FIELD COMPARISON OF 20 POTENTIAL METHYL BROMIDE ALTERNATIVES FOR TREE AND VINE NURSERIES

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Fifteen pre-plant soil treatments of four replicates each were installed into a four-acre field site at Kearney Agricultural Center, Parlier, CA. The site contained nematodes but no replant problem and no remnant woody roots except for those remaining from a one-year nursery crop that had been removed one full year before. This site is typical of a California nursery setting except that *Pratylenchus vulnus, Tylenchulus semipenetrans,* and *Paratylenchus hamatus* nematodes were present and they can occur as deep as 2 m.

Ninety days after the pre-plant treatments each of the plots was sampled for nematodes at 30 cm increments down to 150 cm depth. In March 1997 13 Marianna–2624 Plum and 13 Nemaguard Peach rootings were planted to each plot of 30 m by 3.3 m. At planting time an additional five post-plant treatments were installed within the randomized block design in an effort to quantify the value of a pre-plant treatment compared to monthly dripper-applied treatments made post plant.

Trees will be grown for two full years and sampled for nematodes at six-month intervals. After one year eight of the pre-plant treatments and one of the post-plant treatments were generally effective at nematode reductions of 99% or better with effectiveness down to 150 cm depth.

Three treatments were responsible for visible tree damage. Peach and plum planted 120 days after 360 kg/ha (320 lb/acre) methyl iodide exhibited leaf scorching and necrosis at the margins about 30 days after planting. Leaf scorching was still apparent on the plums 240 days after treatment, however the trees are also nematode free. Trees treated at 30-day intervals with 10 ppm of an MIT-liberating product exhibited reduced growth, and some severe chlorosis of peaches after three such treatments, while not providing adequate nematode control. A single post-plant treatment of 700 ppm sodium tetrathio carbonate (Enzone) 30 days after planting resulted in death or extensive necrosis to seven of 104 trees treated. This treatment at 500 ppm will be resumed in September because of the nematode control it did provide.

Trees from two of the treatments have provided a visual growth benefit that surpasses that of methyl bromide. The best looking treatment is 360 kg/ha 1,3-dichloropropene (35 gal/acre) shanked at 45 cm depth followed by a drench of 100 kg/ha (30 gal/acre) Vapam in two acre inches water. Also, trees receiving monthly post-plant drenchings of Vydate 4L at 1.12 kg/ha (1 lb/acre rate) exhibit excellent growth and nematode control when soil samplings are only conducted in the treated zone.

One surprisingly good pre-plant treatment involved the shallow incorporation of 360 kg/ha Basamid granules followed by 15 hours of intermittent irrigation with 15 cm (6 acre inches) of water. This treatment was scheduled for 15 hours to enable better dissolving of the slow-dissolving granules.

This work will continue another 18 months as the nematode populations are allowed to develop on their favored host. It is still premature to list the winning treatments but there are definite losers which included:

1. Peroxyacetic acid at 40 gal/acre plus 40 gal/acre stabilizer drenched either as a pulse or uniformly applied into the six acre inches of water.
2. An attempt to make chloropicrin in the soil using picric acid and calcium hypochlorite.
3. A drench of 20 kg/ha phenamiphos (Nemacur) in six acre inches water.
4. A uniformly delivered preplant drench of 1142 kg/ha sodium tetrathio carbonate plus one liter/ha Tillam during the last hour of an eight hour (six acre inch) drenching.
5. A monthly post-plant treatment of peroxyacetic acid plus biological inocula at commercial rates actually raised the nematode population levels.
6. A monthly post-plant treatment of MIT released at 10 ppm.
7. The nontreated check.

It is critical that California tree and vine nurseries be able to provide nematode-free planting material to local growers.

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Key Points

1. Post-plant drip-applied treatments only provide nematode control to the wetted zone, and treatments must be repetitive.

2. Biocides/nematicides repeatedly applied post plant may be either phytotoxic (e.g. Vapam or Enzone) or growth enhancing (e.g. Vydate).

3. Methyl iodide at 325 lb/acre rate exhibited marginal leaf necrosis to plum and peach rootstock planted 120 days later.

Implications

1. Telone shanked to dry soil followed by a surface seal of 2 acre inches water containing 250 ppm MIT provides growth responses equal to or above that from methyl bromide.

2. The release rate of MIT from Basamid granules is less than predictable but spreading the 6 acre inches of delivery water over a 15 hr period provided excellent nematode control.

3. A number of products when applied with our best drenching technology did not provide adequate nematode control.