

Research Paper :

## **Effect of FYM, gliricidia compost and *azotobacter* in conjunction with nitrogen fertilizer on yield performance and physico-chemical properties of a *Typic ustipsammments***

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### **ABSTRACT**

A field experiment was conducted on loamy sand soil of the S.D. Agricultural University, Sardar Krushinagar in 2002 to study the effect of organic, inorganic and biofertilizer on chemical and physical properties of soil. The result indicated that application of 75 % RDN (Urea) + 25% (FYM) with *Azotobacter* recorded higher grain and stover yield. The soil physical properties like infiltration rate, bulk density and water holding capacity improved by application of higher dose of organic manure while, soil moisture significantly higher in 50% RDN through urea + 50 % RDN through FYM treatment. Application of different nitrogen management decreased the pH and increased the EC than initial value of soil test. The maximum available N and S content in soil recorded with application of 75 % RDN through urea +25 % RDN through gliricidia compost treatments. The organic carbon, available P and K content in soil was maximum under application of 50 % RDN urea and 50 % RDN through gliricidia compost, while maximum DTPA-extractable Zn and Fe content in soil was noted under application of 50-50 % RDN applied through urea and gliricidia compost.

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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. The use of chemical fertilizer alone for increasing crop production is not sustainable on long-term basis since it may lead to nutrient imbalance in soil. On the other hand, total N requirement of the crop is too large to meet through organic manure and/or biofertilizer. It is being increasingly realized that combined application of organic manure, chemical fertilizer and biofertilizer is essential to maintain and improve the soil fertility and productivity.

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. Good soil management aims at building up organic matter for the maintenance of a suitable physical condition of the soil and production an environment favourable of the activity of soil microorganisms, which maintain the productivity of soil. The organic manure supply macro-nutrients and micro-nutrient to improve physical as well as chemical properties of soil, ecological balance and providing stability to the production without polluting soil, water and air. The application biofertilizer also enhance the accumulation of soil enzymes, which directly reflects on soil fertility index.

Besides this, with the escalating cost of energy based fertilizers materials, integrated nutrient supply approach, combining organic and biological sources along with the chemical fertilizers would be more remunerative for fertility and productivity of soil (Subbiah and Palaniappan, 1992).

### **MATERIALS AND METHODS**

The field experiment was conducted at the S.D. Agricultural University, Sardar Krushinagar in the year 2002. Before sowing, soil samples were collected from 0 - 15 cm soil for physical and chemical analysis.

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  $N P_2 O_5$  ha<sup>-1</sup>. Nitrogen through inorganic and organic sources of nitrogen as per treatments. Organic source of nitrogen was applied 7 days before sowing as per treatment. Whatever, phosphorous