

## Response of frenchbean (*Phaseolus vulgaris* L.) to land configurations and fertility levels during *kharif* season

S.B. KADAM<sup>1</sup>, N.M. MASKE<sup>2</sup>, S.S. LINGE<sup>3</sup> AND S.B. PAWAR<sup>4</sup>

Department of Agronomy, Marathwada Agricultural University, PARBHANI (M.S.) INDIA

### ABSTRACT

A field experiment was carried out during *kharif* season of 2005-06 at Department of Agronomy farm, Marthwada Agricultural University, Parbhani to investigate Response of frenchbean (*Phaseolus vulgaris* L.) to land configurations and fertility levels during *kharif* season. All growth and yield contributing characters viz., plant height, functional leaves, branches, number of pods per plant, number of seeds per pod, seed yield per plant and seed yield (kg.ha<sup>-1</sup>) were found not significant for all land configurations while L<sub>1</sub>-sowing on flat bed with no opening of furrow and L<sub>3</sub>-sowing in paired row (30+60) x10 cm with opening of furrow after last interculture found significantly superior over L<sub>2</sub>-Sowing on flat bed and opening of furrow at last interculture in respect to pod and total dry matter. Fertility level F<sub>2</sub>-120:60:60 NPK kg.ha<sup>-1</sup> recorded significant response in relation to plant height, functional leaves, branches, total dry matter, number of pods per plant and 100 seed weight while yield parameters were found not significant at all fertility levels (F<sub>1</sub>-100:50:50, F<sub>2</sub>-120:60:60, F<sub>3</sub>-140:70:70 NPK kg.ha<sup>-1</sup>).

**Key words** : French bean, Land configurations, Yield and fertility levels, Seed yield.

### INTRODUCTION

Pulses constitute an integral part of Indian vegetarian diet and meet major share of protein requirement of predominantly vegetarian population of India. Credit of green revolution recorded in sixties has been very much shared by cereals while productivity of pulses remained unchanged. Besides, with increase in population, there has been growing demand of pulses, however, due to various constraints their production improvement almost remains stagnant which resulted in almost limiting protein availability to majority of vegetarian population. French bean is specially characterized by the lack in nodulation owing to the absence of NOD gene regulation though it is a legume crop (Pathak and Khurana, 1993). Though it is a leguminous and short duration crop, due to its low productivity, it does not become popular among the cultivators of Maharashtra and the Marathwada as well. For increasing the per hectare production of this crop, one has to choose high yielding varieties with different agro-techniques like sowing, nutrient, water and weed management, etc. However, little work has been done in the past on this crop in the Maharashtra state and particularly in Marathwada region. Generally, this crop is grown during *rabi* season, however, due to very short span of cold and followed by higher temperature, growth of this crop is stunted resulting thereby low productivity. Looking to this, it is necessary to test this crop during *kharif* season. However, drainage is the important criteria

for vertisols and hence, studies on different land configuration combined with nutrient doses are tested. Hence, the present investigation entitled "Response of Frenchbean (*Phaseolus vulgaris* L.) to land configurations and fertilizer levels during *kharif* season" was carried out.

### MATERIALS AND METHODS

The experiment was conducted during *kharif* season of 2005-2006 at the Agriculture College Farm, Marathwada Agricultural University, Parbhani. The topography of the experimental plot was fairly leveled. The soil was medium dark gray in colour and about 100 cm deep clayey loam in texture and moderately fertile being low in organic carbon (0.56 %), high in phosphorus (18.23kg.ha<sup>-1</sup>) and very high in potassium (365.76 kg.ha<sup>-1</sup>). The field experiment was laid out in Split Plot Design (SPD) with four replications. Each replication consisted of nine treatment combinations of three land configuration *i.e.* Sowing on flat bed (45 cm x 10 cm) and no opening of furrows, sowing on flat bed and opening of furrow after last interculture and sowing in paired row (30 + 60) x 10 cm and opening of furrow after last interculture and three fertilizer levels *i.e.* 100:50:50 kg NPK/ha, 120:60:60 kg NPK/ha and 140:70:70 kg NPK/ha. Land configurations were allocated to the main blocks randomly in each replication and fertilizer levels were allotted randomly in each block. The crop was fertilized as per

\* Author for correspondence. Present Address: <sup>1</sup>M.A.U. Sorghum Research Station, PARBHANI (M.S.) INDIA

<sup>1</sup>M.G.M. College of Agricultural Biotechnology, AURANGABAD (M.S.) INDIA

<sup>2</sup>Mahyco Seed Limited JACAM

<sup>3</sup>M.A.U. Agricultural Research Station, BADNAPUR (M.S.) INDIA

the treatments, the complete dose of phosphorus and potassium along with half dose of nitrogen as per treatment were placed 10 cm deep in line to the side of crop row while remaining half nitrogen dose was applied at 30 days after sowing. Variety Varun was selected for sowing and sowing of crop was done on 19.7.2005 by keeping 45 cm spacing between rows and 10 cm between plants. The harvesting of crop was done on 13.10.2005. All statistical analysis was performed using MAU, STAT statistical

package.

## RESULTS AND DISCUSSION

### *Effect of land configuration:*

The object of considering the aspect of land configuration was to study the effect of different land configurations on frenchbean with dual purpose *i.e.* if there is high rainfall, drainage of excess moisture will be

**Table 1 : Effect of land configurations and fertilizer levels on yield attributes and yield of frenchbean**

Treatments	Plant height(Cm)	Functional leaves	Leaf area(dm <sup>2</sup> )	Branches	Pod dry matter	Total dry matter
<b>Land configuration</b>						
L <sub>1</sub> – Sowing on flat bed and no opening of furrow	24.07	7.57	8.09	4.87	7.43	10.59
L <sub>2</sub> – Sowing on flat bed and opening of furrow after last interculture	23.93	7.44	7.95	4.83	7.18	10.09
L <sub>3</sub> – Sowing in paired row (30+60) x 10 cm and opening of furrow after last interculture	24.26	7.52	8.12	5.01	7.53	10.42
S.E. ±	0.15	0.04	0.06	0.11	0.11	0.08
C.D. (P=0.05)	NS	NS	NS	NS	0.18	0.23
<b>Fertilizer levels (kg NPK/ha)</b>						
F <sub>1</sub> – 100:50:50	23.06	6.97	7.78	4.52	7.06	9.78
F <sub>2</sub> – 120:60:60	24.57	7.74	8.00	5.14	7.43	10.47
F <sub>3</sub> – 140:70:70	24.65	7.81	8.38	5.28	7.64	10.81
S.E. ±	0.25	0.08	0.11	0.21	0.17	0.12
C.D. (P=0.05)	0.72	0.23	0.32	0.61	0.50	0.35
G. mean	24.09	7.51	8.05	4.94	7.38	10.36

Table 1 contd.....

Contd... Table 1

Treatments	No. of pods/plant	No. of seeds/pod	Seed yield/plant	100 seed weight (gm)	Pod yield (Kg/ha)	Seed yield (Kg/ha)	Straw yield (Kg/ha)	Shelling (%)
<b>Land configuration</b>								
L <sub>1</sub> – Sowing on flat bed and no opening of furrow	4.27	3.78	4.64	30.83	1224	813	984	66.39
L <sub>2</sub> – Sowing on flat bed and opening of furrow after last interculture	4.24	3.52	4.75	30.43	1191	799	955	67.13
L <sub>3</sub> – Sowing in paired row (30+60) x 10 cm and opening of furrow after last interculture	4.31	3.81	4.83	31.06	231	820	993	66.64
S.E. ±	0.04	0.10	0.08	0.22	18	11	14	--
C.D. (P=0.05)	NS	NS	NS	NS	NS	NS	NS	--
<b>Fertilizer levels (kg NPK/ha)</b>								
F <sub>1</sub> – 100:50:50	4.04	3.45	4.52	29.74	1179	776	936	65.89
F <sub>2</sub> – 120:60:60	4.35	3.71	4.77	31.06	1219	816	981	66.96
F <sub>3</sub> – 140:70:70	4.43	3.95	4.92	31.51	1248	839	1015	67.26
S.E. ±	0.08	0.13	0.11	0.27	22	17	19	--
C.D. (P=0.05)	0.23	0.38	0.32	0.80	63	50	54	--
G. mean	4.27	3.70	4.74	30.77	1215	811	977	66.71

NS-Non significant

achieved otherwise if there is low rainfall the furrows play important role in conservation of existing soil moisture. Opening of furrow also create better tilth condition with sufficient aeration. The land configurations viz. sowing on flat bed without opening of furrow, sowing on flat bed with opening of furrow after last interculture and sowing in paired row (30 + 60) x 10 cm with opening of furrow after last interculture did not influence the plant height, functional leaves, leaf area (dm<sup>2</sup>), branches, number of pods per plant, number of seeds per pod, seed yield per plant, 100 seed weight (g), pod yield (kg.ha<sup>-1</sup>), seed yield (kg.ha<sup>-1</sup>), straw yield (kg.ha<sup>-1</sup>) and shelling percentage significantly while sowing of french bean on flat bed without opening of furrow was found at par with sowing in paired row (30+60) x 10 cm with opening of furrow after last interculture with respect to pod dry matter (g) and total dry matter (g). These results are in conformity to those reported by Sepaskhah *et al.* (1976) and Shelke *et al.* (1998).

#### **Effect of fertility levels:**

French bean [*Phaseolus vulgaris* (L.)] has shown spectacular response to fertilizer level as it plays an important role in improving the growth and yield attributes and finally grains yield. Increases in growth attributes were seen with the application of higher doses of fertilizers. The application fertilizer level 140:70:70 NPK kg.ha<sup>-1</sup> and 120:60:60 NPK kg.ha<sup>-1</sup> were proved better over 100:50:50 NPK kg.ha<sup>-1</sup> in case of plant height, functional leaves, branches, total dry matter, number of pods per plant and 100 seed weight. Similar results were also observed by earlier research workers Singh and Verma (2002), Tewari and Singh (2000) and Farkade and Pawar (2002). Increase in number of pods per plant with higher fertilizer levels was due to favorable vegetative growth of crop and translocation of food material to the reproductive part, which also reflected towards increase in yield attributing characters. Similar favorable effects of nitrogen and phosphorus on number of pods and other yield attributes were reported by Singh and Singh (2000) and Saxena and Verma (1995). Seed yield is a function of yield attributes. Beneficial effect of fertilizer level was observed in case of seed yield (Table 1). Substantial increase in seed yield was observed with the application of higher level of fertilizers, F<sub>3</sub> (140:70:70 NPK kg/ha) and F<sub>2</sub>

(120:60:60 NPK kg/ha). Similar results were also reported by Vyas *et al.* (1996) and Singh *et al.* (1996).

## REFERENCES

- Farkade, B.K. and Pawar, W.S. (2002).** Growth performance and yield of frenchbean varieties as influenced by different fertilizer levels. *J. Soils and Crops*, **12** (1):142-144.
- Pathak N.S. and Khurana, A.B. (1993).** NOD gene regulators affecting nodulations in frenchbean [*Phaseolus vulgaris* (L.)]. *Legume Res.*, **16**(3):95-98.
- Saxena, K.K. and Verma, V.S. (1995).** Effect of nitrogen, phosphorus and potassium on the growth and yield of frenchbean [*Phaseolus vulgaris* (L.)]. *Indian J. Agron.*, **40**(2):249-252.
- Sepaskhah, A.R., Sichani, S.A. and Bahrani, B. (1976).** Subsurface and furrow irrigation evaluation for bean production. *Transaction of ASAE*, **19**(6):1092-1097.
- Shelke, D.K., Oza, S.R., Bainade, S.S., Narkhede, W.N. and Bhale, V.M. (1998).** On farm water management in vertisols. Opportunities and challenges. Seminar on sustainable crop production in Vertisols organized by ISA, Parbhani Chapter during Feb. 7-8 at MAU, Parbhani pp : 18.
- Singh, A.K. and Singh, S.S. (2000).** Effect of planting dates, nitrogen and phosphorus levels on yield contributing factors in french bean. *Legume Res.*, **23** (1):33-36.
- Singh, Kalyan, Singh, U.N., Singh, R.N. and Bohra, J.S. (1996).** Fertilizer and irrigation studies on yield economy and NPK uptake of frenchbean [*Phaseolus vulgaris* (L.)]. *Ferti. News*, **41**(5) : 39-42.
- Singh, N.B. and Verma, K.K. (2002).** Nitrogen and phosphorus nutrition of french bean [*Phaseolus vulgaris* (L.)] grown in Eastern Uttar Pradesh under late sown condition. *Indian J. Agron.*, **47**(1):89-93.
- Tewari, J.K. and Singh, S.S. (2000).** Effect of nitrogen and phosphorus on growth and seed yield of frenchbean [*Phaseolus vulgaris* (L.)]. *Veg. Sci.*, **27**(2):172-175.
- Vyas, J.S., Autkar, K.S. and Wanjari, K.B. (1996).** Response of french bean to N and P fertilization. Strategies for increasing pulse production. Seminar held at Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, March 7-8, pp :30.

---

Received : October, 2008; Accepted : December, 2008