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INCIDENCE OF ROOT-ROT AND WILT DISEASE COMPLEX OF OLIVE TREES IN NEW VALLEY GOVERNORATE IN EGYPT AND ITS CONTROL

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Abstract: Root rot and wilt disease complex was detected in different olive tree orchards at El-Kharga, Paris, El-Dakhla and El-Farafrah oases of the New Valley Governorate. Percentage of disease incidence and severity on olive trees in surveyed districts were differed. The average percentage of disease incidence and severity of root rots and wilt disease in surveyed districts were 27.7-54.1% and 35.4-60.3%, respectively. The most frequent isolated fungi from rotted roots of olive trees were *Fusarium oxysporum*, *F. solani*, *F. moniliforme*, *F. equiseti* and *Rhizoctonia solani*, while *Macrophomina phaseolina*, *Cylindrocarpon sp.*, *Acremonium egyptina*, *Chaetomium olivaceum* and *Nigrospora oryzae* were isolated in less frequency. Frequency of the isolated fungi varied between locations. *Fusarium oxysporum* was most frequent at all locations, followed by *F. solani* and *R. solani*. All the tested fungi were pathogenic to olive transplants, *Fusarium oxysporum*, *F. solani* and *Rhizoctonia. solani* caused the highest root rots incidence and severity. However, *Acremonium egyptina*, *Chaetomium olivaceum* and *Nigrospora oryzae* were non-pathogenic. Efficiency of six different fungicides (Kema-Z, Maxim XL, Rizolex T, Ridomil gold plus, Moncut and Topsin M_{70}) for reducing growth of the tested pathogenic fungi and controlling the disease was studied *in vitro* and *in vivo* experiments. Complete inhibition of mycelial growth of the tested fungi was obtained at 50-200 ppm concentrations of Kema-Z, Maxim XL Rizolex-T and Topsin M_{70}, while, the Moncut fungicide completely inhibited the growth of the tested fungi at 100 ppm concentrations. Maxim XL, Rizolex-T and Topsin M_{70} gave the highest reduction in disease incidence, while, Ridomil gold plus gave the least reduction in disease incidence. Efficiency of Humic acid, as soil drench treatment, varied in reducing incidence of root rot and wilt. Humic acid treatment reduced disease incidence especially when used at 2 and 3% against *F. oxysporium*, *F. solani* and *Rhizoctonia solani*.

Keywords: Olive trees; transplants; root rot and wilt disease complex; Fungicides; Humic acid.

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2. Isolation and identification of the causal fungi

Diseased roots of olive trees showing symptoms of root rot and/or wilt diseases were collected and taken for isolation. The root samples were thoroughly washed under running tap water, cut into small pieces (1 cm), and surface sterilized with dipping in 0.1% mercuric chloride solution for 2 minutes, then washed in several changes of sterile distilled water. The surface sterilized pieces were blotted dry on sterilized filter paper, and transferred individually to Petri dishes, each containing 20 ml potato dextrose agar (PDA) medium, then incubated at 25°C for 5 days and inspected for fungal growth. The developed fungal colonies were purified using hyphal tip or single spore techniques. The purified fungi were identified according to fungal morphological and microscopical characteristics as described by Booth (1977), Barnett and Hunter (1986) and Sneh *et al.,* (1991) and confirmed by Botany Department, Faculty of Science, Assiut University. The obtained cultures isolates were maintained on PDA slants and kept in refrigerator at 5°C for further study. The frequency of the isolated fungi was calculated separately for each of the collected samples.

3. Pathogenicity tests

The pathogenic capability of the isolated fungi was carried out under greenhouse conditions in El-Kharga Agriculture Research Station. Pots (30 cm in diameter) sterilized by dipping in 5% formalin solution for 15 min. and then left for 2 weeks to dry. The sterilized pots were filled with autoclaved soil (2 Kg/pot). The tested fungi were grown on autoclaved barley grain medium in 500 ml glasses. It was inoculated with discs (5 mm in diameter) taken from 7 day-old cultures of each tested fungal isolate, then incubated at 27 ^{0} C for 15 days. The autoclaved soil was individually infested with the tested fungi at the rate of 3% of soil weight. One olive transplant (one year old) of Toffahi cultivar was cultivated in each pot and six transplants (pots) were used as replicates for each treatment. Anther group of pots contained uninoculated medium was kept as control. The pots were irrigated regularly for three times a week before planting to ensure even distribution of the inoculated fungus in the soil. Percentages of infection and disease severity were recorded after three months from inoculation plants. Re-isolation was carried out from infected tissues showing disease symptoms and the isolated fungus was compared with the original culture used.

4. Disease control

4.1 Effect of certain fungicides on root rot and wilt disease complex

Six fungicides i.e. Kema-Z 50% WP (Carbendazim); Maxim XL 3.5% FS (Fludioxonil + Meffnoxam); Rizolex T 50% WP (Tolclofosm methyl + Thiram); Moncut 25% WP (Flutolanil); Ridomil Gold Plus 42.5% WP (Mefenoxam + Copper oxychloride) and Topsin M_{70} 70% WP (Thiophanate methyl) were evaluated *in vitro and in vivo* against root rot and wilt disease complex on olive trees.

4.1.1 Inhibition assay, *in vitro*

Each tested fungicide was added to autoclaved PDA medium before solidification (50°C) to give 25, 50, 100, 200 ppm concentration and then poured in Petri dishes (9 cm in diameter) and seeded in the center with disks (5 mm diameter) from 7-day-old cultures of the main three pathogenic fungi (*Fusarium oxysporum*, *F. solani* and *Rhizoctonia. solani*). Control treatment was PDA medium without fungicide. Plates were incubated at 27°C until the fungus had completely covered the surface of the control plates. After completed the growth in control treatment, linear growth of each tested fungus was recorded and the percentage of reduction in mycelial growth were calculated compared with control plates. Reduction of linear growth was calculated using the following formula:

Reduction of growth (%) = (growth in control- growth in treatment/growth in control) x 100.

The experiment was repeated twice and five plates were used for each treatment.

4.1.2. Effect of certain fungicides on disease severity in Greenhouse

This experiment was carried out on healthy olive transplants (Toffahi var.) under greenhouse conditions during year 2007 and recommended concentrations of the tested fungicides were used. Six Pots containing sterilized soil previously infested with inoculated barley grains inoculum of each fungus. The pots were drenched with each tested fungicide (250 ml per pot) after 7 days for soil infestation. Eight replicates were specified for each treatment. Plants were irrigated regularly for three times a week. Three months after inoculation, the percentages of disease severity (DS) and reduction in disease incidence were calculated according to the following formula:

$$\text{Reduction of DS (\%)} = \frac{\text{DS of control transplants} - \text{DS of treated transplants}}{\text{DS of control transplants}} \times 100$$

4.2 Effect of Humic acid on disease incidence in greenhouse

The effect of Humic acid, as soil drench treatment, on incidence of root rot and wilt disease complex of olive transplants was carried out under greenhouse conditions. One olive transplant (one year old) of Toffahi cultivar was cultivated in each pot. Two weeks before infestation with the pathogens, Humic acid solutions (250 ml) at concentrations of 1, 2 and 3% was added to each pot containing sterilized soil. Control pots were treated with an equal volume of water. Each pot was mixed with inoculated barley grains of each fungus as mentioned under pathogenicity tests. Six pots as replicates were specified for each treatment. Plants were irrigated with water regularly three times a week. After three months from soil infestation, the percentages of disease incidence and disease reduction were calculated as described before.

Statistical analysis:

A completely randomized design with six replicates per treatment was used for all experiments. Data were subjected to statistical analysis using analysis of variance and means were compared using L.S.D. test (Steel and Torrie, 1980).

Results

1. Survey of disease

Disease survey was carried out during two successive years 2006 and 2007 and showed clearly that, typical symptoms of olive root rot and wilt (Fig. 1) were observed in all examined districts. Data in Table (1) indicate that disease incidence and severity of root rot and wilt disease complex affected olive trees in different inspected locations in New Valley Governorate. Disease incidence ranged from 26.0% in El-Kharga to 53.0% in Paris district during 2006 season and from 29.3% at El-Kharga to 55.2% in Paris district in 2007.

The same trend was also detected with disease severity which ranged from 33.3% in El-Kharga to 58.3% in Paris and El-Dakhla during 2006 season, and 37.5% in El-Kharga to 62.2% in Paris during 2007 season. At the same time data obtained showed that, Paris district showed the highest percentage either in disease incidence or severity (54.1 and 60.3% respectively) followed by El-Dakhla (47.7 and 56.3%, respectively), While El-Kharga revealed the lowest disease incidence (27.7 and 35.4%). In Table (1), it was also clear that disease incidence and severity were more pronounced in year 2007 (43.6 and 48.9%) than year 2006 (40.4 and 48.9%).

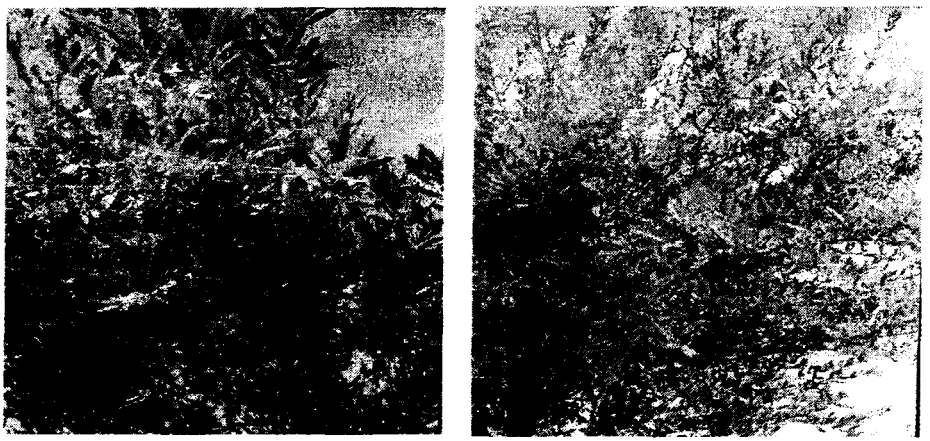
Generally, the disease incidence and severity differed at the four inspected locations, the highest means of disease incidence and severity were recorded for trees grown in Paris (54.1 and 60.3%, respectively) and the lowest were recorded for trees grown at El-Kharga (27.7 and 35.4%respectively).

Table(1): Occurrence of root rot and wilt disease complex of olive trees in different locations of New Valley Governorate during the years 2006 and 2007.

Locations	Disease incidence (%)		Mean	Disease severity (%)		Mean
	2006	2007		2006	2007	
El-Kharga	26.0	29.3	27.7	33.3	37.5	35.4
Paris	53.0	55.2	54.1	58.3	62.2	60.3
El-Dakhla	45.6	49.8	47.7	58.3	54.2	56.3
El-Farafrah	36.9	40.3	38.6	45.8	41.6	43.7
Mean	40.4	43.6	42.0	48.9	48.9	48.9

2. Symptoms of disease:

Initially symptoms, one or more branches will yellow, wilt and then the vascular tissue of the affected branches will darken. The described symptoms included the leaves wilt, yellow, drooping, dropping, drying up of branches tip downwards, and the death of the entire plant. Partial wilting was the characteristic feature of the disease. Also, the roots will be blackened, charcoal root rots and affected roots have typical black speckles on their surface. The trees may die suddenly or slowly decline over several years and eventually die (Fig. 1).



Fig(1): Symptoms of root rot and wilt disease complex of olive trees in New Valley orchards under natural conditions.

3. Fungi isolated from naturally infected samples

Results of isolation procedures are shown on Table (2). *Fusarium oxysporum*, *F. solani*, *F. moniliforme*, *F. equiseti*, *Rhizoctonia solani*, *Macrophomina phaseolina*, *Cylindrocarpon sp.*, *Acremonium egyptina*, *Chaetomium olivaceum* and *Nigrospora oryzae* were the most frequently isolated fungi from roots of olive trees which showed typical symptoms of root rot and wilt disease complex collected from different locations in New Valley governorate. Frequency of the isolated fungi varied between locations. Generally, *Fusarium spp.* was the most common pathogens in these districts. *Fusarium oxysporum* was the most frequent (30.7%) on all locations followed by *F. solani* (17.8%) and *R. solani* (16.7%). Also, *F. moniliforme* and *F. equiseti* were recorded at moderate frequencies (9.2 and 8.1%, respectively). While, *M. phaseolina*, C. *olivaceum*, *N. oryzae* *A. egyptina*, and *Cylindrocarpon sp.* recorded at low frequencies (4.8, 4.2, 3.6, 3.2 and 3.1% respectively).

Table(2): Frequency of fungi isolated from naturally infected samples of olive trees, collected from different locations in New Valley Governorate.

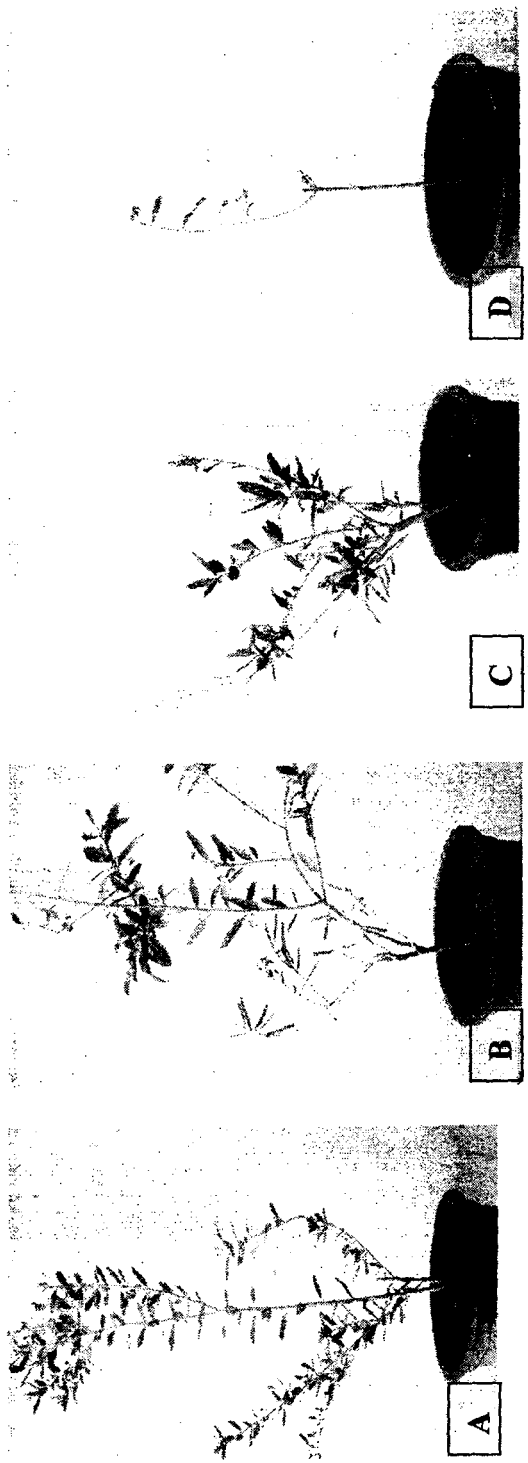
Isolated fungi	Frequency of isolated fungi (%)				Mean
	Locations				
	Kharga	Paris	Dakhla	Farafrah	
Fusarium oxysporum	25.0	32.2	35.0	30.5	30.7
F. solani	18.8	17.8	16.7	18.0	17.8
F. equiseti	8.7	9.0	7.5	8.4	8.1
F. moniliforme	11.3	8.8	8.3	7.3	9.2
Rhizoctonia solani	17.0	18.2	15.0	16.8	16.7
Macrophomina phaseolina	6.2	3.5	4.2	5.2	4.8
Cylindorocarpon sp.	3.7	3.3	2.5	3.2	3.1
Acremonium egyptina	0.0	0.0	3.3	3.1	3.2
Chaetomium olivaceum	4.2	3.5	5.0	4.3	4.2
Nigrospora oryzea	5.1	3.7	2.5	3.2	3.6
Total	100	100	100	100	100

4. Pathogenicity tests:

Data presented in Table (3) and Figure (2) show that all the tested fungi were pathogenic to olive transplants except, *Acremonium egyptina*, *Chaetomium olivaceum* and *Nigrospora oryzae*.The pathogenic fungi isolates exhibited different degrees of pathogenic capabilities. However, the transplants inoculated with the tested fungi appeared as crown and root rots characterized by light to dark color and foliar wilting symptoms. *Fusarium oxysporum*, *F. solani* and *Rhizoctonia solani* caused the highest root rots disease incidence (100 and 83.3%) and severity (87.5, 83.3 and 79.1%, respectively) on tested olive transplants and *F. moniliforme*, *F. equiseti* and *M. phaseolina* caused the moderate percentage of disease incidence and severity. While, the disease incidence and severity caused by *Cylindrocarpon sp.* was lowest. Reisolation from infected tissues yielded mainly the same fungi originally inoculated.

Table(3): Pathogenicity tests of fungi isolated from diseased samples collected from olive trees on transplants (Toffahi var.) under greenhouse conditions.

Isolated fungi	Disease incidence (%)	Disease severity (%)
Fusarium oxysporum	100	87.5
F. solani	100	83.3
F. equiseti	33.3	20.8
F. moniliforme	33.3	25.0
Rhizoctonia solani	83.3	79.1
Macrophomina phaseolina	33.3	20.8
Cylindorocarpon sp.	16.7	12.5
Acremonium egyptina	0.0	0.0
Chaetomium olivaceum	0.0	0.0
Nigrospora oryzea	0.0	0.0
Control	0.0	0.0
L.S.D. at 0.05:	0.48	0.67



Fig(2): Symptoms development of root rot and wilt complex disease on artificially inoculated olive transplants (Toffahi var.) under greenhouse conditions. A: less; B: slight; C: moderate; D: sever symptoms.

5. Effect of fungicides on the linear growth of pathogenic fungi *in vitro*:

Four concentrations of the tested fungicides were used to evaluate their efficiency against the three pathogens (*Fusarium oxysporum*, *F. solani* and *Rhizoctonia solani*) of root rot and wilt disease complex *in vitro*. Data present in Table (4) indicates that the tested fungicides reduced the linear growth of the tested pathogenic fungi. All the tested concentrations of fungicides significantly reduced the linear growth of the tested fungi. Response of the tested fungi to the tested doses of fungicides was different. Complete inhibition of growth of the tested fungi was achieved by the concentrations 50, 100 and 200 ppm of Kema-Z, Maxim XL Rizolex-T and Topsin M_{70}. In the same experiment, Moncut fungicide completely inhibited growth of the tested fungi at 100 and 200 ppm. However, Ridomil gold plus fungicide caused complete inhibition of the growth of the tested fungi at 200 ppm.

6. Efficacy of fungicides in controlling the disease under greenhouse conditions

Results in Table (5) show that all tested fungicides reduced incidence of wilt and root rots disease on olive transplants. Generally, efficiency of the tested fungicides in controlling the disease was varied. Maxim XL, Topsin M_{70} and Rizolex-T gave the highest disease reduction, while, Ridomil gold plus gave the least disease reduction (33%).

7. Effects of Humic acid on disease incidence:

Data presented in Table (6) indicate that all concentrations of Humic acid reduced incidence of root rot and wilt on olive transplants caused by *F. oxysporium, F. solani* and *Rhizoctonia solani*. The highest reduction of disease incidence (83.34 %) was obtained when Humic acid was used at 2 or 3% concentration. Meanwhile, no significant differences between concentration of 1% and 2% of Humic acid on disease reduction against other pathogenic fungi tested. The lowest percentage of disease reductions observed at 1% conc. of Humic acid in case *F. equiseti* and *F. moniliforme*.

Discussion

Olive trees are subject to attack by several soil-borne pathogens, causing severe losses in crop yield and quality during its growth in New Valley Governorate, Egypt. Survey of root rot and wilt disease complex in different locations of New Valley Governorate was conducted during years 2006 and 2007. Results reported herein indicate that root rot and wilt disease complex is considered the most important fungal disease in New Valley Governorate, since it cause a major problem on young and old olive trees. The disease incidence and severity differed at four inspected locations, the highest

Table(4): Effect of different fungicides on growth of the pathogen fungi *in vitro*.

Fungicides	Reduction in linear growth (%)											
	F. oxysporum				*F. solani*				*R. solani*			
	25	50	100	200	25	50	100	200	25	50	100	200
Kema-Z	62.2	100	100	100	65.1	100	100	100	68.9	100	100	100
Moncut	40.0	77.8	100	100	14.5	72.2	100	100	0.0	35.5	100	100
Maxim XL	72.2	100	100	100	83.3	100	100	100	100	100	100	100
Redomil gold plus	19.1	55.5	74.6	100	38.4	55.5	77.8	100	27.3	55.5	75.5	100
Rizolex –T	55.5	100	100	100	61.8	100	100	100	100	100	100	100
Topsin M_{70}	82.6	100	100	100	68.7	100	100	100	71.3	100	100	100
Control	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
L.S.D. at 0.05:												
Fungicides	0.89				0.97				0.88			
Concentrations	0.72				0.79				0.70			
F×C	1.78				1.94				1.76			

Table(5): Effect of different fungicides, as soil drench treatment, severity of root rot and wilt complex disease on olive transplants grown in artificially infested soil, 90 days after treatment under greenhouse conditions.

Fungicides	Recommended dose (Con. /L Water)	*F. oxysporum*		*F. solani*		*R. solani*		Mean	
		Severity	Reduction	Severity	Reduction	Severity	Reduction	Severity	Reduction
Kema-Z	1.5 gm	41.6	52.4	29.1	66.7	33.3	66.7	33.3	60.0
Moncut	3 gm	29.1	66.7	29.1	66.7	16.7	83.3	25.0	75.0
Maxim XL	1 ml	0.0	100	0.0	100	0.0	100	0.0	100
Redomil G P	1.5 gm	70.8	19.1	58.3	33.4	66.7	33.3	66.7	33.3
Rizolex –T	2 gm	12.5	85.7	16.6	81.0	0.0	100	8.3	90.0
Topsin M_{70}	1.5 gm	0.0	100	0.0	100	0.0	100	0.0	100
Control		87.5	-	87.5	-	75.0	-	83.3	-
L.S.D. at 0.05:		0.68	0.73	0.56	0.77	0.62	0.74		

Table(6): Effect of Humic acid as soil treatment on disease incidence of root rot and wilt on olive transplants grown in artificially infested soil, 90 days after planting under greenhouse conditions.

Pathogenic fungi	Disease incidence (%)					Efficiency (%)		
	Conc. of Humic acid (%)					Conc. of Humic acid (%)		
	0	1	2	3	L.S.D. at (0.05)	1	2	3
Fusarium oxysporum	100	66.6	16.66	16.66	1.60	33.4	83.34	83.34
F. solani	100	50.0	33.33	16.66	1.52	50.0	66.67	83.34
F. equiseti	33.3	33.3	16.66	16.66	1.20	0.0	49.92	49.92
F. moniliforme	33.3	33.3	16.66	16.66	1.20	0.0	49.92	49.92
Rhizoctonia solani	83.3	50.0	16.66	16.66	1.49	39.97	80.0	80.0
M. phaseolina	33.3	33.3	16.66	16.66	1.30	0.0	49.92	49.92

means of disease incidence and severity were recorded from trees grown in Paris followed by El-Dakhla district while, the lowest were recorded from trees grown at El-Kharga district. Such results are in agreement with Radwan *et al.*, 1995 and Mousa, *et al.*, 2006, they reported that root rot and wilt disease complex is a serious diseases of olive in Egypt.

The results of the present study revered that several fungi were isolated from rotted root samples collected from olive trees i.e. *Fusarium oxysporum*, *F. solani*, *F. moniliforme*, *F. equiseti*, *Rhizoctonia solani*, *Macrophomina phaseolina*, *Cylindrocarpon sp.*, *Acremonium egyptina*, *Chaetomium olivaceum* and *Nigrospora oryzae*. *Fusarium oxysporum* was the most frequent isolated fungi from rotted root of olive trees, followed by *F. solani* and *Rhizoctonia. solani* on all surveyed locations. While, *Cylindrocarpon sp.* was found in low frequency. Similar results were obtained by several other investigations (Radwan *et al.*,1995; Sánchez-Hernández, *et al.*, 1996 and 1998; Pérez, *et al.*, 2001; Babbitt, *et al.*, 2002; Barrera, *et al.*, 2003; Barreto, *et al.*, 2003; Sergeeva, *et al.*, 2005 and Mousa, *et al.*,2006).

The recorded differences in occurrence of root rot and wilt disease complex on olive trees in different New Valley districts may be due to differences that existed among these districts in environmental factors, control management of such disease as well.

The pathogenicity tests proved that all tested fungi were pathogenic to olive transplants (Toffahi var.) except, *Acremonium egyptina*, *Chaetomium olivaceum* and *Nigrospora oryzae*.

The symptoms of root rot and wilt disease complex of olive trees as previously reported by Sánchez-Hernández, *et al.*, (1996 and 1998), Babbitt, *et al.*, (2002), Barrera, *et al.*, (2003) and Barreto, *et al.* (2003) were observed.

Typical symptoms of wilt and rotted rot in olive transplants were observed, but they differed due to pathogenic capabilities of isolated fungi. *Fusarium oxysporum*, *F. solani* and *Rhizoctonia. solani* caused the highest root rot incidence and severity and showed extensive root and crown necrosis on transplants. Variation existed in pathogenic capabilities of the tested isolates of *Fusarium oxysporum*, *F. solani* and *Rhizoctonia. solani* have also been previously mentioned by Radwan *et al.* (1995) who reported that *Fusarium oxysporum*, *Phytophthora parasitica* and *Rhizoctonia solani* were the most virulent of the tested fungi on seedlings of olive. Other reports confirmed variation in pathogenicity of several soil borne pathogenic fungi to olive transplants and trees world-wide (Sánchez-Hernández, *et al.*, 1998; Pérez, *et al.*, 2001; Babbitt, *et al.*, 2002;

Barrera, *et al.*, 2003). They also showed that the symptoms such as leaf browning, root rot, wilting and plant death of inoculated young olive plants with these pathogenic fungi. However, Mousa, *et al.* (2006) reported that *F. oxysporum*, *F. solani* and *R. solani* caused the highest root rot incidence and severity on olive transplants.

The tested concentration of six fungicides reduced *in vitro*, growth of *Fusarium oxysporum*, *F. solani* and *Rhizoctonia. solani*. Response of the tested fungi to the tested doses of fungicides was different. Complete inhibition of growth of the tested fungi was achieved by the concentrations 25-200 ppm of Kema-Z, Maxim XL, Rizolex-T and Topsin M_{70}. Meanwhile, Moncut fungicide completely inhibited growth of the tested fungi at 100 ppm or over. However, the Ridomil gold plus fungicide gave complete inhibition of growth of the tested fungi at 200 ppm.

Efficiency of the tested fungicides to controlling of root rot and wilt disease complex varied. The fungicides Maxim XL, Topsin M_{70}, Rizolex-T, Kema-Z, and Moncut reduced greatly incidence of the disease that's may be due to the mode of action of this fungicides .The mode of action of Topsin M_{70} and Kema-Z arrested mitosis and cell division of the tested fungi, mode of action of Maxim XL effected of map/ protein-kinase in osmotic signal transduction, mode of action of Moncut effected complex II in fungal respiration (succinat - dehydrogenase) and mode of action of Rizolex-T effected of lipids and membrane synthesis. While, Ridomil gold plus gave the least reduction in disease incidence. The results are in agreement with those reported by Tawil, *et al.*, (1991); Radwan and Hilal, (1994); Radwan *et al.*, (1995); Sánchez-Hernández, *et al.*, (2001) and Abd El-Aziz, (2007).

Humic acid can be applied successfully in many districts of plant production as a plant growth stimulant, soil conditioner, *i.e.* enhanced natural resistance against plant diseases and pests (Scheuerell and Mahaffee, 2004). Efficiency of Humic acid in reduction of root rot and wilt disease complex was varied. Results indicate that at all concentrations of Humic acid reduced disease incidence especially, at concentrations of 2% and 3% on *F. oxysporium*, *F. solani* and *Rhizoctonia. solani*. The lowest percentage of disease reductions was observed with 1% conc. of Humic acid on *F. equiseti* and *F. moniliforme*. In this respect, Scheuerell and Mahaffee (2004) reported that the most effective treatment for suppression damping off in many plants was compost tea plus kelp extract and Humic acid. The role of Humic acid for reducing root rot disease may be due to enhance natural resistance against plant diseases and pests, stimulate plant growth through increased cell division, as well as

optimizing uptake of nutrients, water and stimulate the soil microorganisms (Tattini, *et al.*, 1990; Atiyeh, *et al.*, 2002; Chen and Aviad 2004; Noble and Coventry 2005).

The results of the present study suggest that treatment of transplants and trees by soil drench application of Humic acid is a safe method and might be used commercially for controlling root rot and wilt disease complex of olive in nurseries and orchards under New valley conditions

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optimizing uptake of nutrients, water and stimulate the soil microorganisms (Tattini, *et al.*, 1990; Atiyeh, *et al.*, 2002; Chen and Aviad 2004; Noble and Coventry 2005).

The results of the present study suggest that treatment of transplants and trees by soil drench application of Humic acid is a safe method and might be used commercially for controlling root rot and wilt disease complex of olive in nurseries and orchards under New valley conditions

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تواجد مرض عفن الجذور و الذبول فى أشجار الزيتون بمحافظة الوادى الجديد (مصر) ومقاومته

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وجد مرض عفن الجذور والذبول على أشجار الزيتون المنزرعة فى البساتين المنتشرة بالواحات الخارجة وباريس والداخلة والفرافرة بمحافظة الوادى الجديد. وجد المرض بدرجات متفاوتة فى المناطق التى شملها الحصر، حيث اختلفت نسبة الإصابة وشدة المرض على أشجار الزيتون المصابة، وكان المتوسط العام لنسبة الإصابة (42%) وشدة المرض (48.9%) على أشجار الزيتون بالوادى الجديد. وتم عزل العديد من الأنواع لأجناس فطرية مختلفة من العينات المصابة، تضمنت فطريات: فيوزاريوم اوكسيسبورم، فيوزاريوم سولانى، فيوزاريوم مونليفورم، فيوزاريوم اكواسيتى، ريزوكتونيا سولانى، ماكروفومينا فاصولينا، سيلندروكاربون، اكريمونيم ايجيبتينا، كاتوميم اوليفاسيم، نيجروسبورا اورزى. واختلف نسب عزل تلك الفطريات تبعا لاختلاف أجناسها والمواقع والأجزاء المعزولة منها. وكانت أكثر الفطريات توجدا هى فيوزاريوم اوكسيسبورم، فيوزاريوم سولانى، ريزوكتونيا سولانى.

أثبتت اختبارات القدرة المرضية للفطريات المعزولة على شتلات الزيتون تحت ظروف العدوى الصناعية أن الفطريات فيوزاريوم اوكسيسبورم، فيوزاريوم سولانى، ريزوكتونيا سولانى. هى المسببة لمرض عفن الجذور والذبول على أشجار الزيتون فى محافظة الوادى الجديد.

تم دراسة تأثير ستة مبيدات مختلفة (كيمازد، ومون كت، وماكسيم اكس ال، وريزولكس تى، وريدوميل جولد بلس، وتوبسين ام 70) على تثبيط نمو الفطريات الممرضة المختبرة فى المعمل، ومقاومة المرض فى الصوبة. أظهرت المبيدات الفطرية المختبرة قدرة عالية على تثبيط نمو الفطريات المسببة للمرض ولكن بدرجة متباينة. تباينت كفاءة المبيدات الفطرية المختبرة فى مكافحة المرض على شتلات الزيتون (الصنف التفاحى) فى المشتل، وكانت أفضل المواد المختبرة فى مكافحة المرض هى المبيدات توبسين أم70، وماكسيم اكس ال، وريزولكس تى. وبدراسة فاعلية استخدام الحمض العضوى هيوميك كمعاملة تربة تحت ظروف المشتل فى خفض شدة المرض تبين أنه خفض من حدوث المرض المتسبب عن الفطريات فيوزاريوم اوكسيسبورم، فيوزاريوم سولانى، ريزوكتونيا سولانى وخصوصا عند أستخدامه بتركيزات 2، 3% .