

## MANAGEMENT OF THE REPLANT PROBLEM UTILIZING MINIMAL SOIL FUMIGATION

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Replant problems of the San Joaquin Valley can be managed by: 1) starving the existing soil ecosystem, 2) appropriate disruption of the soil profile, 3) followed by a substantial change in rootstock parentage. The starvation process requires one full year between plant removal and replanting. Success can occur without planting annual rotation crops. Also, there is no benefit to the addition of organic matter until the replants have become established. These steps plus addition of micronutrients at time of planting are adequate whether replanting grapes after grapes, *Prunus* after *Prunus* trees, and perhaps someday soon *Juglans* after *Juglans*. To be successful with *Juglans* we need to find rootstocks with resistance to root-knot and root-lesion nematodes.

There are also limitations to this approach. First, one must diagnose whether or not there are pests and diseases for which resistance and tolerance are unavailable and second rootstock parentage must be substantially different but still contain appropriate soil pest resistance or strip fumigation will still be needed. Below are four examples of successful replanting efforts without soil fumigation and one example indicating how strip fumigation can fit into the process.

### Example 1. Replanting of almond following almond/Nemaguard

1. Just after harvest of almond/Nemaguard, apply Roundup to cut stumps
2. Wait a minimum of 60 days before pushing old stumps
3. During the off-year accomplish needed soil ripping/scraping
4. Replant choosing Hansen 536 rootstock, unless the soil is highly porous
5. Just after planting, water in small amounts of macro and micronutrients.

*Note: Hansen 536 rootstock is highly susceptible to ring nematode in highly porous soils so do not plant it in Bacterial Canker areas. It is resistant to root-knot nematode and offers considerable protection against root-lesion nematode. It is also susceptible to Phytophthora root rot but irrigation management can provide a remedy for Phytophthora.*

### Example 2. Replanting of plum following plum/Nemaguard

1. Just after harvest of previous planting apply Roundup to cut stumps
2. Wait a minimum of 60 days before pushing old stumps
3. During the off-year accomplish needed soil ripping/scraping
4. Maintain weed control and non hosts for root-knot nematode during off-year
5. Replant choosing Krymsk 1, a new dwarfing rootstock
6. Just after planting, water in small amounts of macro and micronutrients.

*Note: Scion incompatibilities of this stock are currently under study but generally unknown. Avoid sandiest soils but this rootstock is the only Prunus rootstock with resistance to root-lesion nematode. It also exhibits root-knot resistance on roots older than 80 days and is tolerant of feeding by root-knot and root-lesion nematodes in the first year.*

Example 3. Replanting stone fruits or almond following any *Prunus* /Nemaguard

1. Just after harvest of previous planting apply Roundup to cut stumps
2. Wait a minimum of 60 days before pushing old stumps
3. During the off-year accomplish needed soil ripping/scraping + deep drying of soil
4. Treat planting strips 8-11 feet wide using 33gal/treated acre Telone II, 49 gal/treated acre Telone C35 or 170lb/treated acre Chloropicrin prior to mid Nov.
5. Replant using Viking rootstock
6. Just after planting, water in small amounts of macro and micronutrients.

*Note: Viking is useful where ring nematode is problematic, does not host root-knot nematode, but is intolerant of the rejection component as well as first-year feeding by root-knot and root-lesion nematodes.*

Example 4 Replant of grapes following own-rooted grapes

1. After vines become dormant apply Roundup to cut trunks (Jan-March)
2. Do not rush to remove old trunks (~July) also maintain weed control
3. Accomplish needed soil ripping/scraping
4. Reduce nematode counts with nematicides such as fosthiazate (not registered in CA), NatureCur or other non-volatile nematicides.
5. Replant the following year on 10-17A rootstock (not commercially available)
6. Just after planting, water in small amounts of macro and micronutrients

*Note: This rootstock has broad nematode resistance, is medium to high vigor and should not be planted where Grapevine Fan Leaf Virus is present.*

Example 5. Rejuvenation of an existing vineyard (

1. When grape prices are depressed, apply 4% Roundup to foliage before November
2. After 60 days remove the upper portion of each vine leaving 6 inches of trunk
3. Maintain weed control, do not irrigate or fertilize
4. Two-years after Roundup begin irrigation of vines and trim to 2 or 3 best canes
5. Apply fosthiazate nematicide (not registered in CA) at 1 lb/acre via drip in May, Oct., then May, Oct)
6. Train trunks the first year as desired. Any dead vines (~2% for Ruby Seedless but 100% for Autumn Royal) need to be replaced.
7. Plan for a harvest three full years after Roundup.

We refer to this general approach as: **Starving the soil ecosystem then switching rootstock parentage.** Commercial successes with the above examples will lead to many more practical uses of this general approach. Consider this approach as a means for avoiding or reducing the need for soil fumigations.

1. Apply Roundup or Garlon (for replanting walnuts) to trunks
2. After 60 days push out the old trees or vines
3. Accomplish needed soil ripping/scraping
4. Reduce counts of those pests for which the replant has no resistance
5. Plant using resistance to the prevailing soil pests.
6. Apply macro and micronutrients at the time of planting