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Effect of Biopost on Different Fungal Diseases of Wheat

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ABSTRACT

Studies were conducted to evaluate the effect of biopost on different fungal diseases of wheat for two consecutive years. The addition of biopost single dose (300 kg/ha) proved highly effective. It reduced the disease incidence by 41 and 50% during 1995-96 and 1996-97, respectively. It was closely followed by NPK (½ of the recommended dose) + biopost which showed 34 and 36% decrease over control during the respective years.

Key Words: Biopost; Wheat; *Azotobacter;* Fungi; Pakistan

INTRODUCTION

Per acre yield of wheat in Pakistan is still low as compared to other wheat growing countries. Low yield is due to several factors, fungal diseases keeping the most important in this regard. Some fungi such as *Penicillium* and *Aspergillus* produce dark humus like substances which serve as structural basis for humic substance formation (Gray & Williams, 1971). Azotobacter is known to produce an ether soluble fungistatic substance which inhibits the growth of fungi like *Alternaria, Helminthosporium* and *Fusarium* etc. under lab. conditions (Singh, 1977). Disease incidence of *Rhizoctonia solani* in cotton was reduced by 83% after seed coating with *Trichoderma* spp. spores (Elad *et al.*, 1982).

Biopost, a biofertilizer containing beneficial micro-organisms increases plant vigour and decreases disease incidence as well. *Azotobacter* inoculants have also been reported to promote seed germination and initial vigour of plants due to growth substances produced by these organisms (Shende *et al.*, 1977).

MATERIALS AND METHODS

The field experiments were conducted at Plant Pathology Research Area, University of Agriculture, Faisalabad, during the years 1995-96 and 1996-97. The net plot measured 5x16.66 m. Field was divided into 18 plots using randomized complete block design, replicated thrice with six treatments in each replication. During 1996-97, 16 plots were prepared with four replications and four treatments. Biopost, Urea, DAP and K_2SO_4 were added @ 300 kg, 207.6 kg, 154.8 kg and 103.2 kg/hectare respectively. Farm yard manure was mixed before sowing @ 25 tonnes/ha. Line to line distance was 0.33 m, plot to plot 0.66 m and replication to replication 1 m. Before sowing, biopost was spread in the field during both years. The seed treatment was done only in 1996-97. The observations on disease incidence of various diseases were recorded. The data were statistically analyzed using Fisher's analysis of variance technique and least significant difference test at 5% probability level was applied to test the significance among treatment means (Steel & Torrie, 1984).

RESULTS AND DISCUSSION

During 1995-96, the differences in the decrease of disease incidence due to treatments were highly significant. Individual comparison indicated that the treatment with Biopost showed maximum reduction in disease incidence i.e. 28.67 and it gave 41% decrease over control (Table I). It differed significantly with treatments NPK ½ + Biopost double dose and NPK (recommended). The minimum reduction in disease incidence was observed where NPK ½ + biopost double dose was added. It showed less effectiveness and gave 8.9% decrease over control.

During 1996-97, biopost (single dose) retained its effectiveness and gave 50% decrease over control (Table II). It differed significantly with NPK (recommended). The minimum reduction in disease incidence followed by addition of NPK was 18%.

Biopost is actually a combination of such beneficial micro-organisms that act on organic matter and convert it into humus. It contains bacteria which take nitrogen from atmosphere, convert it into organic form and provide to the plants in the process of their metabolic activity. These micro-organisms cause about

Table I. Effect of Biopost on disease incidence of various diseases during 1995-96

Treatment	Means	Per cent decrease	Ranked order
Control	48.67 a	-	1 = 48.67 a
NPK*	42.00 ab	13.70	6 = 44.33 ab
BP	28.67 d	41.00	2 = 42.00 ab
BPD.	38.33 bc	21.24	4 = 38.33 ab
NPK ½ + BP	32.00 cd	34.00	5 = 32.00 cd
NPK ½ + BPD	44.33 ab	8.90	3 = 28.67 d

*Recommnded; BP= Biopost; BPD= Biopost double dose

Table II. Effect of Biopost on disease incidence of various diseases during 1996-97

Treatment	Means	Per cent decrease	Ranked order
Control	25.00 a	-	1 = 25.00 a
NPK*	18.00 b	28.00	2 = 18.00 b
BP	12.50 c	50.00	4 = 16.00 b
NPK ½ + BP	16.00 b	36.00	3 = 12.50 c

*Recommended

degradation of higher molecular substances to low molecular substances and thus these elements become available to the plants. Ultimately plant vigour is increased which helps fight the diseases. Some micro–organisms like *Rhizobium japonicum* produce substances which are fungistatic and suppress the growth of different fungi (Chakraborty & Purkayastha, 1984).

Similar results have been reported by Singh and Mehrotra, (1980). Keeping in view the immense importance of biopost, further studies on biofertilizers are imperative.

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