

## REACTION OF SOME GRAPEVINE CULTIVARS TO INFECTION WITH ROOT-ROT FUNGI AND ITS CONTROL

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### ABSTRACT

Evaluation of some grapevine cultivars against the causal fungi of cutting rots, i.e. *Fusarium solani*, *Fusarium moniliforme*, *Rhizoctonia solani* and *Botryodiplodia theobromae* revealed that Thompson seedless (Banati), Flame seedless, Early Superior, Feista and Superior cvs. were the most susceptible to infection with the tested fungi, while Ruby seedless, Cramson, Perlette, Red Globe and Romi - Red cvs were less susceptible to all the tested fungi. Rizolex/T, Vitavax/T, Topsin M<sub>70</sub> and Moncerin gave good effect against root rot disease.

**Keywords:** Grapevine root rot, cultivars, chemical control, fungicides, *Rhizoctonia solani*, *Fusarium solani*, *Fusarium moniliforme*, *Botryodiplodia theobromae*.

### INTRODUCTION

Root rot disease of grapevine is mainly caused by different soil borne fungi belonging to different genera and species. Under the Egyptian conditions, grapevine is attacked by several diseases, among which powdery and downy mildews and fruit rot diseases are of great economic importance. Fungi causing grapevine root rot are mainly *Rhizoctonia solani* (Badawy, 1973; Mourad, 1983, 1987; Walker, 1992 and Mahrous, 1994), *Fusarium moniliforme*, *Fusarium solani* and *Botryodiplodia theobromae* (Mahrous, 1994). During the last several years, a decline of grapevines characterized by delayed and weak growth has been frequently observed in several vineyards in all governorates in Egypt. The disease decline of vines was always associated with typical root rot symptoms showing abundant necrosis on roots and reduction of feeder roots. Moreover, the disease was also able to attack the cuttings in the nurseries and the rootings (transplants) in the fields.

Due to expansion for importation of new grapevine cultivars and the seriousness of cutting rot in nurseries, it was thought important to screen the local and imported cultivars, i.e. Thompson seedless, Early Superior, Superior, Flame seedless, Feista, Perlette, Ruby seedless, Cramson, Red Globe and Romi Red under Egyptian environmental conditions against *Fusarium solani*, *Fusarium moniliforme*, *Rhizoctonia solani* and *Botryodiplodia theobromae*. Systemic fungicides developed since 1965 (Hansing, 1967; Hardison, 1966; Sinclair and Allam, 1968) which have a selective fungi toxicity for *Basidiomycetes* (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, Topsin M<sub>70</sub> and Moncerin were evaluated under greenhouse and field conditions.

### MATERIALS AND METHODS

This experiment was carried out to study the reaction of some grapevine cultivars to root diseases.

Local and newly imported cultivars namely, Banati (Thompson seedless), Superior, Early Superior, Feista Flame seedless Perlette Ruby seedless, Cramson Red Globe and Romi-Red were evaluated against root diseases. The tested fungi were previously isolated from infected grapevine roots and identified at the plant pathology department, faculty of agriculture, Cairo university (Mahrous, 1994). Healthy rootings were planted in soil artificially infested with each of *Fusarium moniliforme*, *Fusarium solani*, *Rhizoctonia solani*, and *Botryodiplodia theobromae* at the rate of 5% (w/w) singly. Two rootings were planted in each pot. A set of 3 pots was used for each treatment. The same number of rootings for each cultivar was planted in sterilized soil amended with equal amounts of the uninoculated substrate to serve as control. Data were recorded by counting the survived rootings and subtracting from the total number of planted rootings to obtain the number of dead plants at 60 days after planting. Another experiment was carried out under natural field conditions. The rootings were transplanted in the naturally infested soil, i.e. plots naturally infested with root - rots causing fungi.

**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 cuttings or rootings. Moreover, the survived plants were also examined periodically.

**Disease severity:**

Severity of root - rot disease 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 Ruby seedless grapevine root rot under greenhouse and field conditions.

**Greenhouse experiments:**

**A-Pre-planting root dipping:**

Four different fungicides, i.e. Rizolex / T (20% folclofs methyl + 30% bisdimethyl thiocarbamoyl disulfide, Vitavex/T (200 WP) (37.5 vitavax + 37.5 thiram), Topsin M<sub>70</sub> and Moncerin (20% pencycurom) were used as suspensions at the rate of 5 grams for each fungicide 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. Cuttings and roots of rootings were dipped into the desired fungicidal suspension for five minutes immediately before planting.

Treated rootings and cuttings of Ruby seedless were planted in soil infested with each pathogen separately. Four replicate pots with 12 cuttings

"3/pot" were used for each treatment. Cuttings treated with water were used as control. Percentage of infection was estimated after 60 days.

**B- Soil drench:**

The four mentioned fungicides were used as suspensions at the rate of 5 grams of each fungicide 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 cuttings 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:**

Cuttings and the roots of Ruby seedless rootings 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:**

Four different fungicides were used as suspensions at the rate of 5 grams for each fungicide per liter of water, adding to this suspensions Triton B at 0.5 ml/liter. Cuttings and roots of Ruby seedless were dipped in the fungicidal suspension for 5 minutes immediately before planting - Rootings and cuttings were examined 60 days after planting to estimate the number of diseased rootings and cuttings. Cuttings and rootings dipped in water served as control.

**B. Soil drench:**

The four mentioned fungicides were used. Soil was drenched with one liter of the 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:**

Cuttings and the roots of rootings 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 rootings and cuttings were counted in both treated and untreated soils 2 months after soil drenching treatment.

Statistical analysis of the obtained results were carried out according to Snedecor and Cochran (1957).

## **RESULTS AND DISCUSSION**

**Reaction of different grapevine cultivars to infection with the tested fungi:**

This experiment was carried out to determine the relative susceptibility of ten grapevine cultivars, i.e. Flame seedless, Ruby seedless, Superior, Early Superior, Perlette, Red Globe, Cramson, Thomason

seedless, Feista and Romi-Red to infection with *F.solani*, *F.moniliforme*, *R.solani* and *B.theobromae*.

Data presented in Table (1) clearly show that percentage of dead plants was significantly varied according to soil infestation with the tested fungi. Soil infestation with each of *R. solani*, *F. solani*, *F. moniliforme* and *Botryodiplodia theobromae* resulted in 73.48, 52.79, 70.80 and 53.57% dead plants on the average, respectively. Meanwhile, all the control plants were remained healthy.

The tested grapevine cultivars exerted significant difference in the percentage of dead plants. Thompson seedless (Banati), Flame seedless, Early Superior, Feista and Superior cvs exhibited the highest percentage of dead plants, being 78.50, 76.43, 75.17, 73.96, while cultivars Perlette, Cramson and Ruby seedless showed intermediate infection, being 61.77, 62.91 and 64.97%, on the average respectively. Meanwhile, cvs Red - Globe and Romi - Red showed 39.50 and 34.00% dead plants on the average, respectively.

The response of any tested grapevine cultivar to infection with any of the tested fungi exerted significant differences. Thompson seedless (Banati), Flame seedless, Early Superior, Feista and Superior cvs were the most susceptible to infection with any of the tested fungi. While Ruby seedless, Cramson, Perlette, Red-Globe and Romi-Red cvs were less susceptible to all the tested fungi (Table 1).

Data also show that *Rhizootonia solani* was the most harmful to cvs Flame seedless, Ruby seedless, Cramson, Perlette, Red-Globe and Romi-Red followed by *Fusarium molliforme*. *Fusarium solani* and *Botryodiplodia theobromae* (Table 1).

Data of the another experiment carried out under natural field conditions, where the rootings were transplanted in the naturally infested soil, i.e. plots naturally infested with root-rots causing fungi showed lower values in the percentage of dead plants in comparison with those obtained from the artificially inoculated pots. In general, varietal susceptibility showed the same trend of the greenhouse experiment (Table 1).

Generally, Thompson seedless, Flame seedless, Early Superior, Feista and Superior were the most vulnerable cultivars, while Red Globe and Romi-Red were far the least affected. Meanwhile, Ruby seedless, Cramson and Perlette cultivars were relatively intermediate.

With regard to varietal susceptibility, different ranges of disease severity were manifested by the tested cultivars indicating different levels of susceptibility. Data indicated that among the ten grapevine cvs tested during this study against root-rot disease, the response of any tested cultivars to infection with any tested fungus exerted significant differences. Thompson seedless (Banati), Flame seedless, Early Superior, Feista and Superior cvs were the most susceptible to infection with any of the tested fungi. Ruby seedless, Cramson and Perlette cvs. were moderately susceptible, while Red-Globe and Romi-Red were less susceptible to all the tested fungi.

Table (1): Reaction of different grapevine rooting to fungi causing root-rot disease.

Grapevine Cultivars	% infection in soil infested artificially with *												Rootings grown in naturally infested soil	
	<i>R. solani</i>		<i>F. solani</i>		<i>F. moniforme</i>		<i>B. theobromae</i>		Avr. % disensed plants		Avr. % survival		Infection %	Survival % **
	Infection %	Survival % **	Infection %	Survival % **	Infection %	Survival % **	Infection %	Survival % **	Infection %	Survival % **	Infection %	Survival % **		
Flame seedless	82.33	17.67	70.33	29.67	82.67	17.33	70.33	29.67	76.42	23.58	56.50	43.50		
Ruby seedless	79.67	20.33	56.87	43.13	77.33	22.67	46.00	54.00	64.97	35.03	48.00	52.00		
Superior seedless	80.00	20.00	67.67	32.33	79.50	20.50	67.87	33.14	73.76	26.24	59.37	47.63		
Early Superior	80.83	19.17	69.83	30.17	80.50	19.50	69.50	30.50	75.17	24.83	54.67	45.33		
Perlette	78.83	20.17	55.00	45.00	74.63	25.37	40.63	59.37	61.77	38.23	46.00	54.00		
Red Globe	53.83	46.17	34.67	65.33	37.00	63.00	32.50	67.50	39.50	60.50	28.33	71.17		
Cramson	78.68	21.33	54.50	45.50	76.14	23.86	42.33	57.67	62.91	34.84	47.17	52.83		
Thomp. seedless (Banati)	83.00	17.00	72.37	27.63	85.37	14.63	73.67	26.33	78.50	21.49	59.50	40.50		
Feista	82.00	18.00	68.67	31.33	80.00	20.00	68.17	31.83	73.96	26.61	53.67	46.33		
Romi Red	38.67	61.33	32.50	67.50	35.00	65.00	79.88	70.17	34.00	66.00	23.67	76.33		
Mean	73.48	25.52	52.79	47.21	70.81	29.19	53.57	46.43	62.66	37.34	47.04	52.96		

\* Rootings grown in uninfested soil ( control ) showed no visible infection .  
 \*\* Final survival at 60 day after transplanting .  
 - L.S.D at 5% for:

Infection in naturally infested soil = 0.589  
 Infection in artificially infested soil (T) = 0.26  
 Cultivars (c) = 0.24  
 Interaction (T. X. C.) = 26.16

Badway (1973) found no clear differences in the susceptibility among the tested cuttings of vine varieties to both *R. solani* and *B.theobromae*. On the other hand, Mourad (1983) found that grapevine cultivars reacted differently to root - rot disease of rootings. Banati, Bezalenze and Fayoumi were susceptible, while Itali, Aziz and Rosaki were moderately susceptible and Romi-Ahmer (Romi-Red), Gharibi and Muscat were resistant.

Also, Mahrous (1994) found that Thompson seedless (Banati) and Flame seedless were the most vulnerable cultivars while Romi-Red was the least affected. Meanwhile, Fayoumi, Rosaki and Gharibi cultivars were relatively intermediate.

#### **Chemical control**

##### **1- Greenhouse experiments**

###### **A. Pre-planting root dipping**

Pot experiments were conducted to study the effect of some fungicides on root-rot disease incidence by treating roots of the rootings and cuttings before planting.

Data in Table (2) 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. moniliforme* and *B. theobromae* under greenhouse. In case of *Rhizoctina solani*, the disease incidence at 60 days after planting was 13.5, 30.00, 40.00, 25.00 and 58.00% for Rizolex/T, Vitavax/T, Topsin M<sub>70</sub>, Moncerin and the control, respectively. This indicated that Rizolex/T and Moncerin 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, Topsin M<sub>70</sub>, Moncerin and the control. When the soil was infested with *Fusarium moniliforme*, the disease incidence after 60 days was 30.00, 20.25, 40.00, 41.50 and 63.50% for Rizolex/T, Vitavax/T, Topsin M<sub>70</sub>, Moncerin 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, Topsin M<sub>70</sub>, Moncerin and the control. In all cases, fungicides significantly decreased the root-rot disease incidence than the control.

###### **B. Soil drench.**

Results in Table (2) indicate that the fungicides showed significant differences due to their effect on the incidence of root-rot disease. 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, Topsin M<sub>70</sub>, Moncerin and the control respectively. Also, in case of *F. solani*, data in Table (2) show that the disease incidence after 60 days reached 33.60, 26.50, 41.33, 39.37 and 67.33% for Rizolex/T, Vitavax/T, Topsin M<sub>70</sub>, Moncerin and the control, respectively indicating that Vitavax/T (200 WP) was much better in protecting the cuttings from root - rot disease.

Results (Table 2) show that the disease incidence under the effect of *F. moniliforme* after 60 days was 32.00, 23.67, 39.33, 42.00 and 63.00 % for Rizolex /T, Vitavax/T, Topsin M<sub>70</sub>, Moncerin and the control, respectively

indicating that Vitavax/T (200WP) was much better in protecting the cuttings from root-rot disease. In case of soil infestation with *B. theobromae* the incidence of root-rot disease recorded 27.00, 24.50, 37.33, 37.00 and 56.67% for Rizolex/T, Vitavax/T, Topsin M<sub>70</sub>, Moncerin and the control indicating that Vitavax/T (200WP) and Rizolex /T were much better in protecting the cuttings from root-rot disease.

**Table (2): Effect of some fungicides on grapevine (cv. Ruby seedless) root-rot disease incidence under green house conditions.**

Fungicides	% infection after 60 days in pots infested with							
	<i>R. solani</i>		<i>F. solani</i>		<i>F. moniliforme</i>		<i>B. theobromae</i>	
	Infection %	Survival %	Infection %	Survival %	Infection %	Survival %	Infection %	Survival %
<b>Pre-planting treatment</b>								
Control untreated	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	30.00	70.00	25.67	74.33	20.50	79.50	22.67	77.33
Topsin. M <sub>70</sub>	40.00	60.00	40.50	59.50	40.00	60.00	36.00	64.00
Moncerin	25.00	75.00	36.67	63.33	41.50	58.50	36.50	63.50
L.S.D at 5%	1.44		1.14		1.34			
<b>Soil drenches</b>								
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	31.33	68.67	26.50	73.50	23.67	76.33	24.50	75.50
Tospin. M <sub>70</sub>	40.00	60.00	39.51	60.50	39.33	60.67	37.33	62.67
Moncerin	29.67	70.33	39.37	60.63	42.00	58.00	37.00	63.00
L.S.D at 5%	1.13	-	1.52	-	0.44	-		-
<b>Combined Treatments</b>								
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	13.37	86.63	10.50	89.50
Vitavax/T	17.67	82.33	13.50	86.50	12.00	88.00	9.33	90.67
Tospin. M <sub>70</sub>	22.37	77.63	18.00	82.00	17.00	83.00	16.37	83.63
Moncerin	29.00	71.00	18.50	81.50	18.00	82.00	22.00	78.00
L.S.D at 5%	1.33	-	1.18	-	1.43	-	0.68	-

**C. Combined treatments:**

Data (Table 2) show that the tested fungicides clearly decreased the disease incidence percentage of grapevine root-rot. In case of *Rhizoctonia solani*, The disease incidence after 60 days was 9.50, 17.67, 22.37, 29.00 and 58.00% for Rizolex/T, Vitavax, (200WP), Topsin M<sub>70</sub>, Moncerin and the control, respectively indicating that Rizolex/T Vitavax/T, Topsin M<sub>70</sub> were better to be used for decreasing the disease incidence. When *F. moniliforme* was used in soil infestation, root-rot disease incidence after 60 days recorded 11.17, 13.50, 18.00, 19.50 and 68.33% for Rizolex/T, Vitavax/t, Topsin M<sub>70</sub>, Moncerin and the control indicating that all fungicides were effective in protecting the cuttings from root-rot disease. Under the effect of *F. moniliforme*, the disease incidence was 13.37, 12.00, 17.00, 18.00 and 63.50% for Rizolex/T, Vitavax/T, Topsin M<sub>70</sub>, Moncerin and the control,

respectively. Also, in case of *B. theobromae*, the disease incidence after 60 days reached 10.50, 9.33, 16.37, 2.00 and 56.67% for Rizolex/T, Vitavax, Topsin M<sub>70</sub>, Moncerin and the control, respectively.

Under greenhouse conditions using the different fungicides as suspensions for root-rot dipping before planting in soil infested with *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 grapevine rootings in the suspensions of different fungicides before planting in the soil infested with the causal fungi of root-rot disease 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 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 grapevine rootings 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 P<sub>Ro</sub> for controlling root-rot disease after planting by drenching soil. While the least effective fungicides were Quinulate 400 and Topsin M<sub>70</sub>. Combining all methods of control in one time, the used fungicides decreased very much the disease incidence of grapevine 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 on root-rot disease incidence.

### **A. Pre-planting root dipping:**

Data presented in Table (3) show significantly that the four fungicides used to treat the roots or cuttings of grapevine by dipping in their suspensions seperately before planting decreased root-rot disease. After 60 days from planting, disease incidence recorded 16.24, 21.67, 28.42, 36.83 and 68.33% for Rizolex/T, Vitavax /T (200WP), Topsin M<sub>70</sub>, Moncerin and the control, respectively.

### **B. Soil drench:**

Results (Table 3) 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, 22.32, 29.87, 39.27 and 68.33% for Rizolex/T, Vitavax/T, (200WP), Topsin M<sub>70</sub>, Moncerin and the control.



**C. Combined treatments:**

Data (Table 3) 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 Topsin M<sub>70</sub> and Moncerin were used, disease incidence percentage reached 8.00 and 18.00 % while the disease incidence percentage of control was 68.33% after 60 days.

**Table (3): Effect of some fungicides on grapevine (cv. Ruby seedless) root-rot disease incidence under field conditions.**

Fungicides	Rate of use	Infection % after 60 days		Activity of Fungicide,%
		Infected %	Survival %	
<b>Pre-planting treatment</b>				
Control (without fungicides)	-	68.33	31.67	-
Rizolex/T	5g/1L.w	16.24	83.76	67.23
Vitavax/T(200WP)	5g/1L.w	21.67	78.33	68.29
Topsin. M <sub>70</sub>	5g/1L.w	28.42	71.58	58.41
Moncerin	5g/1L.w	36.83	63.17	46.10
L.S.D at 5%	-	3.32	-	-
<b>Soil drench</b>				
Control (without fungicides)	-	68.33	31.67	-
Rizolex /T	5g/1L.w	19.47	80.53	71.51
Vitavax/T	5g/1L.w	22.32	77.68	67.33
Tospin. M <sub>70</sub>	5g/1L.w	29.87	70.13	56.72
Moncerin	5g/1L.w	39.27	60.73	42.53
L.S.D at 5%	-	2.41	-	-
<b>Combined treatments</b>				
Control	-	68.33	31.67	-
Rizolex/T	5g/1L.w	00.00	100.00	100.00
Vitavax/T	5g/1L.w	00.00	100.00	100.00
Tospin M <sub>70</sub>	5g/1L.w	08.00	92.00	88.29
Moncerin	5g/1L.w	18.00	82.00	93.66
L.S.D. at 5%	-	2.19	-	-

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

Under natural conditions pre-planting root dipping in the suspensions of different fungicides gave good effect in controlling root-rot disease 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), Topsin M<sub>70</sub>, Moncerin decreased the disease incidence percentage in the field than the control.

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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### قابلية بعض أصناف العنب المختلفة للإصابة بفطريات عفن الجذور ومقاومتها

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من خلال التجارب التي أجريت على أصناف العنب المختلفة ، أظهرت دراسات قابلية بعض أصناف العنب للإصابة بالفطريات المسببة لأعفان جذور العقل والشتلات المتسببة عن الفطريات (*Fusarium solani*, *Fusarium moniliforme*, *Rhizoctonia solani*) ( and *Botryodipladia theobromae* ) أن العنب البناتي والفليم سيدلس والإيرلي سبريور والسبريور والفيسستا كانت أكثر الأصناف حساسية للإصابة بالفطريات المختبرة. بينما أصناف العنب الروبي سيدلس ، الكريسون ، البيرليت ، الرذ جلوب ، والرومي الأحمر كانت أقل الأصناف حساسية للإصابة بالفطريات المختبرة. وفيما يتعلق بتجارب المقاومة أظهرت التجارب أيضاً أن الريزولكس/تي ، الفيتافاكس/ثيرام ، التوبسين إم ٧٠ ، والمونسرين كان لها تأثيراً جيداً في مقاومة مرض عفن جذور شتلات وعقل أصناف العنب المدروسة تحت ظروف الصوبة والحقل.