ECO-COMPATIBLE METHODS OF NEMATODE CONTROL IN SOUTHERN ITALY

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Attempts were made to control root-knot nematodes in southern Italy without application of chemical nematicides. In a first experiment, a field infested by *Meloidogyne incognita* was planted with cauliflower from March to June 1999. In June the residues of this crop were ploughed into the soil and the plots were solarized from June to August with either polyethylene or EVA films of two different thickness and/or treated with three doses of sulphur (90%). From August to December zucchini were planted and from January to May 2000 lettuce. Finally, cantaloupe was cultivated from May to August. The yields of cauliflower, zucchini and lettuce did not show any statistical difference due to the various treatments. As concerning cantaloupe, the most susceptible and the most economically relevant crop, the following results were obtained: the yields were significantly increased by soil solarization with or without sulphur and by sulphur as single treatment; thickness of polyethylene did not affect the yields, which were significantly increased by EVA 0.150 mm, compared to EVA 0.035 mm; the addition of either 750 or 1000 kg/ha of sulphur previously to soil solarization was beneficial with the polyethylene tarping only; sulphur application under EVA tarping did not statistically increased the yield with respect to the 500 kg/ha sulphur application (Table 1).

In a second experiment soil solarization was carried out in Summer 1999, starting at different dates. Its effect was evaluated on tomato in the year 2000 (Table 2). Such practice was more effective when started between the end of July and middle August.

A third experiment was undertaken planting in September 1999 cruciferous cover crops which were harvested in December. The culture residues were ploughed into the soil in January 2000 and half of the plots were kept covered with a polyethylene film until May when tomato was planted. Tomato was harvested during August and September. No differences occurred among the yields of either the tarped or the untarped plots, whereas tarping increased the yield compared to the untarped (Table 3).

Finally, it was tested if a fall (September – December) crop, such as lettuce, may act as a trap plant suppressing soil population of root-knot nematodes for the following tomato culture (in May – August). The results indicate that a fall culture of lettuce does not reduce nematode populations increasing eventually the yields of the next spring – summer crop (Table 4).

Table 1 – Effect of soil solarization and sulphur on yield of cantaloupe.

Soil solarization and tarping type	Sulphur (kg/ha)	Fenamiphos G (kg/ha)	Crop yield (kg/5 x 2 m plot)	
NO	NO	NO	12.6	a
NO	NO	300	18.6	cde
Polyethylene 0.050 mm	NO	NO	17.0	bcd
Polyethylene 0.200 mm	NO	NO	17.4	cd
Polyethylene 0.050 mm	500	NO	16.2	bc
Polyethylene 0.050 mm	750	NO	20.4	e
Polyethylene 0.050 mm	1000	NO	20.4	e
EVA 0.035 mm	NO	NO	16.4	bc
EVA 0.150 mm	NO	NO	19.0	de
EVA 0.035 mm	500	NO	19.0	de
EVA 0.035 mm	750	NO	20.2	e
EVA 0.035 mm	1000	NO	20.4	e
NO	500	NO	16.4	bc
NO	750	NO	17.8	cde
NO	1000	NO	17.0	bcd
NO	750	300	14.8	ab

Table 2 – Effect of different starting dates of soil solarization on tomato yield.

Starting date (1999)	Crop yield (kg/2.3 x 3.5 m plot)		% increase compared to the control
July 29	29.3	bc	73.4
August 8	28.1	bc	66.3
August 18	33.2	c	96.4
August 28	23.5	ab	39.0
Fenamiphos G 300 kg/ha	29.9	bc	76.9
Control	16.9	a	-

Table 3 – Effect of soil biofumigation on yield of tomato.

Cover crop	Crop yield (kg/3 x 4 m plot)				
	Tarped		Untarped		Tarped vs. untarped
Cabbage	36.7	a	28.2	ab	*
Turnip	40.7	a	32.8	ab	*
Broccoli	40.9	a	32.3	ab	-
Cauliflower	37.0	a	26.4	a	-
Horse-radish	38.9	a	31.6	ab	*
Mustard	41.2	a	32.0	ab	*
Fenamiphos 300 kg/ha	42.3	a	32.9	b	*
Control	39.7	a	29.2	ab	**

Table 4 – Effect of a Fall trap crop on the yield of the next Spring tomato crop.

Lettuce in Fall 1999	Chemical treatments		Tomato yield (kg/2 x 3 m plot)	
	Fall	Spring		
NO	-	-	47.4	a
NO	-	1,3 D 97 (200 l/ha)	60.6	bc
NO	-	Fenamiphos G (300 kg/ha)	56.4	ab
YES	-	-	51.6	ab
YES	1,3 D 97 (200 l/ha)	-	70.4	c
YES	Fenamiphos G (300 kg/ha)	-	57.6	ab
YES	-	1,3 D 97 (200 l/ha)	48.2	a
YES	-	Fenamiphos G (300 kg/ha)	49.8	ab