

Evaluation of new field pea (*Pisum sativum*) genotypes in relation to plant density

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Received: March 1993

ABSTRACT

A field study carried out at Hisar during the winter seasons of 1989-90 and 1990-91 showed that 'Aparna' and 'HFP 8712', being at par with 'DMR 4' and 'KPFD 1' field pea (*Pisum sativum* L. sensu lato), gave significantly more yield than 'HFP 8710' and 'Pant P 9'. The 'Pant P 9' pea was found significantly poor yielder. Genotypes also varied significantly in yield attributes, i.e. pods/plant, 100-seed weight and plant height. 'HFP 8712' performed better (31.77 q/ha) with 500,000 plants/ha in 20 cm × 10 cm plant geometry and 'DMR 4' responded 330,000 plants/ha only with 30 cm × 10 cm geometry.

Productivity of traditional tall varieties of pea (*Pisum sativum* L. sensu lato) is low because of their extensive vegetative growth and thick canopy. Recently, certain dwarf, compact and disease-resistant varieties have been developed in this crop. These dwarf-stature varieties with a yield potential of 35-40 q/ha may respond to higher plant density compared with tall ones. Therefore, a field study was carried out to evaluate dwarf and tall-stature genotypes of field pea at different plant densities under Haryana conditions.

MATERIALS AND METHODS

A field experiment with 6 pea genotypes ('Aparna', 'DMR 4', 'KPFD 1', 'HFP 8710', 'HFP 8712' and 'Pant P 9') under 2 plant densities (330,000 and 500,000 plants/ha) was conducted in during the winter (*rabi*) seasons of 1989-90 and 1990-91 at Hisar. The experiment was laid out in randomized block design with 3 replications. The soil of experimental plot was sandy loam with pH

8.4, containing 130, 14 and 421 kg available nitrogen, phosphorus and potassium respectively. A basal dose of 25 kg N and 60 kg P₂O₅/ha was drilled in furrows at the time of sowing. The seed @ 100 kg/ha was sown on 10 and 16 November in 1989 and 1990 respectively. Extra plants were thinned to maintain a plant spacing of 10 cm and to get required plant densities in 30 cm × 10 and 20 cm × 10 cm planting geometry respectively. The total rainfall received during the crop-growth period was 61.4 and 73.3 mm in 1989-90 and 1990-91 respectively. One post-sowing irrigation at pre-flowering stage of crop was applied in both the years.

RESULTS AND DISCUSSION

Genotype

'Aparna' and 'HFP 8712', being at par with 'KPFD 1' and 'DMR 4', gave significantly higher yield than 'HFP 8710' and 'Pant P 9' during 1989-90, whereas 'Aparna' yielded at par with 'HFP 8712' and 'DMR 4' but significantly more than 'KPFD

Table 1. Yield and attributes of pea genotypes under different plant densities

Treatment	Grain yield (q/ha)		Pods/plant		Grains/pod		100-seed weight (g)		Plant height (cm)	
	1989- 90	1990- 91	1989- 90	1990- 91	1989- 90	1990- 91	1989- 90	1990- 91	1989- 90	1990- 91
<i>Genotype</i>										
'KPPD 1'	31.9	26.6	19.6	15.8	3.2	3.3	22.8	20.2	62.8	51.2
'HFP 8710'	30.8	25.8	19.1	15.5	3.9	3.6	20.8	16.7	77.9	61.6
'HFP 8712'	34.8	28.7	22.1	24.9	3.4	3.5	20.2	17.0	74.8	71.0
'Pant P9'	18.6	19.0	17.3	13.7	3.2	3.7	20.4	21.0	191.5	157.2
'Aparna'	35.0	29.5	28.9	25.2	3.6	3.7	22.2	18.5	57.8	53.6
'DMR 4'	32.5	27.4	22.2	19.8	3.7	3.4	17.8	16.6	176.6	148.1
CD (P = 0.05)	3.7	2.7	4.6	2.9	NS	NS	1.5	1.7	35.6	8.4
<i>Plant density (plants/ha)</i>										
330,000	31.2	26.7	20.4	19.8	3.4	3.6	20.6	18.3	107.7	89.5
500,000	30.0	25.7	22.6	18.5	3.6	3.4	20.8	18.3	106.1	91.4
CD (P = 0.05)	NS	NS	NS	NS	NS	0.2	NS	NS	NS	NS

Table 2. Interaction between genotypes and plant density for grain yield (q/ha) during 1990-91

Plant density (plants/ha)	'KPF 1'	'HFP 8710'	'HFP 8712'	'Pant P 9'	'Aparna'	'DMR 4'
330,000	27.47	23.95	25.74	18.70	28.99	29.44
500,000	25.77	27.77	31.77	19.43	30.10	25.44
CD (P = 0.05)		3.91				

1', 'HFP 8710' and 'Pant P 9' during 1990-91. Genotype 'HF 8712' proved to be second best in yield. Averaged over years, 'Aparna' gave 1.47, 7.67, 10.2, 13.82 and 71.2 % more yield than 'HFP 8712', 'DMR 4', 'KPF 1', 'HFP 8710' and 'Pant P 9' respectively. Genotype 'Pant P 9' was significantly poor yielder. Singh *et al.* (1991) also reported higher yield of 'Aparna' over other varieties. Higher seed yield of 'Aparna' was attributed to significantly more pods/plant in this variety than all the others except 'HFP 8712' during 1990-91 only (Table 1).

'KPF 1', being at par with 'Aparna', produced significantly bolder seeds than all the other genotypes during 1989-90, whereas 'Pant P 9' proved its superiority in seed size over all the other varieties except 'KPF 1' during 1990-91. 'Pant P 9' and 'DMR 4' produced significantly taller plants than rest of the genotypes (Table 1).

Plant density

Plant density did not influence the seed

yield and yield attributes in any of the years except grains/pod during 1990-91, where dense canopy (500,000/ha) produced significantly more grains/pod. Variety $\times$ density interaction was significant during 1990-91 only. Genotype 'HFP 8712' performed better (31.77 q/ha) with 500,000 plant density/ha in 20 cm $\times$ 10 cm plant geometry and 'DMR 4' responded to 330,000 plants (29.44 q/ha) only under a planting spacing of 30 cm $\times$ 10 cm (Table 2). More moisture through the rains in this year might have resulted in differential response of genotypes to plant population.

REFERENCES

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