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Effect of nitrogen management on growth and yield of grain amaranthus (*Amaranthus hypochondriacus* L.) grown on loamy sand soil

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ABSTRACT

A field experiment was conducted on loamy sand soil of the S.D. Agricultural University, Sardar Krushinagar to study the effect of integrated nitrogen management on growth and yield of Amaranthus. Ten treatments comprised of nitrogen management practices were tested in Randomized Block Design with four replications. The results revealed that the application of 75 % RDN through urea + 25 % RDN in form of gliricidia compost along with Azotobecter inoculation treatment (T10) recorded highest plant height, length of spike, No. of spikelet per spike, length of spikelet and test weight. The highest grain and stover yield was also noted with the application of 75 % RDN through urea + 25 % RDN in form of gliricidia compost along with Azotobecter. Moreover, the application of Azotobacter also improved the grain and stover yield as compared to non-application of Azotobacter.

Key words : Nitrogen management, Amaranthus, Azotobecter, Gliricidia compost, FYM, Organic fertilizer, Inorganic fertilizer

Amaranth (*Amaranthus hypochondriacus* L.) is a neglected cereal crop belong to family Amaranthaceae (Dicotyledons). The domesticated vegetables and grain types amaranth are grown in the tropics and subtropics. Nitrogen is the most important major nutrient as well as expensive input in agricultural production, which is closely associated with growth and development of plants. It plays an important role in plant metabolism by virtue of being essential constituent of structural component of the cell and many metabolically active compounds. It is also a constituent of chlorophyll, which is an important for the harvest of solar energy (Bray, 1983). Nitrogenous fertilizer therefore, forms a basic input for getting higher yield. The modern day intensive crop cultivation practices have resulted in numerous problems like nutrient deficiencies, nutrient imbalance in crop plant, deterioration of soil health, stagnation of crop yields and so on. This requires the more use of chemical fertilizer, but ascendant price of chemical fertilizers coupled with their inadequate production in India made it imperative that a part of chemical fertilizer be substituted by use of organic manures. It is therefore, time to focus on research for practical and profitable combination of organic manure and chemical fertilizer, which can help in maximizing crop yields and sustain long-term soil productivity. Under these circumstances, integrated nutrient management is only the newly introduced approaches, responsible for sustainable crop production.

MATERIALS AND METHODS

The field experiment was conducted at the Regional Research Station S.D. Agricultural University, Sardar Krushinagar. The experiment was conducted in a Randomized Block Design with ten different integrated nitrogen management treatments *viz.*, No fertilizers or control (T_1), 100 % RDN through urea (T_2), 50 % RDN through urea + 50 % RDN through FYM (T_3), 75 % RDN through urea + 25 % RDN through FYM (T_4), 50 % RDN through urea + 50 % RDN through gliricidia compost (T_5), 75 % RDN through urea + 25 % RDN through gliricidia compost (T_6), T_3 + Azotobacter (T_7), T_4 + Azotobacter (T_8), T_5 + Azotobacter (T_9), T_6 + Azotobacter (T_{10}).The crop was fertilized with 60 kg N and 40 kg N P_2O_5 ha^{-1}. Organic source of nitrogen was applied 7 days before sowing as per treatment. Before application, gliricidia compost was made. Pits were dug near the site of experimentation. These pits were lined with polyethylene sheet. Required quantity of gliricidia leaves were put in five layers and left for decomposition for a period of 15 days. The seeds of amaranthus (G.A.1) were first inoculated with Azotobacter (ABA-1) culture and then the treated seeds were utilized for sowing as per treatments. At maturity different biometrical observation, grain yield and stover yield were recorded plot wise and put to the statistical analysis in accordance with analysis of variance technique as suggested by Panse and Sukhatme (1967) for Randomized Block Design.