INTERACTION BETWEEN ROOT-KNOT NEMATODE AND WILT FUNGI ON TOMATO

By

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B.Sc. Agric. (Plant Protection), Ain Shams University, 2011

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ABSTRACT

Ibrahim Yosif Mahmoud. Interaction between Root-Knot Nematode and Wilt Fungi on Tomato. Unpublished M.Sc. Thesis, Department of Plant Protection, Faculty of Agriculture, Ain Shams University, 2017.

Experiments of this study aimed to find out tomato cultivars that possess adequate resistance or tolerance to *Meloidogyne incognita* (Mi) nematode and / or *Fusarium oxysporum* f. sp. *lycopersici* (Fol) wilt-fungus infections. Screening test of five tomato cultivars against target pathogens indicated that, Hyb.ypeel 303 and H 9035 cultivars are resistant plants while, ALISSA F1 cultivar is tolerant plant but, Jakal and Malika cultivars are susceptible plants. Accordingly, susceptible cultivars were valueless and excluded from advanced study. To estimate plant response against nematode and wilt fungus infections, the increasing inoculum levels of each pathogen indicated that, Hyb.ypeel 303 cultivar possessed complete resistance while H 9035 cultivar has partial resistance. On the other hand, ALISSA F1 cultivar was found to be tolerated. To monitor the interaction between both pathogens, an experiment was designed by applying increasing inoculum levels of one pathogen and a fixed inoculum level of the other. The results revealed that, H 9035 cultivar exhibited increasing wilt severity with increasing Mi inoculum levels but the rate of Mi reproduction did not affected. As with ALISSA F1 cultivar, data indicated that, severe wilt symptoms were induced by increasing inoculum levels of Mi. Conversely, decreasing nematode population was resulted from increasing inoculum levels of Fol. As regard to Hyb.ypeel 303 cultivar, the results showed that, neither Mi nor Fol could infect the roots initially. To demonstrate the role of one pathogen in modifying the host cultivar to the other pathogen, an experiment was achieved by predisposing the host cultivar to one pathogen while the other was delayed. The result indicated that, Mi could stimulate wilt severity in both H 9035 and ALISSA F1 cultivars. On the other hand, Fol could aggravated Mi population in H 9035 cultivar and inhibited Mi population in ALISSA F1 cultivar. As regard to Hyb.ypeel 303 cultivar, sequence of the two pathogens indicated wholly resistance to both target pathogens. Split-root experiment was carried out to detect the possible role of translocatable substances by involved pathogens. The result revealed that, early nematized half root of H 9035 and ALISSA F1 cultivars could induce severe wilt symptoms on wholl plant. On the other hand, fungal diseased half root could not aggravate Mi reproductivety. As with Hyb.ypeel 303 cultivar, the results showed no infections by both pathogens occurred in both halve roots. Furtherly, infected and disinfected roots to Mi and Fol in split root experiment were tested phenolically. The results indicated that, in all dual treatments, increased phenols were propotional to low counts of Mi nematodes and increased Fol wilt severity. Finally, these collective data confirmed that, physiological changes induced by Mi nematode could offer tomato cultivars to be more susceptible to fungal pathogen in tomato H 9035 and ALISSA F1 cultivars.

Key words: Interaction, *Meloidogyne incognita*, Root-Knot nematode, *Fusarium oxysporum* f. sp. *lycopersici*, Wilt fungi and tomato.

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CONTENTS

No.		Page
	LIST OF TABLES……………………………………..	VI
	LIST OF ABBREVIATIONS……………...………..	X
I	**INTRODUCTION**……………………………….……..	1
II	**REVIEW OF LITERATURE**	2
1	**Tomato plants in occurrence of *Fusarium*-wilt and *Meloidogyne* spp. Nematode**………………………	2
2	**Root-knot nematodes**………………………………..	2
2.1	Host rang and geographic distribution………………	2
2.2	Symptoms of root knot nematode………...................	4
2.2.1	Above ground symptoms……………………….…...	4
2.2.2	Below ground symptoms……………………….…...	4
2.3	Conditions for disease development…………………...	5
2.4	The infection process……………………………….…	5
3	***Fusarium* wilt fungus**...	6
4	**Interaction between Root-knot nematode and *Fusarium* wilt on tomato plants**…………..........	8
5	**Split root technique**………………………………..	22
III	**MATERIALS AND METHODS**	25
1	**THE USABLE MATERIALS**	
1.1	**Root-Knot nematode**…………………………….....	25
1.1.1	Source and identification of *M. incognita*..………….	25
1.1.2	Mass culture of *M. incognita*………………………..	25
1.1.3	Preparation of *M. incognita* inoculum………………..	25
1.2	***Fusarium* wilt fungus**………………………………	26
1.2.1	Identification of *Fusarium* wilt………………………..	26
1.2.2	Preparation of fungal inoculum………………………..	26
1.2.3	Disease assessment……………………………...........	26
1-3	**The Source of Tomato seeds** ……………………...	26
2	**THE PRACTICAL EXPERIMENTS**	27
2.1	General procedures ………………………………….	27

2.2	Screening test of some tomato cultivars against Mi or Fol infectivity..	27
2.3	Sensitivity test of tomato cultivars (Hyb.ypeel 303, H 9035 and ALISSA F1) against Mi or Fol infections…	27
2.3.1	Effect of increasing inoculum levels of Mi on tested three tomato cultivars..	27
2.3.2	Effect of increasing inoculum levels of Fol on different tomato cultivars ………………………………………	28
2.4	Effect of concomitant infections with Mi and Fol on the three tested tomato cultivars………………………	28
2.5	Effect of increasing inoculum levels of Mi and constant inoculum level of Fol on tested three tomato cultivars………………………………………………..	28
2.6	Effect of increasing inoculum levels of Fol and constant inoculum level of Mi on tested three tomato cultivars…………………………………....................	29
2.7	Reciprocal effect of Mi and Fol in relation of time of infection on the tested three tomato cultivars…………	29
2.8	Effect of Mi and Fol infecting half roots of tested three tomato cultivars on nematode reproduction and fusarial incidence ……………………………………..	30
2.9	Estimation of total-phenols in infected and disinfected half roots by Mi and Fol……..	30
3	**Statistical analysis**...	31
IV	**RESULTS**	32
1	Screening test of some tomato cultivars against Mi and Fol infectivity…………………………………………	32
2	Sensitivity test of tomato cultivars against Mi or Fol infections..	34
3	Exploring possible interaction between Mi and Fol in tomato cultivars..	40

4	The possible role of population density of tested pathogens in initiating a positive interaction between Mi and Fol..	42
5	The possible role of time addition of tested pathogens in initiating a positive interaction.................................	49
6	The possible role of physiological changes induced by pathogens in initiating a positive interaction…….........	53
7	The possible role of phenolic on contact of both Mi and Fol infections and plant response............................	57
V	**DISCUSSION**...	60
VI	**SUMMARY**……………………………………………...	69
VII	**REFERENCES…**………………………………………	73

LIST OF TABLES

No.		Page
1	Effect of infection by *Meloidogyne incognita* (Mi) or *Fusarium oxysporum* f. sp. *lycoperseci* (Fol) on nematode multiplication, host infestation and host characters on five cultivars of tomato…………………	33
2	Effect of increasing inoculum levels of *Fusarium oxysporum* f. sp. *lycopersici* (Fol) on host infestation and host characters in tomato cv. ALISSA F1………..	35
3	Effect of increasing inoculum levels of *Melidogyne incognita* (Mi) on host infestation, root population of nematodes and host characters in tomato cv. ALISSA F1 …………………………………………………….	36
4	Effect of increasing inoculum levels of *Melidogyne incognita* (Mi) on host infestation, root population of nematodes and host characters in tomato cv. H 9035…	37
5	Effect of increasing inoculum level of *Fusarium oxysporum* f. sp. *lycopersici* (Fol) on host infestation and host characters in tomato cv. H 9035 ……………	38
6	Effect of increasing inoculum levels of *Melidogyne incognita* (Mi) on host infestation, root population of nematodes and host characters in tomato cv. Hyb.ypeel 303……………………………………….	39
7	Effect of increasing inoculum level of *Fusarium oxysporum* f. sp. *lycopersici* (Fol) on host infestation and host characters in tomato cv. Hyb.ypeel 303……..	40

8	Effect of concomitant inocula of *Meloidogyne incognita* (Mi) and *Fusarium oxysporum* f. sp. *lycopersici* (Fol) on host infestation, host characters and multiplication of nematode in three tomato cultivars…………………………………………….........	41
9	Effect of fixed inoculum of *Meloidogyne incognita* (Mi) and increasing inoculum levels of *Fusarium oxysporum* f. sp. *lycopersici* (Fol) on host infestation, host characters and multiplication of nematode in tomato cv. ALISSA F1…………………………………………...	43
10	Effect of fixed inoculum of *Fusarium oxysporum* f. sp. *lycopersici* (Fo) and increasing inoculum levels of *Meloidogyne incognita* (Mi) on host infestation, host characters and multiplication of nematode in tomato cv. ALISSA F1…………………………….……………	44
11	Effect of fixed inoculum of *Meloidogyne incognita* (Mi) and increasing inoculum levels of *Fusarium oxysporum* f. sp. *lycopersici* (Fol) on host infestation, host characters and multiplication of nematode in tomato cv. H 9035………………………………………………….	45
12	Effect of fixed inoculum of *Fusarium oxysporum* f. sp. *lycopersici* (Fol) and increasing inoculum levels of *Meloidogyne incognita* (Mi) on host infestation, host characters and multiplication of nematode in tomato cv. H 9035…………………….…………………….……..	46

13	Effect of fixed inoculum of *Meloidogyne incognita* (Mi) and increasing inoculum levels of *Fusarium oxysporum* f. sp. *lycopersici* (Fol) on host infestation, host characters and multiplication of nematode in tomato cv. Hyb.ypeel 303 ……………………………………..	47
14	Effect of fixed inoculum of *Fusarium oxysporum* f. sp. *lycopersici* (Fol) and increasing inoculum levels of *Meloidogyne incognita* (Mi) on host characters and multiplication of nematode in tomato cv. Hyb.ypeel 303…………………………………………………….	48
15	The reciprocal effect of *Fusarium oxysporum* f. sp. *lycoperseci* (Fol) and *Meloidogyne incognita* (Mi) in relation to time of infection on host infestation and multiplication of nematode in tomato cv. H 9035..….	50
16	The reciprocal effect of *Fusarium oxysporum* f. sp. *lycoperseci* (Fol) and *Meloidogyne incognita* (Mi) in relation to time of infection on host infestation and multiplication of nematode in tomato cv. ALISSA F1	51
17	The reciprocal effect of *Fusarium oxysporum* f. sp. *lycoperseci* (Fol) and *Meloidogyne incognita* (Mi) in relation to time of infection on host infestation and multiplication of nematode in tomato cv. Hyb.ypeel 303…………………………………………………...	52
18	the Reciprocal effect of *Meloidogyne incognita* (Mi) or *Fusarium oxysporum* f. sp. *lycoperseci* (Fol) infecting half-roots of tomato cv. H 9035 on host infestation and root population of nematodes……………………….…	54
19	Reciprocal effect of *Meloidogyne incognita* (Mi) or *Fusarium oxysporum* f. sp. *lycoperseci* (Fol) infecting half-roots of tomato cv. ALISSA F1 on host infestation and root population of nematodes……………………...	55

20	Reciprocal effect of *Meloidogyne incognita* (Mi) or *Fusarium oxysporum* f. sp. *lycoperseci* (Fol) infecting half-roots of tomato cv. Hyb.ypeel 303 on host infestation and root population of nematodes………….	56
21	Phenolic contents per half root of Hyb.ypeel 303, H 9035 and ALISSA F1 cultivars in contact of *Meloidogyne incognita* (Mi) or *Fusarium oxysporum* f. sp. *lycoperseci* (Fol)…………………………………….	58

LIST OF ABBREVIATIONS

Av. Wt.	:	Average of weight
Fol	:	*Fusarium oxysporum* f. sp. *lycopersici*
g	:	gram
IPM	:	Integrated Pest Management
J_2	:	Second juvenile stage
mg	:	ml gram
Mi	:	*Meloidogne incognita*
No.	:	Number
PDA	:	Potato Dextrose Agar
RKN	:	Root-Knot Nematode
Rr	:	Rate of nematode reproduction
Rws	:	Rate of wilt severity
SAS	:	Statistical Analysis System
Sec	:	Second

INTRODUCTION

In fact, plant parasitic nematode and soil borne pathogens such as *Fusarium* wilt devour considerable amount of many agricultural crops. Thus, the development of an effective and successful control management will undoubtedly protect a wide range of vital food crops against disease complex threat.

Chemical control by nematicides and fungicides are still a cost-effective for reducing the population of one of the pathogens. Empirically, the control of the target pathogen beyond the second year was useless with the same chemical treatment.

Cultural control, i.e. crop rotation was practiced by the farmers till now to reduce simultaneously both pathogens to population levels below economically threshold extent. However, the saprophytic ability of *Fusarium* wilt fungi and the wide host range characteristic of nematodes minimize this control measure.

Management of multi-pathogen adversities by cultivating resistant plants has an advantage over other measures. It relieves farmers from costly chemical protection and for higher yield and acceptable agronomical extra efforts.

The present work was, therefore, proposed to detect the resistant or tolerant tomato cultivars to Mi nematode and / or *Fusarium*-wilt disease. Also, to realize the role of Mi nematode in modifying the host plant to facilitate the establishment of *Fusarium* fungi leading to complex disease. Finally, to select potential resistant or tolerant tomato cultivars to avoid nematode and fungal crop loss in fields and to disinfect tomato seedling in nurseries.