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# Effect of fertilizer levels on growth and yield of sweet corn

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## ABSTRACT

**An experiment was conducted to study the growth and yield of sweet corn with different fertilizer doses during *kharif* season of 2006 - 2007 at College of Agriculture, Latur. The experiment was laid out in RBD with six treatments $T_1$ (60: 30: 30 NPK kg ha $^{-1}$), $T_2$ (80: 40: 40 NPK kg ha $^{-1}$), $T_3$ (100: 50: 50 NPK kg ha $^{-1}$), $T_4$ (120: 60: 60 NPK kg ha $^{-1}$), $T_5$ (FYM @ 5 tonnes ha $^{-1}$), $T_6$ (FYM @ 5 tonnes ha $^{-1}$ + *Azospirillum*). The application of 100 per cent RDF through chemical produced significantly higher values of growth and yield attributes resulting in significant increase in grain and straw yield than other treatments but this treatment was famed at par with $T_3$ (100: 50: 50 NPK kg ha $^{-1}$). Therefore, it would be advisable to fertilize the sweet corn with $T_3$ (100: 50: 50 NPK kg ha $^{-1}$). The application of nutrients through FYM recorded significantly lowest values of growth and yield attributes.**

**Key words :** Fertilizer doses, Growth, Yield and sweet corn.

## INTRODUCTION

Among all types of maize, Sweet corn (*Zea Mays saccharine*) has commercial importance. It has got commercial potential. Sweet corn is capturing sound market in most of the big cities of India. Most of the farmers are showing interest in growing sweet corn. Many experimental findings revealed that higher crop yield of maize grown for grain could obtain only when the plant get sufficient quantities of nutrients during there life span. Hence, the balanced fertilization is very important to get the maximum yield, so it was felt necessary to study the effect of fertilizer levels on growth and yield of sweet corn.

## MATERIALS AND METHODS

A field experiment was conducted during *kharif* season of 2006 - 2007 at Department of Agronomy farm, College of Agriculture, Latur. The soil of the experimental plot was the medium black (vertisol) with the pH 8.0, low in available nitrogen (187.4 kg ha$^{-1}$), medium in available phosphorus (20.12 kg ha$^{-1}$) and high in potassium (695.7 kg ha$^{-1}$). The experiment was laid out in Randomized Block Design with six treatments replicated four times for doses of fertilizer $T_1$ (60 : 30 : 30 NPK kg ha$^{-1}$), $T_2$ (80 : 40 : 40 NPK kg ha$^{-1}$), $T_3$ (100 : 50 : 50 NPK kg ha$^{-1}$), $T_4$ (120: 60 : 60 NPK kg ha$^{-1}$), $T_5$ (FYM@ 5 tonnes ha$^{-1}$), $T_6$ (FYM@ 5 tonnes ha$^{-1}$ + *Azospirillum*) were tried. Sweet corn was sown at 60 x 20 cm apart during first fourth night of July (10$^{th}$ July) half dose of nitrogenous and full dose of phosphoric and potassic fertilizer were given as basal dose, organic manners *viz.* FYM was applied as per treatments by broadcasting method at the time of land preparation, seeds were treated with *Azospirillum* @ 3g kg ha$^{-1}$ of seed before sowing, remaining half dose of nitrogenous fertilizer was applied in bands as top dressing one month after sowing. All package of practices were followed as per recommendations.

## RESULTS AND DISCUSSION

***Yield contributing characters:***

The yield attributes of sweet corn (Table 1) like length of cob, diameter of cob, number of grains per cob, number of grain per plant, grain yield per plant and straw yield per plant were significantly influenced due to application of 100 per cent RDF through chemical fertilizers. The length of cob was found highest in $T_4$ (120: 60: 60 NPK kg ha$^{-1}$) treatment. The length of cob of $T_3$ treatment was more than $T_4$ treatment but diameter of cob produced in $T_3$ treatment was less as compare to $T_4$ treatment, which ultimately increase the grain yield per cob of $T_4$ treatment. As there was only one cob per plant due to water stress situation occurred during early stages of crop growth. Hence, no. of grains yield per cob was same as that of no. of grains yield per plant.

As chemical fertilizer supply all the recommended nutrients early as compare to FYM and FYM + *Azospirillum*, hence, the treatments with chemical fertilizer produced more grain and straw yield per plant as compare to FYM and FYM + *Azospirillum* applied plots. Among the chemical fertilizer, the 100 per cent RDF treatment ($T_4$) produced more grain and straw yield per plant as compare to other treatments which were fertilized with less than RDF *i.e.* $T_1$, $T_2$, $T_3$.

FYM + *Azospirillum* treatment ($T_6$) produced more

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**Table 1: Yield attributing character as influenced by fertilizer level**

| Treatment | Length of cob (cm) | Diameter of cob (cm) | Number of grains $cob^{-1}$ | Number of grains $plant^{-1}$ | Grain yield $plant^{-1}$ (g) | Straw yield $plant^{-1}$ (g) | Test weight |
|---|---|---|---|---|---|---|---|
| $T_1$ - 60:30:30 | 15.65 | 11.25 | 401.00 | 401.00 | 43.29 | 160.73 | 11.07 |
| $T_2$ - 80:40:40 | 16.90 | 11.85 | 425.60 | 425.60 | 50.87 | 176.86 | 9.15 |
| $T_3$ - 100:50:50 | 16.00 | 12.45 | 498.30 | 498.30 | 53.61 | 193.21 | 10.58 |
| $T_4$ - 120:60:60 | 17.15 | 12.92 | 529.95 | 529.95 | 64.11 | 210.53 | 11.78 |
| $T_5$ - FYM@ 5 tonnes $ha^{-1}$ | 12.95 | 10.70 | 296.40 | 296.40 | 32.33 | 95.31 | 6.08 |
| $T_6$ - FYM@ 5 tonnes $ha^{-1}$ + *Azospirillium* | 14.55 | 11.05 | 362.40 | 362.40 | 36.51 | 108.43 | 10.8 |
| S.E. $\pm$ | 0.81 | 0.31 | 28.62 | 28.62 | 3.34 | 12.70 | 6.15 |
| C.D. (P=0.05) | 2.45 | 0.94 | 86.12 | 86.12 | 10.06 | 38.23 | 1.8 |
| Mean | 15.86 | 11.70 | 423.94 | 423.94 | 47.28 | 157.54 | -- |

**Table 2: Effect of different levels of fertilizer on grain yield, straw yield, biological yield and harvest index**

| Treatment | Grain Yield (kg $ha^{-1}$) | Straw yield (kg $ha^{-1}$) | Biological yield | Harvest index |
|---|---|---|---|---|
| $T_1$ - 60:30:30 | 2157.40 | 1399.70 | 3557.10 | 60.245 |
| $T_2$- 80:40:40 | 2361.11 | 1562.40 | 3923.51 | 60.682 |
| $T_3$ - 100:50:50 | 2556.00 | 1649.30 | 4205.30 | 61.280 |
| $T_4$ - 120:60:60 | 2837.50 | 1844.60 | 4662.10 | 61.830 |
| $T_5$ - FYM@ 5 tonnes $ha^{-1}$ | 1080.50 | 1117.50 | 2198.00 | 47.965 |
| $T_6$ - FYM@ 5 tonnes $ha^{-1}$ + *Azospirillum* | 1271.87 | 1160.90 | 2432.77 | 52.847 |
| S.E. $\pm$ | 141.87 | 113.00 | 147.39 | 1.80 |
| C.D. (P=0.05) | 426.90 | 332.00 | 442.78 | 5.44 |
| Mean | 2044.06 | 1455.70 | 3499.79 | 57.22 |

grain and straw yield as compare to FYM application alone ($T_5$). Because *Azospirillum* fixed atmospheric nitrogen to some extent, which gave added benefits over FYM application alone. Hence, $T_6$ treatment produced more grain and straw yield per plant compared with $T_5$ treatment. These results are in confermatory with the results of Kang *et al.* (1985), Kapur and Rana (1981), Grewal *et al*. (1982). Tilak *et al*. (1982) and Singh *et al*. (1993).

***Grain, straw, biological yield and harvest index:***

The data from Table 2 depicted that the grain and straw yield per ha , biological yield and harvest index of sweet corn was influenced significantly with different treatments. The treatments fertilized with 100 per cent RDF gave more grain and straw yield, biological yield and harvesting index over FYM alone application ($T_5$) and FYM + *Azospirillum* application ($T_6$). This might be due to higher response to added fertilizer associated with low initial status of available nutrients in soil. Application of $P_2O_5$ in RDF enhanced root proliferation, which helps in more absorption of nutrients from deeper layer of soil resulting into significant increase in dry matter and grain yield. These findings are in agreement with the results reported by Gill *et al*. (1994) and Grewal *et al*. (1982).

The treatment with 100 per cent RDF through FYM recorded significant lower grain and straw yield and harvest index than other treatments. FYM @5 tonnes ha-1 + *Azospirillum* applied ($T_6$) treatments produced more grain and straw yield and harvest index over FYM alone application ($T_5$). Because *Azospirillum* fixed atmospheric nitrogen to soil which helps in development of plants and recorded more grain and straw yield and harvest index.These results are on line with Tilak *et al.* (1982), Singh *et al.* (1993), Pawar *et al.* (1996) and Sharma *et al*. (1987).

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