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Performance of sorghum (*Sorghum bicolor*) varieties on a partially reclaimed sodic soil under different levels of nitrogen

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Sorghum [*Sorghum bicolor* (L.) Moench] is an important crop in Nimar tract of Madhya Pradesh. The newly evolved varieties possess 80–90% yield potential of hybrids, similar to hybrids in maturity and hence hold great promise. These new genotypes have been found to be tolerant to the sodic soil conditions to some extent up to exchangeable sodium of 30%. Hence a field experiment was conducted on a partially reclaimed sodic clay soil at the Soil Salinity Research Station, Barwaha (Madhya Pradesh) during rainy season *(kharif)* 1988 and 1989. The pH, ESP, ECe and CEC of the soil was 8.7, 25, 2.0 dS/m and 48 ceq/kg respectively. Treatments included 16 combinations of 4 varieties of sorghum ('SPV 346', 'SPV 351', 'SPV 462' and 'SPV 475') and 4 levels of nitrogen [0, 30, 60 and 90 kg/ha (one-third basal + one-third at 30 days after sowing + one-third at 45 days after sowing)]. A randomized block design with 4 replications was adopted. The crop was planted on 1 side of the ridges, spaced at 45 cm. A basal application of 40 kg P_2O_5 + 40 kg K_2O + 20 kg $ZnSO_4$/ha was given as band placement. The thinning was done at 15 days to maintain intra-row spacing of 15 cm.

Increasing levels of nitrogen application significantly increased the average plant height, grain yield/plant and grain yield/ha. The highest yield (1,085 kg/ha) was realized with 90 kg N/ha, while it was lowest (464 kg/ha) under no nitrogen application. Similarly, the maximum test weight was also was higher at 60 kg N/ha and 90 kg N/ha. In general, application of increased N doses hastened the maturity, but it was significant only at 90 kg N/ha compared with the control. As regard the varieties there were no apparent differences in plant height. 'SPV 346' and 'SPV 462' were found identical in maturity (126 to 128 days) but earlier than 'SPV 475' (132 days), while 'SPV 351' was at par with 'SPV 346'. Varieties recorded significant differences in test weight; 'SPV 346' recorded the highest test weight followed by 'SPV 351' and 'SPV 462'. 'SPV 351' and 'SPV 462' were at par, while 'SPV 475' had the lowest test weight. The yield/plant of 'SPV 346' and 'SPV 351' was almost equal but significantly higher than that of 'SPV 462' and 'SPV 475', which were identical in test weight (Table 1).

The varieties 'SPV 346' and 'SPV 462' recorded almost equal grain yield (890 kg/ha) but significantly higher than 'SPV 351' and 'SPV 475'. The latter 2 were at par in yield. It clearly indicated that the varieties with higher test weight gave the higher yield/ha. The stover yields differed significantly and 'SPV 346' gave the highest sto-

Table 1. Effect of levels of nitrogen on the growth and yield of sorghum varieties on sodic clay soil

Treatment	Plant height (cm)	Maturity (days)	Test weight (g)	Yield/ plant (g)	Yield (kg/ha)	Stover yield (kg/ha)
N (kg/ha)						
0	133.8	130	26.81	13.14	464	4,188
30	151.6	129	27.38	16.14	659	5,851
60	162.0	128	29.00	21.64	866	7,421
90	179.2	127	28.88	24.05	1,085	7,266
CD (P = 0.05)	9.67	2.6	1.33	1.80	924	347
Variety						
'SPV 346'	154.0	128	30.60	19.95	890	7,465
'SPV 351'	159.3	129	28.13	20.86	692	6,489
'SPV 462'	152.4	126	27.69	17.44	890	7,023
'SPV 475'	158.9	132	25.69	16.71	665	5,751
CD (P = 0.05)	NS	2.6	1.33	1.80	924	347

ver yield, followed by 'SPV 462', 'SPV 351' and 'SPV 475'. The interaction effect between the varieties and the nitrogen levels was not significant.

The yield levels were quite low in this season because the crop suffered due to the moisture-stress conditions during the grain-filling stage associated with the early cessation of rains in first week of September and a higher evaporative demand in September-October (8.0 mm/day), while the rainfall was only 700 mm during this rainy season in the semi-arid tropical condition of Nimar, prevailing at Barwaha.

It was concluded that varieties 'SPV 346' and 'SPV 462' have great potential on the sodic soil and these require application of 90 kg N/ha for higher yields.