SOUTHWESTERN COTTON RUST

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Cotton rust was present in lower-than-usual amounts in 1969 in Pinal, Pima, Graham and Cochise counties. Although the summer rainfall in 1969 was favorable for the occurrence of the disease it appears that the droughty conditions of August and September, 1968, greatly restricted the build-up of inoculum on the grama grass. Hence, we went into the 1969 season with very little inoculum and we experienced little rust on the cotton.

Experimental plantings of our rust-tolerant lines of Upland cotton were made at 4 locations in Pima and Cochise counties, but only in the planting near Elfrida, Cochise county, did we experience sufficient rust to permit grading of the material for disease reaction. Plant selections were made at all locations and have been subjected to fiber and agronomic tests. They were tested also for disease reaction in inoculation experiments conducted in the greenhouse. Selections surviving these several tests will appear in our field trials in 1970.

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PHYMATOTRICHUM ROOT ROT

H. E. Bloss
Plant Pathologist

Emphasis is being placed on studies of the life cycle of Phymatotrichum omnivorum, the cause of root rot in cotton, to determine the role of spore mats and the persistence of strands and sclerotia in the soil in perpetuating and spreading the fungus.

The occurrence of the basidial stage of P. omnivorum, reported one year ago, following treatment with vitamin D_3, has been made for 4 isolates of the fungus from Arizona and 2 isolates from Texas. All six isolates produce sclerotia on steam-sterilized soil and have been induced to produce viable asexual conidia under light on an agar medium containing ergosterol. Methods of controlling the production of spores which may spread the fungus in irrigation water or on cultivating equipment are being investigated. Studies to determine the time of production and persistency of strands and sclerotia in soil where cotton plant debris was removed or roots were allowed to remain throughout the winter have provided information about the overwintering of these structures which survive to infect the following crops.

Attempts to control Phymatotrichum Root Rot by incorporating high tonnages of barley, peas or other green manure crops into the soil following the harvesting of cotton have had some success. The breakdown products of

papago pea and barley residues, which have shown marked effects in reducing Phymatotrichum Root Rot following their incorporation in soil, have been identified chromatographically. Several phenyl fatty acids, 2 phenyl propionic, 3 phenyl propionic and 4 phenyl butyric, suppress production of sclerotia and reduce growth of mycelium on agar and soil media. These chemicals as well as 2, 4 dihydroxybenzoic acid at concentrations of 100-1000 ppm prevent germination of sclerotia.

In 1968 and 1969 a new cotton strain, a hexaploid, developed by Dr. H. Muramoto, was tested for its ability to escape the inoculum of Phymatotrichum omnivorum deep in the soil. The cotton strain has the genetic character of producing numerous, shallow, feeder roots which shows promise for escaping the strands and sclerotia of Phymatotrichum omnivorum which survive at depths of 3-5 feet in the soil.

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SOIL TREATMENT FOR NEMATODES

Where nematode infestation levels warrant treatment the use of nematocide may enhance plant growth and increase early cotton set. The yield of seed cotton on the untreated plot was reduced 35% in the first picking and 20% in the second. Total seed cotton reduction was 32.3%.

Delbert Beyers -- Buckeye Agricultural Extension Agent -- Charles Farr

	Seed Cotton Yield-Lb/Plot			
Treatment	1st Pick	2nd Pick	Total	Ave. Yield lb/A
Nemazon 12.1 lb/A	395	93	488	1096
Untreated	255	75	330	736

Crop History

Planted:	3/21
Harvested:	First Pick 10/20 Second Pick 11/22
Previous Crop:	1966 Barley and Maize 1967 Cotton 1968 Cotton
Soil Type:	Sandy loam
Soil Treatment:	12.1 lb Nemazon per acre injected 12-15 inches deep in center of bed with single shank each row