

Effect of phosphatic bio-fertilizers in conjunction with organic and inorganic fertilizers on growth and yield of groundnut (*Arachis hypogaea*)

ASHA C. MEHTA, D. D. MALAVIA, B. B. KANERIA AND V. D. KHANPARA

Department of Agronomy, Gujarat Agricultural University, Janagadh 362 001

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A field experiment was conducted at the Instructional Farm, Gujarat Agricultural University, Junagadh, during the rainy (*khari*) season of 1991. The soil was clayey in texture, medium in total nitrogen (0.054%), available phosphorus (30.8 kg/ha) and available potassium (156 kg/ha). It was slightly alkaline in reaction (pH 7.9) with normal electrical conductivity (0.27 dS/m). The treatments comprising 2 levels of farmyard manure (no farmyard manure

and farmyard manure @ 10 tonnes/ha) as main plots and combinations of 3 levels of phosphatic biofertilizers (control, inoculation with *Pseudomonas striata* and *Paecilomyces fussisporus*) and 3 levels of P [0 (control), 25 and 50 kg P₂O₅/ha] as subplot treatments were laid out in split-plot design with 4 replications. Full dose of N @ 12.5 kg/ha and P as per treatments were applied as urea and single superphosphate respectively at the time of sowing. The crop was sown on

Table 1. Effect of different fertilizers on growth parameters, yield attributes and yield of groundnut

Treatment	Plant height at harvest (cm)	Plant spread at harvest (cm)	Primary branches/plant	Developed pods/plant	Pod weight/plant (g)	Test weight (g) of kernel	Pod yield (q/ha)	Haulm yield (q/ha)
<i>FYM (tonnes/ha)</i>								
0	18.93	21.20	4.41	3.05	3.99	29.91	9.07	15.68
10	19.68	23.46	4.69	4.45	4.16	30.38	10.21	17.99
CD (P = 0.05)	NS	NS	NS	0.34	NS	NS	0.36	1.29
<i>Biofertilizer</i>								
Control	18.73	22.16	4.47	3.70	3.86	29.69	9.13	15.72
Bacterial culture (<i>Pseudomonas striata</i>)	19.75	23.88	4.72	4.55	4.20	30.58	10.03	17.62
Fungal culture (<i>Paecilomyces fussisporus</i>)	19.45	22.45	4.48	3.20	4.16	30.16	9.77	17.20
CD (P = 0.05)	NS	1.44	0.17	0.23	0.17	NS	0.24	0.68
<i>Phosphorus (kg/ha)</i>								
0	19.16	22.30	4.50	3.80	4.01	29.75	9.61	16.40
25	19.48	24.15	4.59	4.36	4.16	30.50	9.73	17.19
50	19.28	23.05	4.58	4.29	4.07	30.18	9.60	16.94
CD (P = 0.05)	NS	NS	NS	0.23	NS	NS	NS	

16 July 1991 with row spacing of 30 cm using 'GG 2' groundnut with 100 kg kernels/ha. The crop was harvested on 31 October 1991.

An application farmyard manure improved most of the growth and yield parameters (Table 1), though the increase was not up to the level of significance except for number of developed pods/plant. The pod and haulm yields due to application of farmyard manure were significantly enhanced by 12.57 and 14.74% respectively over the control. This increase in yield could be as result of improvement in number of developed pods/plant, pod weight/plant and test weight. Similar findings were reported by Patel and Yadav (1987).

Inoculation with P-biofertilizer cultures significantly improved the plant spread at harvest, but did not affect the plant height at harvest. Yield attributes, viz. number of primary branches/plant, number of pods/plant and pod weight/plant, increased significantly over the control owing to P-biofertilizer, while difference in test weight was not up to the level of significance. The favourable effect of inoculation on plant growth and yield attributes might be due to the improved phosphate nutrition and production of growth-promoting substances by phosphate-solubilizing micro-organism. Pod and haulm yields were significantly influenced by inoculation with P-biofertilizers. *P. striata* performed better than the *P. fussisporus*. The increase in

yield may be attributed to increased availability of nutrients, release of growth-promoting substances and inhibition of pathogenic micro-organisms. Seth (1991) reported increase in yield due to P-biofertilizers in groundnut and sugarcane.

Phosphorus application did not exert remarkable effect on growth parameters, viz. plant height and plant spread. Application of phosphorus did not significantly affect the number of primary branches/plant, pod weight/plant and test weight, but it significantly increased the number of developed pods/plant up to 25 kg P_2O_5 /ha. These findings are in agreement with those of Chauhan *et al.* (1987). Different phosphorus levels were largely comparable in respect of pod as well as haulm of groundnut. It may be due to medium status of phosphorus in soil prior to sowing and ill-distribution of rain. The results confirm the findings of Chauhan *et al.* (1987)

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