



INFORMATION ON RESEARCH SUPPORTED BY THE CALIFORNIA TREE FRUIT AGREEMENT

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## Progress in the Search for Methyl Bromide Alternatives for Stone Fruits

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As new methyl bromide (MB) alternatives have been suggested, their performance has received evaluation in small plot and commercial settings. Here is a summary from our last three years of study funded by CA Tree Fruit Agreement.

**Metam sodium** (MS) is sold as Vapam or Sectagon. In sandy soils which infiltrate 6 to 8 acre-inches of water in 12 hr or less, this product uniformly mixed into water can give 99.9% relief from nematodes down to five-foot depth. Treatments should occur to moist soils and a full year of fallow or non-host crops must occur before replanting or new trees will show yellowing and reduced growth. New trees respond well to NPK fertilization. With great attention to drenching methodology, this chemical costing about \$300/acre plus another \$100 to \$300 in labor can perform well. This can be the least expensive product and that is the reason for interest.

**TeloneII** (1, 3-D) performance is so well known that there is little reason for study. It is the alternative to MB where sandy to sandy loam soils are involved. Finer-textured soils must be deeply dried or the benefits of 1, 3-D are reduced. New equipment that applies 1, 3-D to greater depth is advantageous and should negate the regulatory need for the cumbersome moisture requirement at the field surface. A change in this requirement should be an action item of the stonefruit industry. The new emulsified formulation of 1, 3-D is highly effective when properly applied to moist soils but equipment for proper distribution is scarce.

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Combinations of 1, 3-D with CP and the choice of strip or broadcast applications should be based on proper diagnosis of pest and disease presence.

**Chloropicrin** (CP) is applied in the same manner as TeloneII (1, 3-D) or MB. For stonefruit growers this product applied by shank at 20 inches deep exhibits minimal off-gassing and odor. Incidentally, odors of CP can be directly phytotoxic to nearby leaves of producing trees. Applied to soils that are deeply dried this product can move as far as 1, 3-D but has a much faster degradation rate and thus is a relatively poor root penetrant. It is not a great nematicide to the 5-foot depth unless rates are in excess of 250lb/acre. CP is quite stimulatory of tree growth. This benefit becomes apparent at 120lb/ac rate and at treatment rates of 300lb/ac growth benefits can be observed into July on second-leaf trees. CP at 170lb/ac can also mitigate the rejection component of the replant problem that is not controlled by 1, 3-D. This product has utility for stonefruit growers but must be applied deeply and with care to avoid off-gassing or it will not be available.

**Iodomethane** (MI) is not currently registered in the US. "In soil" performance of this product commonly exceeds that of methyl bromide (MB). If a sandy loam soil is well-dried to the five-foot depth, tarped treatments of 235lb/acre MI have provided one year of nematode relief, the same as a strip application with other fumigants. To be more successful higher treatment rates are required but higher treatment rates will apparently not be allowed. Phytotoxicity, likely a result of residual iodide, has been a problem. Tarped treatments at 150, 200, 235, 325, and 400lb/acre have been applied in fall. At 235 lb/ac MI the most sensitive crops are plum, pluot®, and prune. Pluots® and

plum can exhibit first-year sensitivity at 150lb/ac. Damage is associated with onset of warm weather and occurs regardless of rootstock. Tattered leaves and leaves with marginal necrosis occur along the base of the tree and elsewhere. During mid-summer the main branches of the tree appear thinner and bare as leaves abscise and accumulate on the ground. With sensitive crops tree damage can be dramatic throughout the first and second year. First-leaf damage can occur on peach or nectarine trees, regardless of rootstock. Incidence is primarily at the base of the tree and disappears from view in the second year with minimal reduction of overall tree growth. Friar plum on NemaGuard exhibited leaf necrosis, without reduced growth, when planted 6 years after treating the soil with 325lb/ac MI. Iodide damage may be reduced in high cation exchange soils. Cost of MI applications is unknown.

**Sodium Azide (SA)** is delivered as a drench, similar to MS but the needed treatment rate is 500lb/ac with 330lb/ac being inadequate for stonefruit replant settings. SA can be drenched almost odor-free, but its weakness is its inability to penetrate old roots if pests are within them. Any soil pests not killed by SA can very quickly refill the biological vacuum created. We have experienced a five-fold increase in root lesion nematode within five months after planting. A series of problems needs to be solved before this product becomes useful. It is a product that would be used following Roundup trunk treatments.

**Propylene oxide (PO)** can be delivered five feet deep as a drench but misses all the old roots as well as 1/3 of the nematodes within soil. This product appears to degrade as fast as it moves. This is not a candidate for further field study.

**Roundup** applied to old tree trunks can destroy the entire root system 60 days after application. Without this treatment the root system may not completely die for 2 years. This treatment plus waiting one year before replanting can rid the field of 85% of the rejection component of the replant problem. Without Roundup this level of benefit would require three to four years of fallow. There is minimal value to the use of Roundup followed by

use of a good root-killing soil fumigant. There is value to Roundup plus one year of fallow period when no other soil treatment is planned and nematodes are not a problem in the field.

## USDA Awards Conservation Grants

On Sept. 15, 2004, Agriculture Secretary Ann M. Veneman announced the selection of 41 projects in 29 states that will receive \$14,250,000 in Conservation Innovation Grants. The grants will fund the development and adoption of innovative conservation technologies and approaches through pilot projects and field trials. "These grants provide opportunities for public-private partnerships to accelerate technology transfer and implement promising technologies," said Veneman. "The approaches will help farmers and ranchers protect the environment and comply with federal, state and local regulations."

Peach growers in California will benefit, as a proposal submitted by Protected Harvest was awarded \$999,982. This project is a resource renewal project that will provide peach growers a cost share opportunity to replant peach orchards using sustainable growing practices. Participating growers who successfully complete the requirements will be eligible for a total payment of \$918 per acre. The major production practices required will include the chipping of trees, a two-year fallow period and the installation of a micro irrigation system. See attached flyer for more information or call (858)-780-1822.

## Outreach Sessions Planned

November 19 @ 8:30 a.m. to 11:00 a.m. at the USDA-ARS Science Center in Parlier. There will be presentations on pest management, sour rot, the ag. waiver issue, the EQIP program and the Protected Harvest program. See CTFA website for more info. [www.caltreefruit.com](http://www.caltreefruit.com)

December 1 @ 8:30 a.m. to noon, at the Dinuba Memorial Building. This is the Annual UC Winter Research meeting. Call KAC for more info. (559) 646-6500