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EFFECT OF N, P AND K ON YIELD AND SIZE OF SORGHUM CSH-5 SEEDS

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A field trial laid out to study the effect of N at 0, 100 and 200 kg/ha and P and K at 0, 50 and 100 kg/ha each on the yield and size of sorghum CSH 5 hybrid seed revealed that application of N and P each at 100 kg/ha was optimum for maximising the seed yield. The influence of K was not significant. Percentage recovery of seed retained by 10/64" sieve decreased, while that retained by 8/64" sieve increased with the increase in the doses of N. The trend was reserve for P application.

Agronomy of a seed crop is different in many ways from a grain crop [Agrawal, 1980). The seed yield is a complex character determined by a number of factors both internal and external. Among the external factors, season, availability of nutrients, soil moisture and plant density play a major role. The parental lines of a hybrid may behave differently to the applied nutrients. Hence, a study was carried out with the parental lines of the hybrid sorghum CSH-5 to elucidate information on the effect of N, P and K nutrients.

MATERIALS AND METHODS

A field trial was laid out in the winter season of 1979 with N at O [N_0], 100 [N_1] and 200 [N_2] kg/ha, P at O [P_0], 50 [P_1] and 100 [P_2] kg/ha and K at O [K_0], 50 [K_1] and 100 [K_2] kg/ha in the form of urea single super phosphate and muriate of potash respectively. Split-plot design was adopted with N and P in main and K in sub-plots with three replications. Gross and net size of the plots were 4.05 m x 3.75 m and 1.80 m x 3.45 m, respectively. A planting ratio of 4:2 (female vs male) was followed. Four border rows of male parent were maintained.

Full dose of P and K and half the dose of N were applied as basal dressing at the time of sowing the female line and the remaining dose of N, 30 days after sowing. The recommended cultural and plant protection measures were followed. Of the two rows of male line, one was sown nine days and the other twelve days after sowing of the female line. The crop was harvested on the 112th day after sowing. The seed moisture content at the time of harvest was around 20 per cent. The bulk seeds from individual plots were graded using round perforated sieves of the size 10/64",

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9/64" and 8/64" and the percentage recovery of seeds retained in the above sieves was worked out on weight basis.

Initial analysis of soil revealed that it cotained 150, 5 and 282 kg/ha of available N, P and K, respectively with a pH of 8.2 and E. C. of 0.3 mmhos/cm.

RESULTS AND DISCUSSION

Apart from the nutrition in hybrid seed production, effective pollination especially when cytoplasmic male sterile lines are employed as seed parent, is equally important to stabilize the seed yield In the present experiment, the parental lines came to flowering simultaneously and therefore the differences in seed yield could be mainly due to treatments.

Application of 100 kg N/ha increased the hybrid seed yield by 341 kg/ha over no N. When the dose was increased to 200 kg/ha, the increase in yield was not linear (Table 1). Increased yields due to N application has been reported in many crops (Shalaby and Mikhail, 1979). In contrast, Murthy *et al.* (1974) in sorghum, reported no response. Beyond a certain level, N decreased the yield probably due to over stimulation of leaf and stem growth which interfered with the production of seed (Singh and Bains, 1972).

Table 1 Effect of application of N, P and K on CSH 5 hybrid seed yield (kg/plot)

	P_0			P_1			P_2			Mean
	K_0	K_1	K_2	K_0	K_1	K_2	K_0	K_1	K_2	
N_0	1.604	1.538	1.354	1.364	1.321	1.456	1.439	1.743	1.697	1.502
N_1	1.373	1.281	1.584	1.809	1.702	1.854	1.965	1.990	1.872	1.714
N_2	1.477	1.588	1.463	1.698	1.787	1.654	1.778	1.875	1.822	1.680
Mean	1.484	1.462	1.467	1.624	1.603	1.654	1.728	1.869	1.797	

COMPARISON OF SIGNIFICANT EFFECTS

	CD (P=0.05)
N	0.147*
P	0.147**

* Significant at P = 0.05
** Significant at P = 0.01

A lin ar response to P was evident. Application of P at 100 kg/ha recorded an yield of 2895 kg/ha as compared to 2369 kg / ha obtained under P_0. Govil and Prasad (1972) reported significant and positive response, while Battacharaya (1976) eported lack of response to P application.

The response to application of K was not significant. Fayemi (1967) reported similar results. However, Bathkal *et al.* (1970) reported positive response for K in sorghum.

Response to the applied nutrients depends on the soil status. The field in which the present experiment was conducted was deficient for N and P only and hence the positive response for both the nutrients

Table 2 Effect of N, P and K on CSH 5 hybrid seed size (Angular values of recovery percentages)

	N_0	N_1	N_2	P_0	P_1	P_2	K_0	K_1	K_2	Mean
G1-$\frac{10}{64}$" retained seed	25.78	24.91	24.91	23.34	24.91	27.36	25.42	25.62	24.67	25.20
G2-$\frac{9}{64}$" retained seed	53.18	51.96	51.59	52.42	52.78	51.52	51.69	52.37	52.67	52.24
G3-$\frac{8}{64}$" retained seed	24.11	26.54	26.73	27.32	25.67	24.39	26 53	25.12	25.73	25.79.

COMPARISON OF SIGNIFICANT EFFECTS

	G	GxN	GxP
CD (P=0.05)	1.19**	2.07*	1.07**

*Significant at P=0.05; **Significant at P=0.01

When the bulk seed was graded for size, 62 4% of the total was retained in 9/64" sieve, while the retaining in both 10/64" and 8/64" sieves were 18.5% and 19.1 % respectively (Table 2). Kalingarayar (1972) reported similar higher recovery in 9/64" sieve for sorghum CSH 5 seeds. Application of N at increasing dose not only descreased the percentage recovery of large seeds but also increased that of smaller ones. However, the yield of both size grades of seed showed an upward trend with increase in the doses of N. This would mean that applicatfon of N improved the yield more by increasing the seed number than its size. Higher doses of N increased the proportion of under-sized grain in barley (Jenkins *et al.*, 1979.).

The percentage recovery of large size seed increased and of small size decreased with the application of P at increasing doses. The yield increase was through increase in both size and number of seeds.

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VARIETAL VARIABILITY IN PRODUCTIVITY AND DEVELOPMENT OF *ARACHIS HYPOGAEA* L.

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Intensity of flowering increases with habit in the order of bunch, semi-spreading and spreading. Efficiency in productivity is conditioned by the interaction of fertility coefficient and flowering intensity at distinct phases in each variety. Bunch and to some extent semi-spreading experience a critical stage at peg formation phase while spreading faces a critical stage at immature pod development.

INTRODUCTION

The species of *Arachis* are characterised by aerial flowers and subterranean fruits and the nature or exact development of pods cannot be predicted and thus it has earned the name "unpredictable legume". The research on intervarietal hybridisation have shown the existence of genotypic as well as cytoplasmic differentiation among the varieties of the cultivated species of *Arachis hypogaea* L. The problem of reproductive

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