FIRST-YEAR NEMATODE CONTROL AND TREE GROWTH USING TREATMENTS APPROPRIATE FOR BUFFER ZONES

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Regulatory decisions by California Department of Pesticide Registration have progressively restricted use of methyl bromide (MB), 1,3 dichloropropene (1,3-D), and Vapam (MITC) within 30 to 100 meters of occupied dwellings. However, land costs and cultural practices ensure that planting of tree crops within these buffer zones will continue to occur with or without soil fumigation (see Fig. 1). With orchard crops the best pre-plant treatment for these buffer zones has not been known. Possibilities have included: 1/ use of high quantities of organic matter, 2/ drenches of Vapam or 3/ emulsified 1,3-D via surface or buried drip lines, 4/ reduced rates of 1,3- D drenched plus Thiosol to degrade fumigants before volatilization, 5/ the transport of ½ yard virgin soil (NRPS) or 6/ a synthetic NRPS to each tree planting site within the buffer zone.

A three-acre 20-yr-old peach orchard on nemaguard peach rootstock was removed in fall 1997 and replanted to almond on nemaguard peach in spring 1998 following various pre-plant treatments. Some of the treatments were only applied to individual tree sites while others involved broadcast treatments. The only soil-borne pest was pin nematode, *Paratylenchus hamatus*, present at population levels averaging 2000 per 250 cm^3 soil. The rejection component of the replant problem was also expected to occur in this site.

First-year tree growth was determined in January 1999. Nematode population levels were also determined at that time and are expressed in Table 1 as a percentage of the nontreated control.

The treatment providing best first-year tree growth was tarped MB with or without NRPS. Our attempt to make a synthetic NRPS involved a treatment of tarped MB amended 8 mo before its transport with organic matter (20 ton manure plus 20 ton compost then sprayed with Acadian seaweed extract, *Ascophyllum nodosum*, at 5 pt/acre). Although this synthetic NRPS treatment performed well the first half year, tree growth had ceased by September of the first year and well into the second year (data not shown). Another useful treatment involved a drenching of Telone C-35 in 6 inches of water. The use of Thiosol in combination with Telone also provided visible plant growth benefit. The transport of ½ yard NRPS produced trees in the second year that visibly outperformed those supplied with our synthetic NRPS.

Additions of organic matter (5 ton manure plus 5 ton compost then sprayed with 2 gal/acre seaweed extract) to the field surface at planting time appeared to accentuate the replant problem. In this site the NRPS treatment did not appear economical when carried out in combination with soil fumigation, however the benefit of such treatments is the long-term nematode relief they were intended to provide. In summary, if fumigants are to be used their volatilization must be reduced, additions of organic matter were counterproductive, and transporting of pest-free NRPS has benefit where there are fewer

than 100 trees per acre and soil pests either do not occur or resistant rootstocks are to be planted. At least two full years of tree growth data are needed since lengthy growth lags can occur after a good early start.

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Table 1. First-year nematode control and tree growth utilizing methods appropriate for buffer zones.

				Trunk Diameter (cm) Butte Almond on Nemaguard					
		Nematode Control		Replant Problem Intensity					
	Treatments	***% of Nontreated***	***DMRT****	***Moderate***	***DMRT****	***Severe***	***DMRT****	***Mean***	***DMRT****
1	Organic matter at planting.	52	bc	2.32	b	1.91	e	2.11	d
2	330 lb/acre MITC drenched in 6 acre inches water.	100	a	2.81	a	2.13	e	2.47	bc
2T	330 lb/acre MITC plus ½ yd transported NRPS.			2.39	b	2.92	ab	2.65	ab
3	435 lb/acre Telone C-35 drenched in 6 acre inches water.	100	a	2.78	a	2.88	ab	2.83	a
3T	435 lb/acre Telone C-35 plus ½ yd transported NRPS.			2.88	a	2.50	cd	2.69	ab
4	200 lb/acre Telone, shanked plus 80 gpa Thiosol.	99.6	a	2.79	a	2.59	bc	2.69	ab
5	½ yd transported NRPS.			2.69	ab	2.74	abc	2.71	ab
6	½ yd transported synthetic NRPS.	82.4	b	3.01	a	2.49	cd	2.75	ab
7	350 lb/acre methyl bromide, tarped.	100	a	3.03	a	2.68	abc	2.86	a
7T	350 lb/acre methyl bromide, plus ½ yd transported NRPS.			2.87	a	2.96	a	2.92	a
8	Nontreated check (RPS).	Actual nematode count (1550 / 250 cc soil)	c	2.39	b	2.17	de	2.28	cd

* DMRT. Mean values in each column followed by a different letter are significantly different at the 95% confidence level.