Agri. Res. J. Kerala, 1980, 18 (2) 204—207

RESPONSE OF COWPEA *VIGNA UNGUICULATA* (L.) WALP. TO *RHIZOBIUM* SEED INOCULATION*

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Significant increase in yield of blackgram, green gram, bengal gram, peas and lentil due to seed inoculation with appropriate *Rhizobium* cultures have been reported from different parts of the country (Patil and Gita Nilakantan, 1977; Sundara Rao, 1971). However, in cowpea, consistently significant yield increase due to *Rhizobium* inoculation was not reported (Sheriff *et ai* 1970; Lehri *et al.* 1974). The present investigation mainly deals with the effect of inoculation with selected strains of rhizobia on cowpea crop under field conditions.

Materials and Methods

The study was conducted at the Instructional Farm of the University of Agricultural Sciences, Bangalore. Five selected strains of cowpea rhizobia, namely, IS–8, IS–12, IS-14, IS–20 and UAS B-125 isolated and identified in the Department of Agricultural Microbiology, UAS Bangalore, following the standard procedure described by Vincent (1970), were used for the studies.

Seeds of cowpea cultivar 'Pusa phalguni' were treated with lignite based cultures of different strains of rhizobia prior to sowing. Seeds treated with sterile lignite served as the control. The experiment was carried out in plots of size 2.25 m x 3m in a Randomized block design. The different parameters selected for testing the efficiency of nodulation were number of nodules, its dry weight and leghaemoglobin content, plant top dry weight and its nitrogen content and the nitrogen content of root and nodules. Leghaemoglobin content of nodules were estimated by the procedure detailed by Jordan and Garrard (1951). Yield obtained as a result of different treatments were recorded at the time of harvesting.

Results and Discussion

A consistent improvement in different parameters tested for nodulation efficiency was observed only by inoculation with the strains 8 and 12. Increase in yield, dry weight and nitrogen content of plant top and nodules and leghaemoglobin content of nodules were significant as compared to the control (Table 1). increase in the number of nodules and the nitrogen content of roots were not significant Significant response of leguminous crops to *Rhizobium* inoculation has been reported by many workers (Mal and Yadav, 1972; Bajpai *et at.* 1975; Patil and Gita Nilakantan, 1977).

* Part of M. Sc. (Agri.) Thesis submitted by the senior author to the University of Agri, Sciences, Bangalore.

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Table 1

Symbiotic response ot cowpea for *Rhizobium* inoculation

Strain No.	Nodule No.	Dry weight of nodules (mg/plant)	Nitrogen in nodules (per cent)	Leghaemoglobin content (OD)	Dry weight of plant top (g/plant)	Nitrogen in plant top (per cent)	Nitrogen in root (percent)	Yield after harvest (g/plant)
IS—8	23.50	173*	4.87*	0.18*	3.41*	3.24*	1.51	4.80*
IS—12	25.75	180*	4.21*	0.71*	3.06*	3.07*	1.61	4.50*
IS—14	28.00	129	3.60	0.14	2.65	2.44	1.41	4,10
IS—20	25.75	137	3.73	0.15	2.98	2,53	1.48	4.31
UASB—125	27.25	148	3.86*	0.16*	2.94	2 89*	1.45	4.33
Control	24.75	141	3.53	0.13	264	2 43	1.39	405
CD (p=0.05)	NS	14	0.24	0.03	0.40	0.30	NS	0.30

* Significant at 5% level

Table 2

Coefficient of mutual correlation among the characters studied

Variables	Yield	Nitrogen in plant top	Dry weight of plant top	Nodule number
Yield	—	—	0 52*	0.296
Nitrogen in plant top	0.33	—	—	—
Dry weight of plant top	—	0,69*	—	—
Leghaemoglobin content of nodules	0.55*	0.88*	0.84*	0.25

* Significant at 5% level.

Correlation studies involving the different parameters showed a significant correlation between yield, dry weight of plant and leghaemoglobin content of nodules (Table 2).

Nodule number recorded for different strains under field conditions did not show significant correlation with grain yield. The absence of correlation between nodule number and grain yield has been reported earlier (Schiffmann and Lobel, 1973; Bagyaraj and Hegde, 1978). Plants inoculated with strain-14 produced maximum number of noduies but the plant top dry weight, nitrogen content in plant parts, leghaemoglobin content and grain yield were not appreciable. This indicates the highly infective nature of the strain-14. Similar observation has been reported by Gaur *et al* 1976 in groundnut. The per cent nitrogen on the 30th day of growth was greater than that of 'control' plants, but no significant correlation with final grain yield was obtained (Table 1). This indicates that the plant top nitrogen content at early stage of growth cannot be always taken as a useful parameter for assessing the efficiency of nodulation. Present study suggests that the leghaemoglobin content of nodules, plant dry weight ,and grain yield of inoculated plants can alone be taken as reliable indices for comparing the effectiveness of *Rhizobium* cultures.

Summary

Field experiment was carried out at the Instructional Farm of the University of Agricultural Sciences, Bangalore to study the response of cowpea to seed inoculation with selected *Rhizobium* strains. Significant increase in yield, plant top dry weight and leghaemoglobin content of nodules were noticed in plants inoculated with the strains 8 and 12, Correlation studies showed significant correlation between leghaemoglobin content of nodules, plant top dry weight and final grain yield. No significant correlation was observed between nodule number and nitrogen content of plant top on Thirtieth day of growth and final grain yield.

സംഗ്രഹം

വൻപയർ വിത്തുകളിൽ 8, 12-ാം നമ്പർ റൈസോബീയം കൾച്ചറുകൾ പുരട്ടുന്നതുകൊണ്ട് വിളവ് ഗണ്യമായി വർദ്ധിപ്പിക്കാൻ സാധിക്കുമെന്നു കണ്ടു. വേരുകളിലെ മൂലാർബുദങ്ങളുടെ എണ്ണവും ചെടിയുടെ വേരാഴികെയുള്ള ഭാഗങ്ങളിലെ പാകൃജനകത്തിന്റെ തോതും തമ്മിൽ ബന്ധമില്ലെന്നും കാണുകയുണ്ടായി.

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(MS Received: 19-2-1980)