

SHORT COMMUNICATION

The Effect of *Calothrix* Inoculation on Vegetable Crops

Although the beneficial influence of nitrogen fixing blue-green algae on rice plants has been well documented and substantiated their effect on other crops is little known. The present communication reports the effect of the nitrogen fixing blue-green alga, *Calothrix anomala* on two vegetable crops, viz *Capsicum annum* (chilli) and *Lactuca sativa* (lettuce).

Mass culture of the alga was run in continuously aerated 5 liter aspirator bottles in a nutrient medium containing per 100 ml of glass distilled water: 0.2 g K_2HPO_4 , 0.02 g $MgSO_4 \cdot 7H_2O$, 0.01 g $CaCl_2$, 0.1 ml. Fe-EDTA (1 mg Fe/ml) and 0.1 ml A_5 micronutrient solution of Arnon ².

The agronomical trials were conducted under pot culture conditions, using different levels of algal material in presence and absence of a single dose of urea (44.84 kg N/ha) (Tables 1, 2). The algal inoculation was done by pouring

TABLE 1

Effect of <i>Calothrix anomala</i> inoculation on <i>Capsicum annum</i> (values average of six replications)				
Treatments	Dry wt. shoot *	Dry wt. fruit **	Dry wt. root †	% N in shoot ††
	(g/pot)	(g/pot)	(g/pot)	
a) Control	2.26	1.07	2.70	2.000
b) 1.5 mg alga (dry wt.)/pot . .	2.50	2.15	3.37	2.225
c) 3.0 mg alga (dry wt.)/pot . .	3.08	2.49	4.72	2.250
d) 6.0 mg alga (dry wt.)/pot . .	3.10	2.13	3.41	2.262
e) 12.0 mg alga (dry wt.)/pot . .	3.20	2.25	6.63	2.275
f) 25.0 mg alga (dry wt.)/pot . .	3.85	2.23	5.01	2.402
g) Urea (44.84 kg N/ha)	5.00	2.30	3.83	2.412
h) (g) + (b)	6.08	1.85	3.42	2.612
i) (g) + (c)	6.03	2.15	2.80	2.625
j) (g) + (d)	6.06	2.18	3.31	2.700
k) (g) + (e)	6.70	2.22	2.39	3.025
l) (g) + (f)	8.36	1.93	4.21	2.750

* Significant at 1%; $S_e = 0.659$; C.D. at 1% 2.48, at 5% 1.866

** Significant at 1%; $S_e = 0.225$; C.D. at 1% 0.85, at 5% 0.635

† Significant at 1%; $S_e = 0.679$; C.D. at 1% 2.55, at 5% 1.92

†† Significant at 1%; $S_e = 0.037$; C.D. at 1% 0.22, at 5% 0.14

into each pot a uniform suspension of the alga to give the requisite amount of the algal material. Nitrogen estimations were done by the conventional microkjeldahl method.

Capsicum annum. The yield of fruit was uniformly higher in all the treatments than in the control. The application of urea alone and the inoculation with alga alone significantly increased the yield of shoot (Table 1). While the application of urea with lower levels of alga gave comparable yields of shoot, addition of 25 mg alga (dry wt.) per pot together with urea increased the yield of shoot significantly (Table 1, Treatment 1). The yields of dry weight of root were rather erratic and showed no significant differences.

The algal inoculation had a marked effect on the percentage of nitrogen in the crop. In the control, the percentage of nitrogen in the shoot was 2 per cent. The inoculation with alga alone resulted in a significant increase in the percentage of nitrogen, proportional to the amount of inoculum (Table 1). The effect of 25 mg alga was comparable to that of urea application. A combined application of urea and alga was still better than the application of urea or the alga alone and the highest percentage of nitrogen was observed in the series that received urea and 12 mg alga.

Lactuca sativa. While the effect of algal inoculation was comparable to the application of urea, the combined application of urea and alga gave the highest yield and was about 86 per cent above that in the series with urea alone (Table 2). Similarly, a combined application of urea and alga also significantly increased the root growth and the percentage of nitrogen in the crop.

TABLE 2

Effect of <i>Calothrix anomala</i> inoculation on <i>Lactuca sativa</i> (values average of six replications)			
Treatments	Dry wt. shoot * (g/pot)	Dry wt. root ** (g/pot)	% in N the shoot †
(i) Control	2.40	2.29	1.225
(ii) 25 mg alga (dry wt.)/pot.	4.92	6.32	1.325
(iii) Urea (44.84 kg N/ha)	4.32	6.24	1.337
(iv) (ii) and (iii)	8.04	11.37	2.002

* Significant at 1%; $S_e = 0.517$; C.D. at 1% 2.135, at 5% 1.54

** Significant at 1%; $S_e = 0.849$; C.D. at 1% 3.417, at 5% 2.51

† Significant at 1%; $S_e = 0.014$; C.D. at 1% 0.911, at 5% 0.59

A higher nitrogen content of barley seedlings due to algal inoculation was reported by Fuller *et al.* ³. The inoculation of the soil with *Tolypothrix tenuis* resulted in a significant increase in the vitamin C content of tomato fruits (Aiyer *et al.* ¹). A combined application of Azotobacter and algae proved to increase the oat harvest by 34 per cent. A reduction in the incidence of smut in barley was attributed by Periminova ⁴ to algal inoculation. The present investigation also showed that algal inoculation was beneficial and increased the yield of vegetable crops also. Noteworthy was the observation that a

combined application of nitrogenous fertilizers like urea and alga was more effective than the individual application of either of the two.

Summary

The inoculation of the soil with the nitrogen fixing blue-green alga, *Calothrix anomala* had a positive effect on *Capsicum annum* and *Lactuca sativa*, in terms of yield and percentage nitrogen. A combined application of urea and alga was more effective than their individual applications.

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