

## Short Communication

Efficacy of Phosphate Culture with Phosphorus Levels on Growth and Yield of Clusterbean (*Cyamopsis tetragonoloba* L. Taub)

N.S. Solanki, R.P.S. Shaktawat and B.S. Shekhawat

Agricultural Research Station, Rajasthan Agricultural University,  
Beechwal (Bikaner) 334 001, India

Clusterbean (*Cyamopsis tetragonoloba* L. Taub), an important legume crop, is mainly grown in Rajasthan under rainfed conditions. It is drought tolerant and can be grown successfully in light soils having poor fertility and under erratic rainfall. The productivity of this crop in Rajasthan is very low, because of poor fertility and inadequate fertilization. Phosphorus plays a key role in the balanced nutrition of plants. Applied P is fixed and is not available within a short period, especially under dry-land conditions. Phosphorus solubilizing micro-organisms or phosphate culture play

an important role in releasing and making P available to crop plants, resulting in increased crop yield (Marwaha *et al.*, 1981). Hence, the effect of phosphate culture and phosphorus levels on growth and yield of clusterbean is evaluated.

The experiment, comprising two culture treatments (control and phosphate culture) and three phosphorus levels (0, 20, and 40 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup>), was laid out in factorial randomized block design with four replications at Agricultural Research Station, Keshwana, Jalore (Rajasthan), during *kharif* seasons of 1992, 1993 and 1994. The soil

Table 1. Effect of phosphate culture and phosphorus levels on plant height, pods per plant and yield (mean of 3 years) of clusterbean

Treatment	Plant height	Pods/plant	Stover yield (q ha <sup>-1</sup> )				Grain yield (q ha <sup>-1</sup> )			
			1992	1993	1994	Mean	1992	1993	1994	Mean
<b>Culture</b>										
Control	115.6	34.84	30.64	30.78	29.54	30.32	14.74	14.04	12.89	13.89
Phosphate culture	115.4	36.40	32.02	31.11	29.64	30.92	15.39	14.56	13.10	14.34
CD at 5%	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
<b>Phosphorus (kg ha<sup>-1</sup>)</b>										
0	109.1	28.92	26.30	24.02	23.71	24.67	12.68	12.38	11.13	12.13
20	116.4	36.31	29.42	31.61	29.85	30.29	14.24	13.52	12.79	13.51
40	121.2	41.64	38.28	37.33	35.26	36.95	18.26	17.05	15.18	16.83
CD at 5%	2.5	2.20	2.82	3.12	2.17	1.69	2.62	1.56	0.93	0.81

of the experimental field was sandy loam in texture having 127.08 kg ha<sup>-1</sup> available nitrogen, 15.30 kg ha<sup>-1</sup> available phosphorus, 0.39% organic carbon and 8.3 pH. A uniform basal dose of 20 kg N ha<sup>-1</sup> was applied with phosphorus. Clusterbean cv. RGC-936 was sown after inoculation with phosphate culture.

Application of 40 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup> significantly increased the plant height, number of pods per plant, grain yield and stover yield over control and over application of 20 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup>, in all the three years. However, this was not the case for plant height in 1993 and 1994, where 40 and 20 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup> were statistically at par (Table 1). There was 38.39 and 22.69% increase in grain yield with 40 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup> when compared with control and 20 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup>, respectively. These results

are in close conformity with the findings of Singh and Singh (1989) and Shivran *et al.* (1996). Seed inoculation with *Bacillus polymyxa* could not influence the grain and stover production as the variations were not significant.

## References

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