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BIO-EFFICACY OF SINCOCIN AGTM TO CONTROL TYLENDHULUS SEMIPENETRANS (TYLENCHIDA NEMATODA) IN CITRUS ORCHARD

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ABSTRACT

Field experiment was coducted at a site naturally infested with Tylenchulus semipenetrans to explore the effect of sincocin AGTM as a biocidal agent at 2000 p.p.m. in controlling citrus nematodes.

Sincocin AGTM singificantly reduced citrus nematode population in both soil and roots of Citrus sinensis Var Balady, and enhaced both growth of orange trees and soil mites especialy the mesostigmatid mites In treated soil, the nature nematode feeders, mesostigmatid mites were increased by 140% and 243% one month and two months, respectively, post application.

INTRODUCTION

In recent years, continuing environmental problems associated with the use of nematicides (Thomason, 1987) have introduced a

sense of urgency into the search for alternative methods of nematode managment. Unique biochmical compounds from a wide variety of marine organisms have been studied as potential pharmaceutical or biocidal agents (Targett & Mitsui, 1979; Clowell, 1983; Stein & Borden , 1984; Sivonen et. al., 1990, Kiviranta et. al., 1990 & 1991. Lawton & Codd, 1991)

Biological control agents of selected plant products offer potential novel approach to suppress the plant parasitic nematodes, Meloidogyne spp (Swarup & Sharma, 1967; Alam et. al., 1977 Verma et. al., 1978 Harron & Smart, 1983; Osman & Salem. 1987; Pracer et. al., 1987).

Sincocin AGTM is a new developed biocidal product, composed of nature sterilized plant and mineral extracts, which is very effective against various endo-and ecto- parastic nematodes which attack various field, vegetable and fruit crops (Anonymous, 1987 & Abou-Eid et. al., 1992).

Results obtained in pervious pots experiment (Mousa et. al. 1989) proved that sincocin has a signficant potential in controlling citrus and root-knot nematodes. Theses results encourage us to apply this bicontrol agent in field experiment to control citrus mematoda Tylenchulus semipenetrans.

MATERIAL AND METHODS

Field a experiment was conducted at a site naturally ifested

with Tylenchulus semipenetrans. in Experimental Farm, Faculty of Agriculture, Menofia University, Shebin El-Kom, Egypt. The soil was characterized as clay loam soil. The host plant was Balady orange,Citrus sinenesis.Sincocin-AGTM is a newly developed biocidal product from ATL Enterprises.Inc ., an affiliate of appropriate technology Ltd. (ATL), Dallas, Texas, U.S.A The prodct is composed of natural, sterilized plant and mineral extracts. Treaments were applied in April, 1990, Soil temperature at 10 cm depth was 23 ± 2c°. Treatments were replicated three times (each replicate include three trees). Each orange three recieved' 3000ml of aqueous solution of sincocin around the roots, with the rate of 2000 ppm. The control trees recieved water only without sincocin .T. semipenetrans numbers were estimated before application and one & two months after application from 250g composite soil samples, extracted by modified Baerman ban's funnel, and in 1 g roots stained with acid fuchsin in cold lactophenol.

for soil mite extraction and enumeration, soil samples were collected one and two months after application, using iron sampler volume, 1000 cm^3 All differdnt grups of soil mites were extracted by using modified tullgren-funnels in small petridishes. Examinations were carried out at 2 hrs. intervales by means of a steriomicroscope.

Also, the spring growth of the foliage of orange trees was determined in cm, one and two months after application. Data were

subjected to statistic analysis using F test.

RESULTS AND DISCUSSION

The roots and soils of Balady orange treated with sincocin AGTM had significantly lower Tylenchulus semipenetrans numbers than did untreated ones (Table 1). The reduction percentages of citrus nematodes in treated trees were 22.6,42.3 for soil , and 48.6,58,5 for root, one and two months post application, respectively.

Sincocin AGTM significantly enhanced the numbers of soil mites (Table 2). Total soil mites increased by 133.3 % and predator mesostigmatid mites by 140 % , one month after application by 317 % and 243% for total soil mites and predator msostigmatid mites, respectively, two months after application.

In our tests, treated infested trees with sincocin AGTM at concentration of 2000 ppm increased the spring growth of the foliage by 143.2% and137.2 % after one and two months post application, respectivly. These confirm the results obtained by pracer et. al. (1987) who reported that tomato plant growth was significantly improved by marine algal prodcuts. Also, this improvment in growth may be due to the reduction of nematode populations resulted by the application of sincocin. The beneficial effects of sincocon AGTM on nematode host plants are also reported to be mainly due to its effects on solute content of cells, root exudation, enzyme and bio-

Table (1): Effect of sincocin - AGTM on Tylenchulus seimpenetrans,

population in soil and Balady orange roots, one and to months after application.

Treatment	Dosage per tree (ppm)	Volume of water/ tree	avg. number of nematode population							
			Per 250gsoil				Per 1groots			
			1st month	2nd month	Total	Mean	1st month	2nd month	Total	Mean
Sincocin AGTM	2000	3000cc	3250	2025	5275	2637.5	86.33	100	186.33	93.16
Con rol	-	3000cc	4196.7	3510.8	7707.5	3853.7	194.67	208	402.67	201.33
L.S.D.at 5 % level			17.52	1418.1			39.3	32.18		

L.S.D. Lethal significant differences

Table (2): Effect of sincocin - AGTM on soil mit population one and two months after application.

Treatment	Dosage per tree (ppm)	Volume of water per tree	avgNo. of soil mite population / 1kg soil					
			1st Month		2nd Month		Mean	
			Total soil mite	Mesostigmata	Total soil mite	Mesostigmata	Total soil mite	Mesostigmata
Sincocin AGTM	2000	3000	25	19	38	17	29	15.5
Control	—	3000	15	10	12	7	13.5	8.5
L.S.D.at 5 % level			7.35		14.7			

Mesostigmata are predators

Table (3) : Effect of sincocin - AGTM on spring growth of the-foliageof Balady orange Citrus Sinesis

one and to months after application.

Treatment	Dosage per tree (ppm)	Volume of water per tree	avg. of growth in cm				
			1st Month	2nd Month	Total	Mean	% of increament
Sincocin AGTM	2000	3000cc	7.63	8.55	16.18	8.9	140
Con rol	----	3000cc	5.33	6.23	11.56	5.78	
% of inereament			143.2	137.2			

chemical synthesis of plant cells and oragns. Those changes lead to improved root growth and crop quality (Anonymous. 1987 and Abou- Eid et. al., 1992).

The resulst indecate that sincocin, significanly, suppressed Tylenchulus semipenetrans. populations in both soil and roots of Balady orange.These results confirm that obatined by Harron & Smart (1983); Osman and Salem (1987) and Parcer et. al. (1987) who found that plant extracts decreased the population of plant parsitic nematodes. Tarjan (1977) reported that kElP dervatives benificial was midly nematodes to soil infested by citrus nematodes. Control of ecto parasitic nematocidale, Belnolaimus langicaudates, on established centipede grass truff was obtained when commercial kelp was applied (Morgan and Tarjan 1980).Enhancing soil mites in treated soil by sincocin especialy the perdator mites as shown in Table (2), may explore the role of sincocin on inhibition the plant parasitic nimatodes which is attributed to the increaes of predator mites that feed on nematodes or their metabolites which may have a role in reduction of parasitic nimatodes. These are in harmony with that stated by mousa et. al. (1989) who reportedthat the role of sincocin as biocontrol agent is enhacing the nematode natural enemies of soil microorganisms and nematode feeders. Also we can conclude that. the mechanism or the vol of sincocin as bio-control agent may be due to that, plant extracts ineceased resistance of host to pathogen (Booth, 1966) and besides their role as biocidal

agent, they contain both major and minor plant nutrients (Stephenson, 1966).

Sincocin AGTM acts by providing a non-toxic, biological control system which acts upon plant-parasitic nematodes, soil pathogenic fungi and its host plants. The major components of this bioproduct include natural cyanophoric glucosides and nucleic derivatives that are commonly present in the debris of ceratain plant extracts (Anonymous, 1987).when sincocin AGTM is introduced to the root zone of growing plants the glucoside fraction is hydrolyzed to phenols that kill parasitic nematodes inhibit the growth of soil pathogenic fungi. The nucleic acid dervatives activate the indigenous cyanobacteria to release ethylene and hydrogen sulphide which are also toxic to parasitic nematodes and soil pathogenic fungi (Anonymous, 1987). The research indicated here establishes that sincocin AGTM is a promising candidate for the managment of plant-parasitic nematode of citrus orchard.

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الكفاءة البيولوجية « للسنكوسين » لمكافحة نيماتودا الموالح فى حديقة موالح

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أجريت تجربة حقلية فى حديقة الموالح لكلية الزراعة - جامعة المنوفية فى مساحة منها مصابة طبيعياً « بنيماتودا الموالح » وكان البرتقال البلدى هو العائل. وكانت التربة طينية. وكان الهدف من البحث دراسة امكانية استخدام المستخلص النباتى «سنكوسين» فى مكافحة نيماتودا الموالح كافة خطيرة لها أهميتها كطفيل على جذور الموالح مسبباً مرض « التدهور البطىء » للموالح فى جميع مساحات الموالح على مستوى الجمهورية. «والسنكوسين» مستخلص نباتى له دور هام فى زيادة نشاط الأعداء الحيوية الموجودة بالتربة والتى لها دور هام فى مكافحة النيماتودا (مثل : اكاروسات التربة) ومن هنا كان الهدف للوقوف على اختبار كفاءة هذه المادة البيولوجية. وأسفرت النتائج عن الآتى :

١- أدى استخدام المادة البيولوجية الى خفض لمجتمع نيماتودا الموالح فى التربة والجذور على عائل البرتقال البلدى .

٢- شجع استخدام المادة البيولوجية على زيادة اعداد اكاروسات التربة وبصفة خاصة «الميزوستجماتا » وهى من المفترسات للنيماتودا فقد زاد التعداد وبمعدل ١٤٠ ٪ ، ٢٤٣ ٪ بعد شهر وشهرين من تطبيق المادة البيولوجية مقارنة بمجتع الأكاروسى فى معاملة المقارنة.

٣- شجع استخدام المادة البيولوجية نموات الربيع الحديثة للنمو الخضرى لأشجار البرتقال البلدى.