /plt.	Comp td./ha.	Ave. /plt.	Comp td./ha.
T_1	.249^{e}	12450^{d}	.199^{a}	9950^{d}	.178^{c}	8900^{b}	.138^{c}	6900^{c}	.100^{c}	5000^{c}
T_2	.324^{b}	16200^{b}	.242^{b}	12100^{b}	.223^{a}	11150^{a}	.178^{a}	8900^{a}	.128^{a}	6400^{a}
T_3	.280^{cd}	14000^{cd}	.220^{cd}	11000^{cd}	.191^{bc}	9550^{bc}	.154^{bc}	7700^{bc}	.111^{bc}	5550^{bc}
T_4	.347^{b}	17350^{b}	.250^{ab}	12500^{ab}	.232^{a}	11600^{a}	.194^{a}	9700^{a}	.133^{a}	6650^{a}
T_5	.301^{c}	15050^{c}	.228^{c}	11400^{c}	.212^{b}	10600^{b}	.162^{b}	8100^{b}	.119^{b}	5950^{b}
T_6	.401^{a}	20050^{a}	.204^{a}	13200^{a}	.245^{a}	12250^{a}	.162^{b}	9850^{a}	.141^{a}	7050^{a}
Level of Sig.	**		**		**		**		**	
C.V. %	7.05		4.27		6.61		7.40		7.33	

Population per hectare of corn is based at 50,000 plants.

Numbers with common superscript letter has no significant difference at 1% revel (DMRT).

Treatments:

1. Control (0-0-0), no fertilizer applied
2. Recommended Rate in-organic fertilizer based on the soil analysis
3. 1/2 Recommended Rate
4. 1/2 Recommended Rate plus manufacturer's recommended rate of organic fertilizer
5. Full organic fertilizer (manufacturer's recommended rate at 10 bags per hectare)
6. Recommended rate plus full recommended rate of organic fertilizer

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c. Yield of fresh ears without husk, yield of dried ears and yield of dried kernel per ear

The same situation was observed on each of the three parameters. Meaning there was a consistent trend of data differences from the fresh ears without husk to when these were dried and shelled dried at 14% moisture content. Corn applied with Agrofer alone (T_5) gave significantly higher dried kernel yield than the control (T_1) with 5,950 kg./ha and 5,000 kg. computed per hectare respectively and also significantly comparable with Ta with 5,550 kg. computed per hectare. Treatments 2,4 and 6 with computed yield of dried kernel of 6,400 kg./ha, 6,650 kg./ha and 7.050 kg./ha respectively did not differ significantly among each other and these yields were significantly higher compared with the computed yield of dried kernel in T_5, and T_1.

Generally, the result of this trial supported the observations of Orpia and Teodorico on cotton. Where the yield of test crop applied with organic fertilizer alone is not comparable with the yield of plants applied with the recommended rate of inorganic fertilizer alone and with the combination of the recommended rate of inorganic fertilizer and organic fertilizer recommendation. However, applying organic fertilizer alone either prepared or not prepared commercially can increase seed cotton yield based on the yield of control treatment.

Summary and Conclusion

Based on the results of the study, where, it was found out that the yield of corn applied with AGROFER organic fertilizer was comparable with the yield of corn treated with one half recommended rate of inorganic fertilizer and significantly higher than the yield of corn with no fertilizer applied. It is therefore concluded that applying Agrofer alone af 10 bags per hectare to corn subsequently improved yield in soils with 2.5% organic matter. Mixing 10 bags per hectare of Agrofer to both full and one half of the recommended rate inorganic fertilizers is concluded to provide much better yield to corn.

Recommendation

In order to gather more proofs on the effectiveness of Agrofer organic fertilizer, tests to other crops in the same and/or in higher dosage is highly recommended.

Literature Cited/References

Baclayon, D. P., G. L. Durnay M. T. Diputado, Jr. and R.M. Gapasin. 1993. Effects of different levels and storage of compost produced using compost fungus activator (Trichoderma Harzianum) on the growth and yield of Pechay (Bassica napus Var. Sinensis L.), ViSCA, Baybay, Leyte. The Philippine Journal of crop Science Vol. 18, Supplement No. 1, May 1993.

Yoshida, K. 1993. Effect of organic matter application on rice yjeld. Tohoku National Agricultural Experiment Station, Yotsuya, Omagari, Akita. Japan. The Philippine

Journal of Crop Science, Volume 18, Supplement No. 1, May 1993.

Garcia, F. O. , Obcemea, W. N. and Cruz, R. T. 1996. Influence of organic and inorganic fertilizers on yield of irrigated low land rice. Philrice, Maligaya, Munoz, Nueva Ecija. The Philippine Journal of Crop Science, Volume 20, Supplement No. 1. May 1996.

Orpia, P. C. and P. S. Teodorico Jr. 1996. Response of Cotton to Organic and Inorganic Fertilizers. CRDI, Batac, Ilocos Sur. The Philippine Journal of Crop Science, Volume 20, Supplement No. 1, May 1996.

BiOrganiX Technology. Biogro Organic Fertilizer, Montalban, Bulacan, Philippines.

Department of Agriculture. Gintong Ani Program on Corn.