follows: Small pieces of fresh sclerotial masses of *P. omnivorum* were placed on wads of moist absorbent cotton in culture tubes, the tubes placed inside 2-quart Mason jars, and materials to be tested placed also in the jars at 0.144, 0.72 and 2.88 gm per jar. The materials could act on the sclerotial masses only after diffusing through the air and through the cotton plugs of the tubes. After various periods of exposure the sclerotial masses were transferred aseptically to agar slants and growth observed. At the lowest concentration tested, pentachlorethane, tetrachlorethane, xylene and ammonia killed the fungus masses within 24 hours. Carbon disulfide and 14 other materials were less rapidly toxic; and naphthalene and alpha naphthol were not toxic within the limits of the test.

The ability of the materials to penetrate moist soil and then inhibit growth of the root-rot fungus was tested as follows: Mason jars were filled with moist Houston black clay soil, inoculum of the fungus placed against the glass at various depths in the soil, the materials to be tested placed on the surface, and the jar lids clamped tightly. The following materials, when added on the surface at rates of only 100 ppm of the air-dry soil weight, were able to penetrate to the bottom of the jars (135 mm with 1-quart jars) and there completely prevent growth from the fungus inoculum: pentachlorethane, tetrachlorethane, xylene, carbon disulfide, perchlorethylene, trichlorethylene, dichlorethylene, turpentine and paradichlorobenzene. Some of the materials were ineffective at the highest rates tested: New Improved Ceresan and the other organic-mercury compounds when added at 2,000 ppm; formaldehyde at 4,000 ppm; and ammonia even at 10,000 ppm.

Only pentachlorethane, tetrachlorethane and xylene were completely effective against the root-rot fungus, at the lowest concentration tested, by both methods.

A preliminary field test with tetrachlorethane was started late in the summer of 1933. Tetrachlorethane was applied around cotton plants in six comparable areas at the advancing edges of root-rot spots, 4 additional areas serving as checks. The material was poured into holes (4 per square foot) pierced with a crowbar to a depth of 6 inches. Rates of application were calculated on the soil-weight basis to supply, respectively, 500 or 1,000 ppm of tetrachlorethane to a depth of 4 feet. After 15, 21 and 32 days, trenches 2 feet deep were dug next to the plants, and the roots were separated from the remaining soil, cut into sections corresponding to various depths, placed in separate jars of moist soil, and kept under observation for at least a month.

Phymatotrichum strands grew profusely from the roots from all the check areas. From the 39 plants from the treated areas, on the contrary, there was no Phymatotrichum growth, except from the 12 to 16 inches deep portion of the tap-root of a plant located in exceptionally dense clay at the edge of an area treated at 500 ppm and dug after only 15 days. With this exception, the treatments were successful in killing the root-rot fungus on or within the affected cotton roots in the treated areas, to a depth of at least 2 feet.

Excavation of plants adjoining the treated plats showed that the fungicidal effectiveness of the treatment did not extend more than a few inches horizontally beyond the areas treated. There was no evident injury from the tetrachlorethane to either the treated or neighboring cotton plants.

Summary: Pentachlorethane, tetrachlorethane and xylene were most effective in laboratory tests of ability of volatile materials to kill the root-rot fungus *Phymatotrichum omnivorum,* and to penetrate moist soil and inhibit growth of the fungus. In a preliminary field test, tetrachlorethane placed in the soil at a depth of only 6 inches killed the fungus on cotton roots to depths of at least 2 feet. These highly toxic, soil-penetrating fungicides appear promising for further trial against Phymatotrichum root rot, and are suggested for trial also against other injurious organisms found in the soil.

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