EFFECT OF OLIVE AND GRAPE POMACE IN THE CONTROL OF ROOT-KNOT NEMATODES

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Use of organic amendments could represent one of the possible alternatives to chemicals in the control of root-knot nematodes, *Meloidogyne* species. Among these amendments, olive and grape pomace were already found to be suppressive on root-knot nematodes in glasshouse experiments. Moreover, this nematicidal action could be enhanced by the combination with an organic nitrogen source. Two field trial were carried out in 1998 and 1999 in soils infested by *Meloidogyne incognita* in southern Italy, to verify the nematicidal action of olive and grape pomace in field conditions.

In the first experiment fresh and exhausted olive pomace, a commercial amendment obtained by composting fresh olive pomace, and fresh grape pomace were incorporated into a soil infested by *M. incognita* at dosages of 10, 20 and 40 t/ha. In the second trial the infested soil was amended with fresh olive pomace at the rates of 25, 50 and 100 t/ha and chicken manure at 1, 2 and 4 t/ha, alone or in combination. Moreover, half of the plot surface was covered with a transparent plastic sheet until transplanting. A dosage of 300 kg/ha of the granular formulation of fenamiphos G5 and untreated soil served as control in both the experiments. One month old seedlings of cantaloupe were planted in the plots of the first field, wheras tomato seedlings were used in the second experiment. Crop yield was recorded in both years. Final nematode population was determined on plant roots and in the soil in the first experiment, and only in the soil in the second year. Root gall index was estimated on a 0 – 5 scale.

In the first experiment olive pomace and the other tested amendments did not significantly increased cantaloupe yield compared to the control; only 40 t/ha fresh grape pomace gave a significant increase of yield (Table 1). There were no statistical differences among the treatments at any dosage. Number of eggs and juveniles on cantaloupe roots and in the soil was significantly reduced by all of the amendments compared to the untreated control, although much less than fenamiphos. The highest suppression occurred in soil treated with fresh olive pomace at 40 t/ha, whereas the treatments with composted olive pomace were the least effective. No effect of the amendments was observed on the root gall index.

In the second experiment all the dosages of olive pomace and chicken manure significantly increased tomato yield and reduced *M. incognita* population in the soil, compared to untreated control (Table 2). Combinations of 100 t/ha olive pomace with 2 and 4 t/ha chicken manure resulted in a further yield increase and were more suppressive than fenamiphos on *M. incognita*. No difference was found between covered and uncovered hemiplots.

Table 1 - Effect of olive and grape pomace soil amendments on *Meloidogyne incognita* on cantaloupe.

Amendments and rates	Cantaloupe yield (kg/10.5 m^2)			Final nematode population						Root gall index		
				Eggs and juveniles/g roots)			Eggs and juveniles/ml soil					
Untreated soil	26.1	a	A	972	a	A	56.0	a	A	5.0	a	A
Fenamiphos G5 300 kg/ha	50.8	c	B	267	d	D	10.1	d	C	4.4	d	B
Fresh olive pomace 10 t/ha	33.0	ab	A	591	bc	BC	35.2	bc	B	5.0	ab	A
Fresh olive pomace 20 t/ha	31.0	ab	A	468	cd	BC	30.0	bc	B	5.0	abc	A
Fresh olive pomace 40 t/ha	29.6	ab	A	462	cd	BC	28.0	c	B	5.0	abc	A
Exhausted olive pomace 10 t/ha	29.5	ab	A	635	bc	B	37.0	bc	B	4.8	bc	A
Exhausted olive pomace 20 t/ha	37.7	abc	AB	629	bc	B	36.6	bc	B	5.0	abc	A
Exhausted olive pomace 40 t/ha	36.1	ab	AB	536	bcd	BC	34.8	bc	B	4.9	abc	A
Composted amendment 10 t/ha	36.4	ab	AB	711	b	AB	41.2	b	AB	5.0	a	A
Composted amendment 20 t/ha	36.5	ab	AB	654	bc	B	40.8	bc	AB	4.9	abc	A
Composted amendment 40 t/ha	37.3	abc	AB	600	bc	BC	39.6	bc	B	4.8	c	A
Fresh grape pomace 10 t/ha	33.6	ab	AB	597	bc	BC	37.4	bc	B	5.0	a	A
Fresh grape pomace 20 t/ha	36.1	ab	AB	546	bc	BC	37.7	bc	B	5.0	ab	A
Fresh grape pomace 40 t/ha	39.8	bc	AB	516	bcd	BC	30.7	bc	B	5.0	abc	A

Means followed by the same letters in the same column are not significantly different according to Duncan's Multiple Range

Table 2 - Effect of olive pomace and chicken manure soil amendments on *Meloidogyne incognita* on tomato.

Amendments and rates	Tomato yield (kg/6 m^2)						Final nematode population (Eggs and juveniles/ml soil)					
	Uncovered			Covered			Uncovered			Covered		
Untreated soil	25.0	a	A	26.9	a	A	98.1	a	A	88.0	a	A
Fenamiphos G5 300 kg/ha	37.6	ef	CDE	39.0	gh	DEF	41.3	def	CDE	50.7	bcdef	BCDE
Olive pomace 25 t/ha	33.0	bcde	BC	34.3	bcdef	BCD	55.1	bcd	BCD	52.7	bcde	BCDE
Olive pomace 50 t/ha	30.6	bc	AB	31.8	b	AB	21.4	f	E	42.2	cdef	BCDE
Olive pomace 100 t/ha	32.1	bcd	BC	33.9	bcdef	BCD	25.4	ef	DE	36.5	def	DE
Chicken manure 1 t/ha	30.0	b	AB	32.1	bc	AB	75.7	b	AB	71.5	ab	ABC
Chicken manure 2 t/ha	31.6	bcd	BC	32.6	bcd	BC	68.2	bc	BC	60.3	bcd	ABCD
Chicken manure 4 t/ha	31.0	bcd	B	32.3	bcd	BC	40.7	def	BCDE	25.6	f	E
Olive pomace 25 t/ha + Chicken manure 2 t/ha	31.0	bcd	B	33.7	bcde	BCD	46.4	cdef	BCDE	38.7	cdef	CDE
Olive pomace 25 t/ha + Chicken manure 4 t/ha	34.5	cde	BCD	36.3	cdefg	BCD	46.0	def	CDE	73.7	ab	AB
Olive pomace 50 t/ha + Chicken manure 1 t/ha	33.7	bcde	BC	36.5	defg	BCD	40.8	def	CDE	44.9	cdef	BCDE
Olive pomace 50 t/ha + Chicken manure 2 t/ha	35.5	de	BCD	38.0	efg	CDE	41.9	cde	CDE	53.1	bcde	BCDE
Olive pomace 50 t/ha + Chicken manure 4 t/ha	35.4	de	BCD	36.6	defg	BCD	49.9	cde	BCDE	62.9	bc	ABCD
Olive pomace 100 t/ha + Chicken manure 1 t/ha	37.5	ef	CDE	38.5	fgh	DEF	49.4	cde	BCDE	51.2	bcdef	BCDE
Olive pomace 100 t/ha + Chicken manure 2 t/ha	42.9	g	E	44.3	i	F	29.0	ef	DE	32.6	ef	DE
Olive pomace 100 t/ha + Chicken manure 4 t/ha	40.8	fg	DE	43.1	hi	EF	22.6	f	E	31.7	ef	DE

Means followed by the same letters in the same column are not significantly different according to Duncan's Multiple Range