



## Response of *Triticum aestivum* Var.II 2184 (Wheat) to Wild Strains of *Azotobacter* and *Bacillus*

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### Abstract:

The wild strains of *Azotobacter* and *Bacillus* were used as the biofertilisers. In this treatment, the height of cob and grain weight, shows maximum result due to combined inoculation of both strains. Slightly less results obtained while sole application of bio-fertilisers to plant *Triticum* variety.

**Key words:** *Azotobacter* and *Bacillus*, biofertilisers, Plant, Soil.

### Introduction:

Bacteria containing fertilizers, such as Azotobacterin and Phosphobacterin were extensively used in Russia to improve soil fertility. Killian and Fether (1939) were busy in Russia on several problems relating to interaction between plant and soil microorganisms. The rapid expansion in the field of bacterial genetics had its impact on the study of nitrogen fixing microorganisms. The Departments of Agriculture in several states were investigate soil microbiological aspects of crop cultivation (Subba Rao, 1974). *Azotobacter* inoculants are popular in India because it can be applied to many non-leguminous crops and promotes seed germination and initial vigour of plants due to growth substances produced by this organism (Shende et al, 1977).

### Material and methods:

#### I) Collection and Isolation of Bacteria

*Azotobacter* and *Bacillus* were collected and isolated from rhizosphere of plant soil of various field from Nagpur district by Soil Dilution Method (Gaur, 1990 and ISI, 1979) and cultivated in Jensen's and Pikoviskaya's medium respectively. This wild/lab strain maintained in laboratory.

#### II) Field application of Bio-fertilizer on plant

Field experiment was conducted as per Factorial Randomised Block Design (FRBD) with four treatments replicated in three times. The amount of wild strain of inoculation was given to 1ml/ seedling plant.

##### a.) Mass culture of bacteria

Bacteria lab or wild and metallic strains were prepared in 1000 ml of respective medium. After having 1.5 optical density at 660 nm, 1 ml / seeding plant were used individually for experiments.

##### b.) Bacterial treatments (wild strain treatments)





No treatment	=	T
Treatment with <i>Azotobacter</i> (Wstrain)	=	T1
Treatment with <i>Bacillus</i> (W strain)	=	T2
Treatment with (T1 + T2)	=	T3

## Result and discussion:

Table shows that the wild strains of *Azotobacter*, *Bacillus* were used as the biofertilisers. In this treatment, the height 20.5 to 21.6 cm with 7.4 cm, height of cob and grain weight 2.16-2.18 gm/cob having test weight 5.95-6.10 gm/100 seeds were obtained due to individual applications of biofertilisers separately. While in combined inoculation of two biofertilisers, *Azotobacter* and *Bacillus* height 23.5 cm, with 8 cm cob, the grain weight 2.23 gm/cob and test weight 6.14 gm/100 seeds were obtained which is maximum than individual and control.

In *Triticum* the plant height, and yields of crops were reached to a maximum levels due to combined effects of *Azotobacter* and *Bacillus* as fertilizers. The yield of wheat was increased significantly over control with individual dose of inoculant of *Azotobacter* and *Bacillus*. Gaur and Ostwal (1972) recorded the *Bacillus polymyxa* increased the grain and straw yield in wheat. They further reported that *Pseudomonas straita* with superphosphate and rock phosphate significantly increased yield of wheat. Inoculation of wheat seed with mixed culture of nitrogen fixing and phosphate solubilizing bacteria increased grain yield, dry matter weight as compared with uninoculated treatment (Kundu and Gaur, 1980b). Later in 1982, they reported that seed bacterization (*Azotobacter chroococcum* and PSB) increased appreciably the yield and uptake of nutrients by wheat over uninoculated control. The highest increase in grain and straw yields was with *Bacillus polymyxa* and *Pseudomonas straita* among single and mixed cultures respectively. Similar result shows that single culture inoculation with the phosphobacteria was better than *Azotobacter*. Associative influence of nitrogen fixing and PSB was not observed over single cultures. However, the use of mixed cultures of phosphobacteria improved crop productivity significantly.

**Table. 1-** Effect of wild (W) strains of *Azotobacter* and *Bacillus* on *Triticum aestivum* (Wheat plant).

Treatment	T	T1	T2	T3
Plant height(cm)	15.2	20.5	21.6	23.5
Length of cob (cm)	7.2	7.4	7.4	8.0
Grain wt. of cob(gm)	2.10	2.16	2.18	2.23
Test weight/100 seeds (gm)	5.82	5.95	6.10	6.14





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