

Response of sesame (*Sesamum indicum*) to plant population and nitrogen under irrigated condition

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ABSTRACT

A field study was conducted during summer 1996 and 1997 to study the response of pre released sesame (*Sesamum indicum*) cultivar VS 9104 and ruling variety VRI 1 to plant population (111,000 and 166,000 plants/ha) and N (0, 35, 45 and 55 kg/ha) under irrigated condition. The pre release culture VS 9104 recorded higher number of branches, capsules, dry matter/plant, 1,000-seed weight and higher yield than the variety VRI 1. A favourable increase in yield parameters was observed with a plant population of 111,000 plants/ha. However, the plant population of 166,000 plants/ha recorded significantly higher seed yield. Increasing N levels up to 55 kg/ha resulted in markedly higher yield and yield attributes.

Key words: Sesame, Plant population, Nitrogen

In the north eastern zone of Tamil Nadu, sesame (*Sesamum indicum* L.) is an established oilseed crop raised under irrigated conditions during summer (February-May). However, the yield is low mainly due to poor plant density and lack of optimum fertilizer application. Plant spacing and fertilizer play a major role in influencing the yield of latest sesame varieties having more number of branches, capsule, and hence the seed yield. (Gnanamurthy *et al.*, 1992). The present investigation was, therefore, carried out to study the effect of plant population and nitrogen on growth and yield of sesame to determine the optimum spacing and N requirement.

MATERIALS AND METHODS

A field experiment on sesame was con-

ducted at Regional Research Station, Vridhachalam during summer 1996 and 1997. The trial was laid out in split plot design with three replications. Two varieties (VS 9104 and VRI 1) and 2 plant populations of 111,000 plants/ha (30 × 30 cm) and 166,000 plants/ha (30 × 20 cm) were assigned to main plots and 4 N levels (0, 35, 54, 55 kg/ha) to sub-plots. Soil was red sandy loam low in available N (180 kg/ha), medium in P_2O_5 (7.4 kg/ha) and K_2O (108 kg/ha) with pH 7.2. A basal dose of 25 kg each of P_2O_5 and K_2O was applied to all the treatments.

RESULTS AND DISCUSSION

Performance of varieties

VS 9104 recorded taller plants, more branches, dry matter production, number of

Table 1. Effect of plant population and N on growth attributes of sesame

Treatment	Plant height (cm)		Branches/ plant		Dry matter production (g/plant)	
	1995	1996	1995	1996	1995	1996
<i>Variety</i>						
VS 9104	120.0	119.0	5.15	5.20	30.10	32.06
VRI 1	102.0	105.0	4.78	4.80	28.60	29.46
CD (P = 0.05)	2.9	2.8	0.22	0.28	1.15	1.18
<i>Plant population (plants/ha)</i>						
111,000	114.0	116.0	5.91	5.40	33.48	33.70
166,000	108.0	108.0	5.21	4.60	27.83	27.82
CD (P = 0.05)	3.8	3.7	0.46	0.49	1.31	1.33
<i>N (kg/ha)</i>						
0	98.0	100.0	4.10	4.00	22.30	22.37
35	111.0	112.0	4.70	4.80	29.91	29.51
45	116.0	116.0	5.00	5.10	32.42	33.12
55	120.0	121.0	5.50	5.60	37.98	38.04
CD (P = 0.05)	3.7	3.8	0.49	0.45	1.32	1.34

capsules on the main stem and branches, 1,000 seed weight and seed yield/plant. As a result, cultivar VS 9104 recorded significantly higher seed yield than VRI 1.

Effect of plant density

Lower population of 111,000 plants/ha registered taller plant height and produced more branches, capsules and dry matter production owing to relatively lesser inter plant competition for space, light, nutrients, moisture, etc. Similar results were also reported in sesame by Majumdar and Roy (1992).

Although a favourable effect of lower plant density on growth and yield attributes of individual plants was observed, the seed yield/ha did not improve mainly because of the lower number of plants/ha. These results confirm the findings of Narayan and Narayanan (1987). The seed yield with

higher plant population of 166,000 plants/ha was significantly higher than that of 111,000 plants/ha. The results clearly indicate that for sesamum, 30 x 30 cm (111,000 plants/ha) was a wider spacing affecting adversely the yield. Chimanshette and Dhoble (1992) recorded higher seed yield at a plant density of 222,000 plants/ha than 111,000 plants/ha.

Effect of nitrogen

Each successive increase in dose of N up to 55 kg/ha significantly increased plant height, branches/plant, dry matter production, total number of capsules/plant and 1,000 seed weight (Tables 1 and 2). Higher dose of N enhanced the vegetative growth and development of yield attributes as indicated by higher dry matter production and more number of branches and capsules/plant. These observations are in line with

Table 2. Effect of plant population and N on yield attributes and yield of sesame

Treatment	Number of capsules per plant						1,000 seed weight (g)		Seed yield (kg/ha)	
	1995			1996			1995	1996	1995	1996
	Main stem	Bran-ches	Total	Main stem	Bran-ches	Total				
<i>Variety</i>										
VS 9104	34.0	58.0	92.0	35.0	60.0	95.0	3.04	3.04	842	822
VR11	27.0	60.0	27.0	26.0	61.0	87.0	2.91	2.91	798	786
CD (P = 0.05)	3.4	5.1	5.8	3.4	4.9	5.6	0.06	0.06	32.1	31.8
<i>Plant population (plants/ha)</i>										
111.000	26.0	85.0	111.0	28.0	85.0	113.0	2.98	2.97	786	775
166.000	32.0	66.0	98.0	31.0	67.0	98.0	2.97	2.97	848	833
CD (P = 0.05)	3.9	5.8	8.1	3.8	5.8	8.0	NS	NS	35.6	34.7
<i>N (kg/ha)</i>										
0	20.0	40.0	60.0	18.0	40.0	58.0	2.95	2.93	477	476
35	26.0	48.0	74.0	28.0	49.0	77.0	2.97	2.97	871	852
45	30.0	54.0	84.0	31.0	56.0	87.0	2.98	2.97	923	909
55	34.0	63.0	97.0	34.0	64.0	98.0	2.98	2.98	997	979
CD (P = 0.05)	3.3	6.8	8.8	2.9	6.5	8.6	NS	NS	28.7	27.2

Prakasha and Thimme Gowda (1992) who reported higher values of yield attributes with 60 kg N/ha in sesame.

Application of 55 kg N/ha recorded significantly higher seed yield over lower levels of N. Proportionate to the favourable increase in yield attributes, the maximum yield was obtained with the highest dose of N. These findings are in accordance with those of Balasubramanian *et al.* (1995).

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