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INFLUENCE OF DIFFERENT HOSTS ON THE SENSITIVITY OF CITRUS NEMATODE, *TYLENCHULUS SEMIPENETRANS* TO CERTAIN NEMATICIDES

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Abstract

The influence of the host plants on citrus nematode *T.semipenetrans* sensitivity to the to nematicides : Oxamyl and Fenamiphos was studied . Samples of citrus nematode were collected from three different locations . The sensitivity levels of the nematode to the two nematicides were apparently influenced by host plant variety and soil type . Fenamiphos was more effective aganist the three citrus hosts in the three soil types . Citrus nematode fed on sour orange tolerated the two nematicides over those reared on the other two host citrus plants . Citrus nematodes that were reared in loamy clay or clay soil were more sensitive to the nematicides than those reared in sandy

INTRODUCTION

The response of phytophagous nematode to diffrent toxicants has been neglected for long time . Bass and Rawson (1966) , Abo EL - Ghar *et al* . (1972) and Abd El - Razik (1977) studied the rlation between the physiological resistance of insects to insecticides and the nutritional factors . Meloidogyne species exhibited

differential sensitivty to organophosphate and carbamate nematicides (Barker *et al.* 1981). Zawam (1994) found that LC50 values of fenamiphos to juveniles of *M. javanica which* fed on tomato or egg plants were 4.14 and 9.47 ppm respectively . The same author showed that soil type affects the sensitivity of *M. javanica* to nematicides. Differential sensitivity of Meloidogyne spp and Heterodera glycineces to selected nematicides could be due to a number of physiological reactions, (Gourd *et al* ,1993) oxgen consumption (Nordmeyer and Dickson , 1989) and acetylcholinesterase (Opperman and Change , 1990) .

The present investigation aimed at studying the effects of host plant variety and soil type on the susceptibility of the citrus nematode , *T. semipenetrans* juveniles to nematicides .

MATERIALS AND METHODS

Two expriments were carried out to study the influence of diffrent hosts on the sensitivity of citrus nematode to nematicides .

In the frist experiment , three diffrent populations were collected from north and south of Delta and a new reclaimed area in Egypt . Tow nematicides were used in this test , oxamyl (Vydate) 24% L " N,N-dimethyl -2-methylthio phenyl oxyimno-2 (methylthio) acetamidate " and fenamiphos (Nemacur) 40% E.C. " O-(3-methyl-4-methylthio) phenyl , N-isopropyl phosphoramidate " The three populations were reared on seedlings of sour orange *Citrus aurantium* , rangpure lime *C.limonia* and *C. volkamerian* in an individual 15 cm diam . clay pots filled up with clay soil under green house conditions . The juveniles were extracted by sieving the soil particles through 15 mesh sieve to remove fibrous roots from soil , then mixed by hand , subsampled (100 cm3) and extracted on Baermann units for 72 h . The juveniles were collected daily and the yield of the third day was used for nematicides testing . Five concentrations of each nematicide were prepared in distilled water . A final volume of 5 ml in glass vial of 8 ml capacity was made . One thousand juveniles were placed in each vial . Control treatment was done by placing 1000 juveniles in each vial with distilled water . The treatments were replicated three times . The susceptibility of the three field populations was measured at the same time after collection and after rearing on diffrent hosts .

Complete mortality regression lines were established and LC50`s , LC90`s and slope values were estimated according to Finney (1962) . All tests were repeated three times .

In the second experimiment , population of citrus nematode was collected and tested by oxamyl and fenamiphos as mentioned above . The population was reared on the same hosts which were planted in three different soil types: clay soil (48% clay , 22% silt and 30% sand) loamy clay soil (34% clay ,44% silt and 22% sand) and sand loamy soil (18% clay ,10% silt and 72% sand) . The susceptibility of citrus nematode in the three soil types was measured as mentioned above .

In the two experiments , *T. semipenetrans* was fed on different hosts for five months before being retested to the two nematicides .

RESULTS AND DISCUSSION

The sensitivity levels of citrus nematode juveniles fed on diffrent hosts to the two nematicides are presented in Figs . 1-3 and Table 1.

The organophosphate fenamiphos was more toxic against the three populations of citrus nematode fed on all hosts compared to the carbamate oxamyl . The effect of the host plants on the susceptibility of the nematode to nematicides showed that the juveniles fed on sour orange exhilbited highest susceptibility followed by those reared on volkamerana and rangpure rootstocks . This was for the populations collected from Behera and Qalubia regions . The susceptibility of nematodes collected from south Tahrir to fenamiphos followed the same order of toxicity except of oxamyl which was quite different . The toxicity could be arranged descendingly as follows : juveniles fed on sour orange field population , volkamerana and rangpure , respectively .

The slope values of the toxicity lines are illustrated in Figs 1 - 3 . The two nematicides showed flat toxicity lines when tested on Behera population , whereas the same nematicides gave the steepest toxicity lines when tested on populations collected from Qalubia and south Tahrir . The slope values of the nematicides had changed according to the kind of feeding .

The susceptibility of the nematodes fed on the three host plants grown in the three soil types showed that the susceptibility of citrus nematode to fenamiphos decreased in the following pattern : nematodes reared in clay soil , loamy clay soil followed then by sandy loam soil . The susceptipility to oxamyl decreased in the following pattern : nematodes reared in loamyclay soil , clay soil and sandy loam soil . Nematodes were generally more tolerant to carbamate compounds than organophosphate compounds . The nematodes reared in green house on diffrent host plants grown in diffrent soil types were more susceptible than the field population except those reared on rangpure lime grown in loamy clay soil and sandy loam soil and those reared on volakmeriana lime in sandy loam soil which were more susceptible to fenamiphos than the field population .

The semi-endo parasitic nematode *T.semipenetrans* collected from different sites in Egypt were more tolerant to nematicide compounds than those fed on different hosts for five months in green house . The results indicated that the host on which nematode juveniles were fed influenced their response to the nematicides . The susceptipility to pesticides was found to be affected by the host plant on which the insect was fed (Abd el - Razik , 1977 ; Zawam , 1949) . This effect is probably due to indirect physiological reactions (Gurd *et al.* , 1961) , the nutritional factors (Gordon , 1961) , protein content (Bishara et al . , 1974) , carbohydrate and fat contents (Munson and Gottlieb , 1953) , oxygen consumption (Nordemyer and Dickson , 1989). Opperman and chang (1990) reported no difference in Ache binding to aldicarb or fenamiphos for *M. incognita and M.javanica* Pree *et el* . (1989) found that aldicarb had been shown to be more effective than fenamiphos in inhibiting Ache from *Helicotylenchus dihystera* and other selected nematodes . The infleunce of soil type on the susceptibility of Meloidogyne spp . was observed recently (EL-Morshedy , unpublished data) .

Proper identification of target nematode species or the kind of feeding are crucial in order to maximize control with minimum chemical input because of differences in sensitivity to nematicides . Economic returns are likely to be realized in several crop-nematode combination once nematicide dosages are optimized (Gourd *et al* . , 1993) .

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Table 1. Influence of different host plants planted in different soil types on the sensitivity of citrus nematode to nematicides.

Source of feeding	Clay soil						Loamy clay soil						Sandy loam soil					
	Oxamyl			Fenamiphos			Oxamyl			Fenamiphos			Oxamyl			Fenamiphos		
	LC_{50}	LC_{90}	Slope	LC_{50}	LC_{90}	Slope	LC_{50}	LC_{90}	Slope	LC_{50}	LC_{90}	Slope	LC_{50}	LC_{90}	Slope	LC_{50}	LC_{90}	Slope
Field population	6.44	31.57	1.85	2.16	16.05	1.47	6.44	31.57	1.85	2.16	16.05	1.47	6.44	31.57	1.85	2.16	16.05	1.47
Sour orange	2.82	23.92	1.34	0.91	6.86	1.46	2.33	25.87	1.23	1.09	8.29	1.46	4.76	17.40	2.27	1.53	14.34	1.32
Volkameriana	3.89	39.98	1.27	1.07	10.14	1.31	3.70	33.55	1.34	2.06	15.93	1.44	5.32	29.31	1.73	3.20	23.34	1.48
Rangpur lime	4.30	59.49	1.12	1.62	15.97	1.29	4.30	41.73	1.30	2.22	16.89	1.45	5.59	31.51	1.70	3.29	21.41	1.58

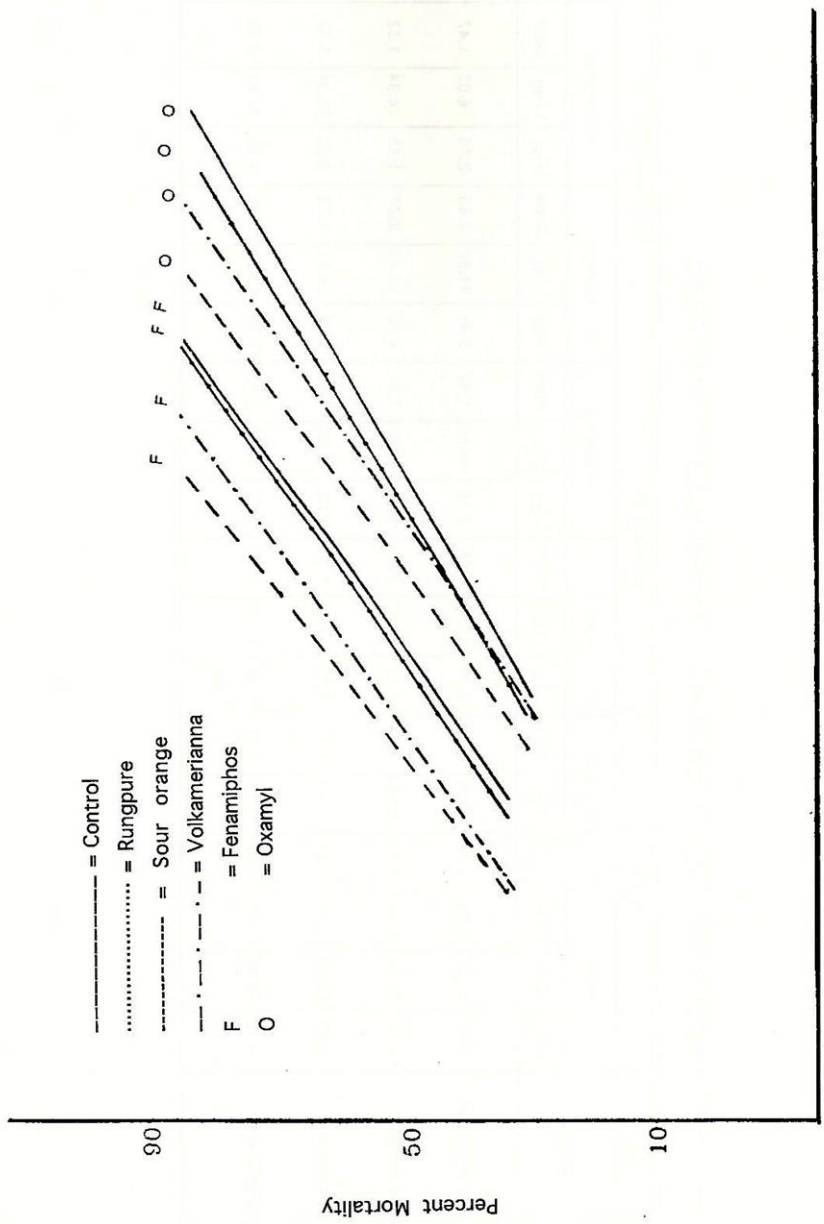

Fig. 1. Mortality regression lines of fenamiphos and oxamyl against citrus nematode (Behera population) fed on different hosts.

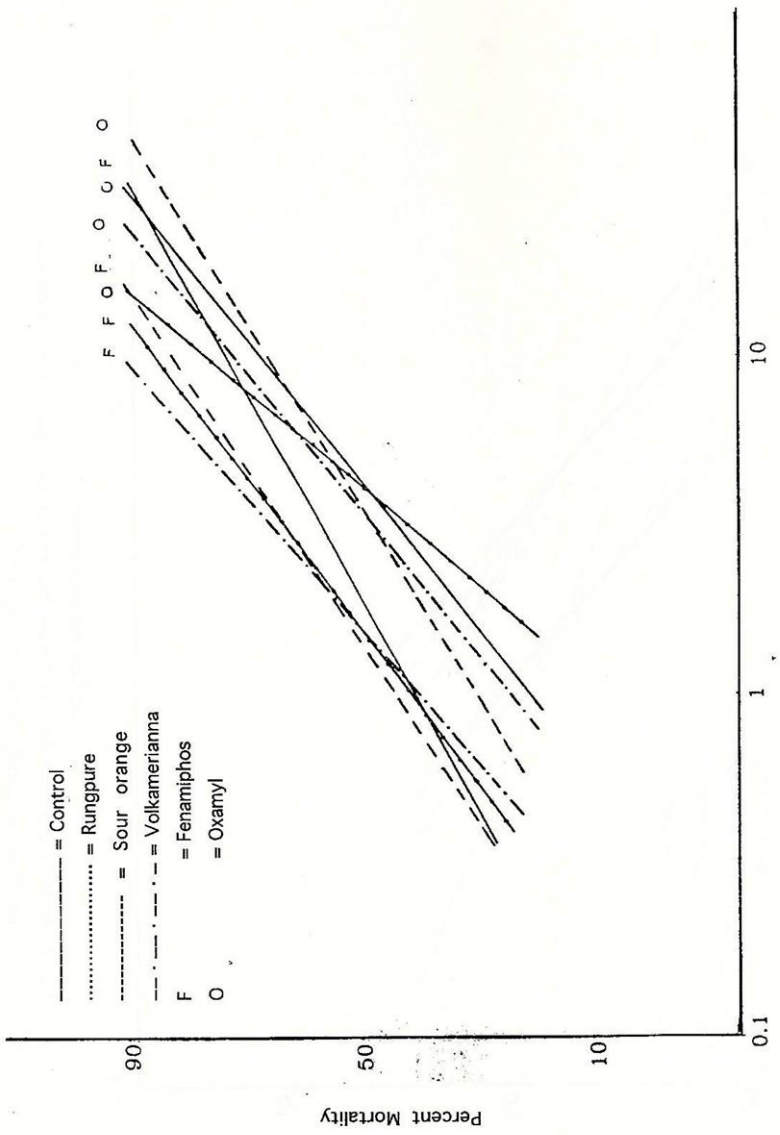

Fig. 2. Mortality regression lines of fenamiphos and oxamyl against citrus nematode (Qalubia population) fed on different hosts.

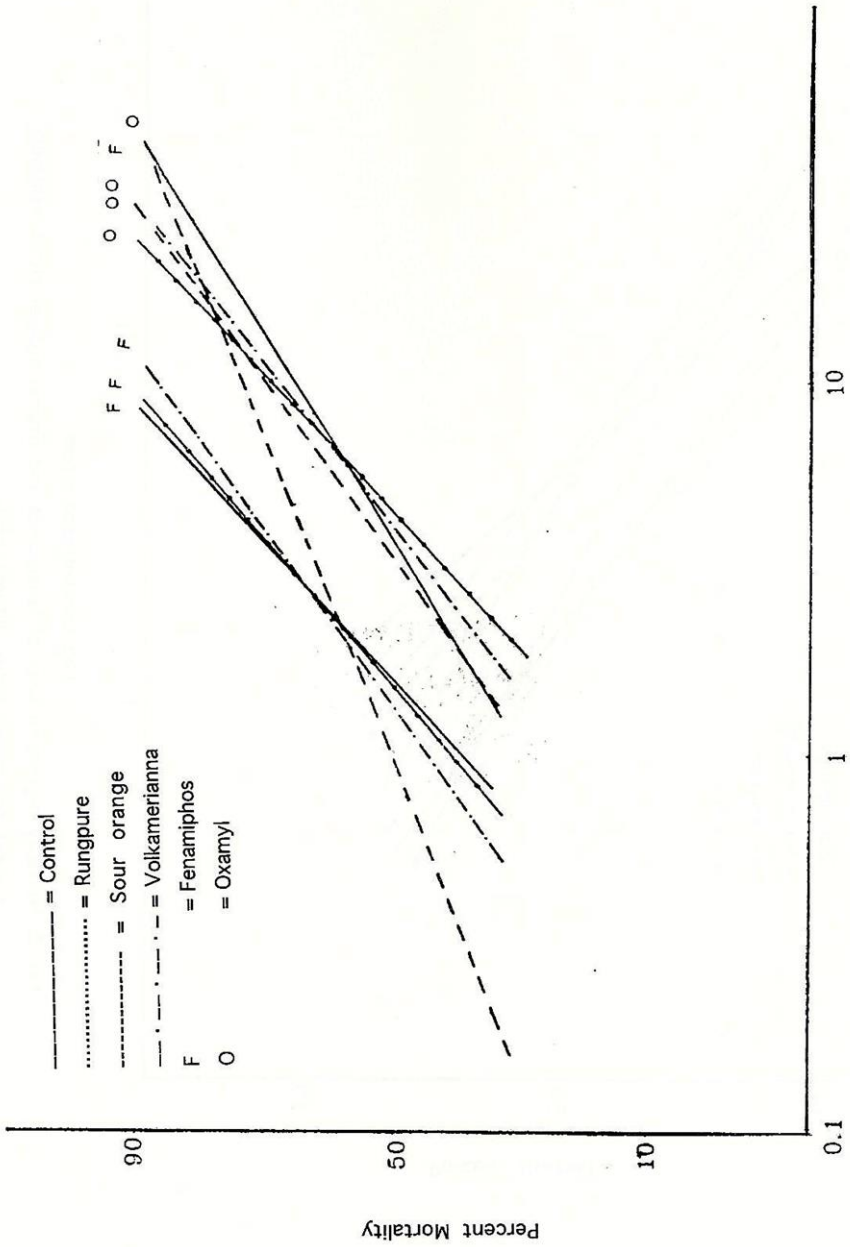

Fig. 3. Mortality regression lines of fenamiphos and oxamyl against citrus nematode (S. Tahrir population) fed on different hosts.

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تأثير العوائل المختلفه على حساسية نيماتودا الموالح لبعض المبيدات النيماتوديه

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فى تجربه لدراسة تأثير العائل على حساسية نيماتودا الموالح لبعض المبيدات النيماتوديه جمعت ثلاثة عشائر من ثلاث مناطق مختلفه واختبرت حساسيتها ، ثم ربيت فى الصوبه على عوائل مختلفه مزروعه فى ثلاث أنواع من التربه لمدة ٥ شهور ، ثم اختبرت الحساسيه مره أخرى.

أوضحت النتائج أن حساسية النيماتودا للمبيدات تأثرت بنوع الغذاء ونوع التربه كما أوضحت أن مبيد الفيناميفوس أكثر فعاليه من مبيد الاكساميل عند اختبار الثلاث عشائر المختلفه. نيماتودا الموالح التى ربيت على أصل نارنج كانت أكثر حساسيه من تلك التى ربيت على أصل فولكاميريانا أو أصل الرانجبور لكلا المبيدين . نيماتودا الموالح التى ربيت على الأصول فى تربه طمييه رمليه كانت أكثر تحملاً للمبيدات عن تلك التى ربيت فى تربه طينيه أو طينيه طمييه.