

Differential response of seed rate and method of sowing on seed yield and quality of *isabgol* (*Plantago ovata*) in shallow black soil

S.K. MAHESHWARI AND R.K. SHARMA

All-India Co-ordinated Research Project on Medicinal and Aromatic Plants,
College of Agriculture, Jawaharlal Nehru Krishi Vishwa Vidyalaya,
Indore, Madhya Pradesh 452 001

Received : February 2001

ABSTRACT

A field study was conducted in shallow black soil of the Malwa region of Madhya Pradesh during the winter season of 1995 and 1996, to study the effect of variable seed rates and methods of sowing on the growth, yield and quality of *isabgol* (*Plantago ovata* Forsskal). The plant height, length of spike and their numbers were not significantly affected by seed rates. A seed rate of 6 kg/ha was found optimum. Sowing of seed by broadcast method resulted significantly higher number of spikes compared to row sowing; however, plant height, length of spike and seed yield were not influenced by methods of seed sowing. Different seed rates and sowing methods did not influence the swelling factor and mucilage percentage of the seeds.

Key words : *Isabgol*, Spike, Row, Broadcast, Seed rate, Swelling factor, Mucilage

Psyllium or *isabgol* is predominantly cultivated in Gujarat and in the world market India is the whole and sole exporter by exporting 80–90% of the produce. Being economically an important crop, it was introduced at Indore in Madhya Pradesh in 1995 for conducting agronomical studies. A study covering seed requirement and method of sowing was conducted during 2 winter seasons of 1995–96 and 1996–97 to optimize the seed rate and sowing method for higher seed yield.

MATERIALS AND METHODS

A field experiment was conducted in spilt-plot design with 4 replications at the College of Agriculture, Indore, during winters of 1995 and 1996. The treatments comprised 4 levels of seed rates, viz. 4, 6, 8 and 10 kg ha, besides 2 sowing methods of 20 cm spacing and seed broadcast during second fortnight of November every year. The crop was irrigated 6 times within duration of 120 days. The soil was shallow black (depth 40–50 cm), belonging to a

benchmark of Kamliakheri series Vertic ustocrepts (Murthy *et al.*, 1982). The soil was low in available N (240 kg/ha) and P (15 kg/ha), but rich in K (570 kg/ha). In 2 seasons normal rainfall of 900–950 mm was received. The crop was fertilized with a dose of 20 kg N+ 40 kg P_2O_5 /ha at sowing. Harvesting was done at 120 days and before it. Sata on height (cm)/ plant, spikes/plant and spike length (cm) were recorded on 5 random plants and seed yield was recorded on hectare basis (Table 1). The swelling factor of seed was determined by dipping/g seed in 40 ml water overnight and recording of swollen mask next day (Dalal, 1978). However, seed mucilage was estimated by defatted seed by using hexane. About 2.5 g such seeds were heated with 100 ml HCl acidulated distilled water (pH 5.5) for 2 hr on a water-bath. The supernatant was filtered in an Erlenmeyer flask. The extraction and acidulation was repeated again and the filtrate was collected in the same flask receiving first filtrate. Pour the mixed filtrate in a beaker containing 75 ml methanol with constant stirring to obtain the precipitate. The supernatant was filtered through previously weighed Whatman No.1 filter paper. The precipitate was collected on the filter paper, oven-dried and desiccate on anhydrous calcium chloride to a constant weight and reported as per cent mucilage (Table 1).

RESULTS AND DISCUSSION

Seed rate

The height of plant, number of spikes and length of spike were not significantly influenced by different seed rates in both the seasons and in pooled years. However,

in 1995 and 1996 the crop yields were regularly and significantly increased after increasing the levels of seeds from 4 to 10 kg/ha, except a seed rate of 8 kg/ha that gave at par yield compared with 4 kg/ha in 1996. In pooled seasons the maximum grain yield was recovered at higher seed rate of 10 kg/ha compared with 4 kg/ha. However, yield differences due to 6, 8 and 10 kg/ha reported to be at par with each other but proved to be significant compared to 4 kg seed rate. This indicated that even 6 kg seed rate would be sufficient for 1 ha of land. Randhawa *et al.* (1978) concluded that the increase in seed rate from 5 to 10 kg/ha, though 7.5 kg/ha gave increasing seed yield under Punjab conditions. These results confirm the findings of Mehta *et al.* (1976).

The data further revealed non-significant effect of seed rates on the swelling factor and per cent mucilage of the seed in different season and pooled.

Sowing method

Plant height and spike length were not significantly affected by sowing the crop in row or by seed broadcast during both seasons and in pooled data. However, number of spikes were significantly influenced by broadcast sowing of the seed in 1995 and 1996. In pooled season, similar effect was noticed and maximum spikes were counted when seed was sown broadcast. Further neither the broadcast method nor the sowing of crop in rows could create significant differences in the crop yield, hence it resulted to be statistically at par.

Positive effect of methods of sowing was not marked on swelling and mucilage

Table 1. Effect of seed rate and sowing methods on plant attributes, seed yield and quality of *isabgol*

[illegible]

percentage of the seed in 1995, 1996 and in pooled data.

REFERENCES

- Mehta, K.G., Modi, J.M and Gupta, R 1976 . Effect of seed rate, time and method of sowing on the yield of isabgol in Pilwai tract of North Gujarat. *Indian Journal of Agronomy* 21 : 509-510.
- Murthy, R.S., Hirekerur, I.R., Deshpande, S.B. and Rao, B.V.V. 1982. *Benchmark Soils of India*, Maharashtra National Bureau of Soil Survey and Land Use Planning, Nagpur, pp. 225-227.
- Randhawa, G.S., Sahota, T.S., Bains, D.S. and Mahajan, V.P. 1978.. The effect of sowing date, seed rate and nitrogen fertilizer on the growth and yield of *Isabgol* (*Plantago ovata* F.). *Journal of Agricultural Science, Cambridge* 90 : 341-343.