

EFFECT OF INDIVIDUAL AND COMBINED INOCULATION OF *AZOSPIRILLUM LIPOFERUM* ON WHEAT (*T.aestivum*) CROP

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Response of individual and combined strains of *A. lipoferum* (native and introduced) inoculation to wheat crop, in black cotton soils of Gulbarga district were studied. Higher yields of root and shoot dry matter and high nitrogenase activity (C_2H_2 reduction) were observed due to inoculation effect, as compared to uninoculated control. However, results of inoculation with combined strains of *Azospirillum* indicated no significant effect on the yield of dry matter and nitrogenase activity in comparison with individual strain inoculation.

The potential nitrogen fixing association between *Azospirillum* and tropical grasses (Neyra and Debereiner, 1977) has drawn considerable attention for improving crop yields under tropical and sub-tropical conditions (Kalpulnik *et al.*, 1981). Beneficial effects of combined inoculation of *Azospirillum* with other nitrogen fixing organisms, such as, *Azotobacter*, *Rhizobium* and blue green algae, on the yield of leguminous and non leguminous plants have also been reported (Sundaram and Balasubramanian, 1986). The present study was undertaken to know the effect of *A. lipoferum*, both native and introduced strains (individual and in combination), on the growth parameters and nitrogenase activity of wheat plants.

MATERIALS AND METHODS

One native (GUG₁) and two introduced strains (Sp 59 from Brazil, and UAS₁₀ from Bangalore) were grown on a semi-solid malate medium for 72 hours, then mixed (40 ml culture of 10⁸ cells/ml to 50 gms of carrier)

with a sterilized carrier (soil : F. Y. M. : : 1:1) and incubated at room temperature (29 to 32°C) for one week (Lakshmi *et al.*, 1977). An aqueous solution of a sticker (6 gms of carboxymethyl cellulose in 500 ml of water) was sprinkled on surface sterilized wheat seeds. The carrier based inoculant (individual and combined cultures) was then sprinkled to mix uniformly. Such treated seeds were sown (10 seeds per pot which were thinned out to 8 seedlings later) in 12" size earthen pots containing 10 kgs of sterilized soil of pH 7.0. Plants raised from uninoculated seeds served as control. Ten weeks after sowing the seeds, the wheat plants were uprooted carefully, to record their fresh and dry weights of both root and shoot portions. Acetylene reduction test was carried out by Gas Chromatography method using a flame ionization detector (Nur *et al.*, 1980).

RESULTS AND DISCUSSION

Results on the effect of individual and combined strains of *A. lipoferum* on different growth parameters and

TABLE : Effect of individual and combined seed inoculation of *A. lipoferum* on wheat crop

Treatments	Shoot Weight (g/pl)		Root Weight (g/pl)		C ₂ H ₄ reduction n moles of ethylene/h/plant
	Fresh	Dry	Fresh	Dry	
Control	1.251	0.783	0.074	0.036	32
Sp 59	2.216	1.289*	0.256	0.173*	58*
GUG ₁₁	2.297	1.174*	0.251	0.160*	62*
UAS ₁₁	2.471	1.295*	0.270	0.179*	56*
Sp 59 + GUG ₁₁	1.980	0.997	0.138	0.078	48
Sp 59 + UAS ₁₁	1.876	0.919	0.142	0.077	46
GUG ₁₁ + UAS ₁₁	1.923	1.050	0.104	0.054	49
Sp 59 + GUG ₁₁ + UAS ₁₁	1.834	0.956	0.098	0.049	45

*Significant at 5% level

nitrogenase activity of wheat plants are given in the Table. The results revealed that, there was a considerable increase in the root and shoot dry weight and nitrogenase activity, due to the inoculation effect of *A. lipoferum* (individual and combined) as compared to uninoculated control. In the present investigation, unlike the beneficial effects of combined inoculation of *Azospirillum* with other nitrogen fixing organisms (*Azotobacter*, *Rhizobium*, blue green algae etc.) on yield of many leguminous and non leguminous crops (Sundaram and Balasubramanian, 1986), no significant beneficial effect on the yield of dry matter content and nitrogenase activity was observed when inoculated with combined strains of *A. lipoferum* (native and introduced) as compared to individual strain inoculant. This may be due to a competitive role for a common food material for their survival at the rhizosphere region of cereal crops rather than competition for nitrogen fixation. Thus the present investigation suggest the use of individual seed inoculation

of *A. lipoferum* to have beneficial effect, and to get higher yield.

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