

## Response of fenugreek (*Trigonella foenum-graecum*) to seed rate and fertilizer application

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### ABSTRACT

A field experiment was conducted during the winter seasons of 1990-93 at Jobner on sandy loam soil low in N and P and medium in K on fenugreek (*Trigonella foenum-graecum* L.). A seed rate of 25 kg/ha gave maximum mean seed yield (11.10 q/ha) and net profit (Rs 7980/ha) with benefit : cost ratio of 2.25. However, maximum pods/plant and straw yield were obtained with 15 and 30 kg/ha seed rate, respectively. Application of 40 kg N plus 40 kg  $P_2O_5$  gave higher seed yield and net return (Rs 8197/ha) with benefit: cost ratio of 2.25.

**Key words:** Fenugreek, Seed rate, Fertilizer

Fenugreek (*Trigonella foenum-graecum* L.) has got an important place in Indian seed spices. However, the productivity of fenugreek is low in loamy sand soils of semi-arid region due to nutrient deficiencies particularly those of N and P as well as their imbalance and inadequate use and sub-optimal plant population. The crop responds favourably to seeding rates (Taneja *et al.*, 1989). Since meagre information is available regarding seed rate and fertility management in fenugreek, an attempt was made on this aspect.

### MATERIALS AND METHODS

An experiment was conducted during winter seasons of 1990-91, 1991-92 and 1992-93 at Jobner (Rajasthan). The soil was sandy loam, low in N (0.08-0.30%), organic carbon (0.17-0.20%), P (0.003-0.005%), and

medium in K (0.24-0.33%) with neutral reaction. The experiment consisting of 24 treatment combinations including 4 seed rates (15, 20, 25 and 30 kg/ha) and 6 combinations of N and P (0 + 0, 20 + 20, 20 + 40, 20 + 60, 40 + 40 and 40 + 60 kg N +  $P_2O_5$ /ha) was laid out in randomised block design with 3 replications. The fenugreek cv. RMT-1 was sown on 26 October, 7 and 22 November with row spacing of 30 cm during first, second and third year, respectively.

### RESULTS AND DISCUSSION

#### Effect of seed rate

A seed rate of 15 kg/ha significantly increased pods/plant compared with 25 and 30 kg/ha seed rate, probably due to less competition among crop plants for growth factors. The maximum seed yield was recorded with 25 kg/ha seed rate being significantly higher

**Table 1.** Effect of seed rate and fertilizer on growth and yield attributes of fenugreek (Average of 3 years)

| Treatment                                                 | Plant height (cm) | Branches/plant | Pods/plants | Pod length (cm) | Seeds/pod (g) | Test weight |
|-----------------------------------------------------------|-------------------|----------------|-------------|-----------------|---------------|-------------|
| <i>Seed rate (kg/ha)</i>                                  |                   |                |             |                 |               |             |
| 15                                                        | 44.6              | 5.0            | 21.0        | 8.9             | 15.4          | 12.08       |
| 20                                                        | 44.9              | 4.8            | 20.2        | 8.9             | 15.0          | 12.05       |
| 25                                                        | 45.1              | 4.6            | 19.1        | 8.9             | 15.0          | 11.90       |
| 30                                                        | 44.8              | 4.7            | 17.8        | 8.8             | 15.0          | 11.93       |
| CD (P = 0.05)                                             | NS                | NS             | NS          | NS              | NS            | NS          |
| <i>Fertilizer (N + P<sub>2</sub>O<sub>5</sub>, kg/ha)</i> |                   |                |             |                 |               |             |
| 0 + 0                                                     | 43.3              | 4.4            | 16.6        | 8.6             | 14.9          | 11.76       |
| 20 + 20                                                   | 44.1              | 4.6            | 17.7        | 9.0             | 15.0          | 11.97       |
| 20 + 40                                                   | 46.4              | 4.9            | 19.9        | 9.0             | 15.1          | 12.08       |
| 20 + 60                                                   | 44.9              | 4.9            | 21.6        | 8.9             | 15.0          | 12.05       |
| 40 + 40                                                   | 45.7              | 5.0            | 22.0        | 8.9             | 15.5          | 12.11       |
| 40 + 60                                                   | 44.9              | 4.8            | 19.3        | 8.8             | 15.0          | 11.98       |
| CD (P = 0.05)                                             | NS                | NS             | 1.8         | NS              | NS            | 0.20        |

**Table 2.** Effect of seed rate and fertilizer on yield and economics of fenugreek

| Treatment                                                 | Mean<br>straw yield<br>(q/ha) | Seed yield (q/ha) |         |         |       | Mean net<br>return<br>(Rs/ha) | Benefit :<br>cost<br>ratio |
|-----------------------------------------------------------|-------------------------------|-------------------|---------|---------|-------|-------------------------------|----------------------------|
|                                                           |                               | 1990-91           | 1991-92 | 1992-93 | Mean  |                               |                            |
| <i>Seed rate (kg/ha)</i>                                  |                               |                   |         |         |       |                               |                            |
| 15                                                        | 20.50                         | 9.38              | 10.52   | 8.51    | 9.47  | 6,438                         | 1.87                       |
| 20                                                        | 21.39                         | 10.74             | 10.94   | 9.30    | 10.32 | 7,201                         | 2.06                       |
| 25                                                        | 23.34                         | 11.56             | 11.74   | 9.98    | 11.10 | 7,980                         | 2.25                       |
| 30                                                        | 23.69                         | 11.35             | 11.67   | 9.29    | 10.77 | 7,665                         | 2.13                       |
| CD (P = 0.05)                                             | 1.59                          | 0.58              | 0.89    | 0.69    | 0.46  |                               |                            |
| <i>Fertilizer (N + P<sub>2</sub>O<sub>5</sub>, kg/ha)</i> |                               |                   |         |         |       |                               |                            |
| 0 + 0                                                     | 20.20                         | 9.79              | 10.21   | 8.46    | 9.49  | 6,805                         | 2.22                       |
| 20 + 20                                                   | 22.95                         | 10.21             | 10.52   | 9.00    | 9.91  | 7,097                         | 2.10                       |
| 20 + 40                                                   | 22.00                         | 10.94             | 11.88   | 9.57    | 10.80 | 7,592                         | 2.14                       |
| 20 + 60                                                   | 22.25                         | 11.35             | 11.25   | 9.27    | 10.62 | 7,310                         | 1.97                       |
| 40 + 40                                                   | 23.72                         | 12.19             | 12.08   | 10.13   | 11.47 | 8,197                         | 2.25                       |
| 40 + 60                                                   | 22.07                         | 10.31             | 11.56   | 9.19    | 10.35 | 6,974                         | 1.83                       |
| CD (P = 0.05)                                             | 1.96                          | 0.71              | 1.08    | 0.83    | 0.57  |                               |                            |

over 15 kg/ha in all the years, and 20 and 30 kg/ha during 1990-91 and 1992-93, respectively. A seed rate of 25 kg/ha produced the maximum mean seed yield (11.10 q/ha) but was on par with 30 kg/ha seed rate (10.77 q/ha). Seed rate of 30 kg/ha being on par with 25 kg/ha recorded significantly higher straw yield over 15 and 20 kg/ha seed rates. Similar effect of seed rate on fenugreek was reported by Teneja *et al.* (1985). Maximum net return (Rs 7980/ha) and benefit : cost ratio (2.25) were obtained with 25 kg/ha seed rate.

#### **Effect of fertilizer**

Application of 40 kg N + 40 kg  $P_2O_5$ /ha significantly increased the pods/plant over control and rest of the N + P combinations except 20 kg N + 60 kg  $P_2O_5$ /ha, and test weight over control. Application of N and P in sandy loam soil low in N and P probably improved the nutritional environment in the rhizosphere which might have favourably influenced these parameters. The maximum seed yield of 12.19, 12.8 and 10.13 q/ha was obtained with 40 kg N + 40 kg  $P_2O_5$ /ha in respective years. This treatment increased the seed yield by 24.51, 18.32 and 19.74% over control during 1990-91, 1991-92 and 1992-93, respectively. Over the seasons, 40 kg N

+ 40 kg  $P_2O_5$ /ha gave markedly higher seed yield over control and rest of the N + P combinations. These results confirm the findings of Bhati *et al.* (1987) and Detroja *et al.* (1995). Maximum mean net return (Rs 8179/ha) and benefit : cost ratio (2.25) were also recorded with 40 kg N + 40 kg  $P_2O_5$ /ha. Based on the mean seed yield and economics, a seed rate of 25 kg/ha and 40 kg N + 40 kg  $P_2O_5$ /ha can be recommended for fenugreek.

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