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Effect of Hot Water Dips on Eradication of Grape Phylloxera from Nursery Stock

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The easiest way to introduce phylloxera to a site is by infested plant material. If a grower can effectively remove any existing phylloxera on new plants, the rate of spread of phylloxera in Oregon vineyards will be significantly decreased.

The objectives of this study are to determine methods for dipping of young self-rooted and grafted vines (nursery stock) that will eradicate existing phylloxera populations without causing plant damage.

In November, 1993, an initial hot water dip study involved dipping all life stages of phylloxera and five different rootstocks (not grafted) in 125°F water for 0, 3, 5, 7, 9, 11, and 13 minutes. Three root pieces with established populations of eggs, nymphs, and adults were dipped for each time treatment. After the heat treatment, the root pieces were placed in petri dishes and stored in an incubator. Data on percent survival for each life stage and amount of time to kill all life stages were collected. The results showed that all life stages were killed at the five minute dip in 125°F water.

The five rootstocks studied were Pinot Noir, 5C, 101-14, 3309C, and Freedom. The dormant plants were removed from their pots, washed free of soil, and pruned to 4 buds and 6" root length. Control plants were dipped in 70°F for 10 minutes (5 minutes as a pre-dip and 5 minutes for the time needed to eradicate the insect). The hot water dip plants received a predip of 5 minutes at 110°F to warm the roots and then were given a 5 minute dip in 125°F water. After dipping, all plants were placed in pots and forced in a greenhouse. The percent budbreak of primary, secondary, and tertiary shoots was evaluated. The results determined that all plants broke bud in all time intervals but the control plants had a higher percentage of bud break.

A second dip will be conducted in January, 1995, including hibernants and grafted rootstocks.

Growth of rootstock grafted grapevines in Oregon vineyards

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Oregon's vineyard industry is currently making a transition from self-rooted vines to grafted, phylloxera-resistant rootstocks. The basis of this study is to provide Oregon's wine grape growers with information on rootstocks that perform best in the different wine grape growing regions of the state and how well the rootstocks perform in already phylloxerated sites.

In spring, 1992, a grower cooperator rootstock trial was established at 17 sites in Oregon (2 of the 17 were established in phylloxerated sites). The rootstocks planted were: 3309C, 10114, 44-53, 5C, Harmony, 420A (scion cultivar, Pinot Noir) and a self-rooted vine (Pinot Noir). There are 5 plants per replicate and 5 replicates per rootstock for a total of 175 plants at each site.

In June, 1994, five sites without phylloxera were chosen to be monitored throughout the growing season. Stocks at phylloxerated sites showed too low plant vigor for monitoring in 1994. The sites range from southern Oregon to the northern Willamette Valley. The soil types, water availability, and slope of the sites all differ.

To evaluate the establishment, growth rate, and yield for each rootstock type, the sites were visited every three weeks from June until harvest in 1994. Three of the five plants from each replicate were studied.

In June, the trunk diameter was recorded and two shoots for each plant were selected and flagged. The shoots were chosen at the second and fifth node at the point where the cane was bent to the fruiting wire. The length of each shoot was measured at each visit. At harvest, the number of clusters and total yield from each replicate were recorded. Cluster samples were picked for average berry weight, average cluster size, °Brix, malic and titratable acids, and pH.

When the plants are dormant in winter, 1994/1995, the trunk diameter will be recorded, the number of nodes and laterals for each of the two shoots will be counted, and pruning weights will be collected.

This project is still in progress and none of the data have been analyzed, but rootstock differences at every site in fruit set and vigor have been observed.

In addition, at the two sites with phylloxera, the control plants (self-rooted Pinot Noir) are dead and the grafted rootstocks are low in vigor and produced no fruit.