

Colonization of Pathogenic Fungi by Bacteria in Soil

T. M. LAGUTINA, N. M. LABUTOVA, T. P. ZUEVA and G. S. MUROMTSEV
All-Union Research Institute for Agricultural Microbiology, Leningrad /USSR/

One of the causes of agricultural production losses is the activity of plant pathogenic fungi. It is known that bacteria can colonize the mycelium and spores of such fungi in the soil and lyse the fungi. The colonization of pathogenic fungi by bacteria in the soil was studied, using the combined membrane chamber technique.

The inoculum of pathogenic fungus was placed on the membrane filter. The filter with the test fungus was wrapped into a piece of gauze from both sides. This triple-fold chamber was fastened on a slide frame and introduced into the soil. After the incubation period the chamber was taken out of the

Table 1
Antagonistic effects of bacterial isolates with different concentrations of cells to Verticillium dahliae

Concentration of bacterial cells, 1.10^6 cells ml^{-1}	Numbers of bacterial isolates, %					
	Inhibition:				Mycelium lyses	
	microsclerotia germination		mycelium growth			
	in water chamber	in soil	in water chamber	in soil	in water chamber	in soil

Bacteria isolated from membrane chamber with <u>Verticillium dahliae</u>						
1	15.4	30.8	46.2	7.8	0.0	16.6
100	76.9	69.2	100.0	53.9	23.1	41.6
Bacteria isolated from soil						
1	11.1	27.4	20.0	10.0	0.0	0.0
100	66.7	54.5	60.0	20.0	0.0	0.0

soil and the bacteria were counted by plate dilution method. We used meat agar as growth substrate.

The bacterial association formed on the membrane filter near the test-fungus *Verticillium dahliae* appeared to be specific, its structure differing from the soil. The ability of bacteria-colonizers to have antagonistic effects on the fungi also differed from that of the ones of the soil. The inhibition of the germination of spores, growth and lyses of the test-fungus *Fusarium oxysporum* were higher in comparison to that in soil. The antagonistic effects depended on the quantity of bacteria cells. The increase of the concentration of the bacterial cells resulted in the increase of antagonization of fungi by bacteria and the antagonistic effect of those bacteria /Table 1/.

These results open the way to the biological control of pathogenic fungi in soil.