NEMATICIDAL VALUE OF EIGHTEEN PREPLANT TREATMENTS ONE YEAR AFTER REPLANTING SUSCEPTIBLE AND RESISTANT PEACH ROOTSTOCKS

M. V. McKenry*, B. Hutmacher, T. Trout

A 15-year-old orchard on Lovell peach rootstock was removed in 1996. Root knot nematode, *Meloidogyne incognita,* was present across the sandy loam soil of this orchard but observable tree damage was only associated with a diagonal strip across 10% of the land which had a sandy subsurface. Pin nematode, *Paratylenchus hamatus,* also occurred across the orchard and provided a useful bioassay for nematicide efficacy.

Eighteen preplant treatments were installed during fall and winter 1996 within 3.3 m-wide strips down each old planting row. The MITC (Vapam® was sprayed on the soil surface with a microsprayer at each planting site (140 and 280 g ai./tree). The 1,3-D was drenched onto a 2 in diameter area at each planting site with drip hose (140 g ai./tree). The 1,3-D plus chloropicrin (Telone C35EC®) was applied through four lines of subsurface drip tape down each tree row (140 g 1,3-D/tree. In spring 1997 Nemaguard and Lovell seedlings were replanted into each treated row alternating three Nemaguard and three Lovell with 24 total trees per treatment plot and four replicates of each treatment in a randomized block design.

Seventeen of 18 preplant treatments that were replanted to Nemaguard and 16 of 18 treatments replanted to Lovell provided significant (P = 0.05) reductions in nematode populations one year after replanting. Seven of the Nemaguard replanted treatments (a, b, c, d, e, f, g) and two of the Lovell replanted treatments (a, b) provided nematode control comparable to that provided by methyl bromide (97% + reduction in nematode population one year later).

Compared to the nontreated check, three Nemaguard replanted treatments (a, d, o) provided significant (P = 0.05) improvements in plant growth; whereas only one of the Lovell replanted treatments (o) exhibited significant improvement in first-year tree growth. The best treatment for plant growth was chloropicrin shanked to the 20 inch depth at 350 lb/acre rate (treatment o). This treatment and the second-best treatment (d), which also included chloropicrin, did not provide adequate nematode control. These two treatments would be useful where nematodes are absent or not problematic or the replanted rootstock provides resistance to their presence. The third-best treatment for plant growth (a) also gave the best nematode control. Properly applied, this treatment of 280 ppm 1,3-D delivered via subsurface drip lines and MITC to the surface via microsprinklers or drippers has the potential to replace methyl bromide in those soils that are drenchable. Soil profile modifications in the form of backhoeing to increase drenchability did not enhance viability of the treatment. For products such as MITC there may not be adequate exposure time if macropores are too abundant. These drench treatments were applied in late November during a time when 1 to 2 inches rainfall was also occurring. As a consequence, the

targeted total water application of 6 inches was reduced to 4 inches but delivered at higher than our normal treatment rates (280 and 320 ppm instead of the usual 250 ppm). It is notable that treatment rates of 640 ppm MITC (treatments g, h) did not provide nematode control nor enhance plant growth.

Additions of ½ yard NRPS (non replant problem soil or "virgin soil") provided observable benefit in plant growth during the third and fourth month after planting (not shown) but this benefit was lost by midsummer. The NRPS soil was the same we had used in other experiments (1) and it has consistently proven to be of only short-term value when placed into soil previously treated with MITC.

Trunk treatments of Garlon, Roundup and fosthiazate two months prior to stump removal to kill tree roots did not improve overall nematode control one year later although fosthiazate plus Roundup reduced nematodes/gram of root by 95% when sampled 60 days after the treatment (data not shown). Plant growth benefits following treatments of Roundup or Garlon do not occur unless replanting is 18 months after such root-killing treatments (2).

References:

1. McKenry, M. V. and T. Buzo. 1996. Growth benefit of adding "virgin soil" when replanting an orchard. Proceedings of Ag Fresno. November 1996, pp. 35-36.

2. McKenry, M. V. and T. Buzo. 1996. A novel approach to provide partial relief from the walnut replant problem. *In* Proceedings of Annual International Research Conference on Methyl Bromide Alternatives and Emission Reductions. Orlando, FL. November 1996.

Acknowledgements: This work partially supported by a special grant from USDA-Fresno and the California Tree Fruit Agreement.

Table 1.Control of pin nematode and root knot nematode one year after 18 preplant treatments.

	Preplant Treatments	**Control Expressed as a % of Nontreated**	
	Products Drenched to Ripped Soil	Nemaguard Replants	Lovell Replants
a	Rip, drench 280 ppm 1,3-D then 280 ppm MITC.	99.5 %	99.9%
b	Rip, drench 320 ppm MITC.	99.5	98.0
c	Rip, drench 280 ppm 1,3-D.	99.9	94.0
d	Rip, drench 320 ppm 1,3-D + chloropicrin.	99.99	89.0
e	Rip, drench 320 ppm MITC, add ½ yard NRPS.	99.0	93.0
f	Roundup to trunk, rip, drench 320 ppm MITC.	99.0	91.0
g	Rip, drench 640 ppm MITC.	98.7	92.0
h	Rip, drench 640 ppm MITC, add ½ yard NRPS.	94.0	94.0
	Products Drenched to Backhoed Planting Sites	Nemaguard Replants	Lovell Replants
bb	Backhoed, drench 320 ppm MITC.	95.0%	92.0%
ee	Backhoed, drench 320 ppm MITC, add ½ yard NRPS.	83.0	85.0
ff	Roundup to trunk, backhoed, drench 320 ppm MITC.	97.5	87.0
jj	Fosthiazate + Roundup to trunk, backhoed, drench 320 ppm MITC.	90.0	80.0
kk	Garlon to trunk, backhoed, drench 320 ppm MITC.	93.0	62.0
ll	Roundup to trunk, backhoed, drench 212° F water.	89.0	63.0
mm	Roundup to trunk, backhoed, naphthalene to side walls, drench 212° F water.	83.0	36.0
	Products Shanked to Ripped Soil	Nemaguard Replants	Lovell Replants
n	Rip, shank 350 lb/acre methyl bromide, nontarped.	99.5%	97.0%
o	Rip, shank 350 lb/acre chloropicrin, nontarped.	88.0	85.0
	Nontreated Check	Nemaguard Replants	Lovell Replants
p	Rip, nontreated.	(405/250 cc soil)	(571/250 cc soil)