THE EC FORMULATION OF THE 1,3 DICHLOROPROPENE AS AN ALTERNATIVE TO METHYL BROMYDE IN THE CONTROL OF ROOT-KNOT NEMATODES

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Two field and four plastic-house experiments were conducted to evaluate the nematicidal activity of 1,3 D 94 EC against root-knot nematodes on tomato and cantaloupe. In the field, in southern and central Italy, the chemical was applied as drench in two volumes of water four weeks before planting either cantaloupe, cv. Dalton or tomato, cv. Perfect Peel. Rates of application were 100, 150, 200 and 250 l/ha.

With cantaloupe in southern Italy the best results were obtained when the nematicide was drenched with 400 m^3 of water per ha, compared with 200 m^3. Fenamiphos was less effective (Table 1).
With tomato in central Italy all treatments, indipendently of the volumes of water drenched, increased significantly almost equally the yields compared to the control. 1,3 D 97 applied by injector gun was as effective as the EC formulation (Table 2).

Two plastic-houses in southern Italy were treated with four doses of 1,3 D 94 EC drenched in three volums of water. Methyl bromide was applied for comparison. On cantaloupe, cv. Proteo, all treatments significantly increased the yield with respect to the control. (Table 3). In the tomato (cv. Faino) plastic-house the best results were obtained in the plots treated with either methyl bromide or 1,3 D EC at the rate of 18 g/m^2 applied in 35 mm of water (Table 4).

Two plastic-houses were treated with the same criteria in Sicily. On both crops, cantaloupe (Table 5) and tomato (Table 6), all treatments statistically increased the yields compared to the control and were equally effective.

Table 1 – Effect of 1,3 D 94 EC on yield of cantaloupe in southern Italy.

Treatment	Rate (l or kg/ha)	Volume of water (m^3/ha)	Yield (kg/9 m^2)			Root-knot index			Nematode population (Eggs and J2/cm^3 soil)					
									Pi			Pf		
Control	-	-	3.1	a	A	4.7	a	A	2.6	a	A	4.6	a	A
1,3 D EC	100	200	21.3	b	B	1.5	b	B	0.7	bc	B	0.8	bc	B
1,3 D EC	150	200	26.8	cd	CD	1.0	c	C	0.6	bc	B	0.6	bc	B
1,3 D EC	200	200	28.0	de	CDE	0.9	cd	CD	0.2	c	B	0.4	bc	B
1,3 D EC	250	200	31.2	ef	DEF	0.5	de	DE	0.3	bc	B	0.4	bc	B
1,3 D EC	100	400	23.3	bc	BC	1.8	b	B	0.7	bc	B	1.1	b	B
1,3 D EC	150	400	32.7	fg	EF	0.4	e	DE	0.5	bc	B	0.7	bc	B
1,3 D EC	200	400	35.5	g	F	0.3	e	E	0.1	c	B	0.7	bc	B
1,3 D EC	250	400	31.8	fg	EF	0.4	e	DE	0.4	bc	B	0.3	c	B
Fenamiphos	300	-	29.5	def	DE	1.0	c	C	1.2	b	B	0.9	bc	B

Means followed by the same letters on the same column are not statistically different according to Duncan's Multiple Range Test (small letters for P = 0.05; capital letters for P = 0.01).

Table 2 – Effect of 1,3 D 94 EC on yield of tomato in central Italy.

Treatment	Rate (l/ha)	Volume of water (m^3/ha)	Yield (kg/9 m^2)		Root-knot index		Nematode population (Eggs and J2/ 100 cc soil)			
							Pi		Pf	
Control	-	-	65.0	a	3.1	a	23.3	a	1,610	a
1,3 D EC	100	200	85.2	bcd	1.5	ab	1.3	b	928	ab
1,3 D EC	150	200	88.3	cd	1.1	ab	0.2	b	903	ab
1,3 D EC	200	200	92.8	d	1.0	ab	0.3	b	272	b
1,3 D EC	250	200	85.0	bcd	0.9	ab	0.0	b	166	b
1,3 D EC	100	400	78.7	bc	1.6	b	1.2	b	378	b
1,3 D EC	150	400	84.7	bcd	0.9	ab	0.3	b	30	b
1,3 D EC	200	400	92.2	d	0.5	ab	0.2	b	6	b
1,3 D EC	250	400	84.5	bcd	1.1	ab	0.2	b	221	b
1,3 D 97	200	*	81.3	b	0.1	c	0.0	b	29	b

By injector gun. Means followed by the same letters on the same column are not statistically different according to Fisher's Test (P = 0.05).

Table 3 - Effect of 1,3 D 94 EC on yield of cantaloupe in plastic-house in southern Italy.

Treatment	Rate (l/ha)	Volume of water (m^3/ha)	Yield (kg/m^2)		Root-knot index		Nematode population (Eggs and J2/cm^3 soil)			
							Pi		Pf	
Control	-	-	1.9	a	5.0	a	11.3	a	2.7	a
Methyl bromide	60	-	3.2	b	0.7	b	0.2	b	1.9	ab
1,3 D EC	12	35	3.7	b	0.4	bc	0.5	b	0.3	c
1,3 D EC	12	25	3.6	b	0.2	c	0.9	b	0.4	c
1,3 D EC	18	35	3.6	b	0.2	bc	0.8	b	0.6	bc
1,3 D EC	18	30	3.4	b	0.2	bc	1.9	b	0.1	c
1,3 D EC	24	35	3.4	b	0.0	c	0.0	b	0.1	c
1,3 D EC	30	35	3.3	b	0.0	c	0.2	b	0.1	c

Means followed by the same letters on the same column are not statistically different according to Duncan's Multiple Range Test (P = 0.05).

Table 4 - Effect of 1,3 D 94 EC on yield of tomato in plastic-house in southern Italy.

Treatment	Rate (l/ha)	Volume of water (m^3/ha)	Yield (kg/m^2)		Root-knot index		Nematode population (Eggs and J2/cm^3 soil)			
							Pi		Pf	
Control	-	-	6.2	a	4.8	a	59.9	a	180.0	a
Methyl bromide	60	-	8.1	cd	0.0	b	4.2	b	3.1	b
1,3 D EC	12	35	7.0	abc	0.0	b	1.6	b	7.0	b
1,3 D EC	12	25	7.8	bcd	0.0	b	3.8	b	4.6	b
1,3 D EC	18	35	8.2	d	0.0	b	3.7	b	4.8	b
1,3 D EC	18	30	7.4	bcd	0.1	b	0.1	b	30.2	b
1,3 D EC	24	35	7.0	abc	0.0	b	9.4	b	0.5	b
1,3 D EC	30	35	7.3	bcd	0.0	b	0.6	b	18.1	b

Means followed by the same letters on the same column are not statistically different according to Duncan's Multiple Range Test (P = 0.05).

Table 5 - Effect of 1,3 D 94 EC on yield of cantaloupe in plastic-house in Sicily.

Treatment	Rate (l/ha)	Volume of water (m^3/ha)	Yield (kg/m^2)		Root-knot index		Final nematode population (Eggs and J2/cm^3 soil)	
Control	-	-	1.3	a	5.0	a	15.7	a
Methyl bromide	60	-	2.3	b	1.5	b	2.1	b
1,3 D EC	12	35	2.4	b	1.3	b	0.8	b
1,3 D EC	12	25	2.5	b	0.9	c	1.0	b
1,3 D EC	18	35	2.1	b	0.5	de	0.7	b
1,3 D EC	18	30	2.0	b	0.7	cd	1.5	b
1,3 D EC	24	35	2.3	b	0.8	cd	0.4	b
1,3 D EC	30	35	2.3	b	0.3	e	1.3	b

Means followed by the same letters on the same column are not statistically different according to Duncan's Multiple Range Test (P = 0.05).

Table 6 - Effect of 1,3 D 94 EC on yield of tomato in plastic-house in Sicily.

Treatment	Rate (l/ha)	Volume of water (m^3/ha)	Yield (kg/m^2)		Root-knot index		Final nematode population (Eggs and J2/cm^3 soil)	
Control	-	-	2.5	a	5.0	a	4.7	a
Methyl bromide	60	-	8.1	b	0.3	b	1.7	bc
1,3 D EC	12	35	7.4	b	0.3	b	3.3	ab
1,3 D EC	18	35	6.4	b	0.6	b	1.8	bc
1,3 D EC	24	35	6.8	b	0.4	b	2.4	bc
1,3 D EC	30	35	7.6	b	0.0	b	1.3	c

Means followed by the same letters on the same column are not statistically different according to Duncan's Multiple Range Test (P = 0.05).