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STUDY ON RESPONSE OF SORGHUM GENOTYPES TO LEVELS OF NITROGEN

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ABSTRACT

An experiment was conducted for two consecutive years at Rajasthan College of Agriculture, Udaipur in Kharif, 1984 and 1985. The experimental results showed that the highest grain yield was obtained from hybrid CSH -9 (38.3 q/ha) which was significantly higher than those from all the cultivars tried including national check CSH -5. Due to taller growth habit SPH - 196 gave the maximum stover yield (117.7 q/ha) followed by CSH - 9 (90.6 q/ha). Among the varieties SPV - 346 was found best in respect of grain yield as well as fodder production. Highest net monetary return was obtained from CSH - 9 (Rs. 3611/ha) Of the two levels of nitrogen 50 and 100 kg N/ha applied in two splits (half at the time of sowing and rest at about 35 days after sowing), 100 Kg N/ha was found optimum, giving a yield of (34.9 q/ha) Per cent increases in grain yield over control and 50 kg N/ha were 38 and 18, respectively. Highest monetary return was obtained from 100 Kg N/ha (Rs. 2859/ha) which was higher by Rs. 770 and 425/- than control and 50 kg N/ha, respectively.

KEY WORDS : N Levels, Sorghum

INTRODUCTION

Rajasthan is one of the main sorghum producing states of India ranking 5th in total cultivated area (16.1 million ha) and 8th in production in India. Hybrid CSH-5 was released in 1974 for general cultivation which gave more yield than all other cultivars (Nagre, **et.al.**, 1981) Recently, some more responsible hybrids/varieties have been released. Sorghum responds differently under different agroclimatic condition in drylands and different cultivars have varying magnitudes of response to nitrogenous fertilizers.

With regard to the response of sorghum to nitrogen, it has been reported that the maximum yield was obtained at 90 kg N/ha (Gupta **et.al.**, 1986) and Patil and Sinke, 1979). Hence it was thought necessary to compare these hybrids/ varieties with the existing hybrid i.e., CSH-5 at varying levels of the nitrogen under agroclimatic conditions of Udaipur (South Rajasthan).

METHODS AND MATERIALS

A field experiment was conducted for two consecutive years at the Rajasthan College of Agriculture, Udaipur during Kharif, 1984 and 1985 under All India

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Co-ordinated Sorghum Improvement Project. The crop was raised under rainfed conditions. In 1984 the amount of rainfall was 555.1 mm from 1st July to 30th September and in 1985 it was 320 mm. The soil of the farm was sandy loam which had 7.6 pH, 180 kg N/ha, 17 Kg P/ha and 298 Kg K/ha. The treatments comprised 8 sorghum cultivars, i.e., Hybrid CSH-5, CSH-9, SPH-196, SPH-221 and varieties SPV-346, SPV-351, SPV-462, SPV-475 and 3 nitrogen levels viz. 0,50 and 100 kg/ha The experiment was laid out in split plot design, taking sorghum entries in main plot and nitrogen levels as sub-plot treatments. Half of the nitrogen as per treatment along with 40 Kg P_2O_5/ha was applied at the time of sowing and the rest was applied at 35 days after sowing which coincided with rainfall of 18.7 mm during 1984 and 40.0 mm during 1985.

RESULTS AND DISCUSSION

Earhead Weight :

A perusal of data (Table-1) reveals that hybrid CSH-9 produced the highest mean earhead weight/plant (33.3g). However, the earhead weight of cultivar SPH-221, was more than those of other cultivars during 1984, but it was statistically at par with CSH-9, CSH-5 and SPV-475. In the year 1985, the difference in earhead weight/plant was not found significant. Successive increase in nitrogen levels progressively increased the earhead weight/plant significantly.

Test weight :

The results (Table-1) show that grain of variety SPV-346 gave the highest average test weight (29.41g). It was followed by CSH-9 (28.0g) and SPH-221 (26.7g). Test weight recorded at 100 kg. level of N was significantly higher than other levels of nitrogen in both the years.

Grain yield :

The results on productivity of sorghum cultivars show that the highest grain yield was obtained from the hybrid CSH-9 consistently during both the years. The mean increase in grain yield was extended by 12 per cent over CSH-5 (33.9 q/ha). Superiority of CSH-9 over CSH-5 has also been reported by Subbiah and Chamy (1985). Grain yield obtained from SPH-221 was also on par with that of CSH-5 the national check. Among the varieties SPV-346 proved to be the best giving the mean grain yield of (29.2 q/ha) However, the pooled grain yield obtained from SPV-346 was 13 per cent less than that from CSH-5. Yields obtained from other cultivars were found reduced to the extent of 2.7 per cent (SPH-221), 14 per cent (SPV-351), 15 per cent (SPH-196) and 24 per cent (SPV-475) as compared to CSH-5.

The grain yield was found to respond significantly to increasing levels of nitrogen. The percentage increase in grain yield due to 50 and 100 kg N/ha was of the order of 17 and 38 per cent and 17 and 39 per cent during 1984 and 1985 respectively. The mean grain yield was found maximum (34.9 g/ha) with 100 kg N/ha level. Similar trend was observed by Babawi and Abdelaziz (1983) and Naik (1983).

Table -1 Effect of Nitrogen and Cultivars on yield attributes and yields of sorghum 1984-85

Treatments	Earhead Wt.(q/ha)			Test Wt.(g)			Grain yield (q/ha)			Stover yield(q/ha)			Net Income (Rs./ha)		
	1984	1985	Mean	1984	1985	Mean	1984	1985	Pooled	1984	1985	Pooled	1984	1985	Mean
CULTIVARS															
CSH-5	31.3	29.1	30.2	22.8	22.3	22.6	41.6	26.3	33.9	123.8	37.0	80.4	4663	1091	2877
CSH-9	32.5	34.1	33.3	28.0	28.1	28.0	45.6	31.0	38.3	137.2	44.1	90.6	5415	1807	3611
SPH-196	30.7	30.2	30.5	22.1	23.4	22.8	34.1	22.9	28.5	172.5	62.9	117.7	4742	1206	2974
SPH-221	34.1	30.4	32.2	27.2	26.1	26.7	40.4	25.7	33.0	134.3	39.1	86.7	4732	1066	2899
SPV-346	30.1	30.3	30.2	29.9	28.9	29.4	34.6	23.7	29.2	131.4	36.4	83.9	3980	772	2382
SPV-351	23.1	28.8	26.0	21.1	21.0	21.1	34.3	23.5	28.9	120.4	33.5	76.9	3724	690	2206
SPV-426	30.2	24.1	27.2	23.8	23.6	23.7	25.3	18.0	21.7	113.4	35.0	74.2	2504	60	1288
SPV-475	31.0	30.9	31.0	23.8	23.4	23.6	30.7	20.1	25.4	100.1	30.2	65.1	2886	216	1550
CD at 5%	3.277	NS	-	0.632	0.213	-	4.40	2.53	2.97	8.74	5.71	5.66	-	-	
N LEVELS (Kg/ha)															
0	27.2	26.2	26.7	24.3	23.8	24.1	30.3	20.1	25.2	126.5	33.5	80.0	3623	543	2083
50	29.3	29.4	29.4	25.0	24.7	24.9	35.4	23.6	29.5	130.2	40.2	85.2	4035	833	2434
100	35.7	33.6	34.7	25.4	24.9	25.2	41.7	28.0	34.9	130.6	45.6	88.1	4518	1200	2859
CD at 5%	1.187	2.106	-	0.320	0.097	-	1.908	1.55	1.82	NS	1.60	3.46			

Stover yield :

Data on stover yield presented in Table - 1 reveal that among the hybrids maximum stover yield was obtained from SPH-196 (117.7 q/ha) followed by CSH-9(90.6 q/ha) which were 46.4 and 12.7 per cent more than CSH-5 (80.4 q/ha) respectively. Among the varieties, SPV-346 gave maximum stover yield (83.9 q/ha).

During 1984, SPH-196 gave significantly more stover yield as compared to the rest of the cultivars. But cultivars CSH-9, SPH-221 and SPV-346 were statistically at par with each other in respect of stover yield. In 1985, also cultivar SPH-196 produced maximum stover yield which was significantly higher than other cultivars.

The mean stover yield was recorded higher with 100 kg N/ha (88.1 q/ha) which was 10 per cent higher than no nitrogen application. Application of 50 kg N also gave significant increase (7%) in stover yield over no N application. However, during 1984, nitrogen application did not show any significant variation in stover yield. Increase in stover yield the response of N has also been reported by Nagre et.al.(1981).

Net Income :

Maximum net monetary return was obtained from cultivar CSH-9 (Rs. 3611/ha) which was high by Rs. 734/ha than CSH-5. Net return from cultivars CSH-5, SPH-221 and SPH-196 were found on par. SPH-196 was although low grain yielder but it gave highest stover yield attributing to increased net return. Among the varieties SPV-346 gave the highest net income of Rs. 2382/- during both the years of experimentation. In case of nitrogen a trend of increase in net return was observed with increasing levels of nitrogen from 0 to 100 kg. N /ha. 100 Kg. N/ha gave the maximum net income (Rs. 2859/ha) which was Rs. 776/- and Rs. 425/- more than 0 and 50 Kg. N/ha, respectively.

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