

## Influence of Intergrated Nutrient Management on Growth and Yield of Fenugreek (*Trigonella foenum-graecum* L.)

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### ABSTRACT

A field experiment was conducted at Regional Agricultural Research Station, Lam during 2000-01 to study the response of fenugreek (*Trigonella foenum – graecum* L.) to certain integrated nutrient management treatments. The study revealed that combined application of inorganic, organic and biological sources of nutrients ( $T_1$  – 100% RDN + FYM @ 5 t ha<sup>-1</sup>+ *Azospirillum*,  $T_2$  – 75% RDN + FYM @ 5 t ha<sup>-1</sup>+ *Azospirillum*,  $T_3$  – 50% RDN + FYM @ 5 t ha<sup>-1</sup>+ *Azospirillum*) recorded significantly superior grain yields of Fenugreek over control with superior plant growth characters and yield attributes such as plant height, number of pods per plant and length of pod.

**Key words:** Fenugreek, Integrated Nutrient Management.

Fenugreek (*Trigonella foenum–graecum* L.) belonging to sub family papilionaceae is an important annual herbaceous seed spice crop of India. It is valued as a condiment, leafy vegetable and medicinal plant (Pruthi, 1992). Fenugreek seed besides rich in nutritive value contains diosgenin, a steroidal substance which is used in the production of oral contraceptives and cortico steroids (Elujoba and Hardman, 1988). Modern crop management practices like greater reliance on chemical fertilizers for improving crop productivity has led to the environmental pollution, decline in soil and human health (Sharma *et al.* 1999) *Azospirillum*, the free – living nitrogen fixing bacteria is considered to be more efficient with nitrogenase properties than other nitrogen fixers and contribute significant amounts of nitrogen to the plants there by saving nitrogenous fertilizers ( Govinarajan and Thangaraju, 2001) A suitable combination of organic and inorganic nitrogenous fertilizers maintains a long term soil fertility and sustains higher level of quality produce ( Pillai *et al.* 1985). Keeping the above aspects in view, the present experiment was conducted to study the response of fenugreek to the integrated nutrient management.

### MATERIAL AND METHODS

The present investigation was conducted at Regional Agricultural Research Station, Lam, Guntur during 2000-2001 *Rabi* season under irrigated conditions. The experimental soil was clayey in texture having low in available N (186 kg ha<sup>-1</sup>), medium in available P<sub>2</sub>O<sub>5</sub> (29 kg ha<sup>-1</sup>) and high in exchangeable K<sub>2</sub>O (454kg ha<sup>-1</sup>). The experiment

was laid out in randomised block design replicated thrice. The treatments consisted of 100% recommended dose of nitrogen (RDN) + FYM @ 5 t ha<sup>-1</sup>+ *Azospirillum* ( $T_1$ ), 75% RDN + FYM @ 5 t ha<sup>-1</sup>+ *Azospirillum* ( $T_2$ ), 50% RDN + FYM @ 5 t ha<sup>-1</sup>+ *Azospirillum* ( $T_3$ ), FYM @ 5 t ha<sup>-1</sup>+ *Azospirillum* ( $T_4$ ), FYM @ 5 t ha<sup>-1</sup> ( $T_5$ ), FYM @ 10 t ha<sup>-1</sup>+ *Azospirillum* ( $T_6$ ), FYM @ 10 t ha<sup>-1</sup> ( $T_7$ ) and 100% RDN (Control,  $T_8$ ). The recommended dose of nitrogen @ 50 kg ha<sup>-1</sup> was given as urea as per the treatment. *Azospirillum* was given as seed inoculated Fenugreek variety, Lam selection - 1 was drilled in rows spaced at 30 cm by using 30 kg seed/ha and plants in the rows were thinned to maintain a spacing 10 cm from plant to plant within the row. The crop was observed for plant height, number of branches per plant, number of pods per plant, length of pod, number of seeds per pod and grain yield.

### RESULTS AND DISCUSSIONS

A perusal of the data in table showed a significant influence of inorganic, organic (FYM) and biological (*Azospirillum*) sources of nutrients on plant height.  $T_1$  with 100 %RDN + FYM @ 5 t ha<sup>-1</sup>+ *Azospirillum* was observed with tallest plants of 47.1 cm followed by  $T_2$  (75% RDN + FYM @ 5 t ha<sup>-1</sup>+ *Azospirillum*) with 46.7 cm and  $T_3$  (50% RDN + FYM @ 5 t ha<sup>-1</sup>+ *Azospirillum*) with 46.2 cm which were significantly superior over control,  $T_8$  (100% RDN). The lowest crop height of 34.6 cm was observed in  $T_5$  (FYM @ 5 t ha<sup>-1</sup>). No significant differences were found among the treatments with regards to number of branches per plant.

Table 1. Influence of Integrated Nutrient Management of growth and yield of Fenugreek

Treatment	Plant height (cm)	No.of branches per plant	No.of Pods per plant	Length of Pod (cm)	No.of Seeds per Pod	Grain yield (kg ha <sup>-1</sup> )	Percentage increase/decrease over control
T <sub>1</sub>	47.1	6.0	30.5	11.4	15.3	1198	21.0
T <sub>2</sub>	46.7	5.9	30.1	11.2	15.2	1177	18.9
T <sub>3</sub>	46.2	5.9	28.9	10.9	15.2	1167	17.9
T <sub>4</sub>	40.1	5.8	22.6	9.5	12.8	1000	1.0
T <sub>5</sub>	34.6	5.6	16.9	9.0	11.7	917	(-)7.4
T <sub>6</sub>	41.8	5.9	24.2	10.1	13.2	1062	7.3
T <sub>7</sub>	39.5	5.8	21.2	9.4	12.5	979	(-)1.1
T <sub>8</sub>	39.8	5.8	21.8	9.5	12.6	990	-
CD (P=0.05)	4.66	NS	4.81	1.42	NS	96.0	-

T<sub>1</sub> = 100% RDN + FYM @ 5 t ha<sup>-1</sup> + *Azospirillum*

T<sub>2</sub> = 75% RDN + FYM @ 5 t ha<sup>-1</sup> + *Azospirillum*

T<sub>3</sub> = 50% RDN + FYM @ 5 t ha<sup>-1</sup> + *Azospirillum*

T<sub>4</sub> = FYM @ 5 t ha<sup>-1</sup> + *Azospirillum*

T<sub>5</sub> = FYM @ 5 t ha<sup>-1</sup>

T<sub>6</sub> = FYM @ 10 t ha<sup>-1</sup> + *Azospirillum*

T<sub>7</sub> = FYM @ 10 t ha<sup>-1</sup>

T<sub>8</sub> = Control (100% RDN)

The combination of inorganic, organic and biological sources of nutrients was found to significantly increase the number of pods per plant and pod length. Number of pods per plant were highest in T<sub>1</sub> (30.5) which was on par with T<sub>2</sub> (30.1) and T<sub>3</sub> (28.9) and were significantly superior over control, T<sub>8</sub> (21.8). Lowest number of pods were recorded in T<sub>5</sub> which was not significantly varying from T<sub>7</sub>. With regards to pod length, longest pods of 11.4 cm length were observed in T<sub>1</sub> which was on par with T<sub>2</sub> (11.2 cm) and T<sub>3</sub> (10.9 cm) while shortest pods of 9.0 cm length were recorded in T<sub>5</sub> which did not significantly differ with T<sub>6</sub> (10.1 cm), T<sub>4</sub> (9.5 cm), T<sub>8</sub> (9.5 cm) and T<sub>7</sub> (9.4 cm). The differences among the treatments with regards to number of seed per pod were found to be non-significant.

Among the different treatments T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> with a combination of inorganic, organic and biological sources of nutrients recorded significantly superior grain yields of 1198, 1177 and 1167 kg ha<sup>-1</sup> respectively over control, T<sub>8</sub> (990 kg ha<sup>-1</sup>). The yield increments in T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> over T<sub>8</sub> (Control) were 21.0, 18.9 and 17.9% respectively. The Fenugreek crop with a combination of nutrients from three sources viz. inorganic, organic and biological (T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub>) produced taller plants with more number of longer pods which ultimately resulted in better grain yields over the rest of the treatments. The lowest

yield was recorded in T<sub>5</sub> which was on par with T<sub>6</sub>, T<sub>4</sub>, T<sub>8</sub> and T<sub>7</sub>.

Based on the results of study, it can be concluded that higher grain yield of Fenugreek could be obtained with integrated use of inorganic, organic and biological sources of nutrients.

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