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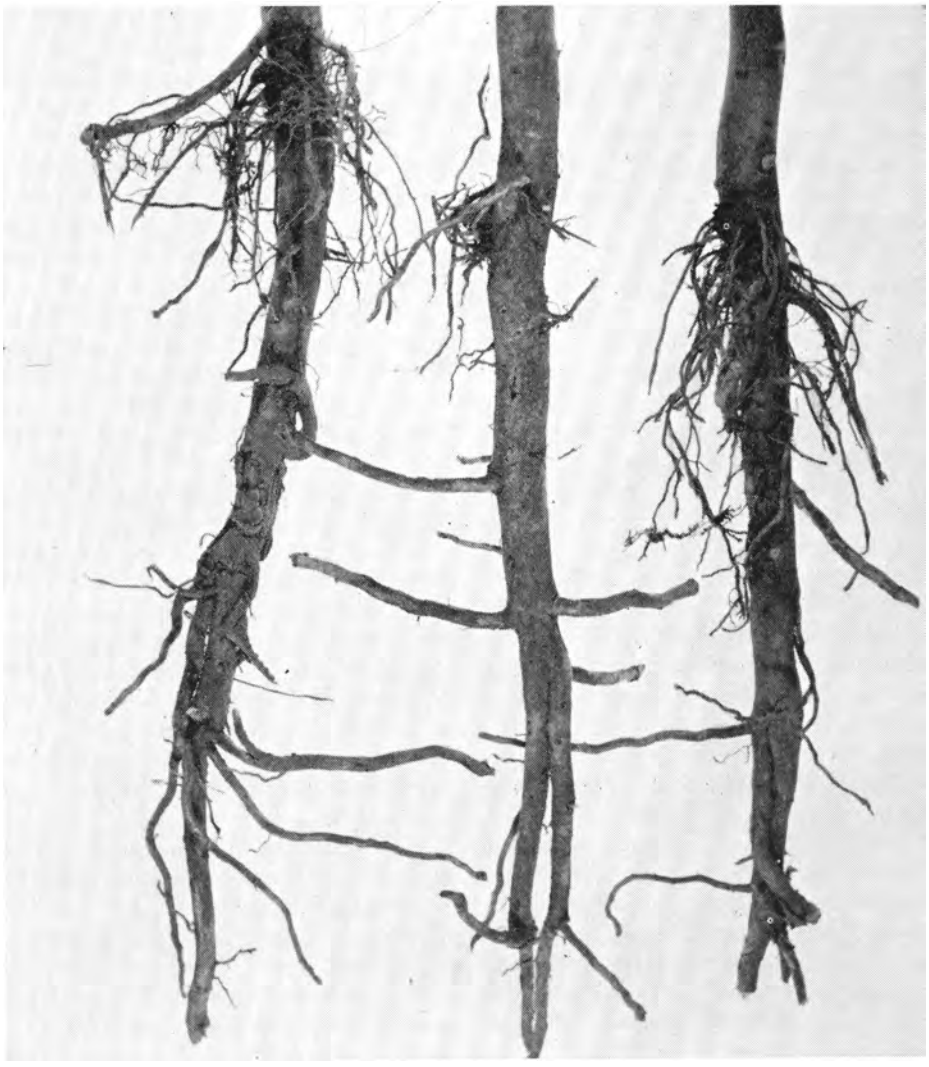
Disinfestation of planting sites may improve

Growth of Navel Orange Trees

on Troyer citrange rootstock

Whether Troyer citrange rootstock can be used successfully in old citrus soils, or in soils contaminated by microorganisms that attack citrus roots, and whether it is profitable to pretreat planting sites to disinfest them of root-destroying fungi were objectives of experiments in southern California.

Three successive plantings of navel oranges on sweet orange rootstocks—in 1955, 1956, and 1957—had failed in one section of an orchard in Pauma Valley. Prior to the 1957 planting the tree sites were treated with Vapam—sodium N-methyl dithiocarbamate dihydrate—but no precautions were taken to exclude run-off water and splashings from sprinklers and the trees were soon contaminated by root rot microorganisms. The soil of the area is of granitic origin, is rather heavy, and contains considerable clay. Soil samples taken from the test plot yielded many isolates of brown rot and gummosis fungi, which indicated that root rot caused by these fungi was the probable cause of failure of the trees. From 22 of the 24 tree sites chosen for the experiment, specimens of fungus, *Phytophthora parasitica* were isolated on February 27, 1958. One tree site yielded *Phytophthora citrophthora.* Neither species was recovered from another tree site and the check tree planted later in that area made a good growth, indicating the absence or low incidence of the fungi on that date. However, *Phytophthora parasitica* was isolated from the site on March 19, 1958.



Sweet orange rootstocks of trees that failed. Note absence of fibrous feeder roots except those at top of root system which grow in soil that dries out rapidly.

The 24 tree sites were organized in eight groups of three sites each to obtain the best statistical layout. One tree site in each of the eight groups was to remain untreated, one was to be treated with Vapam, and one with Mylone—3,5-dimethyltetrahydro,-1,3,5,2H thiadiazine-2-thione. Circular basins 8′ in diameter and about 50 square feet in area were made around each site by ridging soil taken from within and at the exterior edge of the basin area. Removing and using soil from the outside edge of the basin made an exterior drainage trench. Through the downhill side of this trench a break was made so that surface water from rains and sprinklers would be conducted around and away from the treated sites and delay recontamination. In treating with 4S Vapam, a pint of the chemical was placed in a container, such as a pail or large can, at the center of the site and water added to the container and

Effect of Soil Disinfestants on Growth Rate in 437-day Period of Navel Orange Trees on Troyer Citrange Rootstocks

Group	Check	Mylone	Vapam
	millimeters		
1	23	63	66
2	60	76	84
3	52	62	64
4	41	77	60
5	70	64	72
6	9	63	72
7	24	59	59
8	36	81	73
Mean	39.4*	68.1	68.8

* The Mylone and Vapam means were significantly different from the check mean at the 0.01 level of probability.

allowed to overflow into the basin to a depth of 4″ of the Vapam-water mixture. with the 85% wettable Mylone, nine ounces of the powdered material was spread over the soil surface of the basin and 4″ of water run into a container as with Vapam.

Treated sites were dusted with 12.7% Bordeaux mixture, on March 7 and 26, 1958, to help delay recontamination of the treated basins. The water used on the plot was from wells and presumably free of the fungi, but the basins could be recontaminated by soil bearing oöspores blowing or splashing into them from the outside contaminated areas. After the Bordeaux mixture was removed from the soil surface, samples were taken from all of the treated basins. None yielded brown rot or gummosis fungi.

After a period of 133 days to allow the chemicals to disinfest the soil and to degrade to forms noninjurious to roots, trees were planted on July 10, 1958. Around the trees small basins about 3′ in diameter were made from treated soil within the large basins. The trees were irrigated by running water into the inner basins with a hose.

To evaluate the effect of the treatments on growth of the trees, measurements of the circumference of the trunks 6″ above the bud union were made on July 23, 1958, April 8, 1959, and October 28, 1959. The increases in size of the trees growing in the treated and untreated sites are shown in the accompanying table.

The average increment of growth in circumference of the trees in the disinfested sites after 437 days was 74% greater than those in untreated areas.

If a young tree grows well during its first two years it usually—with good subsequent cultural treatment—becomes a successful orchard tree. A young tree in soil with a high concentration of root-destroying organisms may be killed or so handicapped in its growth that it never develops into a commercially productive orchard tree.

A group of trees—Washington Navels on Troyer citrange rootstocks—of same age: *left*, tree in untreated soil; *center*, in soil treated with 9 ounces of 85% Mylone in basin of 50 square feet; *right*, in soil treated with a pint of Vapam in the basin of 50 square feet.

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Influence of extractives on

Seasoning Stain

of redwood lumber

The distinctive color of redwood is due—in part, at least—to the nature of its extractive components. The excellent durability of redwood heartwood also is attributed to the fungicidal properties of its extractives. However, one of the problems associated with the manufacture of redwood lumber is the chemical seasoning stain resulting from the chemical nature of some of the extractives.

The dark brown, blackish stain, which may appear as streaks, in patches, or sticker stain, is more apt to occur in the heavy redwood sinker stock generally derived from the peripheral and intermediate heartwood regions from the butt log. This material usually contains a higher extractive content as well as being very high in moisture content.

When redwood lumber dries, the moisture moves from its center toward the surface of the boards carrying some of the water soluble extractives. As the moisture evaporates, a heavy deposition of extractives is left in the surface zones of the lumber.

The over-all appearance of redwood boards can be governed somewhat by kiln conditions such as high temperatures producing darker boards while the lower temperatures generally produce the lighter appearing boards.

Preliminary studies indicated that steaming of the lumber prior to seasoning may reduce the occurrence of stain. This and other treatments are being investigated in attempts to minimize or obviate the redwood stain problem.

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