

Influence of boron and zinc on increasing productivity of Fenugreek seed (*trigonella foenum graecum* L.)

A. PARIARI, S. KHAN AND M. N. IMAM

Department of Spices and Plantation Crops Faculty of Horticulture
Bidhan Chandra Krishi Viswavidyalaya, Mohanpur-741252, West Bengal

ABSTRACT

A field experiment was carried out at Horticultural Research Station, Mondouri, Bidhan Chandra Krishi Viswavidyalaya during 2006-07 and 2007-08 to study the effect of Boron and zinc on growth and seed yield of fenugreek. Zinc was applied in four concentrations (0.1%, 0.2%, 0.3% and 0.4%) and boron was applied in two concentrations (0.1% and 0.2%). The result showed that foliar application of boron @0.1 % and zinc @0.2% twice had been found to be effective in enhancing most of the yield attributes and seed yield of fenugreek. It is also observed that lower concentration is more effective than higher concentration.

Key words : Boron, zinc, productivity and seed

Fenugreek is an important and one of the most popular seed spice grown in tropical and subtropical countries of the world. India is the major producer and exporter of this spice. Both of its leaf with tender stem and seeds are commonly used by the people in their daily diet. Not only for culinary purpose, but it has an extensive use in production of confectionery and bakery products. It has a tremendous medicinal importance. It is digestive, carminative, diuretic, antidiabetic and also a rich source of protein. It is generally grown as a cool season crop. A total yield of 93350 tonnes seed was produced from an area of 89420 ha in India during 2007-08 with a productivity of 1044 kg/ha. India exported 8750 tonnes seed with an foreign exchange of Rs. 1,771.25 lakh. To obtain its potential yield, trials on nutritional aspect is gaining importance day by day like other crops. But the productivity is yet to be increased. Beside other nutrients, micronutrients like boron and zinc also play a positive role for increasing seed yield in different horticultural and field crops. Keeping this in mind the experiment was conducted.

MATERIALS AND METHODS

The field experiment was carried out at Horticultural Research Station, Mondouri, Bidhan Chandra Krishi Viswavidyalaya during 2006-07 and 2007-08. It is under Gangetic Alluvial Zone of West Bengal. The soil character was as pH 7.6, organic carbon 5.8g/kg, DTPA extractable Zn 0.38 mg/kg and hot CaCl₂ extractable B 0.12mg/kg. The effect of B and Zn in different concentrations on vegetative growth and seed yield of the crop was studied. For this purpose zinc was applied in four concentrations viz 0.1%, 0.2%, 0.3% and 0.4% and boron was applied in two concentrations viz 0.1% and 0.2%, twice each at three and eight weeks after sowing of seed including water spray as a control treatment. The experiment was designed in RBD with seven treatments and four replications. The crop was manured with 10 tonnes FYM, 50 kg N, 30kg P and

E-mail: dranupariari@yahoo.co.in

50 kg K. Nitrogen was applied in two splits. Other cultural practices were undertaken as per schedule. The data was recorded on different vegetative and yield parameters. The treatments were

T1: NPK + Zn (0.1%), T2: NPK + Zn (0.2%),
T3: NPK + Zn (0.3%), T4: NPK + Zn (0.4%),
T5: NPK + B(0.1%), T6: NPK + B (0.2%),
T7: control(water spray)

RESULTS AND DISCUSSION

The result (Table 1) showed that application of both B and Zn individually from lower to higher concentration exhibited a significant variation in all the parameters under study. The tallest plant (66.00 cm) was observed with the spraying of Zn (0.2%) followed by B (0.1%), Zn (0.4%) and B (0.2%) which were statistically at par. Regarding number of primary branches, the same trend has also been observed. Spraying of Zn (0.2%) and B (0.1%) produced maximum number of branches followed by Zn (0.3%) and B (0.2%). The control plot (water spray) produced the lowest value in both the cases.

Considering yield parameters, the maximum number of pods per plant was found with B @ 0.1% (33.10) closely followed by Zn @0.2% (32.50). The longest pod (12.85 cm) was also seen with T5 i.e.B@ 0.1%. The seed content per pod was also maximum (14.50) in the same treatment followed by Zn @0.2%, though much variation was not observed regarding length of pod and number of seeds per pod. The bolder seed was observed with B@ 0.1%. So, the maximum test weight of fenugreek seed (14.00g) was found with this treatment followed by Zn @0.2% (13.45 g) and B @0.2% (13.05g).

The economic part of fenugreek for this experiment is seed. So considering the seed production an increased yield of 22.43% over control was found with spraying of B (0.1%). The maximum seed yield (13.10 q/ha) was obtained with B @0.1% followed by Zn@0.2%(12.75 q/ha) and Zn @0.3% (12.40 q/ha).

Table 1: Effect of boron and zinc on growth, seed yield component and yield of fenugreek

Treatments	Plant height (cm)	No. of primary branches	No. of pods/plant	Pod length (cm)	No. of seeds/pod	Test weight	Seed yield (q/ha)
Zn (0.1%)	54.50	7.00	27.80	10.63	12.50	11.00	11.15
Zn (0.2%)	66.00	8.75	32.50	12.20	14.20	13.45	12.75
Zn (0.3%)	62.00	7.85	29.90	11.50	14.00	12.90	12.40
Zn (0.4%)	65.50	7.00	28.50	11.00	13.75	12.50	11.50
B (0.1%)	65.75	8.50	33.10	12.85	14.50	14.00	13.10
B (0.2%)	65.30	7.25	30.35	11.75	14.10	13.05	11.90
Control	50.25	6.50	27.30	10.25	11.90	10.52	10.70
LSD(0.05)	3.50	0.81	1.55	0.67	0.82	1.06	0.68

From this experiment it is observed that boron and zinc at lower concentration has produced a significant positive result over control. The same trend of result was observed by Enania and Vyas (1995) in their experiment with zinc in chickpea. Khattab and Omer (1990) also recorded an increased plant growth and yield with zinc application in fennel. The positive effect of zinc may be due to the fact that zinc favours the enzyme system, auxin and protein synthesis and seed production directly or indirectly (Sharma *et al.*, 1999). An increased seed yield of 19.05% was observed by Sharangi *et al.*, (2002) by application of boron at lower concentration in fennel. The positive effect may be due to increased value of number of pod per plant, number of seed per pod and the test weight.

From the present experiment it may be concluded that foliar application of boron @ 0.1% or zinc @ 0.2 twice individually may increase the seed

yield of fenugreek in Gangetic alluvial plains of West Bengal.

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