

Role of Phosphobacterin in the Uptake of Nitrogen in Rainfed Sorghum

Indian soils are deficient in nitrogen and phosphorus and hence a good crop response may be expected for these nutrients. The utilisation of nitrogen and correspondingly the uptake pattern of the same in crops will be in proportion to the uptake of the phosphorus from the soil as these two go together always (Menkinar 1956, Stefan and Boti, 1960). The role of phosphobacterin in augmenting P uptake in plants has been recognised.

An experiment to study the effect of rainfed sorghum (CO 20) inoculated with phosphobacterin with and without nitrogen and phosphorus to study N uptake was laid out in the New area adjoining the Millet Breeding Station. The gross and net plot sizes were 6.75×3.30 meters and 5.85×3.00 meters respectively. Split plot design with four replications was chosen without phosphobacterin (B_0) and with phosphobacterin (B_1) and at three levels of nitrogen viz., 0, 20 and 40 kg N/ha. Nitrogen content in the plant sample taken on the 45th day, 90th day and 135th day and in the grain was analysed separately by micro-Kjeldahl method.

The per cent of nitrogen in the plant at all the stages of the crop growth (Table I) showed higher uptake in the phosphobacterin applied plot than in the control plot.

The summary of results for the nitrogen uptake of the plant at harvest is presented in Table II.

The data clearly reveal that nitrogen uptake was significantly high in the presence of phosphobacterin. It should be admitted that phosphobacterin had no direct influence on the uptake of nitrogen. However, higher levels of phosphorus uptake due to phosphobacterin inoculation helped N uptake. Increase in the uptake of nitrogen due to phosphobacterin was reported by Sundara Rao *et al.* (1963), Subramanian *et al.* (1974) and Kundu *et al.* (1980).

It is concluded that phosphobacterin indirectly helped nitrogen uptake in sorghum.

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REFERENCES

- KUNDU, B. S., and A. C. GAUR, 1980. Effect of phosphobacteria on the yield and phosphate uptake of potato crop. *Curr. sci.* 49 : 159.
- MENKINAR, R. A. 1956. Phosphobacteria and condition for their application Udobrenic i' Urozhai 1 : 25—28; Abstr., in Chem. Abstr. 50 : 15012.

STEFAN, V. and D. BOTI, 1960. The influence of mineral and bacterial fertilizers on uptake of soil phosphorus by sunflower. *Soils & Fert* 24 : 281.

SUBRAMANIAN, A. and D. PURUSHOTHAMAN 1974. Effect of seed treatment of bengalgram with *Bacillus circulans* on phosphorus uptake. *Madras Agric J.* 61 : 793.

SUNDARA RAO, W. V. B., P. D. BAJPAI, J. P. SHARMA and B. V. SUBBIAH. 1963. Solubilization of phosphates by phosphorus solubilizing organisms using 32 as tracer and the influence of seed bacterisation on the uptake by the crop. *J. Ind. Soc. Soil. Sci.* 11 : 209-19.

TABLE I Plant Analysis for total nitrogen at different stages of growth.

		Nitrogen (per cent)							
		45th day		Grain		90th day		135th day Straw	
		B ₀	B ₁	B ₀	B ₁	B ₀	B ₁	B ₀	B ₁
N ₀	P ₀	0.708	0.736	0.392	0.420	0.805	0.875	0.294	0.309
	P ₁	0.82	0.944	0.308	0.420	0.868	0.875	0.294	0.322
	P ₂	0.680	0.988	0.364	0.392	0.854	0.861	0.287	0.294
N ₁	P ₀	0.680	0.736	0.420	0.420	1.113	1.190	0.336	0.441
	P ₁	0.644	0.960	0.476	0.364	1.225	1.155	0.315	0.441
	P ₂	0.960	0.960	0.308	0.420	1.274	1.379	0.364	0.434
N ₂	P ₀	0.820	0.988	0.308	0.420	1.204	1.267	0.378	0.469
	P ₁	0.848	0.848	0.392	0.392	1.435	1.169	0.378	0.422
	P ₂	0.736	0.848	0.392	0.420	1.316	1.253	0.420	0.546

TABLE II Effect of Phosphobacterin treatment on the Nitrogen uptake.

Source	D.F.	S.S.	M.S.	F.
Between Phosphobacterin (B)	1	101.40	101.40	21.71**
Between Nitrogen levels (N)	2	60.35	30.17	6.46**
** Significant at 1% level				
Bacterial treatment				
Mean Nitrogen uptake in kg.				
B ₀		67.55	SED : 0.509	
B ₁		69.92	CD : 1.085	

Conclusion : B₀ B₁