

Effect of Epiphytic Microflora of Water Hyacinth (*Eichhornia crassipes* Mort. Solms) on Wheat

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Bacterial cultures P-1 isolated from the phylloplane and mixed cultures of R-I and R-II isolated from the roots of water hyacinth increased the yield of wheat cv. HD-1982 when sprayed on foliage.

Key Words: Epiphytic microflora, Water hyacinth, Wheat

Introduction

Iswaran et al. (1973) reported the presence of *Azotobacter chroococcum* in the phylloplane of water hyacinth. Sen (1975) reported yield increases of about 130% and 80% in wheat cv. Sonalika and rice N. P. 130, respectively when a culture of this organism was applied on the foliage. Isolates from leaf and roots of water hyacinth i.e., one isolate from leaf (P-I), two isolates from root (R-I and R-II) and a mixed culture (all the three) were tested against wheat cv. HD-1982 in microplot experiments during 1976-77 and 1977-78.

Materials and Methods

The treatments included in this experiment were:

- 1) Spray of leaf isolate (P-I) on the foliage

- 2) Spray of root isolate (R-I) on the foliage
- 3) Spray of root isolate (R-II) on the foliage
- 4) Mixed culture from roots of water hyacinth
- 5) Spray with sterile water (control).

The experiment was conducted in a randomised block design. Plot size was 1m² and the treatments were replicated 4 times. P₂O₅ @ 50 kg/ha in the form of superphosphate and K₂O @ 25 kg/ha in the form of muriate of potash were applied as basal dose. Wheat cv. HD 1982 was sown during November 1976-77 and November 1977-78. Spraying with different cultures was done at 30, 40 and 65 days after germination. 100, 150 and 150 ml broth of each of the above cultures were sprayed during 1st, 2nd and

3rd sprays respectively. The average number of cells per ml of the broth used were:

- P-I — 18×10^8 cells/ml
- R-I — 20×10^8 cells/ml
- R-II — 43×10^8 cells/ml

Grain and straw yields were recorded. Total nitrogen in grains was determined by the micro Kjeldahl procedure.

Results and Discussion

Table 1 shows the performance of P-I, R-I, R-II and the mixed culture, containing all three. Variation in the response of wheat crop to different cultures was observed during the two years. Maximum increase in wheat yield was obtained in response to the application of P-I. Spraying with R-I, R-II and with the mixed culture gave better yields during 1977-78 than in 1976-77. There

was significant increase in nitrogen content in grains and in straw yields in the treatments over the control.

When the cultures were examined for their nitrogen fixing ability it was observed as below:

- P-I — 1.96 mg/g sucrose
- R-I — 1.99 mg/g „
- R-II — 11.76 mg/g „
- Mixed culture—11.76 mg/g „

Sircar and Chakravarti (1962), Iswaran and Sen (1973) have reported the beneficial effect of sprays of extracts of water hyacinth on various crop plans. The beneficial effects obtained might be due to the activities of these epiphytic organisms in releasing free amino acids, nitrogenous substances, gibberellin and IAA like substances.

The findings are preliminary and confirmation of the data in field is currently under way.

Table 1 *Effect of epiphytic cultures on yield and nitrogen uptake in wheat var. H.D. 1982 (Micro-plot experiment)*

Treatment	1976-77 <i>Yield in q/plot</i>		N uptake in grains g/plot	1977-78 <i>Yield in q/plot</i>		N uptake in grains g/plot
	Grain	Straw		Grain	Straw	
Control	250.75 ± 12.42	366.25 ± 21.72	5.47 ± 0.36	291.25 ± 17.60	397.75 ± 12.60	6.85 ± 0.49
Spray of P-I	360.00 ± 24.46	450.00 ± 27.56	8.52 ± 0.86	358.00 ± 20.44	481.25 ± 11.24	10.22 ± 0.90
Spray of R-I	316.75 ± 18.01	408.25 ± 21.80	6.69 ± 0.44	385.50 ± 9.19	513.25 ± 14.65	10.38 ± 1.00
Spray of R-II	318.25 ± 17.39	406.75 ± 37.81	7.30 ± 0.36	425.00 ± 5.00	554.50 ± 2.75	10.85 ± 0.75
Spray of mixed culture	276.25 ± 15.98	373.75 ± 34.30	5.68 ± 0.34	404.25 ± 41.10	508.25 ± 39.00	10.10 ± 1.06
C.D. at 5% level	54.68	NS	1.34	80.66	67.67	2.67

Average of four replications
NS, Non-significant

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