

Calcium Polysulphides For Root-Rot Control?

Tests To Date Show No Results

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Plant Pathology

In October 1951, a cotton grower reported the eradication of a root-rot spot in his field following the accidental flooding of the spot while soluble sulphur (calcium polysulphides) was being applied to improve water penetration on adjoining land. The area was inspected by a number of people who were impressed by the absence of root rot where it was said to have occurred the previous year.

Control Long Sought

For many years there has been great interest in the possibility of finding a chemical which will eradicate root rot from relatively small spots to keep it from spreading into non-infested areas. Many compounds have been tried against root rot, both in Arizona and in Texas.

Each year the University of Arizona has tested one or more new soil fungicides developed by commercial companies. To date, no soil treatment has proved to be effective.

Calcium polysulphides, however, have a number of characteristics which would make them good fungicides: (1) They are alkaline in reaction and presumably would not be fixed in the surface layers or quickly changed chemically in the soil; (2) they are one of the oldest and best

known fungicides for use as dormant or summer sprays on fruit trees and as summer sprays on vegetables against leaf and fruit diseases; and (3) they are relatively cheap compared to other compounds of fungicidal value.

A comprehensive program of testing these compounds was begun last fall and a very brief summary of the first year's results is given below:

The compounds come as a liquid concentrate containing about 29 percent sulphur and are applied in irrigation water at the rate of about 20 gallons per acre to increase water penetration. The Department of Agricultural Chemistry has been studying this phase of the question and reports good penetration, so the chemical apparently is carried to a depth of 3 or 4 feet at least.

A series of concentrations from 10 to 160 gallons per acre were applied in cylinders of known area placed around the stem of cotton plants dying of root rot so the soil around the taproot was saturated by the solution. No evidence of control was observed, but the experiment was considered inconclusive on account of the lateness of the season.

Control Not Obtained

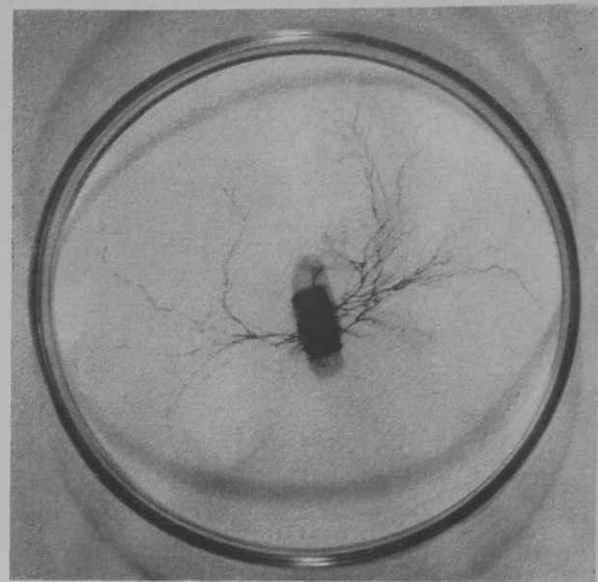
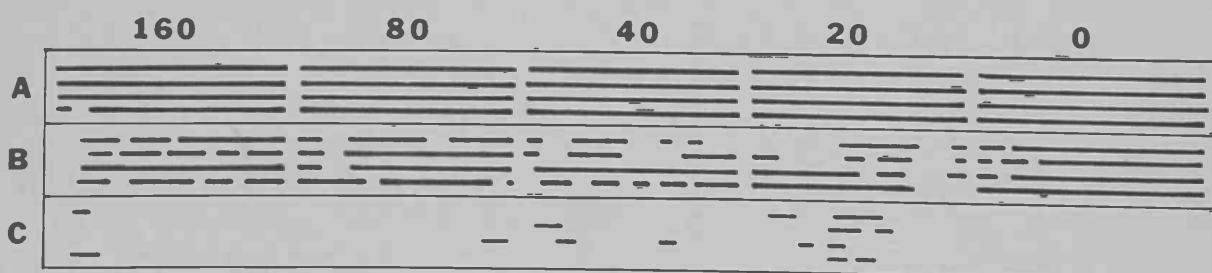
In the spring of 1952, a plot of land on which 97 percent of the cotton plants died of root rot in 1951 was treated by applying calcium polysulphides in open furrows at the rates of 20, 40, 80 and 160 gallons per acre. At the end of the growing season none of the treated plots had more surviving plants than the adjoining untreated plot. (See the diagram below.)

Plots of root-rot infested land planted to cotton in 1952. Heavy bars represent plants killed by root rot at end of season, November 1.

A. Treated with calcium polysulphide at 20, 40, 80 and 160 gallons per acre before planting.

B. Untreated.

C. Winter cover crop of Papago Peas followed by early maturing cotton (Arizona 44).



This piece of taproot of cotton plant, dying of Texas root rot, was soaked in calcium polysulphide solution and incubated on sterile moist filter paper. The vigorous growth of strands of the root-rot fungus shows that the organism was not killed by the treatment.

Plots of alfalfa (one-seventh acre each) were carefully mapped to show the extent and distribution of root rot. The alfalfa was then cut and calcium polysulphides applied in the irrigation water at the rates of 35, 70 and 140 gallons per acre. About one month later when the alfalfa was again ready for cutting, the plots were mapped again and the root rot had not measurably decreased in any of the replications.

Application of calcium polysulphides in irrigation water to fruit trees and various ornamental shade trees and shrubs visibly affected by Texas Root Rot, has not proved to be a dependable treatment. In fact, most of the treated trees and shrubs are now dead.

In an effort to determine the toxicity of calcium polysulphides to the root rot fungus, short pieces of taproot of cotton plants bearing visible strands of the root rot fungus were immersed in a series of concentrations of the chemical from 10 to over 3,000 gallons per acre, and then incubated on sterile moist filter paper. The root-rot fungus surviving this treatment developed its distinctive light brown strands easily seen against the white paper. (See the photo at top of this page.) No evidence of toxicity to the fungus was seen until impractical dosages were used.

Not Recommended

In summary, while studies are being continued, results to date have been very disappointing and on the basis of our present knowledge, calcium polysulphides cannot be recommended for prevention or control of root rot.