

Response of sorghum (*Sorghum bicolor*) to nitrogen and phosphate under western Rajasthan condition

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A field trial was conducted during the rainy seasons of 1986 and 1988 at Sumerpur, to study the effect of different levels of N and P_2O_5 on 'SPV 96' rainfed sorghum [*Sorghum bicolor* (L.) Moench]. Soil of the experimental site was sandy loam having total N 168 kg/ha, available P_2O_5 31 kg/ha and K_2O 280 kg/ha. Treatments comprised 3 levels each of N (0, 40 and 80 kg/ha) and P_2O_5 (0, 20 and 40 kg/ha) replicated thrice in factorial randomized block design. The crop was sown with 45 cm row-to-row and 15 cm plant-to-plant spacings. Half N and full dose of P_2O_5 as per treatment were applied at sowing. Remaining N was top-dressed at active-tillering stage. The total rainfall received during the crop-growth period were 445 mm in 1986 and 451 mm in 1988.

Sorghum responded to N and P_2O_5 significantly (Table 1). Application of 80 kg N/ha resulted in highest mean grain yield of 13.18 q/ha, which was 57.84 and 18.20% higher over no N and 40 kg N/ha respectively. Leaf-area index and seed index also increased significantly with N up to 80 kg/ha. However, tillers/plant responded up to 40 kg N/ha only. Mahale and Seth (1989), Patel *et al.* (1990) and Solankey *et al.* (1990) also reported significant response of sorghum to N. Phosphorus applied @ 40 kg/ha recorded significantly higher leaf-area

Table 1. Leaf-area index (LAI), yield attributes and seed yield of sorghum as influenced by nitrogen and phosphorus (pooled over 2 seasons)

Treatment	LAI	Seed index (g)	Productive tillers/plant	Seed yield (q/ha)
<i>N (kg/ha)</i>				
0	2.23	18.34	1.20	8.35
40	2.59	19.48	1.37	11.15
80	2.97	21.68	1.51	13.18
CD (P=0.05%)	0.10	1.96	0.18	1.68
CV (%)	4.12	9.90	8.12	10.12
<i>P₂O₅ (kg/ha)</i>				
0	2.51	19.36	1.40	9.92
20	2.58	19.74	1.51	10.27
40	2.70	20.41	1.57	12.49
CD (P=0.05)	0.10	NS	0.18	1.68
CV (%)	4.12	9.90	8.12	10.12

index and seed yield over rest of lower levels. Mean increase in seed yield with 40 kg P_2O_5 /ha was 21.61 and 25.90% over 20 kg P_2O_5 /ha and the control respectively. Seed index showed no response to P_2O_5 application. Solankey *et al.* (1990) reported maximum yield of rainfed sorghum at 60 kg P_2O_5 /ha. A consistent increase in leaf-area index and yield attributes with increasing levels of N and P_2O_5 might be responsible

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for higher yield.

The economic level of N and P_2O_5 on the basis of response functions were 74 and 33 kg/ha respectively. The respective estimated yields achieved at these levels were 12.80 and 11.60 q/ha. Interaction effect of N and P_2O_5 were non-significant.

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Effect of irrigation water quality on the yield of pearl millet (*Pennisetum glaucum*)

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Most of the subsoil waters (55-60%), especially in Western and Southern parts of Haryana, are brackish with poor quality. Use of sodic water for life-saving irrigation of crop is the common practice in pearl millet [*Pennisetum glaucum* (L.) R. Br. emend. Stuntz] with variable success of crop during drought years. Manchanda *et al.* (1988) studied the effects of sodic water on pearl millet and advocated technology for safer use. Information on relative detrimental effects of sodic and saline irrigation water on grain yield of pearl millet under similar soil and agronomic management is limited.

Therefore, a field experiment was taken up on farmer's field to study differential effects of sodic and saline irrigation water.

Two crop demonstrations were laid on farmers' fields during the rainy season 1989 in Sarmathala village, in Gurgaon district under Agro-technology Transfer Programme. The demonstration sites represented Karna soil series in Mewat Region. Physico-chemical properties of soil are presented in Table 1. Soil samples (surface) were collected from 2 experimental sites, analysed for pH, electrical conductivity and organic carbon and the

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