Influence of Integrated Nutrient Sources on Agronomic Traits of Maize

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Abstract
Modern agricultural technologies have created a wide range of issues in agriculture. Recently, it has been realized that application of chemical fertilizers in conjunction with organic manures will sustain and maintain the productivity of soil. A field experiment was conducted to evaluate the effect of integrated nutrient sources on the agronomic traits of maize. The experiments were laid out in randomized complete block design with three replications. Two source of organic manures, *viz.,* seriwaste compost at 5 t ha^{-1} and vermicompost 5 t ha^{-1} were imposed along with Nitrogen (N), Phosphorus (P), Potassium (K) levels (150:75:75 kg ha^{-1}) *viz.,* 100% of Recommended Dose of Fertilizer (RDF), 75% of RDF + 25% seriwaste compost, 50% of RDF+50% seriwaste compost, 25% of RDF + 75% seriwaste compost, seriwaste compost 100%, vermicompost 100%, seriwaste compost 50% +vermicompost 50% and absolute control. Seriwaste compost at 50 per cent with 50 per cent recommended dose of fertilizer increased the plant height, number of leaves, leaf area index and dry matter production, followed by seriwaste compost at 25 per cent with 75 per cent recommended dose of fertilizer. The results also indicated that the novel seriwaste compost tried in the present study can be recommended as an alternative source of nutrient to improve the crop yield.

Keywords: Agricultural technologies, Organic manures, Recommended dose of fertilizer Seri waste compost, Vermicompost
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Introduction
Technological innovations brought out in India during the past four decades in the agricultural production system have enabled to sustain the food demands of the growing population. To meet the challenging future needs, there is a felt need to adopt improved soil and crop management practices in agriculture. Since, there is no scope of further increasing the land area for cultivation, the only way to increase the food and fodder requirement will be through increasing cropping intensity and crop productivity through efficient nutrient management.

The demand for maize is increasing day by day as maize possess tremendous potential in terms of feed for dairy, poultry and piggery and other agro industries, in addition to human consumption. It also has great potential for exports and other commercial avenues. To feed the growing population, there is a need to produce more and quality food with available land. With intensive agricultural practices, without commensuration of restorative inputs, the future threats to soil fertility are very serious. Sustainable crop yield levels could be achieved only by applying appropriate combination of organic manures and inorganic fertilizers. The success of future agriculture depends upon sustainability of production system. This has necessitated research on use of organic manures. It helps farmers to reduce input of commercial fertilizers, thereby increasing profit margin. Nutrients contained in organic manures are released slowly and stored for a long time in the soil, ensuring a long residual effect (Sharma and Mittra, 2007).

In recent years, recycling of crop residues has received considerable interest. One among them is seriwaste compost which is practiced only in mulberry to produce high yield and healthy leaves to improve the silk productivity. As a new trend, use of seriwaste compost as a nutrient source for field crop has been tried in this study.

Materials and Methods
Field experiment was conducted at Northern block farm of Agricultural Research Station, Bhavanisagar, Tamil Nadu Agricultural University to evaluate the effect of integrated nutrient sources on the agronomic traits of maize. The experiment was laid out in randomized complete block design with eight treatment combinations in three replications. The treatments comprised of two source of organic manures, *viz.,* seriwaste compost at 5 t ha^{-1} and vermicompost 5 t ha^{-1} were imposed along with Nitrogen (N), Phosphorus (P), Potassium (K) levels (150:75:75 kg ha^{-1}) *viz.,* 100% of Recommended Dose of Fertilizer (RDF) (T_1), 75% of RDF + 25% seriwaste compost (T_2), 50% of RDF + 50% seriwaste compost (T_3), 25%

of RDF + 75% seriwaste compost (T_4), seriwaste compost 100% (T_5), vermicompost 100% (T_6), seriwaste compost 50% + vermicompost 50% (T_7) and absolute control (T_8). Seeds of maize hybrid CoHM (5) were used for this study. Five plants in each treatment in the net plot area were selected at random and tagged for observing agronomic traits (30 DAS).

Results and Discussion

The results of analysis of variance indicated that integrated nutrient sources significantly affected agronomic traits as compared to the absolute control (Table 1).

Different organic manures and NPK levels favourably influenced the growth parameters such as plant height, number of leaves, LAI and DMP. Seriwaste compost at 25, 50 and 75 per cent along with 75, 50 and 25 per cent RDF produced comparably higher growth parameters like taller plants, higher LAI and more DMP application at all growth stages. This might be due to better nutrient release from the organic manures and better crop growth might be the result of adequate nutrition (Chandrasekara *et al.*, 2000). Application of 100 per cent of the RDF resulted in higher growth parameters compared to control. The positive influence of the higher doses of applied NPK could be attributed to their favourable effect on yield attributes of plants. Application of seriwaste compost at 50 per cent + 50 per cent of the RDF produced taller plants with more LAI and DMP which was followed by seriwaste at 25 per cent + 75 per cent RDF and seriwaste at 75 per cent + 25 per cent RDF. In the present study, the inorganic NPK might have helped in the promotion of growth characters during early stages of growth. The steady and continuous supply of N through organics like seriwaste compost might have promoted the growth and yield characters. Besides this, favourable soil physical condition promoted by organic manure in addition to supplying plant nutrient might have influenced the growth parameters positively. This type of positive effect of organics was reported by Agasimani and Babalad (1991) in groundnut.

Table 1: Influence of integrated nutrient sources on plant height (cm), number of leaves, leaf area index and dry matter production of hybrid maize (kg ha^{-1}) at 30 DAS

Treatments	Plant height	Number of leaves	Leaf area index	Dry matter production
T_1 - 100% of Recommended Dose of Fertilizer	90.20	10.23	1.92	885
T_2 - 75% of RDF + 25% Seriwaste compost	94.40	11.00	2.61	951
T_3 - 50% of RDF + 50% Seriwaste compost	100.90	12.40	3.36	1098
T_4 - 25% of RDF + 75% Seriwaste compost	96.12	11.40	2.72	991
T_5 - Seriwaste compost 100% (5 t/ha)	78.40	10.00	1.67	778
T_6 - Vermicompost 100% (5 t/ha)	81.80	9.20	1.67	765
T_7 - Seriwaste compost 50% + Vermicompost 50%	82.30	10.20	1.71	786
T_8 - Absolute control	78.33	10.10	1.68	737
SEd	**2.9**	**0.3**	**0.1**	**21.9**
CD (P=0.05)	**6.6**	**0.7**	**0.2**	**46.9**

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