

Effect of plant population, nitrogen and phosphorus on grain amaranth (*Amaranthus* species)

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A field experiment was conducted at Watershed Management Research Unit, Akola, during rainy season (*kharif*) 1991, to study the effect of plant population, nitrogen and phosphorus fertilization on growth and yield of grain amaranth (*Amaranthus* sp.). The experiment consisting of 27 treatments was laid out in 3 partially confounded

design with 2 replications, taking 3 levels each of plant population (111,000; 148,000 and 222,000 plants/ha), nitrogen (0, 25 and 50 kg/ha) and phosphorus (0, 20 and 40 kg/ha). The soil was silty loam in texture with pH 8.3, low in total N (0.0612), medium available P_2O_5 (16.80 kg/ha) and high in K_2O (309.9 kg/ha). The 'Local' variety of

Table 1. Growth, yield attributes and yield of amaranth as influenced by different treatments

Treatment	Plant height at 60 days* (cm)	Dry matter/ plant (g)	Leaf area/plant (cm ²)	Panicle length (cm)	Grain yield/ plant (g)	Grain yield (kg/ha)	Stalk yield (q/ha)	Straw yield (kg/ha)
<i>Plant population/ha</i>								
111,000	49.8	32.5	41.76	29.80	40.58	465.60	416.10	627.10
148,000	53.2	31.4	43.19	28.59	37.22	470.16	532.70	666.55
222,000	51.7	26.8	44.47	29.20	36.05	553.46	541.60	628.60
CD (P = 0.05)	NS	3.78	NS	NS	NS	55.60	89.05	NS
<i>N (kg/ha)</i>								
0	48.8	27.7	37.22	30.70	36.44	481.81	452.20	540.16
25	58.5	31.8	42.26	28.90	38.25	548.32	578.30	678.50
50	53.3	30.9	49.94	28.00	39.16	461.59	520.00	653.29
CD (P = 0.05)	NS	3.78	6.35	NS	NS	55.60	NS	NS
<i>P₂O₅ (kg/ha)</i>								
0	47.9	29.24	48.82	29.30	35.88	470.68	416.60	617.74
20	52.2	32.43	41.56	27.60	38.39	495.89	526.10	627.57
40	84.5	28.68	39.04	30.70	39.58	525.15	547.70	676.95
CD (P = 0.05)	4.55	NS	6.35	NS	NS	NS	89.05	NS
Interaction		NS	NS	NS	NS	NS	NS	NS

amaranth for sowing was undertaken by keeping row spacing of 45 cm.

The plant height and dry-matter accumulation of amaranth increased significantly with lower plant population (Table 1). This may probably be because of more space and adequate supply of air, water and nutrients. Similar results were recorded by Weber *et al.* (1989). The leaf area/plant, length of panicle and grain yield/plant were not significantly influenced by varying plant population. The grain yield/ha increased with an increase in plant population and highest plant population of 222,000 plants/ha recorded significantly higher yield than other population levels. The stalk yield recorded with 222,000 and 148,000 plants/ha was significantly higher than yield of 111,000 plants/ha.

Application of N @ 25 kg/ha increased plant height and dry matter/plant. Improvement of growth parameters with nitrogen application was also recorded and Weber *et al.* (1989). The N levels did not influence the length of panicle significantly. Nitrogen @ 25 kg/ha recorded significantly higher yield than the control as well as 50 kg N/ha. Similar results also reported by Alejandre and Gomez (1981). The differences in stalk

and straw yields were not significant mainly because of increased lodging. Similar results reported by Alejandre and Gomez (1981).

Plant growth in terms of plant height was significantly improved with application of phosphorus @ 20 kg/ha. Dry matter was not consistently and significantly influenced by different P levels. Leaf area decreased with application of P. The length of panicle, and grain yield/plant were not significant due to P levels. Grain and straw yields/ha increased with an increase in P. However, the differences were not significant. Alejandre and Gomez (1981) also reported similar results.

Thus plant population of 222,000 plants/ha (45 cm x 10 cm) may be maintained with application of 25 kg N/ha and 20 kg P₂O₅/ha to achieve higher grain and stalk yields.

REFERENCES

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