IPM-BASED GUIDELINES FOR REPLANTING PRUNUS ORCHARDS IN 2000 WITHOUT METHYL BROMIDE

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In California 85% of almond, peach, plum, and nectarine orchards are replanted on Nemaguard rootstock. There is only a 35 to 50% occurrence of soil pests/diseases across these orchards. Methyl bromide (MB) as a single treatment served the purpose of controlling soil pests and diseases while minimizing the rejection component of the replant problem and stimulating initial plant growth. To replace MB the IPM strategy is as follows: Use an auger or backhoe to diagnose soil physical or chemical problems while collecting soil samples for nematodes, oak root fungus, etc. > kill root systems > wait 18 months before replanting > during the wait correct soil physical, chemical and biological problems > replant with addition of macro and micronutrients. Except for the value of Telone II treatments, these guidelines have received little commercial testing at this time.

Nemaguard replanted to Nemaguard:

1. Determine if *Pratylenchus vulnus* and/or *Criconemella xenoplax* nematodes are present in the orchard site. Avoid replanting of orchards if *Armillaria mellea* is present, but if present and Bacterial Canker is not expected, plan to use Marianna 2624 rootstock.
2. Harvest fruit before mid October > irrigate > cut off old trees at trunk level and paint solution of 50 ml Roundup plus 150 ml MorAct to cambium. This treatment plus 18 months of wait will minimize by 85% the intensity of the rejection component of the replant problem where soil pests and diseases are absent.
3. Wait at least 60 days before pushing trees.
4. Backhoe or rip soil as needed > land level as needed > plant sudan x sorghum into moistened soil before June 15 of the next year.
5. Mow and re-mow as sudan grass reaches four feet of height. If the sudan grass needs nitrogen fertilizer apply 650 lb per acre urea throughout a single, six-acre inch irrigation after mowing in July.
6. To deeply dried sandy or sandy loam soil apply an 8 ft wide strip treatment of Telone II at 35 gallons per treated acre before there has been 2 inches of rainfall (by November 15).
7. To deeply dried clay or clay loam soil apply an 8 ft wide strip of Telone II at 40 to 70 gallons per treated acre before 2 inches of rainfall (by November 1).
8. Replant trees early the following spring applying diverse micro and macronutrients.

The above process will solve most of the replant problem for that 50% of acreage where nematodes and diseases are not considered a serious problem.

If root lesion nematode, *Pratylenchus vulnus*, is present or the soil is very porous and ring nematode, *Criconemella xenoplax*, is present **broadcast** treat sandy to sandy loam soils at 35 gallons per treated acre with Telone II. An adequate broadcast treatment to finer-

textured soils is no longer possible because of the 35 gallons per acre limitation with Telone II. Nematode control comparable to a tarped, methyl bromide treatment can be achieved by drench applying Metam Sodium (Vapam, etc.) at 250 ppm MS in 2 acre-inches of water (25 gallons per acre Vapam HL in 54,000 gallons of water) following the Telone II treatment. Vapam is useful against nematodes but not very useful where the rejection component of the replant problem is intense (we cannot currently diagnose the intensity of the rejection component). Addition of chloropicrin with Telone can stimulate first-year tree growth but at treatment rates less than 300 lb/acre has not been shown to provide additional control of any of the pests listed above.

In highly porous soils where Bacterial Canker Complex is anticipated a low volume irrigation system should be installed with an effective post-plant nematicide applied to the affected area each October for the first seven years.

Compared to Nemaguard rootstock, Marianna 2624 rootstock is less sensitive to the rejection component of the replant problem. It is, however, a better host for ring nematode, more sensitive to Bacterial Canker Complex, and produces suckers.

Hansen's 536 peach x almond hybrid exhibits little sensitivity to the rejection component of the replant problem but is more sensitive to Phytophthora root rot.

Poor growth of sudan grass can indicate the need for additional soil profile modification because of residual herbicides or soil stratification but does not indicate the intensity of the rejection component of the replant problem.

For organic-type growers: Remove trees and plant a California selection of alfalfa. Keep it relatively weed-free at least the first two years. After three years the root lesion nematode present is not *Pratylenchus vulnus*. The ring nematode, if prevalent in a potential Bacterial Canker site, can be reduced in number without causing a biological vacuum by growing sorghum x sudan for one full year. Replant Nemaguard with addition of small amounts of macro and micronutrients at planting time. Organic growers without damaging nematodes wishing to replant within one or two years of tree removal appear to aggravate the rejection component of the replant problem with addition of organic matter (compost, manure, seaweed) at or before planting time. More data are needed relative to addition of organic matter into a replant setting however it should probably not be applied before first fall.

Another option: Instead of applying Telone, consider a drench of Metam Sodium (Vapam HL at 75 gallons per acre rate in 6-acre-inches water) where delivery equipment is available, especially in sands. If six acre inches of water can be infiltrated into moistened soil within eight hours it is possible to make a successful soil treatment using 250 ppm MS. Avoid drenching of soils where deep shank marks are still evident or loosely filled. Avoid deep-drenching of MS if its final delivery depth will be less than 4 feet. MS creates a biological vacuum as well as poor tree growth when the more serious rejection component is prevalent. These problems can be remedied (more research needed here) by making the treatment a full year ahead of replanting and then planting a non host

rotation crop such as sudan grass. MS treatments at current label rates will not provide adequate kill of old roots below 2½ feet soil depth so treatments should follow a systemic herbicide treatment to old trunks and should not currently be recommended where root lesion nematode is the problem.

For more information refer to "The Replant Problem and Its Management" at: http://www.uckac.edu/nematode

Note: Not all the listed treatments are currently registered.