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EFFECT OF PLANT AGE , SOIL TYPE, BIO-FERTILIZER AND FUNGICIDE APPLICATION ON THE INFECTION BY ROOT ROT OF APRICOT .

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ABSTRACT

Two experiments were carried out to study the effect of plant age and soil types on the infection with root rot of apricot transplants under green house conditions, Results of the first trial showed significantly that the transplants of 3 years- old were more resistant than 2 years- old plants and one year- old when transplanted in soil artificially infested with each of *Fusarium solani, Fusarium moniliforme, Rhizoctonia solani and Botryodiplodia theobromae* separately.

Results of the second trial showed significantly that the transplants grown in clay sandy soil exhibited the best results where the infection with root rot recorded the lowest values.

Concerning the effect of systemic fungicides and the bio-fertilizer on the infection with root rot of apricot transplants under field conditions, results showed that the four tested chemicals decreased significantly the percentage of infection with root rot of apricot. Rizolex/T and Vitavax/T (200WP). showed the best results for disease control.

Keywords: apricot root rot, disease incidence, bio-fertilizer, systemic fungicides, plant age, soil types, clay sandy soil.

INTRODUCTION

Apricot (*Prunus armeniaca* L.*)* is considered one of the most popular fruit crops to the Egyptians. The cultivated area is concentrated in Nobaria, Kaloubyia and Fayoum governorates. The total grown areas of apricot in ARE reached 20350 feddans (8537.92 hectare) during 2006 season, which produced 105901 tons (Anonymous, 2006) . The future of apricot cultivation in Egypt mainly depends on planting in the new reclaimed areas with the new introduced cultivars.

Root rot of apricot trees is mainly caused by different soil borne fungi belonging to different genera and species. Under the Egyptian environmental conditions the isolated fungi from the rotted roots of apricot included several pathogens, The most frequentative and pathogenic fungi which isolated from roted roots of apricot were *Macrophmina phaseolina*, *Fusarium solani* , *Botryodiplodia theobromae* and *Rhizoctonia solani*. (Abd-El Malek,1982)

According to the morphological, anatomical and chemical changes which happened in plant by age advancing, many researchers studied the relationship between plant age and susceptibility to different diseases . In this connection, Futton and Hanson (1960) reported that *Fusarium oxysporum*, *F. solani, F. roseum, F. moniliforme, Gliocladium sp.* and *Rhizoctonia solani* proved to be more pathogenic to seedlings than to older plants of red clover. Mohamed *et al*. (1987) found that percentages of fungi-free cuttings of pelargonium decreased by increasing age of plants used as source of cuttings from 0.5 to 2 year-old .

Abd El Malek (1982) found that susceptibility of stone fruits (apricot, peach and almond) to root-rot disease caused by *Pythium ultimum* was decreased as the plants became older . Mourad (1983) found that rootings of grapevine (cv. Banati.) were more infected than cutting and as the rooting age was increased, the susceptibility to root rot disease was decreased . Mahrous (1994) mentioned that root rot disease incidence of grapevine rootings was decreased by increasing rootings age Mostafa (1995) mentioned that the young apricot trees were more susceptible to verticillium wilt than the older ones .Moreover, susceptibility was decreased by increasing plant age .

Concerning the effect of soil type on the occurrence and severity of root rot disease, many researchers studied the effect of different soil types on the growth of several pathogens . Magie (1953) recorded that Fusarium diseases were destructive in areas with light-sandy soils, heavy rainfall and warm climate . Ibrahim and Abdel El Rehim (1965) found that the percentage of infection of horse-bean seedlings infected with *Fusarium solani f . fabae* and *Fusarium oxysporum f. fabae* was higher in the sandy soil than in either the sandy-loam or the clay soil. Papavizas (1968) reported that the numbers of viable propagules of *Rhizoctonia solani* were greater in very coarse sandy than in the very fine sandy and in the silt clay fractions. Badawy (1973) indicated that the severity of Rhizoctonia-rot of grapevine decreased by increasing the percentage of clay in soil. Herr (1977) found that in a sandy loam soil inoculum density of *Rhizoctonia solani* increased throughout the growing season while in a silty clay soil inoculum density remained low with only a slight increase throughout the growing season .

Kannaiyan and Prasad (1981) mentioned that *Rhizoctonia solani* survived better in pots with a clay soil than with a sandy one. The greater the proportion of clay in the soil the longer the survival. Mourad (1983) recorded that the severity of root-rot disease of grapevine increased by increasing the percentage of sandy in soil . Mahrous (1994) obtained the highest percentage of rotted grapevine cuttings in sandy soil while the lowest percentage was found in clay soil.

Another potential role for reducing the development of root rot diseases is the use of bio-fertilizer (chitosan) such as chito care . Chitosan is a hydrophilic polysaccharide ,which is soluble in dilute aqueous organic acid solutions and insoluble in pure water. Chitosan has been used as a seed treatment and a pesticide (Webster et al.,2007).Also, they added that seed treatment with chitosan inhibited the fungus *Pythium aphanidermatum* and was useful for preventing the occurrence of the seedling blight disease of corn.

Concerning the effect of systemic fungicides on the infection with root rot of apricot seedlings. Systemic fungicides developed since 1965 (Hardison, 1966; Sinclair and Allam, 1968) which have a selective fungi toxicity for Basidomycetes (Edgington *et al*, 1966) like the oxathins as Vitavax formulations are considered important fungicides against a great number of soil-borne fungi. In this study, Rizolex / T, Vitavax / T, and Maxim XL were evaluated under greenhouse and field conditions.

The present study was planned to investigate the effect of plant age, soil type on the infection by apricot root rot . and to compare the effect of some fungicides and the bio-fertilizer (chitosan) on the development of apricot root rot.

MATERIALS AND METHODS

Two experiments were carried out to study the effect of plant age and soil types on the infection with root rot of apricot trees

The first trial was carried out to study the effect of plant age on apricot root-rot incidence. Planting was in soil artificially infested with the tested fungi *i.e*. *Fusarium solani, Fusarium moniliforme, Rhizoctonia solani* and *Botryodiplodia theobromae* at the rate of 5% (W/W) singly. Two healthy transplants of the cv. Amar 1,2.3 years-old were planted in each pot containing infested soil. A set of 3 pots was used for each treatment. The same number of transplants, for each age, was planted in sterilized soil amended with equal amount of the uninoculated substrate to serve as control. Data were recorded by counting the survived transplants and subtracting from the total number of planted transplants to obtain the number of dead plants at 60 days after planting.

Another trial was carried out to study the effect of soil types on apricot root-rot disease incidence. Sandy, clay sandy and clay soil samples were disinfested using 5% formalin solution .After 15 days, the soil was potted in disinfested pots (25 cm in diameter) as described by (Mahrous, 1994). Each soil type was represented by twelve pots, each three pots were infested with one of the tested fungi, *i.e. Fusarium solani, Fusarium moniliforme, Rhizoctonia solani* and *Botryodiplodia theobromae* at the rate of 5% (W / W) inoculum level. Two transplants of Amar cultivar were planted in each pot. Three replicate pots were used as control for each treatment contained sterilized soil mixed with equal amount of the uninoculated substrate.

Disease assessment:

In most cases disease assessment was determined as follows:

Number of dead plants due to root - rots was recorded 60 days after planting and the percentage of dead plants was calculated according to the original number of the used transplants. Moreover, the survived plants were also examined periodically.

Disease severity:

Severity of root - rot was estimated according to the disease index of grapevine root- rot proposed by Mahrous, (1994) as follows:

0- Roots with no visible disease symptoms.
1- Slight to moderate root discoloration from (1 to 25%)
2- Severe rot with extensive decay from (25.1 - 50%)
3- Very severe rot involving the crown area and most of the root system as well as the lower part of the stem with the absence of most lateral and feeder roots (more than 50.1 %)

Chemical control:

Formulation of four systemic and non-systemic combinations were tested for their efficiency in controlling apricot root rot under greenhouse and field conditions.

Greenhouse experiments:

A-Pre-planting root dipping:

Three different fungicides, *i.e.* Rizolex / T (20% tolclofs methyl + 30% bisdimethl thiocarbamoyl disulfide), Vitavex/T (200 WP) (37.5 vitavax + 37.5 thiram), Maxim XL(Fludioxonil) and the bio-fertilizer Chito care (Citosan) were used as suspensions at the rate of 5 grams or 5 cm^3 for each fungicide or 50 cm^3 for the bio-fertilizer (Chito care) separately per liter of water. Triton B or Agral as sticker was added to each fungicide suspension at the rate of 0.5% ml/liter. Seedlings of apricot were dipped into the desired fungicidal suspension for five minutes immediately before planting.

Treated transplants of apricot were planted in soil infested with each pathogen separately. Four replicate pots with 12 seedlings "3/pot" were used for each treatment. Seedlings treated with water were used as control. Percentage of infection was estimated after 60 days from transplanting.

B- Soil drench:

The three mentioned fungicides were used separately as suspensions at the rate of 5 grams or 5 $cm^3$of each fungicide or 50 cm^3 for the bio-fertilizer (chito care) per liter of water. Pots containing soil infested with each of the tested fungi separately were drenched using one liter of the desired fungicidal suspension after planting directly. Four replicate pots with 3 transplants per each were used for each treatment. Pots treated with water were used as control. Percentage of infection was estimated at 60 days after planting.

C- Combined treatments:

Transplants of apricot were dipped in the desired fungicidal suspension then planted in pots containing soil infested with each of the tested fungi separately. Fifty days after planting, the soil in each pot was also drenched with the desired fungicidal suspension as mentioned before. Percentage of infection was estimated at 60 days after soil drenching.

2- Field Experiments:

A-Pre-planting root dipping treatment:

Three different fungicides, *i.e.* Rizolex / T (20% tolclofs methyl + 30% bisdimethl thiocarbamoyl disulfide, Vitavex/T (200 WP) (37.5 vitavax + 37.5 thiram), Maxim XL(Fludioxonil) and the bio-fertilizer (chito care) were used as suspensions at the rate of 5 grams or 5 cm^3 for each fungicide or 50 cm^3 for the bio-fertilizer (chito care) separately per liter of water. Triton B or Agral as sticker was added to each fungicide suspension at the rate of 0.5% ml/liter. Transplants of apricot were dipped in the fungicidal suspension for 5 minutes immediately before planting - Seedlings treated with water were used as control .Seedlings were examined 60 days after planting to estimate the number of diseased plants.

B. Soil drench:

The three mentioned fungicides were used as suspensions at the rate of 5 grams or 5 $cm^3$of each fungicide or 50 cm^3 for the bio-fertilizer (chito care) per liter of water. Soil was drenched with one liter of the desired fungicidal suspension after planting directly above the roots then watered. Soil treated with water by the same manner served as control. Diseased plants were counted 2 months after planting.

C- Combined treatments:

Transplants of apricot were dipped in the desired fungicidal suspension as described before. Fifty days after planting the soil was also drenched with the desired fungicidal suspension as mentioned before. Diseased plants were counted in both treated and untreated soils 2 months after soil drenching.

Statistical analysis of the obtained results were carried out according to Snedecor and Cochran (1972).

RESULTS AND DISCUSSION

This experiment was carried out under greenhouse conditions to study the effect of plant age on root rot of apricot.

Under greenhouse three treatments of plant age were used in infested soil with *Fusarium solani* , **,,***Fusarium moniliforme , Botryodiplodia theobromae* and *Rhizoctonia solani*

Table (1): Effect of plant age on the disease incidence of apricot root-rot disease under greenhouse conditions.

Seedling age	% infection in soil infested with							
	F. solani		*F.moniliforme*		*B. theobromae*		*R. solani*	
	Disease Incidence %	Survival plants %	Disease Incidence %	Survival plants %	Disease Incidence %	Survival plants %	Disease Incidence %	Survival plants %
1Year–old	66.67	33.33	74.50	25.50	84.50	22.67	87.33	12. 67
2Year–old	33.33	66.67	56.67	43.33	66.67	33.33	66.67	33.33
3Year–old	14.50	85.50	33.33	66.67	33.33	66.67	38.50	61.50
L.S.D.at 5%	1.42	-	0.67	-	1.37	-	2.74	-

Results presented in table(1)show significantly that plants of 3 years old were more resistant (14.50) than 2 years old plants (33.33) and one year old (66.67) in the soil inoculated with *Fusarium solani*. By using soil infested with *Fusarium moniliforme,* the disease incidence was 66.67, 56.67and 33.33% for 1 year , 2 year and 3 year old seedlings, respectively. In soil infested with *Botryodiplodia theobromae*, the disease incidence was 33.33% using 3 years old plants but using other plant ages , the disease incidence was increased to 66.67% and 84.50% for 2 years old and one year old transplant, respectively.

By using *Rhizoctonia solani* in soil inoculation, the disease incidence was 87.33, 66.67 and 38.50% for 1 year , 2 year and 3 year old transplants, respectively.

Table (2): Effect of different soil types on the disease incidence of apricot root-rot disease under greenhouse conditions.

soil types	% infection in soil infested with							
	F. solani		*F.moniliforme*		*B. theobromae*		***R. solani***	
	Disease Incidence %	Survival plants %	**Disease Incidence %**	**Survival plants %**	**Disease Incidence %**	**Survival plants %**	**Disease Incidence %**	**Survival plants %**
Clay soil	40.33	59.67	74.50	25.50	55.50	44.50	38.33	61.67
Sandy soil	60.00	40.00	56.67	43.33	66.67	33.33	46.67	53.33
Clay sandy soil	53.67	46.33	33.33	66.67	48.50	51.50	33.33	66.67
L.S.D.at 5%	0.969	-	0.87	-	0.85	-	0.813	-

Results presented in table (2) show significantly that the disease incidence was 40.33,60.00 and 53.67 for clay, sandy and clay sandy soil, respectively by using soil infested with *Fusarium solani*.. When the soil was infested with *Fusarium moniliforme,* the disease incidence was 74.50,56.67 and 33.33 for clay, sandy and clay sandy soil, respectively. In soil infested with *Botryodiplodia theobromae*, the disease incidence was 48.50% using clay sandy soil but using other soil , the disease incidence was increased to 66.67% and 55.50% for sandy and clay soil, respectively. By using *Rhizoctonia solani* in soil inoculation, the disease incidence was38.33, 46.67 and 33.33% for clay, sandy and clay sandy soil, respectively.

Chemical control

1- Greenhouse experiments

A. Pre-planting root dipping

Pot experiments were conducted to study the effect of some fungicides and the bio-fertilizer (Chito care) on apricot root-rot incidence by treating roots of the transplants before planting.

Data in Table (3) show that the different fungicides were differed in their effect on disease incidence caused by the tested fungi; i.e. *R. solani, F. solani, F. moniliferme and B. theobromae* under greenhouse. In case of *Rhizoctina solani,* the disease incidence at 60 days after planting was 13.5, 29.00, 38.00, 32.00 and 58.00% for Rizolex/T, Vitavax/T, Maxim XL, Chito care and the control, respectively. This indicated that Rizolex/T and Vitavax/T significantly decreased the disease incidence in comparison with other fungicides. Also, in case of *F. solani*, disease incidence after 60 days was 32.00, 25.67, 40.50, 36.67 and 68.33% for Rizolex/T, Vitavax/T, Maxim XL, Chito care and the control. When the soil was infested with *Fusarium moniliforme*, the disease incidence after 60 days was 30.00, 20.50, 40.00, 39.50 and 63.50% for Rizolex/T, Vitavax/T, Maxim XL, Chito care and the control. Results in case *of Botryodiplodia theobromae* indicated that the disease incidence after 60 days was, 26.33, 22.67, 36.00, 36.50 and 56.67% for Rizolex/T, Vitavax/T, Maxim XL, Chito care and the control. In all cases, fungicides significantly decreased the root-rot disease incidence than the control.

B. Soil drench.

Results in Table (3) indicate that the fungicides showed significant differences due to their effect on the incidence of root-rot. In case of *R.*

solani, the disease incidence after 60 days recorded 12.50, 31.33, 40.00, 29.67 and 58.00% for Rizolex/T, Vitavax/T, Maxim XL, Chito care and the control, respectively. Also, in case of *F. solani*, data in Table (3) show that the disease incidence after 60 days reached 33.60, 26.50, 41.33, 39.37 and 68.33% for Rizolex/T, Vitavax/T, Maxim XL, Chito care and the control, respectively indicating that Vitavax/T (200 WP) was much better in protecting the transplants from root - rot disease.

Table (3): Effect of some fungicides and bio-fungicide on the incidence of apricot root rot disease under green house conditions.

Fungicides	% infection after 60 days in pots infested with							
	R. solani		*F. solani*		*F. moniliforme*		*B. theobromae*	
	Infection %	Survival %	Infection %	Survival %	Infection %	Survival %	Infection %	Survival %
Pre-planting treatment								
Control	58.00	42.00	68.33	31.67	63.50	36.50	56.67	43.33
Rizolex/ T	13.50	86.50	32.00	68.00	30.00	70.00	26.33	73.67
Vitavax/T(200WP)	29.00	71.00	25.67	74.33	20.50	79.50	22.67	77.33
Maxim XL	38.00	62.00	40.50	59.50	40.00	60.00	36.00	64.00
Chito care	32.00	68.00	36.67	63.33	39.50	60.50	30.50	69.50
L.S.D at 5%	1.54		1.24		1.44	-	1.23	-
Soil drenches								
Control	58.00	42.00	68.33	31.67	63.50	36.50	56.67	43.33
Rizolex/ T	12.50	87.50	33.60	66.40	32.00	68.00	27.00	73.00
Vitavax/T(200WP)	31.33	68.67	26.50	73.50	23.67	76.33	24.50	75.50
Maxim XL	40.00	60.00	41.33	58.67	40.33	59.67	37.33	62.67
Chito care	29.67	70.33	39.37	60.63	38.00	58.00	33.00	67.00
L.S.D at 5%	1.23	-	1.42	-	0.54	-	1.27	-
Combined Treatments								
Control	58.00	42.00	68.33	31.67	63.50	36.50	56.67	43.33
Rizolex/ T	9.50	90.50	11.14	88.86	11.17	88.83	10.50	89.50
Vitavax/T(200WP)	18.67	81.33	13.50	86.50	12.00	88.00	9.33	90.67
Maxim XL	21.37	78.63	17.00	83.00	17.00	83.00	16.37	83.63
Chito care	20.00	80.00	18.50	81.50	18.00	82.00	18.00	82.00
L.S.D at 5%	1.53	-	1.28	-	1.43	-	0.68	-

Results (Table3) show that the disease incidence under the effect of *F. moniliforme* after 60 days reached 32.00, 23.67, 40.33, 38.00 and 63.50 % for Rizolex/T, Vitavax/T, Maxim XL, Chito care and the control, respectively indicating that Vitavax/T (200WP) was much better in protecting the transplants from root-rot. In case of soil infestation with *B. theobromae* the incidence of root-rot recorded 27.00, 24.50, 37.33, 33.00 and 56.67% for Rizolex/T, Vitavax/T, Maxim XL, Chito care and the control indicating that Vitavax/T (200WP) and Rizolex /T were much better in protecting the transplants from root-rot.

C. Combined treatments:

Data (Table 3) show that the tested fungicides clearly decreased the disease incidence percentage of apricot root-rot. In case of *Rhizoctonia solani,* The disease incidence after 60 days recorded 9.50 , 18.67, 21.37, 20.00 and 58.00% for Rizolex/T, Vitavax/T, Maxim XL, Chito care and the

control, respectively indicating that Rizolex/T, Vitavax/T, Chito care were better to be used for decreasing the disease incidence. Also, in case of *F. solani*, data in Table (3) show that the disease incidence after 60 days reached 11.14 , 13.50, 17.00 , 18.50 and 68.33% for Rizolex/T, Vitavax/T, Maxim XL, Chito care and the control, respectively indicating that Rizolex/T was much better in protecting the transplants from root -rot. Under the effect of *F. moniliforme*, the disease incidence was 11.17, 12.00, 17.00, 18.00 and 63.50% for Rizolex/T, Vitavax/T, Maxim XL, Chito care and the control, respectively. Also, in case of *B. theobromae,* the disease incidence after 60 days reached 10.50, 9.33, 16.37, 18.00 and 56.67% for Rizolex/T, Vitavax/T, Maxim XL, Chito care and the control, respectively.

Under greenhouse conditions using the different fungicides and the bio-fertilizer as suspensions for root-rot dipping before planting in soil infested with each of *Rhizoctonia solani, F. solani, F. moniliforme and B. theobromae* caused different effects on disease incidence.

Rizolex/T, Vitavax/T, (200WP) significantly reduced the disease incidence than other fungicides used when the soil was infested with each of *R. solani*, *F. solani, F. moniliforme* and *B. theobromae.*

Date also show that dipping roots of apricot transplants in the suspensions of different fungicides before planting in the soil infested with the causal fungi of root-rot differed significantly according to the action of fungicides and also the causal pathogen. Mahdy (1988) and Mahrous (1994) came to the same conclusion.

Using the different fungicides and the bio-fungicide as soil drenches in the greenhouse when the soil in the pots was infested with each of *R. solani, F. solani*, *F. moniliforme* and *B. theobromae*, the root-rot disease incidence was much affected by Rizolex/T and Vitavax/T than other fungicidal treatments and the control . Walker (1992) reported that root-rot of apricot transplants caused by *R. solani* may be controlled by Quintozene but not Tolclofos Methyl. Mahrous (1994) indicated that the best fungicides used were Moncerin Combi, Rizolex/T, Benlate, Vitavax 300 and Quniulate PRo for controlling root-rot after planting by drenching soil. While the least effective fungicides were Quinulate 400 and Topsin M_{70}. Combining all methods of control in one time, the used fungicides decreased very much the incidence of apricot transplant root-rot. Similar results were obtained by Mahdy (1988)

II. Filed experiments:

Experiments were conducted under natural filed conditions to study the effect of different fungicides and the bio-fungicide on root-rot disease incidence.

A. Pre-planting root dipping:

Data presented in Table (4) show significantly that the three fungicides and the bio-fertilizer used to treat the roots of transplants by dipping in their suspensions separately before planting decreased root-rot. After 60 days from planting, disease incidence recorded 18.24, 21.67, 28.42, 26.66 and 68.33% for Rizolex/T, Vitavax/T(200WP), Maxim XL, Chito care and the control, respectively.

Table (4): Effect of some fungicides and bio-fungicide on the incidence of apricot root rot disease under field conditions after 60 days from transplanting.

Fungicides	Rate of use	Infected %	Survival %	Activity of Fungicide,%
	Pre-planting treatment			
Control	-	68.33	31.67	-
Rizolex/ T	5g/1L.w	18.24	81.76	73.31
Vitavax/T(200WP)	5g/1L.w	21.67	78.33	68.29
Maxim XL	5 cm^3/1L.w	28.42	71.58	58.41
Chito care	50cm^3/1L.w	26.66	73.34	60.98
L.S.D at 5%	-	3.12	-	-
Soil drench				
Control	-	68.33	31.67	-
Rizolex/ T	5g/1L.w	19.47	80.53	71.51
Vitavax/T(200WP)	5g/1L.w	21.32	77.68	68.80
Maxim XL	5 cm^3/1L.w	27.87	73.13	59.21
Chito care	50cm^3/1L.w	32.27	67.73	52.77
L.S.D at 5%	-	2.51	-	-
Combined treatments				
Control	-	68.33	31.67	-
Rizolex/ T	5g/1L.w	00.00	100.00	100.00
Vitavax/T(200WP)	5g/1L.w	00.00	100.00	100.00
Maxim XL	5 cm^3/1L.w	08.00	92.00	88.29
Chito care	50cm^3/1L.w	18.00	82.00	73.66
L.S.D. at 5%	-	2.27	-	-

B. Soil drench:

Results (Table 4) show that the used fungicides added as soil drench had significant effect on root-rot disease incidence. The fungicides were clearly differed in their effect and any of them was not able to cause a complete control for this disease. The infection percentages after 60 days were 19.47, 21.32, 27.87, 32.27 and 68.33% for Rizolex/T, Vitavax/T(200WP), Maxim XL, Chito care and the control, respectively.

C. Combined treatments:

Data (Table 4) indicate significantly that this treatment was better than any other treatment used in this study. All the used fungicides were more effective when compared with the untreated control. Rizolex/T, Vitavax/T gave a complete effect and no visible symptoms of the disease were noticed for a period of two months. When Maxim XL and Chito care were used, disease incidence percentage reached 8.00 and 18.00 % while the disease incidence percentage of control was 68.33% after 60 days.

Accordingly, Rizolex/T, Vitavax, (200 WP) can be used in controlling root-rot of apricot transplants by using the combined treatment method under natural conditions in the field.

Under natural conditions pre-planting root dipping in the suspensions of different fungicides and the bio-fertilizer (Chito care) gave good effect in controlling root-rot incidence. However, Rizolex/T and Vitavax/T (200WP) were the best. Similar results were obtained by Mahrous (1994).

Drenching different fungicides to soil proved that Rizolex /T, Vitavax/T, (200WP), Maxim XL and Chito care decreased the disease incidence percentage in the field than the control.

In all cases, combining all methods of control in the field showed significantly that Rizolex/T and Vitavax/T gave a complete effect and no visible disease symptoms were noticed. Similar results were obtained by Mahrous (1994).

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تأثير عمر النبات ونوع التربة واستخدام السماد الحيوي والمبيدات الفطرية على الإصابة بمرض عفن جذور شتلات المشمش

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أجريت تجربتان لدراسة تأثير عمر النبات ونوع التربة على الإصابة بأعفان جذور شتلات المشمش تحت ظروف الصوبة ، وكانت التجربة الأولى لدراسة تأثير عمر النبات، وأظهرت النتائج المتحصل عليها أن الشتلات عمر ٣ سنوات كانت أكثر مقاومة من الشتلات عمر سنتين أو عمر سنة واحدة والمنزرعة في تربة ملوثة صناعيا بالفطريات المسببة لأعفان الجذور وهى *Fusarium solani, Fusarium moniliforme, Rhizoctonia solani* and *Botryodipladia theobromae* كل على حدة. كما أجريت تجربة لدراسة تأثير نوع التربة على عفن جذور شتلات المشمش ، وأظهرت النتائج المتحصل عليها أن الشتلات المنزرعة في تربة طينية رملية أظهرت أحسن النتائج في خفض نسبة الإصابة بأعفان الجذور.

بالنسبة لتأثير استخدام المبيدات الفطرية الجهازية والسماد الحيوي (الشيتوكير) على الإصابة بأعفان جذور شتلات المشمش ، أظهرت النتائج أن المواد الكيمائية الأربع خفضت بدرجة معنوية الإصابة بأعفان جذور شتلات المشمش ،أظهرت مادة الريزولكس/تى ومادة الفيتافاكس ثيرام أحسن النتائج فى حماية الشتلات من عفن الجذور.