(3-methoxycarbonyl-2-thioureido)benzene (thiophanate methyl) against T. basicola.

Since the root-infecting fungi rarely occur singly in the field, various combinations of fungicides were tested in the greenhouse and field for the control of root rot caused by F. solani f. sp. phaseoli, R. solani, and T. basicola. Root rot caused by the three pathogens combined was reduced considerably by Difolatan + chloroneb, Difolatan + TSX + benomyl, Difolatan + chloroneb + benomyl, and especially by Difolatan + chloroneb T + thiophanate methyl. When tested in the field at Beltsville with the cultivars Gallatin 50 and Gold Coast Wax, the last combination increased plant stand and resulted in excellent plant appearance. Significant yield differences were observed with the Difolatan + chloroneb T + thiophanate methyl combination in one field experiment but not in a second one. Bean varieties varied considerably in their sensitivity to single fungicides and fungicidal combinations.

Root Rot of Dry Beans in Nebraska

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Initial surveys and bean root collections were conducted with E. D. Kerr in western Nebraska in 1970 and 1971. Out of a total of over 1000 isolations, Fusarium solani was identified in 70 percent of the isolations. Samples of the F. solani cultures were found to produce the same symptoms (small reddish lesions which coalesce as the disease progresses on the taproot, small lateral roots, and hypocotyl) in the greenhouse as were observed in the field. Although Rhizoctonia solani was identified in 7 percent of the islolations, the field symptoms are different and normally appear earlier than the F. solani symptoms. Fusarium solani f. sp. phaseoli is considered to be the primary pathogen in root rot of dry beans in Nebraska

In studies to appraise the yield loss due to root rot in Nebraska, data were gathered from an average of 38 bean fields per year over three successive summers. From statistical analysis of the data, adventitious root formation (sometimes observed in association with the disease symptoms) was not found to be related to root rot index or seed yield by simple correlation. Although the number of pods per plant was not related to root rot index, total seed yield was inversely correlated with root rot index. Based on a multiple regression analysis and specifying a mean seed yield of 40 $\pm$ 14 bu/A and a root rot index interval from 1-4 (1-5 scale), a loss of 3-4.5 by/A was estimated per unit of root rot rating. This model, however, could only account for 45 percent of the variation in grain yield indicating that other variables are not accounted for.

Chemical control of Fusarium root rot using seed treatment fungicides has not been effective. Studies in cooperation with E. D. Kerr on the use of soil fumigation as a preplant treatment has shown some promise in root rot control and increasing bean yields. In evaluating Phaseolus vulgaris Plant Introduction material in cooperation with D. P. Coyne, PI No. 165-426 was found to have a good level of root-rot resistance or tolerance as well as good horticultural characters. In crosses with lines of bacterial common blight tolerant Great Northern #1 sel. 27, root rot tolerant selections also exhibiting earliness and white seed have been made. Further crosses will be made with these selections with the hope of developing a root rot tolerant or resistant variety with good seed quality and yield.

Bean Root Rot Research

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Chemical control of bean root rot in Wisconsin has been researched for several years in plots on infested soil at the University of Wisconsin Experimental Farm near Hancock, WI on the overhead irrigated "central sands." In 1971 we studied the chemical Mertect applied at three different dosages to the soil in two differ-