

RESPONSE OF SORGHUM VARIETIES TO TIME OF SOWING AND FERTILIZER LEVELS

P. SUBBLIAN, K. SIDDESWARN, G.S. THANGAMUTHU
and C. UDAYASOORIAN *

ABSTRACT

Field experiments were conducted at TNAU, Coimbatore to study the response of sorghum varieties to time of sowing and NPK levels during 1985-88. The results showed that early sowings were better than delayed sowings during both kharif and summer seasons. Application of 180-90-90 kg NPK ha⁻¹ recorded significantly higher grain yield than the other levels. Among the varieties, Co.25 performed better than others.

Selection of proper variety, optimum time of sowing and adequate supply of nutrients are the important factors which contribute to higher crop yields. Sorghum cultivars differ in their response to levels of fertilizer application under different agro-climatic conditions. Sidhu and Gill (1987) and Premsekar and Iruthayaraj (1981) reported that early season sowing was better than delayed sowing in sorghum. Sorghum responded well to NPK application (Gomes et al., 1986) and yield response was noticed up to 200 kg N ha⁻¹ (Singh et al., 1986). In the present study an attempt was made to evaluate different sorghum varieties and pre-release cultures to time of sowing under varying NPK levels in the western agro-climatic zone of Tamil Nadu.

MATERIALS AND METHODS

Field experiments were conducted at Tamil Nadu Agricultural University, Coimbatore during Kharif 1986 and 1987 and Summer 1985, 1987 and 1988 to study the response of sorghum varieties to time of sowing (early and delayed sowings), levels of NPK (0-0-0, 60-30-30, 120-60-60 and 180-90-90 kg ha⁻¹, and varieties (two popular varieties and two pre-release cultures), which were allotted to main, sub and sub-sub plots respectively. The varieties of sorghum tested were Co.25 (all the seasons), Co.24 (summer '85 and kharif '86) and Co.26 (summer and

kharif '87 and Summer '88). The pre-release cultures evaluated were TNS 30 (all the five seasons), TNS 24 (Summer '85), TNS 33 (Kharif '86), TNS 32 (Summer and kharif '87) and TNS 40 (Summer '88). The experiment was conducted in a split plot design replicated thrice. The soil of the experimental field was low in available N (168 kg N ha⁻¹) medium in available P (14.3 kg P ha⁻¹), and high in available K (540 kg K ha⁻¹). Nitrogen was applied in two equal splits at sowing and 30 days after sowing, while the entire quantity of P and K was applied basally. Cultural and plant protection measures were followed as per the recommendations.

RESULTS AND DISCUSSION

The results of the study are presented in Tables 1 and 2. Early sowing of sorghum recorded higher grain as well as straw yields in both summer and kharif seasons and was found better than delayed sowing. Sowing of sorghum by the end of February was found optimum for summer season whereas sowing by early June was preferable during kharif season. Higher grain yield of sorghum by going for early seasonal sowing is also reported by Nadanam and Palaniappan (1981). In this study, the increased grain yield at early sowings could be primarily attributed to the higher earhead weight in both the seasons. The test grain weight

* Dept. of Agronomy, TNAU, Coimbatore.

Table 1. Response of sorghum varieties to time of sowing and NPK levels

Treatments	Summer 1985				Kharif 1986				
	Earhead weight (g)	1000 grain weight (g)	Grain yield (kg/ha)	Straw yield (kg/ha)	Treatments	Earhead weight (g)	1000 grain weight (g)	Grain yield (kg/ha)	Straw yield (kg/ha)
Time of Sowing					Time of Sowing				
D1 28.2.85	101.4	23.55	4117	8993	D1 11.6.86	50.55	21.56	1947	7583
D2 13.3.85	91.2	21.55	3451	8510	D2 26.6.86	46.00	46.00	1360	6489
SE	1.7	0.62	65	142	SE	0.92	0.92	56	218
CD (P=0.05)	5.3	N.S	207	452	CD (P=0.05)	2.94	2.94	177	689
Varieties					Varieties				
V1 Co. 25	133.0	23.52	4318	11500	V1 Co. 25	50.50	21.32	1788	7244
V2 Co. 24	95.8	22.80	3624	7653	V2 Co. 24	49.27	20.86	1619	6165
V3 TNS. 24	92.2	22.57	3696	8751	V3 TNS. 30	49.41	20.75	1698	6878
SE	71.3	21.72	3498	7108	V4 TNS. 33	47.92	20.71	1511	7042
CD (P=0.05)	2.4	0.70	94	301	SE	0.83	0.49	24	254
	4.2	1.41	188	603	CD (P=0.05)	1.66	NS	48	509
NPK levels (kg/ha)					NPK levels (kg/ha)				
F0 0-0-0	73.8	21.54	2225	7305	F0 0-0-0	42.86	20.37	1009	6516
F1 60-30-30	96.7	22.89	3655	8774	F1 60-30-30	48.10	20.85	1545	7085
F2 120-60-60	108.3	23.03	4452	9235	F2 120-60-60	50.45	21.11	1704	7200
F3 180-90-90	113.5	23.13	4775	9698	F3 180-90-90	51.68	21.30	2158	7343
SE	4.8	0.77	100	324	SE	1.09	0.56	37	283
CD (P=0.05)	10.0	N.S.	209	677	CD (P=0.05)	2.29	N.S	78	597
Summer 1987									
Time of Sowing					Time of Sowing				
D1 1.3.87	70.60	22.93	3818	8100					
D2 16.3.87	61.24	20.85	3375	7375					
SE	1.30	0.45	59	138					
CD (P=0.05)	4.11	N.S	187	436					
Varieties					Varieties				
V1 Co. 25	70.91	22.38	4120	8010					
V2 Co. 26	59.83	21.91	3535	7241					
V3 TNS 30	79.70	21.66	3472	7928					
V4 TNS 32	61.24	21.61	3261	7768					
SE	1.72	0.54	72	105					
CD (P=0.05)	3.56	N.S	145	330					
NPK levels (kg/ha)					NPK levels (kg/ha)				
F0 0-0-0	62.44	21.40	2592	7024					
F1 60-30-30	65.20	21.73	3480	7653					
F2 120-60-60	67.71	22.07	3944	7889					
F3 180-90-90	68.93	22.37	4375	8383					
SE	1.84	0.66	85	194					
CD (P=0.05)	3.80	N.S	179	409					

though recorded higher values with early sowings, the differences were not statistically significant during all the seasons. The crop sown during late June was affected by the rains received during September, October resulting in lower yields.

Sorghum responded well to NPK application. Application of 180-90-90 kg NPK

ha⁻¹ recorded significantly higher yields in both the seasons followed by 120-60-60 kg NPK ha⁻¹. Higher levels of NPK application improved the earhead weight whereas the test weight was not affected by the fertilizer levels.

Sorghum variety Co.25 performed better than all other varieties tested in both summer

Table 2. Response of sorghum varieties to time of sowing and N P K levels

Treatment	Kharif1987				Treatment	Summer 1989			
	Earhead weight (g)	1000 grain weight (g)	Grain yield (kg/ha)	Straw yield (kg/ha)		Earhead weight (g)	1000 grain weight (g)	Grain yield (kg/ha)	Straw yield (kg/ha)
Time of Sowing:					Time of Sowing:				
D ₁ 2.6.87	55.72	22.26	2018	6114	D ₁	12.2.88	78.42	21.38	3874
D ₂ 17.6.87	46.55	20.66	1483	5491	D ₂ 26.2.88	51.63	19.34	2742	6438
SE	1.20	0.42	42	94	SE	1.31	0.51	53	128
CD (p=0.05)	3.84	1.34	133	297	CD (p=0.05)	4.23	1.63	169	410
Varieties					Varieties				
V ₁ Co.25	53.65	21.89	1926	6028	V ₁ Co.25	71.94	20.92	3544	6518
V ₂ Co.26	51.40	21.52	1747	5675	V ₂ Co.26	61.72	20.06	3194	6482
V ₃ TNS 30	48.71	21.25	1642	5900	V ₃ TNS 30	61.90	20.10	3186	5957
V ₄ TNS 32	50.78	21.18	1686	5587	V ₄ TNS 40*	-	-	-	10361
SE	1.45	0.59	69	127	SE	1.80	0.55	85	288
CD (p=0.05)	2.90	N.S	139	254	CD (p=0.05)	3.61	N.S	171	276
NPK levels (kg/ha)					NPK levels (kg/ha)				
F ₀ 0-0-0	45.93	20.96	1314	5296	F ₀ 0-0-0	57.13	19.94	2772	5883
F ₁ 60-30-30	50.82	21.43	1682	5792	F ₁ 60-30-30	62.81	20.24	3187	6864
F ₂ 120-50-60	53.06	21.60	1926	5889	F ₂ 120-60-60	67.64	20.52	3460	7963
F ₃ 180-90-90	54.73	21.85	2081	6233	F ₃ 180-90-90	72.46	20.75	3811	8612
SE	1.80	0.67	80	158	SE	2.33	0.63	94	305
CD(p=0.05)	3.78	N.S	169	333	CD (p=0.05)	4.80	N.S	197	638

* Did not flower

and kharif seasons. Among the pre-release cultures tried, TNS 30 was found to be promising with comparable yields to that of

varieties Co.24 and Co.26. Higher earhead weight and better test weight contributed to the higher grain yield in the variety Co.25.

REFERENCES

- GOMASE, B.P., DHAWASE M.R. and PATIL B.M., 1986. Response of high yielding varieties of sorghum under varying levels of fertility and plant density. PKV Res. J. 10: 110-114.
- NADANAM, M. and PALANIAPPAN SP., 1981. Studies on the effect of season, plant population, geometry of planting and nitrogen levels of sorghum. Sorghum Newsl. 24: 37.
- PREMSEKAR, M. and IRUTHAYARAJ M.R., 1981. Effect of irrigation regimes and mulches on growth, yield and water use in sorghum Co.23. Sorghum Newsl. 24 : 39-40.
- SIDHU, M.S. and GILL G.S. , 1987. Effect of sowing dates, spacings and seed rates on seed yield of sorghum. J. R.S. Punjab agric. Univ. 24: 555-562.
- SINGH, M., SINGH T. and SINGH H., 1986. Studies on plant geometry and nitrogen fertilization on hybrid Sorghum. Indian J. Agron. 31 : 33-36