J. Agric. Sci. Mansoura Univ., 34 (5): 5381 - 5392, 2009

COMPARISON BETWEEN THE EFFECT OF SOME PESTICIDES , BIOCIDES AND BIOAGENTS IN CONTROLLING ONION WHITE ROT DISEASE CAUSED BY *Sclerotium cepivorum* (BERK)

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ABSTRACT

This study was carried out to compare effect of some pesticides and bioagents or biocides in controlling onion root rot disease caused by *Sclerotium cepivorum* (Berk) . In the experiment field four fungicides (triflumizole , benomyl , thiophanate-methyl and dimethomorph) , two herbicides (pendimethalin and butralin) , one insecticides (KZ oil) , four bioagents (*Trichoderma harzianum* , *T*. *viride* , *Bacllius subtilis* and *Bacllius pumilius*) and four commercial biocides (Plant guard , Biozeid , Bio Arc and Rhizo –N)were applied to control this disease under naturally infested field .The tested compounds were treated as seedling treatment and as spray treatment .The results indicated that fungicides in general were the most effective in reducing disease incidence followed by commercial biocides , herbicides and insecticide (KZ oil) . Also fungicides used were the most effective in increasing plant height , blub diameter , total soluble solids and yield .The best effective biocides was Plant guard followed by Biozeid, Bio Arc and Rhizo –N in controlling onion white root rot disease . The lowest effect was obtained by KZ oil which used mainly as insecticide and herbicides had moderate effect in controlling the disease.

INTRODUCTION

Onion (*Allium cepa* L.) is one of the most important crops in Egypt . Onion occupies the third grade among exporting crops to European contries because its high quality . Onion is plannted mainly in middle and upper Egypt and recently is plannted in northern governorates. Onion plant is attacked by several fungus diseases such as white root rot (caused by *Sclerotium cepivorum*), basal rot (caused by *Fusarium oxysporium*) , black moled rot (caused by *Aspergillius niger*) , purple blotch (caused by *Alternaria porri*) and others . The white root rot disease considered the most dangerous fungal disease for onion crops because it causes a greet damage for onion production . Fungicides were and will be still the most effective method to control this disease (El-Shehaby *et al* .,1992) . But fungicides possessed a risk to the environment and human health . Recently biological control of onion white root rot has been achieved by using numerous micro organisms , (Abd-EL Moity 1976 , Abd-EL Razik *et al* ., 1985 , and Clarkson *et al* ., 2002) such as fungi , bacteria and others . In view of hazardous impact of pesticides and other agrochemical on the ecosystem , the biocontrol of plant disease as an alternate strategy received increasing attention in recent years (Papavizas and Lumsden , 1985; Baker, 1987 and Lookwood , 1988) . About 35 genera of fungal and bacteria species have been used as biocontrol agents against various plant pathogens (Cook and Baker, 1983). *Trichoderma* spp., *Gliocladium* spp., *Bacillus* spp., and

Pseudomonas spp. represent the most thoroughly studied antagonistic microorganisms . The fungal species of *Chaetommium globosum* , *T. harzianum* and *T*. *virens* were confirmed as antagonists of *Sclerotium cepivorum*. Mclean and Stewart (2000). Ibrahim *et al* .,(2004) used both *Trichoderma* sp. and *Bacillus* sp. to control white root rot disease. Radwan *et al*., (2006) investigated the antagonistic potential of forty seven local *Trichoderma* strains against the phytopathogenic *S*. *rolfsii* in dual culture and bioassay on bean plants . They revealed that application of tested strains greatly reduced the disease incidence. Perazzolli *et al*., (2008) demonstrated the capability of *Trichoderma harzianum* T39 to protect susceptible grapevine cultivars (*Vitis vinifera* cv). Sureyya Altinats , Ugar Bal (2008) studed the effect of commercial based on *Trichoderma harzianum.* On plant ,blub and yield characteristies of onion . Pertot *et al.,* (2008) evaluated the efficacy of alternative to chemical fungicide against strawberry powdery mildew to reduce pesticide residues on fruits effective . Biocontrol agents (BCAs) , like *Ampelomyces quisqualis* , *Bacillus subtilis* and *Trichoderma harzianum* T39 , controlled the disease , but to a lesser extent than chemical fungicides.

This experiment aims :-

1-To protect the plants from infestation by onion white root rot disease .

2-To control the disease when the plants were infected by *Sclerotium cepivorum* .

3-to compare the effect of biocides in controlling the disease by the effect of fungicides , herbicides and other pesticides in this field .

MATERIAL AND METHODES

A- Pesticides used:-

Different fungicides, herbicides, miniral oil, isolated microorganisms an commercial biocides were tested to control onion white root rot disease (OWRR) at the farm of Agriculture Faculty .,Tanta , Tanta University.

The tested compounds were :

(1)**Fungicides**:

a- Triflumizole. (15% E.C)

Chemical Name: 1-(1((4-Chloro-2-(trifluoromethyl)phenyl)imino)-2- propoxyethyl)-1H-imidazole

Commen Name : triflumizole

Trade Name :, Trifmine.

Molecular Weight : 345.7

Basic Manufacturer: Nippon Soda Co., Ltd , Japan.

b- Benomyl. (50% W.P)

Chemical Name: methyl-1-[(butylamino)carbonyl]-H-benzimidazol-2-ylcarbamate

Commen name : benomyl.

Trade Name : Benlate.

Molecular Weight : 290.62

Basic Manufacturer: DuPont Agricultural Products

c- Thiophanate-methyl. (70 % W.P)
Chemical Name: dimethyl{1,2-phenylenebis (iminocarbonothioyl) }bis{carbamate}.
Commen Name : thiophanate-methyl.
Trade Name : Topsin-M.
Molecular Weight : 342.4
Basic Manufacturer : Nippon Soda Co., Ltd e- Dimethomorph. (50% W.P)
ChemicalName : 4-{3-(4-chlorophenyl)- 3- (4,3-dimethoxyphenyl) -1-oxo-2-propenyl}- morpholine.
Commen Name : dimethomorph.
Trade Name : Acrobat
Molecular Weight :387.9
Basic Manufacturer: Cyanamid
(2)Herbicides:-
a- **Pendimethalin**.(50% E.C)
Chemical Name :N-(1-ethylpropyl)-2,6-dinitro-3,4-xylidine
Commen Name : pendimethalin
Trade Name : Stomp.
Molecular Weight : 281.31
Basic Manufacture : American Cyanamid
b- **Butralin**. (48 % E.C)
Chemical Name: 4- (1,1-dimethylethyl) -N- (1-methylpropyl) -2,6-dinitrobenzenamine
Commen Name : butralin.
Trade Name : Amexine
Molecular Weight : 295.33
Basic Manufacture : Nufarm – Cepi company **.**
B-**Biocides used:-**
a- Plant guard :
Liquid (30 X 10^5 spores / 1 ml)
Spores of fungi *Trichoderma harzianum*
Rate 3/L 50L water Fed.
Introduced by El-Nasr for biopesticides and fertilizers company (Bio).
b- Biozeid 2.5% , W.P . (30 X 10^6 spores / 1 ml) ,
Trichoderma album
Rate 3/L 50L water Fed.
Introduced by El-Nasr for biopesticides and fertilizers company (Bio).
c-Bio Arc. 6% wp containing (32 X10^6 Iu / mg) of bacteria *Bacllius megaterium.*
Rate 3/L 50L water Fed.
Introduced by El-Nasr for biopesticides and fertilizers company (Bio).
d- Rhizo –N *Bacllius subtilis* .(E.C 6 %)
Rate 3/L 50L water Fed.
Introduced by El-Nasr for biopesticides and fertilizers company (Bio).
C- **Bioagents used :-** (fungal and bacterial isolates): include :-
a-Fungi: both *Trichoderma harzianum* and *T. viride* were hindly obtained as culture slants from Department of plant pathology , Faculty of Agriculture at Kafer El- Sheikh, University of Kafer El- Sheikh.

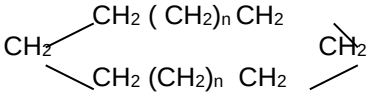
b-Bacteria : both *Bacllius subtilis* and *Bacllius pumilius* were obtained as culture slants from the previous department.

(5)**Miniral oil** : KZ oil (95% E.C.)

Chemical name: mixture of alphatic Paraffin:-

$CH_3 (CH_2)n\ CH3$

where n = 13-39 carbon atoms and cyclic paraffin



where n= 3-17 carbon atoms .

Introduced by Kafr El-Zayat company , Egypt .

Spores suspension:

To obtain spore suspension of bioagents :- incula of *T* . spp were grown on wheat bran (wheat bran , sawduct and tap water 3:1:4 v/v/v) for 10 days at 28ºc . The cultures were filtrated through double cheesecloth by using sterilized distilled water. The concentration of 10^7 spores/1 ml were prepared by hemocytometer (Elad *et al*.,1980). On the other hand incula of *Bacllius* spp were prepared by growing on nutrient broth at 30ºc for 4 days using shaking inculator (160 rpm) . The concentrations (10^7 cells /ml) were prepared for each isolate**.** .

D- Field experiments :

Two field experiments were carried out at the experimental farm of the Faculty of Agriculture in Tanta , Tanta University during two season (2007 and 2008) . The plot area was $21m^2$ including 6 rows . Row length 7 m and its width 50 cm . Onion seedlings (Giza 20) aged 70 days were transplanting in December 26 (2006/2007)and December 20 (2007/2008) seasons , respectively . Nitrogen fertilization (ammonium sulphate 20.5%N) and phosphorus fertilization (calcium supper phosphate 16% P_2O_5)were applied before the second irrigation at the rate of 3 kg (N) and 16 kg (P_2O_2) per fed. Fungicides , herbicides , mineral oil , bioagents and biocides were treated by two techniques:- .

a- Seedling treatment :

Onion transplanting were dipped in each fungicides , herbicides , miniral oil , bioagents and biocides at 20 ml or 20 gm/L water for 20 minutes and left to dry before transplanting in the naturally infested field by *Sclerotium cepivorum* which causes onion white root rot diseases .

b- Spray treatment : (soil treatment)

In this experiment, all fungicides were sprayed (7 days) after onion transplanting at the recommended dose . Also mineral oil , bioagents and biocides were sprayed at the recommended dose after 7 days from

planting . Herbicides pendimethalin was sprayed before onion transplanting, followed by planting and followed by irrigation. Herbicids butralin was directly sprayed on the soil at the recommended dose after onion transplanting followed by irrigation. .

In both the two previous experiments , weeds were controlled handly two times (70 and 110 days after transplanting). Random sample of 10 plants were obtained from each plot at 130 days to determine plant height , bulb diameter and total soluble solids (T.S.S) estimated by hand refractometer . At the harvest , the blubs from each plot were collected and weighted . The reduction percent (R%) of each parameter was calculated from the following equation (Topps and Wein , 1957) .

$$R\% = \frac{a - b}{a} \times 100$$

where

a=the measurement of parameter in untreated plot (control).
b= the measurement of parameter in treatment.

Diseases incidence percent (D.I%) was calculated by equation (El-Shafey *et al* , 1988).

$$D.I\% = \frac{\text{No. of infected plants}}{\text{No. of the total plants}} \times 100$$

Disease reduction percent (R%) was calculated by equation:- (El-Shemi , 2003)

$$R\% = \frac{(D.I)_c - (D.I)_t}{(D.I)_c} \times 100$$

Where

$(D.I)_c$= disease incidence in control.
$(D.I)_t$=disease incidence in treatment .

Statistical analysis:-

Data were analyzed statically according to (Steel and Torrie , 1960) . Duncan's multiple range test (DMRT) was applied for comparing mean .

RESULTS AND DISCUSSION

Results in Tables (1&2) shown the effect of different substances on disease incidence (D.I%) and disease reduction percent (R%) in seedling treatment and spray treatment respectively .

Table (1) Effect of fungicides , herbicides ,mineral oil, bioagents and biocides on disease reduction percent (R%) compared with control in seedling treatments.

Parameters / Treatments	Concentrations	Infected plants No.	Healthy plants No.	Disease incidence D.I%	Disease reduction percent (R%)
Control:-	**0**	**85**	**15**	**85**	**-----**
Fungicides:-					
1- Triflumizole	20 ml/1L water	10.3	89.7	10.3	87.88
2- Benomyl	20 gm/1L water	12.6	87.2	12.6	85.17
3- Thiophanate-methyl	20 gm/1L water	10.3	89.7	10.3	87.88
4- Dimethomorph.	20 gm/1L water	15.9	84.1	15.9	81.13
Herbicides:-					
1- Pendimethalin	20 gm/1L water	40.6	59.9	40.6	52.22
2- Butralin	20 ml /1L water	38.3	61.7	38.3	54.94
Oil:-					
1- KZ oil	20 ml /1L water	53.3	36.7	53.3	37.30
Bioagent:-					
1-*T. harzianum*	10^7 spor/1ml	30.3	69.7	30.3	64.35
2-*T. viride*	10^7spor/1ml	35.6	64.4	35.6	58.11
3-*B. subtilis*	10^7cell/1ml	40.9	59.1	40.9	51.88
4-*B. pumilius*	10^7 cell /1ml	38.3	61.7	38.3	54.94
Biocides:-					
1- Plant guard	20 ml /1L water	25.6	74.4	25.6	69.88
2- Biozeid	20 gm/1L water	24.9	75.1	24.9	70.70
3- Bio Arc	20 gm/1L water	30.3	69.7	30.3	64.35
4- Rhizo –N	20 ml /1L water	35.3	64.7	35.3	58.47

Table (2) Effect of fungicides , herbicides ,mineral oil, bioagents and biocides on disease reduction percent (R%) compared with control in spray treatments.

Parameters / Treatments	Concentrations	Infected plants No.	Healthy plants No.	Disease incidence D.I%	Disease reduction percent (R%)
Control:-		**85**	**15**	**85**	**------**
Fungicides:-					
1- Triflumizole	1 L / fed.	14.3	85.7	14.3	83.18
2- Benomyl	1 kg / fed.	16.6	83.4	16.6	80.47
3- Thiophanate-methyl	1 kg / fed.	13.6	86.9	13.6	84
4- Dimethomorph.	1 kg / fed.	13.9	86.1	13.9	83.65
Herbicides:-					
1-Pendimethalin	1 kg / fed.	44.3	55.7	44.3	47.88
2- Butralin	1 L / fed.	42.6	57.4	42.6	49.88
Oil:-					
1- KZ oil	1 L / fed.	60.6	39.4	60.6	28.70
Bioagents:-					
1-*T. harzianum*	3 L / fed.	27.3	72.7	27.3	67.88
2-*T. viride*	3 L / fed.	32.3	67.7	32.3	56.12
3-*B. subtilis*	3 L / fed.	35.9	64.1	35.9	57.76
4-*B. pumilius*	3 L / fed.	32.6	67.4	32.6	61.65
Biocides:-					
1- Plant guard	3 L / fed.	23.6	76.4	23.6	72.24
2- Biozeid	3 kg / fed.	21.9	78.1	21.9	74.24
3- Bio Arc	3 kg / fed.	26.9	77.1	26.9	68.35
4- Rhizo –N	3 L / fed.	31.3	68.7	31.3	63.18

All compounds reduce disease incidence by different ratio . Also (1&2) revealed that triflumizole and thiophanate-methyl were the most effective in controlling onion white root rot disease (OWRR) , were they gave the lowest disease incidence (10.3%) and the highest efficiency percentage (87.88%) in case of seedling treatment . In case of spray treatment thiophanate-methyl was the most effective where (D.I%=13.6) and disease reduction percent was (84%). The lowest effect was obtained by KZ oil which caused disease incidence by (53.3% and 60.6%) and disease reduction percent were (37.3% and 28.7%) in seedling and spray treatments respectively. All tested fungicides were very effective in controlling disease followed by commercial biocides , spore suspension of bioagents , herbicides and kz oil respectively . Among commercial biocides , Biozeid was the most effective where caused disease incidence (24.8% and 21.9%) and disease reduction percent were (70.7% and 74.24%) in both seedling and spray treatments respectively . The effect of bioagents were higher than the effect of herbicides and KZ oil in controlling onion white root rot disease (OWRR), in generally.

The results in Table(3) represent the effect of different treatments on onion plant height and blub diameter in seedling treatment. Data shown that fungicides gave the highest effect in increasing plant height and blub diameter followed by commercial biocides , then bioagents , herbicides and KZ oil respectively. Benomyl increased plant height by (112.81%) and blub diameter by (165.12%) compared with control , while thiophanate-methyl caused increased in plant height (107.38%) and blub diameter (176.44%) compared with control . Plant guard increased plant height and blub diameter by(83%) and (137.20) respectively compared with control . The lowest effect in increasing plant height and blub diameter was obtained by KZ oil (51.23% and 60.47%).

Table (3) Effect of fungicides , herbicides ,mineral oil, bioagents and biocides on plant height and bulb diameter in seedling treatment compared with control.

Parameters	Plant height		Bulb diameter	
Treatments	Mean in (cm)	Increasing Plant height percent I%	Mean in (cm)	Increasing Percent I%
Control:-	20.3	-----	4.3	------
Fungicides:-				
1- Triflumizole	40.5	99.51	12.6	193.02
2- Benomyl	43.2	112.81	11.4	165.12
3- Thiophanate-methyl	42.1	107.38	11.9	176.44
4- Dimethomorph.	38.3	88.66	10.6	146.51
Herbicides:-				
1-Pendimethalin	36.8	81.28	7.7	79.07
2- Butralin	30.9	52.15	8.9	106.98
Oil:-				
1- KZ oil	30.7	51.23	6.9	60.47
Bioagent:-				
1-*T. harzianum*	33.3	64.03	9.6	123.25
2-*T. viride*	34.6	70.44	8.9	106.98
3-*B. subtilis*	30.9	52.16	9.9	130.23
4-*B. pumilius*	30.9	52.16	8.8	104.65
Biocides:-				
1- Plant guard	37.3	83.74	10.2	137.20
2- Biozeid	36.6	80.29	9.9	130.23
3- Bio Arc	32.9	62.06	9.4	118.60
4- Rhizo –N	31.9	57.14	11.1	158.13

The results in Table (4) indicate effect of the different treatments on plant height and bulb diameter in spray treatments . The highest effect were obtained by fungicides followed by biocides , bioagents , herbicides and KZ oil . Thiophanate-methyl increased plant height by (104.92%) and bulb diameter by (155.81%) . Plant guard increased plant height by (73.17%) and bulb diameter by (123.25%) compared with control , while KZ oil increased plant height by (42.36%) and bulb diameter by (48.83%).

Table (4) Effect of fungicides , herbicides , mineral oil, bioagents and biocides on plant height and bulb diameter in spray treatments

Parameters	Plant height		Bulb diameter	
Treatments	Mean in (cm)	Increasing Plant height percent I%	Mean in (cm)	Increasing Percent I%
Control:-	20.3	------	4.3	-------
Fungicides:-				
1- Triflumizole	38.3	88.66	11.5	167.44
2- Benomyl	40.4	99.01	11.1	158.13
3- Thiophanate-methyl	41.6	104.92	11	155.81
4- Dimethomorph.	35.3	73.89	9.6	116.27
Herbicides:-				
1-Pendimethalin	34.5	69.95	7.2	67.44
2- Butralin	35.4	74.38	8.1	88.37
Oil:-				
1- KZ oil	28.9	42.36	6.4	48.83
Bioagent:-				
1-*T. harzianum*	31.6	55.66	8.9	106.98
2-*T. viride*	30.3	49.26	8.2	90.69
3-*B. subtilis*	29.3	44.33	9.1	111.62
4-*B. pumilius*	28.2	38.91	8.1	88.37
Biocides:-				
1- Plant guard	35.5	73.17	9.6	123.25
2- Biozeid	34.4	69.45	9.2	113.95
3- Bio Arc	31.4	55.66	8.9	106.96
4- Rhizo –N	30.9	52.21	10.3	139.53

The results in Table (5) revealed that all treatments increased both total soluble solids and bulb yield in seedling treatment. Triflumizole , benomyl, thiophanate-methyl, dimethomorph , Plant guard , Biozeid and KZ oil were increased yield by 301% , 289.52% , 283.80%, 274.28% , 269.52% , 249.52% and 158.38% respectively in seedling treatment.

The results in Table (6)were indicated that the highest yield obtained by triflumizole (291.92%) followed by benomyl (274.28%) , thiophanate-methyl (274.28%) …. Etc. and KZ oil (130.47%) compared with control in spray treatments.

Table (5) Effect of fungicides , herbicides , mineral oil, bioagents and biocides on total soluble solids and bulb yield in seedling treatment.

Parameters	T. SS		Yield	
Treatments	mg	Increasing Percent I%	Kg/plot	Increasing Percent I%
Control:-	6.3	-----	10.5	------
Fungicides:-				
1- Triflumizole	11.3	79.36	42.2	301.90
2- Benomyl	12.4	96.82	40.9	289.52
3- Thiophanate-methyl	12.6	100	40.3	283.80
4- Dimethomorph.	10.5	66.66	39.3	274.28
Herbicides:-				
1-Pendimethalin	8.7	38.09	35.5	238.09
2- Butralin	9.3	47.61	30.5	190.47
Oil:-				
1- KZ oil	7.1	12.69	26.5	152.38
Bioagent:-				
1-*T. harzianum*	8.9	41.26	36.9	251.42
2-*T. viride*	8.8	39.68	33.8	221.90
3-*B. subtilis*	7.5	19.04	31.6	200.95
4-*B. pumilius*	7.6	20.63	32.9	213.33
Biocides:-				
1- Plant guard	9.8	55.55	38.8	269.52
2- Biozeid	10.3	63.49	36.7	249.52
3- Bio Arc	9.9	57.14	35.9	241.90
4- Rhizo –N	10.4	65.07	35.3	236.19

Table (6) Effect of fungicides , herbicides , mineral oil, bioagents and biocides on total soluble solids and bulb yield in spray treatments

Parameters	T. SS		Yield	
Treatments	mg	Increasing Percent I%	Kg/plot	Increasing Percent I%
Control:-	6.3	-----	10.5	-----
Fungicides:-				
1- Triflumizole	11.1	76.19	41.1	291.42
2- Benomyl	11.2	77.77	39.3	274.28
3- Thiophanate-methyl	10.9	73.01	38.2	263.80
4- Dimethomorph.	10.2	61.90	37.6	258.09
Herbicides:-				
1-Pendimethalin	8.1	28.57	33.5	219.04
2- Butralin	8.9	41.26	28.9	175.23
Oil:-				
1- KZ oil	6.8	7.93	24.2	130.47
Bioagent:-				
1-*T. harzianum*	8.1	28.57	33.6	220
2-*T. viride*	8.3	31.74	31.9	203.80
3-*B. subtilis*	7.1	12.69	30.2	193.13
4-*B. pumilius*	6.9	9.52	30.9	194.28
Biocides:-				
1- Plant guard	9.6	52.38	36.5	247.61
2- Biozeid	9.7	53.96	34.2	225.71
3- Bio Arc	9.4	49.20	34.5	228.57
4- Rhizo –N	10.1	60.31	33.9	222.85

In general the effect of all treatments on disease incidence and phytotoxicity (plant height , bulb diameter , total soluble solids and yield) as seedling treatment was higher than the effect of all treatments when used as spray treatment.

In conclusion fungicides were the most effective in controlling onion white root rot disease hence they gave the the lowest disease incidence and the highest efficiency percentage , also , increased plant height , bulb diameter , total soluble solids and yield compared with other treatment and control .Commercial biocides comes after fungicides in its effect . Biocides such as Plant guard , Biozeid , Bio Arc and Rhizo –N were effective in controlling disease and in increasing plant height , bulb diameter , T.S.S and yield compared with herbicides , K Z oil , fungal and bacterial isolates and control , but less than fungicides. .

Biocontrol agents (BCAS) may act directly on plant pathogens by one or more mechanisms (Narayanasamy , 2001):

1-Antibiosis is the ability to inhibit or destroy the pathogen by producing toxic metabolites.

2-Competition between the antagonist and the pathogen for essential food material such as carbohydrates , nitrogen or growth factors may occur , resulting in retarded development of the pathogen.

3-Parasitism of the pathogen by an antagonist may result in necrosis or death of the pathogen .

4-Disease suppression may be due to prevention of colonization by the pathogen.

5-Induction of resistance in host plants by biocontrol agents. .

(Bilai 1963) reported that *Trichoderma* spp could secrete antibiotic (gliotoxin) able to affect the pathogen without any hyphal contact *Trichoderma* spp. are known to affect the host pathogen by more than one mechanism . It may hyperparasitize invading the host and causing lyses to the inside cells (El-Assiuty *et al*.,1986) . This antagonist can also affect the host by producing the antifungal substance ; gliotoxin the posions and inhibits the growth of the pathogen remotely. This substance probably affects the respiratory sites of the host fungus and causes reduction in the mycelial growth as suggested by (Hadler *et al*., 1973) ; *B.Subtilis* produces several antibiotics such as subtilin , bacilin , abacillomycin , subtenplin ….. etc . which may affect the growth of pathogens (Loeffler *et al*., 1986).

Kowall *et al*., (1998) mentioned that *Bacllius subtilis* and *Bacllius pumilius* are produced antibiotics such as surfactin , fengycin , mycosubtilin and bacillomycin . Naruse et al ., (1992) suggested that *Bacllius pumilius* secrete antibiotics such as surfactin and bacillomycin.

Finally , fungicides remaine and will remaine the strongest in it effect in controlling onion white root rot disease in spite of its problems . The commercial biocides are active in controlling the disease but need to more time and more studies to increase its efficiency in controlling disease .

REFERENCES

Abd El-Moity, T.H. (1976) . Studies on the biological control of white rot disease of onion . M.Sc. Thesis, Faculty of Agriculture ., Menofeia University .

Abd El-Razik, A.A.; El-Shabrawy , A.M.; Scllam , M.A. and El-Rehim , M.H. (1985). Effectiveness of certain fungi and bacteria associated with sclerotia of *Sclerotium cepivorum* in Upper Egypt soil in controlling white rot disease of onion. Egyptian Journal of Phytopathology, 17(2):107-114.

Baker, K.F. (1987). Involving concepts of biological control of plant pathogens. Annu. Rev. Phytopathol.,25:67-85.

Bilai , V.I. (1963) . Antibiotic-producing microscopic fungi . Elsevier Publishing Company . Amesterdam, Netherland .

Clarkson, J.P; Payne , T.; Mead, A. and Whipps, J.M . (2002) . Selection of fungal biological control agents of *Sclerotium cepivorum* for control of white rot by sclerotial degradation in a UK soil. Plant Pathology , 51:735-745.

Cook, R.J. and K.F. Baker (1983). The nature and practice of biological control of plant pathogens. St. Paul. Minn. Am. Phytopathol., Soc., 539 pp.

El-Assiuty, E.M.; T.H. Abd El-Moity and H.A. El-Shafey(1986). Mycoparasitic effect of *Trichoderma harzianum* Rifai against *Cephalosporum acremonim* Corda. Egypt . J. Microbial., 21 , No. 1 pp. 111-116.

Elad , Y.; Chet, I. and Katan, J. (1980).*Trichoderma harzianum* is biocontrol agent effective against *Sclerotium rolfsii* and *Rhizoctonia solani* . Phytopathology, 70;119-121.

El-Shafey, H.A.; F.A. El-Shorbagy; Ikbal, Khalil and E.M. El-Assiuty (1988). Additional sources of resistance to the late wilt disease of maiz caused by Ceohalosoporum maydis . Agriculture Research Review , , 6(2):221-230.

El-Shehaby, A.I. ; Radwan, I.A. ; Moustafa, M.S.H. and Abd El-Halim (1992) . Control of white rot disease of onion by fungicides . Plant Pathology Research Institute , Agricultural Research Center , Giza , Egypt.

El-Shemi , A.O. (2003). Effect of some plant extracts and plant resistance inducers on potato verticillum wilt. Annals of Agric. Sci . Moshtohor, 41(1):103-113.

Hadler, H.I.; M.R. Hadler and B.E. Danial (1973). Direct *in vitro* action of gliotoxin on rate liver mitochondria . J. Antibiol, 26(1):36-43.

Ibrahim, M.E.K.; Sh.M.A. El-Gremi; M.M.E. El-Naggar and Nagwa, M.M El-Khateeb (2004). Biological control of *Sclerotium cepivorum* (BERK) at El-Gharbia governorate , Egypt . J. Agric. Res. Tanta Univ., 30(3)2004.

Kowall, M.; Vater , J.; Kluge , B,; Stein , T,; Franke, P. and Ziessow, D. (1998). APMALDIM Sn for rapid characterization of cycle lipopeptides . Journal of Colloid and Interface Science , 204:1-8 .

Loeffler, W.; J.S. M. Tschen; V. Nongnuch; M. Kuglei; T. Elisabe; T. Hsieh and T.G. Wu. (1986). Antifungal effects of bacilysin and fengymcyin from *Bacillus subtilis* F.293.A comparison with activities of other Bacillus antibiotech Phytopatho;. 115:204-215.

Mclean, K.L. and Stewart, A. (2000). Application strategies for control of onion white rot by fungal antagonists . E-mail : stewartA@lincoln.ac.nz

Lookwood, J.L. (1988). Evaluation of concepts associated with soil borne plant pathogens. Annu. Rev. Phytopathol.,26:93-121.

Naruse, N.; Tnmyo, O.; Kobaru, S.; Kamei, H.; Miyaki T.; Konishi, M. and Oki, T. (1990). Pumilacidin , a complex of new antiviral antibiotics production , isolation , chemical properities , structure and biological activity , J. Antibiot ., 43:267-280.

Narayanasamy, P. (2001). Microbial plant pathogene and crop disease management . Science puble . Inc . P. 249-300.

Papavizas, G.C. and R.D. Lumsden (1985). Improved medium for isolation of Trichoderma spp. from soil . Plant Dis., 66:1019-1020.

Perazzolli, M.; S. Dagostin; A. Ferrari; Y. Elad and I. Petot (2008) . Induction of systemic resistance against *Plasmopara viticola* in grapevine by *Trichoderma harzianum* T39 and benzothiadiazole. Biological control 47:228-234.

Pertot, I.; R.Zasso; L.Amsalem; M. Baldessari; G. Angeli and Y. Elad (2008). Integrating biocontrol agents in strawberry powdery mildew control strategies in high lunnel growing systems . Crops Protection, 27:622-631.

Radwan, M.B.; F.Al-Mahareeq and M. Al-Masri (2006). Biological control of *Sclerotium rolfsii* by using indigenous *Trichoderma* spp. isolate frome palestin. Hebron Univ., Res., J., 2(2):27-47 .

Sureeyya Altintas , Ugur Bal . Effect of the commercial product based on *Trichoderma harzianum* on plant , blub and yield characteristics of onion . Scienta Horticultureae , Volume 116, Issue 2,4 April.

Topps, J. H. and R. L. Wain (1957) . Investigation on fungicides . 111 . The fungitoxicity of 3- and 5- allegl salicylanilide and Pavachlovanilines . Ann . Appl . Boil . 45(3), 506-511.

مقارنة بين تأثير بعض المبيدات الكيميائية والمبيدات الحيوية وبعض المواد الحيوية فى مكافحة مرض العفن الأبيض فى البصل الناشئ عن فطر *Sclerotium cepivorum*

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أجريت هذه التجربة لمقارنة تأثيربعض المبيدات الكيميائيةو المبيدات الحيوية التجارية أو العوامل الحيوية فى مكافحة مرض العفن الأبيض فى البصل الناشئ عن فطر *Sclerotium cepivorum* .وقد استخدمت فى هذه المقارنة أربعة مبيدات فطرية و اثنين من مبيدات الحشائش ومبيد حشرى وأربعة عزلات فطرية وبكتيرية وأربعة مبيدات تجارية حيوية بغرض مكافحة مرض العفن الأبيض فى البصل وبغرض دراسة السمية النباتية لها عن طريق معاملة الشتلات بالغمر أو عن طريق الرش فى حقول مصابة بالفطر بطريقة طبيعية . اوضحت النتائج المتحصل عليها أن جميع المبيدات الفطرية كانت الأعلى تأثير فى خفض نسبة الاصابة بالفطر وزيادة أعداد النباتات السليمة وزيادة ارتفاع النبات وقطرالبصلة ونسبة المادة الصلبة الكلية الذائبة وكذلك المحصول . واحتلت المرتبة الثانية جميع المبيدات الحيوية التجارية وكان تأثيرها أعلى من جميع المعاملات الأخرى فيما عدا المبيدات الفطرية . واحتلت العزلات الميكروبية والفطرية والبكتيرية المرتبة الثالثة تليها مبيدات الحشائش ثم الزيت المعدنى KZ oil كان أقل المواد المستخدمة تأثيرا.