ROOT-KNOT NEMATODE CONTROL WITH TROPICAL COVER CROPS

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For the fifty years fumigants nematicides, such as methyl bromide, have been the primary nematode CONTROL tactic used. With the withdraw and restriction of fumigant nematicides alternative management options have been investigated and developed. Recently, we conducted three experiments in Hawaii to determine the efficacy of several alternative root-knot nematode CONTROL tactics. Fourteen cover crops were evaluated for their ability to reduce damage by root-knot nematode, *Meloidogyne javanica* in one experiment. In a second and third trial, dried sesame plant (marketed as Nematrol®) was applied for root-knot nematode CONTROL on tomato and basil.

Cover crops were grown and incorporated into the soil before taro, the indicator crop, was planted (Table 1). Greenpanic, glycine, marigold, sesame, sunn hemp, and sorghum × sudangrass DeKalb ST6E were poor or nonhosts to the nematode as measured by low population changes of nematodes in soil between cover crop planting and taro planting. lablab, mustard, rhodes grass, ryegrass, and wheat allowed nematode populations to increase dramatically. Taro yields were greatest in the marigold plots and lowest in the lablab plots. Ryegrass and Blizzard wheat plots had higher taro yield than plots with similar Pi's but planted to other cover crops. The nonhost plants allowed nematode populations to decline, thus reducing damage to taro. The host plants may have produced toxic compounds upon decomposition or stimulated antagonistic microorganisms.

A dried chopped sesame product (Nematrol) was applied and incorporated at 129, 256, 516, or 774 kg/ha and compared to a granular fenamiphos (7 or 14 g a.i./m row) treatment for root-knot nematode CONTROL in tomato. In basil, a dried chopped sesame application (258 kg Nematrol/ha) was compared to 1,3-dichloropropene (255.4 kg/ha) for root-knot nematode management in basil. Tomato yield was greatest in the 14 g a.i. fenamiphos treated plots and lowest in the untreated plots (Table 2). The sesame product at all rates gave better CONTROL compared to the untreated tomato CONTROL (Table 2). Final basil shoot biomass was greatest in the 1,3-dichloropropene treated plots followed by the dried sesame product treatment (Table 3). The untreated basil yielded the least of all treatments (Table 3).

Alternatives for root-knot nematode CONTROL were not as effective as the standard

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nematicides used as comparisons. Some of the cover crops may have antagonism to other soil microorganisms or the decomposition products of the cover crops may be toxic or adversely affect the nematodes. Cover crops may be an effective and valuable nematode management tactic for use in minor tropical cropping systems. However, these alternative root-knot nematode controls may need to be combined with other tactics to reduce nematode damage.

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TABLE 1. Population changes of root-knot nematode, *Meloidogyne javanica*, under various cover crops and subsequent Bun long taro yield on Molokai, HI. Nematode populations were assayed following cover crop soil incorporation before taro planting (P_{taro}). Data are the means of three replications.

Cover crop	Root-knot nematode P_{taro} [a,b]		Corm weight (kg)[b]	
Fallow	23	mn	0.52	abcde
Glycine	45	lmn	0.38	cde
Greenpanic	118	ijklm	0.77	ab
Lablab	44,453	abcde	0.31	cde
Marigold	2	n	0.86	a
Mustard	3,600	defg	0.37	cde
Rhodes grass	887	ghij	0.56	abcde
Alamo ryegrass	9,690	defg	0.60	abcd
Sesame	158	ijkl	0.60	abcd
DeKalb ST6E sudex	97	jklm	0.57	abcd
Sunn hemp	63	klm	0.51	abcde
Bun long taro	24,067	bcde	0.30	de
Blizzard wheat	19,657	bcdef	0.78	ab
Norstar wheat	6,217	efgh	0.45	bcde
Weston wheat	13,646	cdefg	0.35	cde

[a] Numbers are untransformed means of second-stage juveniles and eggs from the soil and roots. $Log_{10}(P_{taro} + 1)$ transformations were used for statistical analysis.
[b] Numbers in a column followed by the same letter are not different according to the Waller-Duncan *k*-ratio *t*-test (*k* ratio = 100).

Table 2. Root-knot nematode, *Meloidogyne javanica*, population and tomato yield after treatment with various rates of Nematrol, fenamiphos, or left untreated.

Preplant treatment		Eggs/g root[a]		Fruit count[a]		Number of plants[a]	
Nematrol	129 kg/ha	62,132	ab	64	ab	6	abc
	258 kg/ha	69,331	ab	61	ab	6	abc
	516 kg/ha	48,353	b	58	abc	5	c
	774 kg/ha	58,479	ab	59	abc	5	bc
Fenamiphos	7 g/row m	30,002	b	66	ab	7	a
	14 g/row m	21,163	b	69	a	6	abc
Untreated		68,734	ab	37	bc	6	ab

[a] Means followed by the same letter are not different according to a Waller-Duncan *k* ratio *t*-test ($k = 100$).

Table 3. Root-knot nematode, *Meloidogyne javanica*, galling and egg population/g root on basil after treatment with Nematrol, 1,3-dichloropropene, or left untreated.

Preplant treatment	Galling[a]	Eggs/g root[a]
1,3-dichloropropene (255 kg/ha)	30	773
Nematrol (258 kg/ha)	5	301
Untreated	49	10,367

[a]Does not differ among the treatments ($P > 0.1$).