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Full Length Research Article

Advances in Cultivation Technology of Maize

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ABSTRACT

Field experiment was conducted at experimental farm at Annamalai University, Annamalai Nagar to study the effect of integrated nutrient management practices on growth and yield of maize during the summer 2011 results revealed that application of 100 percent recommended NPK + EFYM @ 750 kg ha-1 + Azospirillum @ 2kg ha-1 (SA)+ ZnSO4 @ 0.45% foliar spray at 30 and 45 days after sowing compared with other treatments.

Key words: Maize, organic manure, recommended NPK fertilizers and soil nutrients.

INTRODUCTION

Maize (Zea mays) is a major cereals crop, which provides the nutritional security due to its high nutritional value and having great demand. Maize grain contains about 10% protein, 70%, carbohydrates, 4.1% oil and 2.3 %, crude fibre. Due to its high yield potential, it is called as queen of cereals. It is grown in 6.45 million hectare land with 11.11 million tonnes of production and 1723 kg ha^{-1} productivity in India, while 1.71 million tonnes of production and 1977 kg ha^{-1} productivity. On account of its quick growth habits, maize is a highly exhaustive crop and it is absolutely necessary that essential nutrient elements should be supplied in appropriate proportion to maintain soil fertility and to get higher yield. The demand of maize plant for nitrogen and phosphorous is more than any other essential element for the development of all phases of maize plant. High fertility of the soil is considered as the key to good production, which supplies different nutrients to the crop plants still gets depleted continuously supplied but their cost has increased considerably resulting is low net return and also the imbalance utilisation of chemical fertilizers adversely affects the soil health. INM plays an important role in sustainable agriculture by maintaining the productivity of crops in cereal based cropping system. The inorganic fertilizers are very costly and harmful for soil health. Therefore, combine application of organic manure with inorganic fertilizer may be beneficial to maximum the crop productivity and improve soil properties (Verma *et al*., 2002). Organic manures such as enriched farm yard manure are important components of INM. Organic manures supply the traces of amount of micronutrients, which are generally not supplied by the farmers as straight fertilizers. Organic farming is therefore, the only remedy, which should be encouraged in order to lower down the cost of inputs and ort improve soil fertility.

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The use of organic manures such as enriched farmyard manure not only helps to maintain the soil productivity by improving the physio – chemical properties of soil but also improves the efficiency of applied chemical fertilizers keeping these facts in view the present experiment was a conducted on summer 2011 at experimental farm, Annamalai University.

MATERIALS AND METHODS

Field investigation was carried out the experimental farm, Department of Agronomy, Annamalai University, Annamalai Nagar (Summer 2011) to study the performance of maize as influenced by INM techniques. The soil of the experimental field was clay loam in texture with low in available N medium is P and high in available potassium. The crop was raised during Summer 2011. The maize hybrid PH3502 was choosen for the study. Enriched farmyard manure and *Azospirillum* were applied to experimental plot as per treatment schedule. The field experiment was laid out in Randomized block design with three replication. The treatment schedule of experiment study as follows: T_1 - 100 percent of recommended dose of NPK ha^{-1},T_2 - 100 percent of recommended dose of NPK ha^{-1} + EFYM @ 750 kg ha^{-1} ,T_3 - 100 percent of recommended dose of NPK ha^{-1} + *Azospirillum* @ 2kg ha^{-1} (SA), T_4 - 100 percent of recommended dose of NPK ha^{-1} + ZnSo4 @ 0.5 per cent foliar spray at 30 and 45 days after sowing, T_5 - 100 percent of recommended dose of NPK ha^{-1} +EFYM @ 750 kg ha^{-1} + *Azospirillum* @ 2 kg ha $^{-1}$ (SA), T_6 - 100 percent of recommended dose of NPK ha^{-1} + + EFYM @ 750 kg ha $^{-1}$ + *Azospirillum* @ 2 kg ha $^{-1}$ (SA) + ZnSo4 @ 0.5 percent foliar spray at 30 and 45 days after sowing, T_7 – 75 percent N and full dose of P and K + EFYM @ 750 kg ha – 1 + *Azospirillum* @ 2 kg ha $^{-1}$ (SA) + ZnSo4 @ 0.5 percent foliar spray at 30 and 45 days after sowing, T_8 – 50 percent N and full dose of P and K + EFYM @ 750 kg ha – 1 + *Azospirillum* @ 2 kg ha $^{-1}$ (SA) + ZnSo4 @ 0.5 percent foliar spray at 30 and 45 days after sowing.

Table 1. Influence of Organic manures on growth and yield contributes of maize

Treatments	Plant Height (cm)	LAI (cm)	DMP (t ha^{-1})	No. of grains Cob $^{-1}$	Grain yields (Kg ha^{-1})
T_1	169.24	4.63	11.59	409	2962
T_2	190.18	5.54	12.74	436	4484
T_3	201.45	5.20	15.52	462	5556
T_4	198.18	6.74	13.74	4532	5196
T_5	216.18	7.82	14.43	481	6574
T_6	181.29	8.34	15.51	409	3859
T_7	204.19	7.19	13.95	474	5868
T_8	201.16	4.18	10.02	469	5852
S.Ed	3.72	1.09	1.81	3.12	326.00
CD (p = 0.05)	7.46	2.18	3.76	6.24	652.00

The data on observations and characters studied were statically analyzed and wherever the results were found significant, the critical differenced were arrived at 5 percent level to draw statistical conclusions (Panse and Sukhatme 1978).

RESULTS AND DISCUSSION

Growth Components: The results showed that the INM practices approach significantly influenced the crop growth components viz., plant height, leaf area index and dry matter production. Among the various treatments tested, (100%) application of recommended dose of NPK + Enriched farm yard @ 750 kg ha^{-1} + *Azospirillum* @ 2kg ha^{-1} (Soil application) recorded the highest value of growth components compared with other treatments. The increased levels of N, P_2O_5 and K_2o accomplished the requirement of balanced crop nutrition and caused rapid division and elegation of cells that resulted in increased viz., plant height, leaf area index and dry matter production plant $^{-1}$. Similar findings were reported by Shalini pillai and Sheeba Rebella Issac 2011 and Lazcano *et al*., 2011. Application of *Azospirillum* increased the germination percentage, plant height, leaf area index and dry matter yield by virtue fizzing atmospheric nitrogen and soubilizing nutrients and its secretes growth promoting substances. The findings of the present study in accordance with the earlier reports of Tetawar *et al*., 2012.

Yield components: Among the treatments, registered the highest yield components viz., cob length, cob diameter and grain number cob^{-1} as compared to other treatments. The increased yield components might be due to the application of 100 per cent recommended fertilizer resulted in higher nutrient uptake by increasing nutrient availability. These findings were is agreement with reports of Uma reddy *et al*., 2010. Application of enriched farmyard manure @5 t ha^{-1} increased the efficiency of applied nutrients, increased availability of N, P and K and increased the uptake of these nutrients,. The findings are in by agreement with the reports by Ushkumari *et al*., 2006. Application of *Azospirillum* supplies plant nutrients and increases the nitrogen's content that plays a vital role in graminiaceacuis crops. The present results were in accordance with the findings of swarti yadev *et al* 2011 and Anil kumar and Thakaur 2004. Improved in plant growth is due to significant translocation and storage of photosynthesis from source it sink, which resulted significant enhancement in all the yield attributes and greater grain yield. These findings are in accordance with the reports of Chauhan and patel 2010 and shobana 2007.

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