J. Agric. Sci. Mansoura Univ., 30 (2): 1135 - 1146, 2005

STATUS OF PLANT PARASITIC NEMATODES ASSOCIATED WITH RICE CULTIVATIONS IN NORTHEASTERN NILE DELTA REGION, EGYPT WITH REFERENCE TO *Hirschmanniella oryzae*

El-Sherif, A.G.*; A. R. Refaei*; A.E. Khalil and A.H.Nour El-Deen***

*** Nematology Res. Unit., Zoology Dept., Faculty of Agric., Mansoura Univ., Egypt .**

**** Plant Pathology Res. Inst.; A . R. C, Giza, Egypt.**

ABSTRACT

A survey of the cultivated rice area of seven Egyptian rice cultivars i.e. Sakha 101,102,Giza171,177,178, Yasmin and Reiho grown in northeastern Nile Delta region, especially Dakahlia governorate revealed the presence of nine nematode genera i.e. *Aphelenchoides,Helicotylenchus,Heterodera,Hirschmanniella,Meloidogyne, Pratylenchus, Trichodorus, Tylenchorhynchus* and *Tylenchus*. Whereas, five of these nematodegenera i.e. *Hirschmannniella*, *Meloidogyne* , *Trichodorus, Tylenchorhynchus* and *Tylenchus* were only recorded in the rhizosphere of rice plants cv. Giza 178 and Sakha101grown in Damietta governorate. *Hirschmannilla* was the prevailing nematode genus as it was found in association with the rhizosphere of the seven rice cultivars surveyed, whereas, *Aphelenchoides* was only in the rhizosphere of rice plant cv.Sakha 101,102, Giza 178 and 171and was not detected from soil samples of Damietta governorate.

The population density of *Hirschmanniella oryzae* increased throughout the rice plants cv. Sakha 101 growing seasons of 2002 and 2003 during wheat-rice – barseem-rice-wheat cropping sequence.It was found in greater numbers between August and October than in other months due to the pre-flowering and flowering stages in August and September, respectively.

Hirschmanniella oryzae population was very low in the studied area previously planted with barseem in comparison with that when planted with wheat.

With respect to *H. oryzae* management on rice plant cv. Sakha 103 during the rice growing season 2003 with four chemical pesticides i.e. Malathion 57% EC, Dimethoate 40% EC. Carbo-ElNasr 10% G and Cartan 10% G as well as two plant extracts i.e. *Vinca rosea* and *Datura stramonium*, results revealed that all tested pesticideS obviously reduced the population of *H. oryzae* infesting soil of rice plants. Among the materials tested, Cartan 10% G (broadcasting), achieved the highest percentage of nematode reduction with value of 65.4%, followed by *V. rosea* (foliar spray) with value of 59.6%, whereas Carbo El-Nasr (broadcasting) gave the least value of nematode reduction (39.4%) when compared with the untreated plots, respectively.

Keywords: Nematode fauna, rice cultivations, Population dynamics of *Hirschmanniella oryzae*, cropping sequence,management,chemical pesticides, Plant extracts, *Vinca rosea* and *Datura stramonium*.

INTRODUCTION

Rice, *Oryza sativa* L.,is the main food of more than two billion people, predominately in Asia, where, more than 90% of the world's rice grown and consumed (Bridge *et al.*, 1990). Rice cultivation in Egypt reached 1.1 million feddan in 2003, 80% of them is by transplanted seedlings, while the rest 20%

is by direct seeding.More than 1/3 of the Egyptian rice area is cultivated in Dakahlia and Damietta governorates where they are located at the Northeastern of the Nile-Delta region.Productivity of rice in Egypt is 6.175 million tons as the productivity average is 4.09 tons per feddan according to report published by Badawi *et al.* (2004).

Worldwide, rice yield losses due to plant parasitic nematodes are estimated at 10% (Sasser and Freckman, 1987). Major nematode pests of rice were recorded to be *Aphelenchoides besseyi, Criconemella onoensis, Ditylenchus angustus, Heterodera* spp.,*Hirschmanniella* spp.,*Hoplolaimus indicus,Meloidogyne*spp,*Paralongidorus*spp.,*Pratylenchus* spp.,*Tylenchorhynchus* spp. and *Xiphinema ifacolum* (Yossif, 1985 and Bridge *et al.*, 1990).

In Egypt, Yossif (1985) reported that when the nematicide carbofuran was applied at the rates of 0.9, 0.6 and 0.3 kg.a.i./ feddan in soil area infested with *H,oryzae* before soil wet levelling for transplanting rice seedlings cv. Reiho, it improved plant growth and increased rice grain yield at 0.9 kg a.i./ feddan only, whereas application after soil wet levelling,a significant increase in rice grain yield was obtained from treatments receiving any of the nematicide rates tested over that of the untreated check.

In India, Dwivedi and Upadhyay (2000) reported that the population of *Holoplaimus* spp., *Helicotylenchus indicus, Tylenchorhynchus, vulgaris, Longidorus* spp., *Bashiria graminophila* and *Hirschmanniella oryzae* were commonly associated with rice-wheat cropping system, which occupies the major cultivated area. In addition they also added that application of farmyard manure and phosphorus deficiency in soil increases the population density of *H. oryzae*.

The purpose of the present work was (1) to assess the nematode fauna through surveying them in the cultivated rice area within certain counties of Dakahlia and Damietta governorates, (2) to study the seasonal fluctuations of the rice root nematode, *Hirschmanniella oryzae* on rice cv. Sakha 101 at one location during crop rotation and (3) to determine the influence of certain chemical pesticides i.e. Malathion, Dimethoate, Cartan, Carbo El-Nasr as well as two plant extracts i.e. datura and periwinkle on controlling *H. oryzae* on rice cv. Sakha 103 under field conditions during the growing season of 2003.

MATERIALS AND METHODS

A- Nematode assay:

652 composite soil samples from the rhizosphere of rice plants were collected during the growing seasons of 2002 and 2003. These samples represented a total of seven Egyptian rice cultivars, i.e. Sakha 101, 102, Giza 171,177,178,Yasmin and Reiho,grown in eight counties of Dakahlia governorate (Aga, Mansoura, Talkha, Simbellawian, Temi-El-Amdeed, Dekerness, Belkas and Manzala), whereas, the rice cultivars of Giza 78 and Sakha 101 were grown in two counties i.e. Faraskor and Zarka of Damietta governorate.. Each sample was kept separately in a plastic bag, refrigerated

at 4°C and then processed for nematode recovery. Separation of nematodes from soil was accomplished by sieving and modified Baermann-pan technique (Goodey,1957). Recovered nematodes were killed by pouring an equal volume of boiled water to the suspension and then fixed in formaline-acetic acid. Identification of nematode genera in repeated aliquots (1 ml each) in each soil sample was based on the morphological characters of the adult and larval forms according to Goodey (1963) and Mai and Lyon (1975). The Hawksely counting slide was used for determining the number of each genus and recorded. Identification of *Hirschmanniella* species was accomplished through the examination of 10 females and 8 males temporary mounted. The key of Luc and Goodey (1964) was consulted.

B- Population dynamics of *Hirschmanniella oryzae*:

The population densities of *H. oryzae* were monitored in the wheat (*Triticum aestivum*) –rice- (*Oryza sativa*) and then Barseem (*Trifolium alexandrinum*) -rice- wheat cropping system that was carried out at the same location of Shubrakeballa village, Simbellawian county, Dakahlia governorate during the rice (cv.Sakha 101) growing seasons of 2002 and 2003, respectively. Three soil samples were monthly collected between 15 June 2002 till 15 February 2003 and then from 15 June 2003 till 15 February 2004. These soil samples of about 500 gm in plastic bag each sent to the Nematology Laboratory, kept in the refrigerator at 4°C until nematode extraction. Nematode extraction of each soil sample with a volume of (250 gm) was done by sieving and modified Baermann-pan technique (Goodey 1957).The Hawksely counting slide was used for determining the number of *H. oryzae* and recording the average of each month.

C- Management of *H. oryzae* infesting rice plants under field conditions:

To determine the influence of certain pesticides i.e. Malathion 57% EC cheminova, 0,0-dimethyl-S-(1,2-dicarbethoxy) ethyl phosphorodithioate; Carbo El-Nasr 10% G,2,3-dihydro-2,2-dihydro-2,2-dimethyl benzofural-7-methyl Carbonate; Dimethoate 40% [0,0-dimethyl-S-(methyl-carbamoyl)] methyl phosphorodithiate; Cartan 10% (Local); Methyl N',N'-dimethyl-N-[(methyl carbamoyl) Oxy]-1- thiooxamimidate as well as two aqueous leaf extracts of periwinkle, *Vinca rosea* and datura, *Datura stramonium* (that were prepared according to Khalil, 1996) to control *H. oryzae*, an area of 210 m^2 of land was chosen at Shubrakeballa village, Simbellawian county,south Dakahlia of Northeastern Nile Delta region to carry out this experiment. The chosen area was divided into seven plots with thirty square meters for each. Each plot served as a treatment with three replicates of 10 m^2 each. After thirty days from sowing rice cv.Sakha 103 seeds,seedlings were transplanted into the previous mentioned area,which was prepared according to the procedure of rice cultivation under the Egyptian conditions. Ten days later, pesticidal applications as well as aqueous leaf extracts tested were added. Treatments were as follows:1) Malathion 57% EC, 2) Carbo El-Nasr 10% G, 3) Dimethoate 40% EC, 4) Cartan 10% G (Local), 5) *Vinca rosea*, 6) *Datura stramonium* and 7) Without any chemical or plant products.

Malathion or dimethoate was separately added as spray at the rate of 5 ml/L or 2.5 ml/L/replicate, respectively. Each of Carbo-El-Nasr or Cartan (Local) was introduced at the rate of 21, 28 gm. per replicate, whereas each aqueous leaf extract of perwinkle or datura at 50% was tested as spray at the rate of 12.5 ml/L/replicate. Each treatment was replicated three times.

Two weeks later, NPK fertilizer was added at the recommended rate/replicate.At the beginning of the experiment after preparing this area for transplanting rice seedlings, the initial population of *H. oryzae* in three soil samples with 250 gm. each was determined by sieving and Baermann-pan technique (Goodey, 1957) and the average nematode number was then recorded to be 300 individuals/250 gm soil.

After twenty days from transplanting rice seedlings into the location, one soil sample with 250 gm each/replicate treatment was weekly collected in plastic bag between August 18th and September 17th, 2003,sent to the Nematology Laboratory and kept in a refrigerator at 4°C for nematode extraction. Nematode extraction was carried out by sieving and Baermann-pan technique and the average number of *H. oryzae* was determined and recorded.

Data were subjected for analysis of variance (ANOVA) (Gomez and Gomez, 1984) and means were compared by Duncan's multiple range test (Duncan, 1955).

RESULTS

Data in Table (1) recorded the presence of nine genera of plant parasitic nematodes in soil samples collected from the rhizosphere of seven rice cultivars i.e. Sakha 101,102, Giza 178, 177, 171, Yasmin and Reiho grown in Dakahlia and Damietta governorates during the seasons of 2002 and 2003. These nematode genera were *Aphelenchoides, Helicotylenchus, Heterodera* (J_2),*Hirschmanniella,Meloidogyne* (J_2),*Pratylenchus, Trichodorus, Tylenchorhynchus* and *Tylenchus*. 497 soil samples selected from Dakahlia governorate revealed the presence of the nine nematode genera in the surveyed counties of rice fields.*Hirschmanniella* and *Aphelenchoides* seemed to be the most prevailing rice pests as they occurred at rates of 240 and 111 times with percent occurrence of 48.29% and 22.33%, respectively. The nematode genera,*Tylenchorhynchus* and *Tylenchus* showed moderate distribution as they occurred at rates of 39 and 47 times with percent occurrence of 7.85% and 9.46 %, respectively.Whereas, the genera *Pratylenchus,Trichodorus,Meloidogyne*(J_2),*Heterodera*(J_2)and *Helicotylenchus* were less common as they occurred at 11, 8, 6, 5 and 2 times with percent frequency of occurrence of 2.21%, 1.61%, 1.21%, 1.01% and 0.40%, respectively.

It was also evident from data presented in Table (1) that Simbellawian county encountered the largest number of nematode genera (7) followed by Aga (6), Belkas (6) and Manzala (5).The rice root nematode, *Hirschmanniella* was recorded from all soil samples examined and ranked first in Temi-El-Amdeed county at rate of 147 times with an average of 564.1 individuals per 250 gm. soil followed by Simbellawian county at the rate of 47

times with an average of 256 individuals per 250 gm soil, while its population density per 250 gm soil reached the highest number in Manzala county (670) at the frequency of occurrence amounted to 9 times. In Mansoura county, *Hirschmanniella*, *Tylenchorhynchus* and *Pratylenchus* were the most common at rate of 6, 5 and 1 times with an average of 345, 75 and 100 individuals per 250 gm. soil, respectively.*Aphelenchoides* was only recovered from soil of three out of eight counties of Dakahlia governorate i.e. Temi-El-Amdeed, Simbellawian and Aga at the rate of 81, 20 and 8 times with an average of 462.5, 304 and 76.4 individuals/250 gm soil, respectively. *Heterodera* (J_2), *Meloidogyne* (J_2) and *Trichodorus* were present in two counties, whereas *Helicotylenchus* was detected in one county.

Concerning Damietta governorate, five nematode genera were observed in the collected soil samples (155) the rice root nematode, *Hirschmanniella* and *Tylenchorhynchus* seemed to be the most prevailing pests as they occurred at the rate of 80 and 55 times with percentages of 51.61% and 35.48%, respectively, the nematode genera, *Meloidogyne* (J_2) and *Trichodorus* showed moderate distribution as they occurred at the rate of 20 and 25 times with percentage of 12.90% and 16.13% respectively. The nematode genera, *Hirschmanniella, Trichodorus, Tylenchorhynchus* and *Tylenchus* seemed to be the prevailing pests in Faraskor county and occurred at the rate of 40, 25, 30 and 30 times with an average of 62.6, 75, 75 and 70 individuals per 250 gm soil respectively, whereas in Zarka county, the genera *Hirschmanniella, Meloidogyne* and *Tylenchorhynchus* were the most prevalent at rates of 40, 20 and 25 times with an average of 200, 10, 100 individuals per 250 gm. soil, respectively.

In Damietta governorate, the nematode genera, *Hirschmanniella,* and *Tylenchorhynchus* were recorded from the soil of the two counties tested whereas, *Meloidogyne, Trichodorus* and *Tylenchus* were found in soil of one county.Furthermore, the nematode genera, *Aphelenchoides, Helicotylenchus, Heterodera* and *Pratylenchus* were not found in the soil of Damietta governorate.

Among rice cultivars surveyed, Sakha 101, Giza 178 and Giza 171 cultivars encountered the largest number of nematode genera, 8, 8 and 7 respectively (Table 2). However, Sakha 102 and Giza 177 cultivars ranked the second in the number of nematode genera 3 each while Yasmin and Reiho cultivars encountered one genus only. Data also revealed that the highest densities of nematode individuals per 250 gm. soil average 517.0, 486.0, 422.4, 381.0, 356.0 and 250.0 for *Hirschmanniella* spp. in the rhizosphere of Giza 171, Reiho, Giza 177, Sakha 101, Giza178 and Sakha 102 cultivars, respectively. Furthermore, an average of 200.0, 174.0, 108.3 and 46.0 individuals per 250 gm soil were recorded for the white-tip rice nematode, *Aphelenchoides* spp. in the rhizosphere of Sakha 102, Giza 178, Sakha 101 and Giza 171 which occurred at rates of 2, 13, 4 and 11 times, respectively. *Hirschmanniella* spp. was recorded from soil of the seven rice cultivars surveyed, whereas, *Heterodera* and *Pratylenchus* were only discovered on three rice cultivars i.e. Sakha 101, Giza 178 and 171. Moreover,*Trichodorus* was detected from soil of Sakha 101, Giza 178, 177 and 171 rice cultivars, otherwise *Tylenchorhynchus* was recorded in the

Table (1): Frequency of occurrence and population density of nematode genera infested with rice fields at ten counties of Dakahlia and Damietta governorates during the rice growing seasons of 2002 and 2003.

Nematode genera / Location	Occurrence of nematode genera within each county of rice fields																		
	Dakahlia (n = 497)											Damietta (n = 155)					Total	Frequency occurrence %	No. of infested counties
	Aga (n= 140)	Mansoura (n=22)	Talk-ha (n=34)	Simbellawin (n=76)	Temi El-Amdeed (n=200)	Dekernes (n=4)	Belk-as (n=12)	Manzala (n=9)	Total	Frequency of occurrence %	No. of infested counties	Faraskor (n=115)	Zarka (n=40)	Total	Frequency of occurrence %	No. of infested counties			
Aphelenchoides	8 (76.4)	0	0	20 (304)	81 (462.5)	0	0	2 (10)	111	22.33	4	0	0	0	0	0	111	17.02	4
Helicotylenchus	0	0	0	0	0	0	2 (5)	0	2	0.40	1	0	0	0	0	0	2	0.31	1
Heterodera (J_2)	0	0	0	3 (15)	0	0	2 (44.5)	0	5	1.01	2	0	0	0	0	0	5	0.77	2
Hirschmanniella	11 (153)	6 (345)	5 (111)	47 (256)	147 (564.1)	4 (172)	11 (176)	9 (670)	240	48.29	8	40 (67.5)	40 (200)	80	51.61	2	320	49.08	10
Meloidogyne (J_2)	0	0	1 (130)	5 (10)	0	0	0	0	6	1.21	2	0	20 (10)	20	12.90	1	26	3.99	3
Pratylenchus	4 (13)	1 (100)	0	0	0	0	2 (49)	4 (20)	11	2.21	4	0	0	0	0	0	11	1.69	4
Trichodorus	3 (316)	0	0	5 (85)	0	0	0	0	8	1.61	2	25 (75)	0	25	16.13	1	33	5.06	3
Tylenchorhynchus	13 (315)	5 (75)	0	14 (120)	0	0	4 (110)	3 (60)	39	7.85	5	30 (75)	25 (100)	55	35.48	2	94	14.42	7
Tylenchus	12 (430)	0	0	6 (57.5)	16 (114.8)	4 (98)	5 (85)	4 (25)	47	9.46	6	30 (70)	0	30	19.35	1	77	11.81	7
Total	51	12	6	100	244	8	26	22				125	85						
Nematode genera /per location	6	3	2	7	3	2	6	5				4	3						

n = number of soil samples.

Number between parenthesis represented the average of nematode population density per 250 gm. soil.

Table (2): Frequency of occurrence and population density of nematode genera associated with certain rice cultivars during the rice growing seasons of 2002 & 2003 in Dakahlia and Damietta governorates.

Nematode genera / Cultivars	Occurrence and population density of nematodes/250 gm. Soil							Total occurrence	Frequ-ency of occurrence %	No. of infested cultivars
	Sakha 101 n=283	Sakha 102 n=12	Giza 178 n=167	Giza 177 n=90	Yassmin n=1	Giza 171 n=79	Reiho n=20			
1. *Aphelenchoides*	4(108.3)	2(200)	13(174)	0	0	11(46)	0	30	4.6	4
2. *Helicotylenchus*	1(5)	0	1(5)	0	0	0	0	2	0.3	2
3. *Heterodera* (J_2)	1(5)	0	1(83)	0	0	3(15)	0	5	0.76	3
4. *Hirschmanniella*	141(381)	9(250)	87(356)	17(422.4)	1(50)	37(517)	15(486)	307	47.1	7
5. *Meloidogyne* (J_2)	0	0	20(10)	0	0	5(10)	0	25	3.80	2
6. *Pratylenchus*	4(13)	0	5(65)	0	0	3(63)	0	12	1.84	3
7. *Trichodorus*	15(77.5)	0	15(80)	2(300)	0	1(50)	0	33	5.06	4
8. *Tylenchorhynchus*	42(120)	0	0	0	0	0	0	42	6.44	1
9. *Tylenchus*	28(94.5)	2(25)	17(99)	2(7.5)	0	12(56)	0	61	9.36	5
Total occurrence	236	13	159	21	1	72	15			
Nematode genera/ cultivar	8	3	8	3	1	7	1			

n = number of soil samples.

Number between parenthesis represented the average of nematode population density per 250 gm. soil.

rhizosphere of only one rice cultivar, Sakha 101. Moreover, *Tylenchus* which is considered to be suspected plant parasitic nematode genus was recorded in the rhizosphere of five rice cultivars i.e. Sakha 101, 102, Giza 178, 177 and 171 at the total rate of 61 times with total percentage occurrence of 9.36%.

The temperal variation in population densities of *H. oryzae* was studied through rice growing season of 2002 and 2003 during crop rotation of wheat-rice 2002-Barseem – rice 2003 then wheat 2003/2004 as shown in Figure (1).The population of the rice root nematode, *H. oryzae* increased during the rice season of 2002 and 2003. It was found in greater numbers in August and October than in other monthes due to the pre-flowering and flowering stages in August and September, respectively.

The increase in nematode population on wheat was less than on rice. Lower population density of *H. oryzae* on wheat perhaps indicates that the ecological conditions prevailing under the rice crop were more conducive for reproduction of this nematode. On the other hand, the nematode population density was very low in the field previously planted with barseem (February 2003) in comparison with that planted with wheat (February 2004).

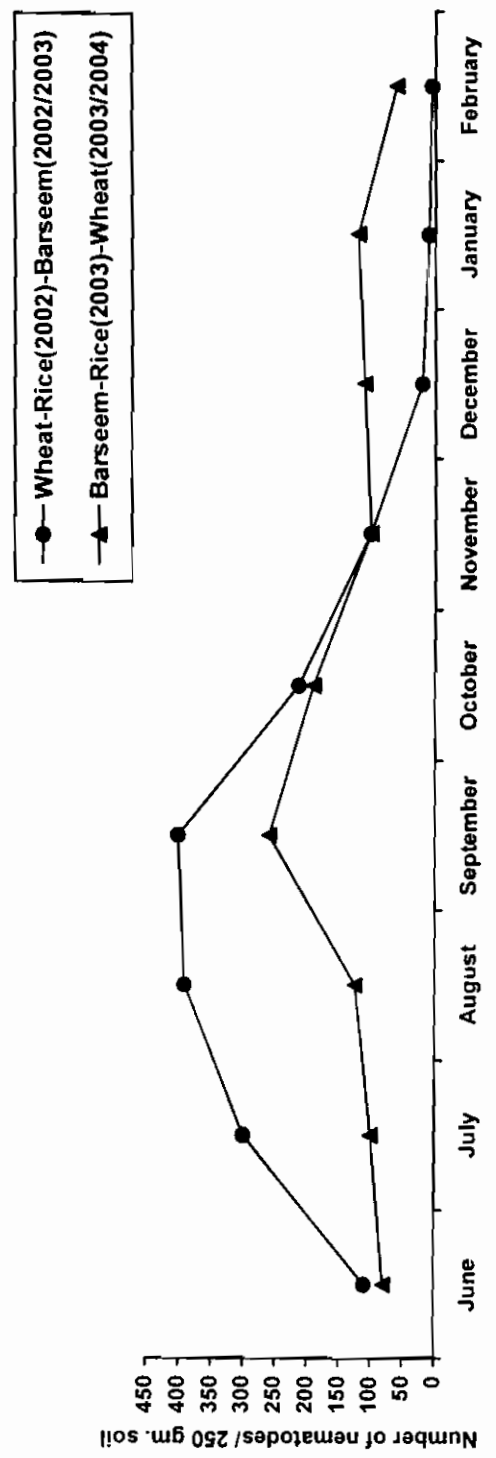
Data in Table (3) show the influence of four chemical pesticides i.e. Malathion 57% EC., Dimethoate 40% EC, Carbo El-Nasr 10% G. and Cartan 10% G. as well as two plant extracts i.e. *Vinca rosea* and *Datura stramonium* in controlling the rice root nematode, *Hirschmanniella oryzae* that naturally infested soil cultivated with rice cv. Sakha 103 during the rice growing season of 2003 under field conditions. Results indicated that all materials tested, obviously reduced the population density of *H. oryzae* infesting soil of rice plants during the growing season. The use of Cartan, *V. rosea*, Malathion, Dimethoate, *D. stramonium* and Carbo El-Nasr in controlling *H. oryzae* during the growing rice period until harvesting time gave good results in percentage of nematode reduction which were recorded in descending order to be 65.4, 59.6, 58.15, 56.4, 55.9 and 39.4%, respectively.

Table (3): Influence of four pesticides and two aqueous plant leaf extracts on controlling *Hirschmanniella oryzae* infesting soil of rice cv. 103 during the growing season of 2003.

Treatments	Date of sampling					Total No. of Nema	Average No. of Nema	% Reduction
	8/18	8/25	9/2	9/10	9/17			
Malathion 57% EC	350^{a}	142^{f}	164^{d}	144^{d}	71^{f}	871	174.2^{d}	58.15
Dimathoate 40% EC	314^{b}	328^{b}	122^{f}	82^{g}	62^{g}	908	181.6^{c}	56.4
Carbo El-Nasr 10% G	300^{c}	225^{d}	273^{b}	312^{b}	151^{c}	1261	252.2^{b}	39.4
Cartan 10% G	144^{f}	180^{e}	176^{c}	110^{f}	110^{d}	720	144.0^{f}	65.4
Datura	240^{d}	180^{e}	173^{c}	162^{c}	162^{b}	917	183.4^{c}	55.9
Perwinkle	210^{e}	273^{c}	153^{e}	122^{e}	82^{e}	840	168.0^{e}	59.6
Check	352^{a}	450^{a}	375^{a}	490^{a}	414^{a}	2081	416.2^{a}	-

*** Each figure represented the average number of *H. oryzae* in three replicates. Means in each column followed by the same letter did not differ at P < 0.05**

At rice growth stages examined during August and September months(2003), the materials such as Cartan 10% G which was applied as broadcasting granules achieved the highest percentage of nematode reduction with value



Population dynamics of *Hirschmanniella oryzae* during crop rotation in the same area for rice growing seasons of 2002 and 2003

of 65.4% followed by *V. rosea*, Malathion, Dimethiate and *D. stramonium* which were applied as foliar spray with values of 59.6, 58.15, 56.4 and 55.9%, respectively. Moreover, Carbo El-Nasr, which was applied as broadcasting granules, gave the least value of nematode reduction (39.4%) when compared with the untreated plots.

DISCUSSION

The present work revealed the presence of nine nematode genera found in association with the rhizosphere of rice plant in Dakahlia governorate whereas five of them only were detected in Damietta governorate. These nematode genera are: *Aphelenchoides, Helicotylenchus, Heterodera* (J_2), *Hirschmanniella, Meloidogyne*(J_2), *Pratylenchus, Trichodorus, ylenchorhynchus* and *Tylenchus.* Furthermore, the nematode genera *Aphelenchoides, Helicotylenchus, Heterodera* and *Pratylenchus* were not recorded in soil samples of the cultivated rice area in Damietta governorate. Apparently, the rice root nematode, *H. oryzae* was found to be the most prevalent in the two surveyed governorates as well as in the rhizosphere of the seven rice cultivars surveyed i.e. Sakha 101, 102, Giza 178, 177, 171, Yasmin and Reiho. In general, these results of nematode survey in rice paddy soil are in accordance with the finding of Yossif (1985).

With respect to population dynamics of *H. oryzae* on wheat-rice-barseem-rice-wheat cropping system it was found that this species is a potentially important nematode in the rice-wheat cropping sequence since this nematode was below levels in the studied location that previously planted with barseem (February 2003) in comparison with that of wheat (February 2004).These results are in accordance with the finding of Vadhera (2000) who reported that the mean population density of *H. oryzae* was high during the pre-flowering and flowering stages, low at the time of maturity of the rice crop and the increase in nematode population on wheat was less than that on rice.

Concerning the management of *H. oryzae* on rice cv. Sakha 103 under field conditions during the growing season of 2003, Cartan 10% G which was applied as broadcasting granules achieved the highest percentages of nematode reduction with value of 65.4% followed by *V. rosea* (foliar spray) with value of 59.6%, respectively.Whereas Carbo El-Nasr gave the least value of nematode reduction (39.4%) when compared with the untreated plots. These results agree with that of Yossif (1985) who reported that applying carbofuran at the rate of 0.3 kg a.i./ feddan broadcasting in soil area infested with *H. oryzae* after soil-wet-leveling before transplanting rice seedlings cv. Reiho gave a significant increase in rice grain yield over that of the untreated check.

It is worthy to note that this is the first report in Egypt for using such successful plant extract i.e. *V. rosea* in the management of *H. oryzae* on rice under field conditions, however, more research is needed to clarify such method in this respect.

REFERENCES

Badawi, A.E.; F.N., Mahroos; M.A., Maksemos; S.A., Khanem; M.R., Sohle, S.M., Hassan and M.R., Sherif (2004). Rice program, Agric. Res. Centre, Ministry of Agric., Egypt, pp. 62 (In Arabic Language).

Bridge, J.; M. Luc and A., Plowright (1990). Nematode parasites of rice. In: Plant Parasitic Nematodes in Subtropical Agriculture. (Ed. by Luc, M.; Sikora, R.A.; Bridge, J.), pp. 69-108.C.A.B. International, Walling Ford, UPI.

Duncan, D.B. (1955). Multiple range and multiple F-test, Biometrics 11: 1-42.

Dwivedi, K. and K.D. Upadhyay (2000). Status of Plant Parasitic Nematodes Associated with Rice-Wheat-Legume Cropping Systems in Kanpur, Uttar Pradesch.P.14 – 15 Rice-What Consortium Paper Series 7. New Delhi, India.

Gomez, K.A. and A.A., Gomes (1984). Statistical procedures for agricultural research, 2nd Ed., John Willey and Sons. Inc. Now York.

Goodey, J.B. (1957). Laboratory methods for work with plant and soil nematodes. Tech. Bull. No. 2 Min. Agric. Fish. Ed. London, England, pp. 47.

Goodey, J.B. (1963). Soil and Freshwater nematodes. London: Methuen&COLTD, pp. 544.

Khalil, A.E. (1996). Controlling cotton reniform nematode, *Rotylenchulus reniformis* parasitizing some tomato cultivars by various biological methods. M.Sc. Thesis, Fac. of Agric., Mansoura Univ. pp. 95.

Luc, M. and J.B. Goodey (1964). *Hirschmanniella* nom Nov. for *Hirschmannia*. Nematologica 9(3) 471.

Mai, W.F. and H.H. Lyon (1975). Pictorial key to genera of plant parasitic nematodes. Cornell Univ. Press, Ithaca, New York, pp. 172.

Sasser,J.N.and D.W.,Freckman (1987). A world Perspective on Nematology, the role of the society. In: Vistas on Nematology (Ed. By Veech, J.A. and Dickson, D.W.), pp. 7-14. Society of Nematologists, Hyattsville, Mary Land.

Vadhera, I. (2000). Association of *Hirschmanniella oryzae* with Rice-Wheat-Legume cropping systems in Madhya Pradesh. P. 18 – 19. Rice-Wheat Consortium Paper Series 7. New Delhi, India.

Yossif, M.A.M. (1985). Studies on rice root nematode pests. M. Sc. Thesis, Fac. of Agric., Cairo Univ. pp. 81.

وضع النيماتودا المتطفلة و المرتبطة بزراعات الأرز فى منطقة شمال شرق الدلتا فى مصر مع الإشارة إلى نيماتودا هيرشمانيلا أوريزا

أحمد جمال الشريف*،عبد الفتاح رجب رفاعى*، أشرف السعيد خليل** و أحمد حماد نور الدين*

* وحدة بحوث النيماتولوجى – قسم الحيوان الزراعى – كلية الزراعة – جامعة المنصورة.

** معهد بحوث أمراض النبات – مركز البحوث الزراعية – الجيزة.

أسفرت نتائج الحصر الذى أجرى على مساحات الأرز المنزرعة بسبعة أصناف مصرية وهى: سخا ١٠١، ١٠٢، وجيزه ١٧١، ١٧٧، ١٧٨، وياسمين وريهو فى منطقة شمال شرق الدلتا خاصة فى محافظة الدقهلية عن وجود تسعة أجناس من النيماتودا المتطفلة وهى *Aphelenchoides, Helicotylenchus, Heterodera, Hirschmanniella, Meloidogyne, Pratylenchus, Trichodorus, Tylenchorhynchus* و *Tylenchus*. فى حين وجدت خمسة أجناس منهم فقط وهم: *Hirschmanniella, Meloidogyne, Trichodorus, Tylenchorhynchus* و *Tylenchus* مصاحبة لجذور الأرز لأصناف جيزه ١٧٨، سخا ١٠١ المنزرعة فى محافظة دمياط. ووجد أن جنس النيماتودا *Hirschmanniella* هو السائد حيث وجد مصاحبا لمنطقة جذور سبعة أصناف أرز والتى تم حصرها فى هذه الدراسة. فى حين أتضح أن جنس *Aphelenchoides* وجد مرتبط فى منطقة جذور أربعة أصناف أرز فقط وهى سخا ١٠١، ١٠٢ وجيزه ١٧٨، ١٧١ ولم يكتشف فى عينات تربه نباتات الأرز فى محافظة دمياط.

كما سجل تعداد *Hirschmanniella oryzae* ارتفاعا ملحوظا فى تربة جذور صنف الأرز سخا ١٠١ خلال موسمى نمو الأرز ٢٠٠٢، ٢٠٠٣م خلال تعاقب محاصيل القمح – الأرز (٢٠٠٢) – برسيم – أرز (٢٠٠٣) – قمح. حيث وجدت هذه النيماتودا بأعداد وفيرة فى الفترة بين شهرى أغسطس وأكتوبر مقارنة بالشهور الأخرى وذلك خلال مرحلتى ما قبل التزهير والتزهير فى أغسطس وسبتمبر على التوالى. ولوحظ انخفاض تعداد هذه النيماتودا فى مساحة الأرز تحت الدراسة عندما كان المحصول السابق للأرز برسيما بالمقارنة فى حالة إذا كان المحصول السابق للأرز قمحا.

أوضحت نتائج مكافحة نيماتودا جذور الأرز *H. oryzae* على صنف الأرز سخا ١٠٣ خلال موسم النمو ٢٠٠٣ عند استخدام أربعة مبيدات كيماوية وهى ملاثيون ٥٧%، دايمثويت ٤٠% (كلاهما رشا) وكاربونصر ١٠% وكارتان ١٠% (كلاهما نثرا)، وكذا مستخلصين نباتيين هما الونكا والداتوره (كلاهما رشا) إلى أن كل هذه المواد خفضت بدرجة ملحوظة تعداد نيماتودا جذور الأرز فى تربة نباتات الأرز المصابة طبيعيا حيث كان مبيد الكارتان المحبب أفضل المواد المستخدمة فى الحصول على أعلى نسبة انخفاض فى تعداد النيماتودا بقيمة تصل إلى ٠٫٤ر٦٥% يليه مستخلص نبات الونكا (رشا) بقيمة قدرها ٦ر٥٩%، بينما أعطى مبيد الكاربونصر (نثرا) أقل قيمة فى خفض تعداد النيماتودا (٤ر٣٩%) مقارنة بالنباتات غير المعاملة.

ملحوظة: تم تمويل هذا البحث من وحدة حساب البحوث بجامعة المنصورة