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Studies on the Antagonistic Relationship of Soybean Spermosphere Microflora with *Rhizoctonia bataticola* and *Sclerotium rolfsii*[*]

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Soybean (*Glycine max*) covers more than 12 lakh hectares in Madhya Pradesh as per 'Agricultural Statistics', Directorate of Agriculture, M.P. 1985. Among the several diseases of soybean, the two soil borne pathogens *Rhizoctonia bataticola* and *Sclerotium rolfsii* cause pre-and post emergence losses upto 40 % (Jharia and Khare, 1986). The soil being a complex store house of different micro-organisms, influences germinating seeds in one way or other. In the present investigations, the spermosphere microflora on and around the germinating seed was examined for their antagonistic effect on these two important soil borne pathogens.

To study the spermosphere, soybean seeds were sown in the experimental area of the Department of Plant Pathology, J.N. Krishi Vishwa Vidyalaya, Jabalpur. Uungerminated and germinated but unemerged seeds were taken out with the help of a forceps at an interval of 3 days upto 12 days. Ten seeds along with the soil particles were thoroughly washed in 10 ml of sterile water by shaking for 10 minutes. One ml of this washate was transferred to 9 ml sterile water to get the dilution of 1:10 and serial dilutions were prepared upto 1:10000 for isolation of fungi and 1:100000 for isolation of bacteria and actinomycetes. Half ml of the dilutions was poured on Petri plate containing streptomycin Dexon potato dextrose agar medium for fungi and on nutrient agar for bacteria. Ten plates were poured for each treatment and the mean was calculated. These Petri plates were incubated at 25 ± 1°C for six days for fungi and five days for bacteria. Different fungal and bacterial colonies were counted and transferred to PDA and nutrient agar slants respectively for further study.

The total population of spermosphere microflora obtained from 3,6,9 and 12 days after sowing was counted and the data are given in Table 1.

Out of the total count, percentages of the antagonists viz., *Trichoderma harzianum* and *Bacillus subtilis* and the pathogens *viz., R. bataticola* and *S. rolfsii* were calculated. It indicated that maximum number of bacterial colonies were isolated from the 6th day samples followed by 3rd day, 9th day and lowest number from 12th day. However, percentage of *B. subtilis* (40%) was highest on the 12th day.

The total number of fungal colonies isolated from the spermosphere of ungerminated seeds was maximum on the 6th day followed by 9th day and only the lowest number of colonies was detected from 3rd and 12th day after sowing. Out of these total fungal colonies isolated, the highest percent of *R. bataticola* and *S. rolfsii* was obtained from the 6th day sample. *B. subtilis* increased from 20 on the 6th day to 40 per cent on the 12th day.

The gradual increase in *T. harzianum* and *B. subtilis* populations in the spermosphere after 6th day of sowing and decrease in the per cent association of *R. bataticola* and *S. rolfsii*

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Table 1. Spermosphere microflora isolated from seeds of soybean 3,6,9 and 12 days after sowing (Average of ten plates)

Number of days after sowing	Total number of bacterial colonies	Per cent *Bacillus subtilis*	Total number of fungal colonies	*Rhizoctonia bataticola*	Per cent *S. rolfsii*	*T. harzianum*	Other fungi
3	18	11.0	12	15.0	20.0	3.3	*Alternaria alternata, Aspergillus flavus, A. niger, Penicillium* sp. and non sporulating fungi
6	24	20.0	32	20.0	25.0	10.0	*A. flavus, Curvularia lunata, Fusarium oxysporum, F. moniliforme, Penicillium* sp. and non-sporulating fungi
9	12	30.0	20	10.0	15.0	35.0	*A.alternata, A. flavus, A. niger, F. oxysporum, Curvalaria verruculesa, Trichoderma* sp. and non-sporulating fungi
12	10	40.0	12	5.0	10.0	40.0	*C. lunata, Dreschslera sp. F.oxysporum, F.solani, Penicillium* sp., *Trichoderma* sp., *Trichocladium* sp., and non-sporulating fungi

might be due to ecological relationships among the microorganisms. The antagonistic activity of *B. subtilis* against *R. bataticola* has been demonstrated earlier by Singer and Mehrotra (1980), Jharia and Khare (1986) and Ramakrishnan and Jeyrajan (1986) and against *S. rolfsii* by Ahmed and Ahmed (1965). The antagonistic activity of *T. harzianum* against *R. bataticola* (Kraft and Papavizas, 1983) and against *S. rolfsii* (Elad *et al.*, 1983 : Henis *et al.*, 1983) reported earlier conform to the finding of the present investigations.

Key words : Soybean, spermosphere microflora, interaction, *Rhizoctonia-bataticola, Sclerotium rolfsii*

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