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RESPONSE OF PIGEONPEA TO PHOSPHORUS AND SULPHUR NUTRITION

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ABSTRACT

Field experiments were conducted over a period of two years (!989, 1990-91) at the Millet Breeding Station, Tamil Nadu Agricultural University, Coimbatore. The results showed that combined application of phosphorus and sulphur had resulted in the increased yield or pigeonpea. Appliciation of phosphorus at 20 kg/ha and sulphur at 20 kg/ha was found to be the optimum for getting the increased yield of pigeonpea.

KEY WORDS : Pigeonpea, Responses, Sulphur, phosphorus

Pigeonpea *(Cajanus cajan*(L) (Millssp.) is an important crop for semi-arid and sub-tropics. Their cultivation in the country is neglected in respect of application of major and minor nutrients. Low production and productivity of pulses has become one of the weakest links in food security for several years in India. Since independence the average productivity of pulses in India has been practically stagnant mainly due to the low input use. As a result, the yield, quality and per capita availability/day of pulses are fast dwindling (Saraf, 1988). The country's requirement of pulses is going up while production is not increasing to that extent. Increase in hectarage is not possible and the yield could be increased by proper management of agronomic practices.

Both phosphorus and sulphur occupying an important place in plant nutrition, improve both the quantity and quality of the crop produce. The supply of sulphur to the growing crops has a profound influence on the synthesis of sulphur containing aminoacids and these legumes have remarkable affinity for P and S elements (Chopra and Kanwar, 1966). Since the information on the response of pigeonpea to the application of phosphorus alone or in combination with the sulphur is meagre, experiments were conducted to study the influence of phosphorus and sulphur application on the yield of redgram at the Tamil Nadu Agricultural University, Coimbatore.

MATERIALS AND METHODS

A total of 12 treatment combinations comprising of 4 levels of phosphorus *viz.*, O (P1), 20 (P1), 40 (P2) and 60 (P3) kg P205/ha and 3 levels of sulphur *viz.*, O(So), 20 (S1) and 40 (S2) kg S/ha was tried in a randomised block design with four replications. The initial soil sample analysis revealed that the available nitrogen, phosphorus and potassium were 146, 12.3 and 392 kg/ha. respectively. The electrical conductivity was 0.2 m. mhos/cm and the soil pH was 7.9. The initial sulphur status of soil was 19.0 ppm and the texture of the soil was clay loam. The variety Co.5 pigeonpea was tried in the study. The fertiliser phosphorus and sulphur were applied basally to the respective plots as per the treatments. The intercultural operations were given at the appropriate time.

RESULTS AND DISCUSSION

The yield attributes and yield obtained from the various treatments are presented in the table 1. It could be seen that there was response in pigeonpea for the application of phosphorus and sulphur which had resulted in the increased mean number of pods and yield. The mean number of pods per plant was increased with the increased levels of phosphorus and sulphur application. Same trend was noticed in the mean seed yield of pigeonpea. Application of phosphorus at 40 kg/ha (P2) and sulphur at 40 kg/ha (S2) had recorded highest mean seed yield. This was closely followed by phosphorus at 20 kg/ha (P1) and sulphur at 20 kg/ha (S1). The results clearly had indicated that combined application of phosphorus and sulphur at 40 and 20kg/ha respectively had recorded the highest seed yield of 1409 kg/ha in 1989-90 and 325 kg/ha in 1990-91 eventhough there was slight increase in the seed yield of 330 kg/ha when the level of phosphorus and sulphur were increased to 60 and 40 kg/ha respectively. Though there was increase in yield of pigeonpea at the increased level

Table 1. Influence of P and S application on the yield attributes and yield in redgram.

Treatment	1989-90		1990-91	
	Pods/Plant	Yield kg/ha	Pods/Plant	Yield kg/ha
P0 S0	51.70	968.50	45.25	221.75
P0 S1	53.30	1154.75	47.12	234.00
P0 S2	46.75	1236.70	42.75	237.75
P1 S0	68.85	1110.05	53.87	263.25
P1 S1	51.10	1288.85	52.87	304.50
P1 S2	51.90	1378.25	53.25	297.50
P2 S0	47.25	1080.25	47.37	278.25
P2 S1	50.20	1408.05	52.37	299.25
P2 S2	56.05	1288.85	51.50	311.50
P3 S0	44.30	1117.50	46.75	290.50
P3 S1	53.85	1132.40	54.50	325.25
P3 S2	52.40	1378.25	53.00	330.50
SE D		87.80		14.93
CD (5%)		NS		30.38

Mean of Two years

		Pods/plant	Yield kg/ha
P0	:	48.0	675.0
P1	:	55.0	774.0
P2	:	51.0	778.0
P3	:	51.0	762.0
S0	:	51.0	666.0
S1	:	52.0	768.0
S2	:	51.0	807.0

of phosphorus, the difference in yield was not found to be significant.

Nandal *et al* (1987) while studying the effect of phosphorus at different levels on the yield of *arhar* had reported that 60 and 90 kg P_2 O_5 application per ha had produced significantly higher yield of red gram. Dwivedi *et al* (1988) recommended combined application of phosphorus and sulphur at 40 kg/ha for increased yield of mungbean. The results of the experiment are in agreement with the above findings.

It could be thus concluded that there was response for the combined application of phosphorus and sulphur in red gram. Though the increased levels of phosphorus and sulphur at 40 kg/ha in each was found to increase the yield of pigeonpea, application of phosphorus and sulphur at 20 kg kg/ha in each was found to be the optimum for getting the increased yield especially in sulphur deficient soils.

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REFERENCES

CHOPRA, S.L. and KANWAR,J.S. (196). Effect of sulphur fertilization on the chemical composition and nutrient uptake by legumes. **J. Indian Soc Soil Sci., 14**: 69-76.

DWIVEDI, S.K. SINGH, V.P. and DWIVEDI, M. (1988). Effect of phosphorus and sulphuru on yield potential and nutritional quality of balckgram (*Vigna mungo*) L. Hepper). **Ann. Agric. Res., 9**: 6-12.

NANDAL, D.P. MALIK, D.S. and SINGH, K.P. (1987). Effect of phosphorus levels on drymatter accumulation of kharif pulses. **Legume Res., 100**: 31-33.

SARAF, C.S. (1988). Sulphur fertilization of pulses for yield and quality. **Fld. Crop Abst., 41**: 9080.