

Study of Comparative Efficiency of Different Modes of Application of Phosphatic Fertilizer To Sorghum Using P^{32}

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The results of a field experiment conducted at the Agricultural Research Station, Bhavanisagar to study the influence of different modes of phosphatic fertilizer application with CSH 1 sorghum as test crop indicated that placement of phosphatic fertilizer was found to be superior than broadcast application. Among the different methods of placement tried, the placement of fertilizer 7.5 cm below the seed and 5 cm away from seed is found to be ideal.

Among the three macronutrients, phosphorus is one of the important nutrients required for most of the plants. However, in the application of this nutrient, the proper method of application becomes important because of the fixation of phosphorus in soils and consequent unavailability of the same to the crops later. Hence the different methods of application of phosphatic fertilizers such as broadcasting at surface, placements at different positions and depths have been tried by various workers like Stewart (1953) Stanford and Pierre (1953) Nelson and Stanford (1958). They have shown that the side placement of phosphatic fertilizers is superior to surface broadcast application for many crops like small grains, pastures and cotton. Oomman (1967) and Sinha (1968), reported that greater amount of phosphorus was derived from placement than from broadcast application. However, Datta (1961) and Murthy and Nara-

singa Rao (1967) reported better utilisation of applied phosphate by rice in the surface broadcast application than in the placement application. Hence different methods of application of phosphatic fertilizers were tried with a view to assess their efficiency in increasing the utilisation of phosphorus by sorghum from phosphatic fertilizers.

MATERIAL AND METHODS

A field experiment with jowar (sorghum) was laid out at the Agricultural Research Station, Bhavanisagar with the following treatments.

Treatments	
30 Kg P_2O_5 /ha applied as broadcast	(T ₁)
30 Kg P_2O_5 /ha placed at 7.5 cm deep below the seeds in row	(T ₂)
30 Kg P_2O_5 /ha placed at 7.5 cm deep below the seed row and 5 cm away from the seed row	(T ₃)

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60 Kg P_2O_5 /ha applied as in treatment (T₁) (T₁)
 60 Kg P_2O_5 /ha applied as in treatment (T₂) (T₂)
 60 Kg P_2O_5 /ha applied as in treatment (T₃) (T₃)
 Control - Nitrogen and Potassium fertilizer application only (T₇)
 Absolute control with no fertilizer application (T₈)

In addition to the P_2O_5 doses indicated above, the treatments 1 - 7 above were given 120 kg N/ha as ammonium sulphate and 60 kg K₂O/ha as muriate of potash. Nitrogen was applied in two split doses, one half at the time of sowing, and the other half 30 days after sowing. In all the P applied treatments,

TABLE. Phosphorus utilisation and dry matter yield of CSH 1 Sorghum

Treatment	I		II		III		IV		V		VI	
	Dry matter for 6 plants in gm		% P derived from fertilizer		Uptake of P by plants mg/6 plants		Fertilizer P uptake mg/6 plants		Yield in kg/plot		P uptake at harvest kg/plot	
	A	B	A	B	A	B	A	B	G	S	G	S
(T ₁) 30 Kg P_2O_5 /ha applied as broadcast	52.3	375	23.32	21.50	146.2	769	28.5	108.4	3.5	8.4	6.72	7.16
(T ₂) 30 kg P_2O_5 /ha placed 7.5 cm deep below the seeds	61.1	396	39.40	25.75	174.3	799	76.5	175.5	3.73	9.2	8.01	6.74
(T ₃) 30 kg P_2O_5 /ha placed at 7.5 cm deep below the seed row and 5 cm away from seed row	48.6	411	42.00	23.46	151.7	866	83.7	134.8	3.34	8.3	7.35	6.10
(T ₄) 60 kg P_2O_5 /ha applied as in treatment (T ₁)	46.9	378	35.81	25.01	130.7	798	63.2	167.2	3.52	8.7	7.44	7.16
(T ₅) 60 kg P_2O_5 /ha applied as in treatment (T ₂)	61.8	384	50.77	35.40	178.2	849	165.0	355.6	3.57	8.5	7.38	6.97
(T ₆) 60 kg P_2O_5 /ha applied as in treatment (T ₃)	64.5	399	55.30	—	191.6	849	125.7	262.5	3.80	9.0	7.25	6.76
(T ₇) Control-Nitrogen and Potassium fertilizer application only	51.2	324	—	—	139.0	614	—	—	3.39	8.5	5.69	5.79
(T ₈) Absolute control with no fertilizer application	37.8	217	—	—	97.3	389	—	—	1.13	6.4	2.78	8.73
S.E.	N.S.	22	6.13	1.10	18.4	59	—	31.7	0.17	0.4	0.84	0.57
C.D.	N.S.	63	17.86	3.37	52.7	169	—	92.4	0.54	1.2	1.55	1.64

A = at 35 days

B = at 60 days

G = Grain

S = Straw

the middle two rows of plants were treated with P^{32} tagged superphosphate having a specific activity of 0.2 mci/gm of P_2O_5 . Six plant samples were collected from each of the plots as well as P^{32} treated rows in each plot on 35th and 60th day after sowing, and the dry matter yield, P uptake on the 35th and 60th day, and yield of grain and straw were recorded. The data are presented in Table.

RESULTS AND DISCUSSION

When the yields of dry matter collected on the 35th and 60th day were analysed, there was significant difference only in the dry matter yield on the 60th day. The highest dry matter yield on the 60th day was recorded in treatment (T_3) viz. placement 7.5 cm deep below the seed row and 5 cm away from the seed row followed by (T_4) at both the P levels. The placement treatments at both the levels were superior to broadcast application in the production of dry matter yield. There was no significant difference in the dry matter yield due to fertilizer treatments in the soil studied.

Considering the percentage of P drawn from the fertilizer by the crop up to 35th day and 60th day, it was found that the crop obtained more of the P from the placement treatments than from broadcast treatments and also higher levels of P. Considering the fertilizer P uptake by the crop, similar results were obtained on the 35th and 60th day. Regarding the yield of the crop at maturity, it was found that fertilizer treated plots gave higher yields than absolute control. All the fertilizer treatments

were on par with each other, with the placement treatments exhibiting a tendency for higher yields. Considering the P uptake by the plants, though there was no significant difference in the dry matter production on the 35th day, yet there was significant difference in the P uptake with the placement treatments giving better uptake than broadcast. Similar results were obtained on the 60th day and also at maturity when the total uptake by grain and straw were considered. From the above, it can be concluded that the placement treatments are better than broadcast applications for sorghum crop and among them, the placement of fertilizer 7.5 cm below the seed and 5 cm away from seed row is the best.

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