

Growth and yield of french bean (*Phaseolus vulgaris* L.) as influenced by different levels of row spacing, seed rate and nitrogen

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ABSTRACT

A field experiment was conducted during the winter seasons of 1992-93 and 1993-94 at Kanpur (U.P.) to study the effect of row spacing, seed rate and nitrogen levels on growth and yield of french bean (*Phaseolus vulgaris*). The row spacings of 30 and 40 cm being at par produced significantly higher grain yield of french bean than 20 cm row spacing. Among seed rates, 150 kg/ha seed produced significantly highest grain yield of 26.18 q/ha against 25.54 and 24.28 q/ha at 125 and 100 kg seed/ha, respectively. In case of nitrogen, grain yield showed significant increase upto 160 kg N/ha. The optimum economic dose computed from quadratic response equation was found 152.5 kg N/ha with estimated grain yield of 29.15 q/ha. Stover yield also behaved in almost similar manner under different treatments.

Key words : French bean, Row spacing, Seed rate, Grain yield.

INTRODUCTION

French bean which is also known as 'Rajmash' is an important legume crop. It is used both as dry seeds or as green pod vegetable. Its demand is increasing day by day throughout the country. In plains of Uttar Pradesh, it is a new introduction as commercial crop. Hence, limited agronomical informations are available for its cultivation. It is said to be very inefficient in biological nitrogen fixation owing to poor nodulation (Ram Gopal *et al.*, 2005). It requires higher dose of nitrogen fertilizer for enhanced productivity particularly in plains. In view of these, the present experiment was conducted to assess the effect of row spacings, seed rates and nitrogen levels on the performance of french bean.

MATERIALS AND METHODS

A field experiment was carried out at Vegetable Research Farm, Kalyanpur of C.S. Azad University of Agriculture and Technology, Kanpur during winter season of 1992-93 and 1993-94. The soil of experimental fields was silty loam in texture, low in available nitrogen (0.32 and 0.30% O.C.), medium in available phosphorus (14.70 and 13.90 kg P₂O₅ / ha) and medium also in available potassium (168.2 and 163.0 kg K₂O /ha) having 7.4 and 7.6 pH during 1992-93 and 1993-94, respectively. Twenty seven treatment combinations consisting of 3 row spacings (20, 30, 40 cm), 3 seed rates (100, 125, 150 kg/ha) and 3 nitrogen levels (0, 60, 120 kg/ha) were laid out in split plot design with 3 replications keeping the combination of row spacing and seed rates in main plots and nitrogen levels in sub plots. Uniform dose of 60 kg P₂O₅ and 60 kg K₂O/ha was applied in whole experimental area as basal

through single superphosphate and muriate of potash, respectively. Nitrogen as per treatment was applied through urea, half at sowing and half at first irrigation. french bean variety PDR – 14 was sown in furrows behind plough on 2-11-92 and 8-11-93 in two years. Sowing was done after pre-sowing irrigation and later on 3 irrigations were given to the crop during each year. One weeding and hoeing was done with hand khurpi after first irrigation. Experimental crop was harvested at full grain maturity on 22-3-1993 and 24-3-1994 during two years. To evaluate the effect of treatments on crop, various growth and yield attributes and yields of french bean were recorded.

RESULTS AND DISCUSSION

Growth attributes :

Number of plants per unit area were influenced significantly only by seed rates, 150 kg seed / ha maintained significantly maximum plants and 100 kg seed / ha maintained significantly minimum plant population (Table 1). These are attributed directly to the number of seeds sown per unit area with varied seed rates. Saxena and Verma (1992) also reported the similar effects. Plant height was affected significantly only by increasing levels of nitrogen where 80 and 160 kg N being at par produced taller plants than control. Number of branches / plant and dry weight / plant were influenced significantly by all the three treatment factors. Among row spacings, 40 cm, among seed rates, 100 kg/ha and among N levels, 160 kg /ha attained maximum values of both branches and dry weight/plant. Significantly minimum values of branches and dry weight/plant were recorded at 20 cm row spacing, 150 kg seed /ha or without N application. Better