

## Effect of methods of seeding, weeding and fertilizer on growth and yield of horsegram (*Macrotyloma uniflorum*)

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### ABSTRACT

A 3-year field experiment was carried out during rainy season of 1989–91 to study the effect of row seeding, practice of weeding and fertilizer on horsegram [*Macrotyloma uniflorum* (Lam.) Verdc.]. The row seeding was superior to broadcasting, and practice of 2 weedings at critical period was beneficial. Application of diammonium phosphate @ 75 kg/ha significantly improved the yield parameters and also seed yield of horsegram from 651 to 853 kg/ha.

Horsegram [*Macrotyloma uniflorum* (Lam.) Verdc.] is grown on red soils under rainfed conditions during late rainy season (*khari*) in some parts of Karnataka. Due to its low-yield potentiality, it is usually broadcast without any fertilizer application and weeding. Being a low-priced leguminous and drought-resistant crop, it is necessary to improve its yield potential by adopting suitable methods of seeding, fertilizer application and weeding. With this in view, a study was carried out to work out suitable seeding method, fertilizer application and weeding in horsegram.

### MATERIALS AND METHODS

The field study was carried out at University Farm, Bangalore, during late rainy season of 1989–91 under rainfed condition. The soil of the experimental site was Alfisol with pH 5.7, available  $P_2O_5$  and  $K_2O$  20 and 220 kg/ha respectively. The soil was low in organic carbon (0.38%) and cation-exchange capacity of soil was 9.0

meq/100 g. The rainfall was 269 mm (13 rainy days), 242 mm (20 rainy days) and 723 mm (22 rainy days) during respective cropping seasons. The treatments comprised 2 methods of seeding [broadcasting and row seeding (30 cm x 10 cm)], 2 weed-control methods (no weeding and hand-weeding twice at 25 and 50 days after sowing) and 2 levels of fertilizer (no fertilizer and 13.5 kg N and 34.5 kg  $P_2O_5$ /ha as diammonium phosphate of 75 kg/ha). 'BGM 1' horsegram was used for the study and the experiment was laid out in factorial randomized complete-block design with 3 replications. The fertilizer was applied at the time of seeding. The crop was maintained well and harvested at 110 days after seeding.

### RESULTS AND DISCUSSION

Row seeding was superior to broadcast application in increasing the plant height, number of primary branches and nodule number/plant significantly in all the years (Table 1), owing to uniform population and

**Table 1.** Effect of methods of seeding, weeding and fertilizer use on growth of horsegram

| Treatment                | Plant height (cm) |      |      | Primary branches/plant |      |      | Nodules/plant |      |      |
|--------------------------|-------------------|------|------|------------------------|------|------|---------------|------|------|
|                          | 1989              | 1990 | 1991 | 1989                   | 1990 | 1991 | 1989          | 1990 | 1991 |
| <i>Method of seeding</i> |                   |      |      |                        |      |      |               |      |      |
| Broadcasting             | 17.5              | 17.4 | 20.3 | 5.85                   | 4.47 | 6.05 | 5.60          | 5.25 | 6.12 |
| Row seeding              | 20.3              | 19.2 | 22.9 | 7.95                   | 6.62 | 8.35 | 6.82          | 6.60 | 7.75 |
| CD (P = 0.05)            | 1.45              | 1.59 | 2.37 | 0.72                   | 0.42 | 1.22 | 1.10          | 1.08 | 1.08 |
| <i>Weeding</i>           |                   |      |      |                        |      |      |               |      |      |
| No weeding               | 18.2              | 17.7 | 20.3 | 6.37                   | 5.05 | 6.60 | 5.75          | 5.55 | 6.42 |
| Hand-weeding (twice)     | 19.6              | 19.0 | 23.0 | 7.42                   | 6.05 | 7.80 | 6.75          | 6.30 | 7.45 |
| CD (P = 0.05)            | NS                | NS   | 2.37 | 0.72                   | 0.42 | NS   | NS            | NS   | NS   |
| <i>Fertilizer</i>        |                   |      |      |                        |      |      |               |      |      |
| No fertilizer            | 17.8              | 17.2 | 20.1 | 4.77                   | 6.42 | 5.63 | 5.75          | 5.52 | 6.30 |
| 75 kg DAP/ha             | 20.0              | 19.4 | 23.2 | 6.32                   | 7.97 | 7.37 | 6.67          | 6.32 | 7.57 |
| CD (P = 0.05)            | 1.45              | 1.59 | 2.37 | 0.72                   | 0.42 | 1.22 | NS            | NS   | 1.08 |

DAP, Diammonium phosphate

good germination.

Weeding significantly influenced the plant height in the third year, possibly due to relatively high precipitation. Primary branches were also influenced by weeding in the first 2 years. However, hand-weeding had no effect on number of nodules.

Application of diammonium phosphate @ 75 kg/ha significantly enhanced all the growth parameters except nodules in the first 2 years. The number of nodules/plant was considerably enhanced due to higher rainfall, which caused diammonium phosphate to react well in soil to supply enough P for nodulation in the third year.

There was a significant influence of row seeding, except in the second year, on seeds/pod (Table 2). The resultant beneficial effect of row seeding on growth parameters continued to influence yield parameters due to availability of moisture and supply of nutrients. However, 100-seed weight was not affected by method of seeding. An extra grain yield up to 240 kg/ha was obtained by row

seeding. Poor grain yield of horsegram by broadcast method was due to uneven plant population and non-placement of seeds at uniform depth, resulting in poor germination and growth (Shankarlingappa and Hegde, 1992) and seeding in rows provided better conditions for intercultivation and weed control (Balasubramanian, 1985).

Hand-weeding twice during critical period of crop growth significantly influenced the yield parameters except 100-seed weight. An extra grain yield of 166 kg/ha was obtained by hand-weeding twice. Weeding provided enough supply of moisture and nutrients enables the crop to put up vigorous growth resulting in higher grain yield.

In soils of low-fertility status, fertilizer application was also highly effective on yield parameters as well as grain yield because of the beneficial effects of diammonium phosphate on growth resulting in enhancement in grain yield even to 200 kg/ha. The results are in conformity with

Table 2. Effect of methods of seeding, weeding and fertilizer use on yield and yield parameters horsegram

| Treatment                 | Pods/plant |      |      | Seeds/pod |      |      | 100-seed weight (g) |      |      | Grain yield (kg/ha) |      |       |
|---------------------------|------------|------|------|-----------|------|------|---------------------|------|------|---------------------|------|-------|
|                           | 1989       | 1990 | 1991 | 1989      | 1990 | 1991 | 1989                | 1990 | 1991 | 1989                | 1990 | 1991  |
| <i>Methods of seeding</i> |            |      |      |           |      |      |                     |      |      |                     |      |       |
| Broadcasting              | 16.8       | 15.7 | 22.6 | 3.4       | 3.5  | 3.4  | 3.3                 | 3.2  | 3.3  | 602                 | 532  | 759   |
| Row seeding               | 18.8       | 18.1 | 26.4 | 3.5       | 3.5  | 3.6  | 3.4                 | 3.3  | 3.4  | 869                 | 741  | 1,004 |
| CD (P = 0.05)             | 0.93       | 0.97 | 0.63 | 0.06      | NS   | 0.12 | NS                  | NS   | NS   | 58.9                | 45.3 | 39.1  |
| <i>Weeding</i>            |            |      |      |           |      |      |                     |      |      |                     |      |       |
| No weeding                | 16.2       | 15.9 | 22.9 | 3.4       | 3.4  | 3.4  | 3.3                 | 3.2  | 3.3  | 632                 | 565  | 808   |
| Hand-weeding (twice)      | 19.4       | 17.9 | 26.1 | 3.6       | 3.5  | 3.6  | 3.3                 | 3.3  | 3.4  | 839                 | 708  | 955   |
| CD (P = 0.05)             | 0.93       | 0.97 | 0.63 | 0.06      | 0.09 | 0.12 | NS                  | 0.10 | NS   | 58.9                | 45.3 | 39.1  |
| <i>Fertilizer</i>         |            |      |      |           |      |      |                     |      |      |                     |      |       |
| No fertilizer             | 16.6       | 15.7 | 22.2 | 3.4       | 3.4  | 3.4  | 3.3                 | 3.2  | 3.3  | 634                 | 544  | 774   |
| 75 kg DAP/ha              | 19.0       | 18.1 | 26.7 | 3.6       | 3.5  | 3.6  | 3.3                 | 3.3  | 3.4  | 838                 | 730  | 990   |
| CD (P = 0.05)             | 0.93       | 0.97 | 0.63 | 0.06      | 0.09 | 0.12 | NS                  | NS   | NS   | 58.9                | 45.3 | 39.1  |

DAP, Diammonium phosphate

those of Sonune and Verenkar (1991) and Thakur and Sharma (1990).

The study revealed that the yield of horsegram could be improved substantially by adopting row seeding, weeding and fertilizer application.

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