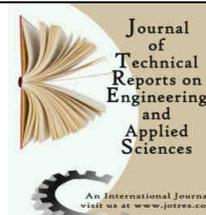




## JOURNAL OF TECHNICAL REPORTS IN ENGINEERING AND APPLIED SCIENCE



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### Effect of different inorganic phosphorus sources and organics on yield attributes and yield of maize

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#### ARTICLE INFO

#### ABSTRACT

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A field experiment was conducted during Jan-April, 2007 in neutral normal soil located at Vadipatty Village, Tamilnadu, India to examine the effect of different sources of phosphorus and organics on yield attributes and yield of maize. The experiment was conducted with two sources of P (SSP, DAP) and three organics (GM, FYM, VC). The treatments included here were Control, SSP alone, SSP + GM @ 10 t ha<sup>-1</sup>, SSP + FYM @ 12.5 t ha<sup>-1</sup>, SSP + VC @ 0.5 t ha<sup>-1</sup>, DAP alone, DAP + GM @ 10 t ha<sup>-1</sup>, DAP + FYM @ 12.5 t ha<sup>-1</sup> and DAP + VC @ 0.5 t ha<sup>-1</sup> in all soils. The treatments were laid out in plots of size 5 x 4 m in Randomized Block Design with three replications. The maize crop cv. Ganga - 5 was grown as a test crop. Good quality seeds @ 20 kg ha<sup>-1</sup> were sown with a spacing of 20 cm apart. Nitrogen and potassium were applied as per the recommended dose. The crop was grown up to maturity and harvested. Yield attributing characters, grain and straw yields were recorded. The results revealed that the application of single super phosphate (SSP) in combination with green manure registered higher yield attributes and yield of maize crop (58.53, 22.30 cm, 20.00 cm, 27.01 g, 5.80 and 11.38 t ha<sup>-1</sup> of double cobs percentage, length and girth of the cob, 100 grain weight, grain and straw yield respectively).

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#### Introduction

Maize is one of the most versatile emerging crops having wider adaptability under varied agro-climatic conditions. Globally, maize is known as queen of cereals because it has the highest genetic yield potential among the cereals. Maize is globally the top ranking cereal in potential grain productivity. Among the cereals grown in India, it ranks fifth in area (6.42 mha), fourth in production (11.47 mt), third in productivity with 1790 kg ha<sup>-1</sup>. Phosphorus

is one of the essential elements for the growth and development of plants. It is ranking second after nitrogen which plays a major role in synthesis of cell metabolites in plants. Besides, Phosphorus is a problematic nutrient in soil that the availability is hardly 20 to 30 % only. The remaining amount phosphorus is fixed by the metallic ions *viz.*, iron and aluminium or by the non-metallic ions such as calcium, magnesium, potassium etc. India has a vast scope for utilization of organic manures such as green manures,

farmyard manure, vermicompost and other industrial by-products. Utilization of organic materials in conjunction with inorganic fertilizers leads to improved crop productivity in various soil conditions. Organic manures have considerable quantities of macro and micro nutrients, besides having ameliorating effects and can be used to improve the physical, chemical and biological properties in soils. On decomposition of organic manures, the release of organic acids have the capacity to chelate the phosphorus fixing ions in the soil and thereby release of phosphorus is being enhanced. Keeping these points in mind, the present investigation was taken up.

### Materials and Methods

A field experiment was conducted during Jan-April, 2007 in neutral normal soil to examine the effect of different sources of phosphorus and organics on yield attributes and yield of maize. The experimental field of the normal soil was sandy clay loam in texture which comprised of 74.01% sand, 4.35% silt and clay 21.30%. It was neutral in reaction (pH 7.3), non saline in nature with electrical conductivity of  $0.21 \text{ dSm}^{-1}$  and cation exchange capacity of  $15.7 \text{ cmol (p+) kg}^{-1}$ , less sodicity with exchangeable sodium percentage of 11.5, the exchangeable calcium, magnesium, sodium and potassium content of the soil were 5.2, 2.20, 1.8 and  $6.3 \text{ cmol (p+) kg}^{-1}$  respectively, low in organic carbon (0.21%), low in available N ( $201 \text{ kg ha}^{-1}$ ), low in available P ( $9.63 \text{ kg ha}^{-1}$ ) and high in available K ( $388 \text{ kg ha}^{-1}$ ). The total nitrogen, phosphorus and potassium content of the normal soil were 0.08, 0.11 and 0.42 per cent respectively. The maize crop cv. Ganga - 5 was grown as a test crop. The proposed experimental sites of normal, saline and sodic soils in the field were well ploughed till a fine tilth was obtained. Plots of  $5 \text{ m} \times 4 \text{ m}$  dimensions were laid out in the field. The treatments included here were Control, SSP alone, SSP + GM @  $10 \text{ t ha}^{-1}$ , SSP + FYM @  $12.5 \text{ t ha}^{-1}$ , SSP + VC @  $0.5$

$\text{t ha}^{-1}$ , DAP alone, DAP + GM @  $10 \text{ t ha}^{-1}$ , DAP + FYM @  $12.5 \text{ t ha}^{-1}$  and DAP + VC @  $0.5 \text{ t ha}^{-1}$ . The treatments were replicated thrice in a randomized block design with the plot size of  $5 \times 4 \text{ m}$ . The yield attributes and yield of maize were recorded. The data from the three experimental results were subjected to statistical scrutiny following the procedure outlined by Gomez and Gomez (1976).

### Results and discussion

The results revealed that the application of single super phosphate (SSP) in combination with green manure registered higher yield attributes and yield of maize crop (58.53, 22.30 cm, 20.00 cm, 27.01 g, 5.80 and  $11.38 \text{ t ha}^{-1}$  of double cobs percentage, length and girth of the cob, 100 grain weight, grain and straw yield respectively) as in table. Among the different treatments, application of single super phosphate along with green manure recorded significantly higher yield attributing characters *viz.*, double cobs percentage, length of the cob, girth of the cob and 100 grain weight. Similar results were reported by Janaki (2004) in rice- rice cropping sequence. It is due to the fact that the phosphorus application might have improved the root system by accelerating various metabolic processes such as cell division, cell development and cell enlargement in roots. The sufficient amount of P absorbed by the plant at early growth stages could be easily redistributed to growing organs which perhaps enhanced the yield attributing characters of maize crop. These findings are in good harmony with the reports of Sharma *et al.* (2006). Application of single super phosphate combined with green manure recorded significant improvement in grain and straw yield of maize crop. Bahl and Singh (1997) reported the favorable effect of combined application of inorganic phosphorus and green manure in maize crop. It might be due to the reason that green manuring in particular gains a

special concern in terms of environmental quality and sustained crop production by augmenting the fertility build up and finally enhancing the system productivity.

#### References

- Bahl, G.S. and Singh, A. 1997. The inorganic soil phosphorus fractions and available P as influenced by green manuring, cropping and P fertilization. **J. Indian Soc. Soil Sci.**, **45**: 19-23.
- Gomez, A.A. and Gomez, R.A. 1976. Statistical procedure for agricultural research with emphasis on rice. **IRRI**, Los Banos, Manila, Philippines. pp- 294.
- Janaki, P. 2004. Influence of green manure and P sources on efficiency and recovery of applied phosphorus in rice-rice sequence. **Mysore J. Agric. Sci.** **38** (1): 77-83.
- Sharma, V.K., Massarat Shafi, Namgyal, D., Sofi, J.A. and Mir, A.A. 2006. Effect of phosphorus and FYM on yield and uptake of nutrients by wheat under cold arid condition of Ladaki. **Ann. Pl. Soil Res.** **8** (1): 94-95.

**Table 1. Effect of different inorganic p sources and organics on yield attributing characters and yield of maize crop**

Treatments	Double cobs (%)	Cob length (cm)	Cob girth (cm)	100 grain weight (g)	Grain yield (t ha <sup>-1</sup> )	Straw yield (t ha <sup>-1</sup> )
<b>T<sub>1</sub> - Control</b>	45.02	16.00	13.50	18.62	3.92	9.60
<b>T<sub>2</sub> – SSP alone</b>	56.28	20.10	18.50	25.80	4.81	11.38
<b>T<sub>3</sub> – SSP + GM</b>	58.53	22.30	20.00	27.01	5.80	13.56
<b>T<sub>4</sub> – SSP + FYM</b>	58.11	21.90	19.80	26.88	5.71	13.28
<b>T<sub>5</sub> – SSP + VC</b>	57.03	20.90	19.00	26.00	5.38	12.46
<b>T<sub>6</sub> – DAP alone</b>	54.51	18.50	17.70	24.60	4.70	10.90
<b>T<sub>7</sub> – DAP + GM</b>	56.54	19.80	18.60	25.80	5.53	12.86
<b>T<sub>8</sub> – DAP + FYM</b>	56.17	19.10	18.30	25.13	5.24	12.08
<b>T<sub>9</sub> – DAP + VC</b>	55.88	19.00	18.20	24.98	4.97	11.70
<b>SEd</b>	0.25	0.24	0.15	0.12	0.05	0.18
<b>CD (p= 0.05)</b>	0.50	0.47	0.30	0.25	0.11	0.37