EXPERIMENTAL RESULTS

EXPERIMENTAL RESULTS

1. Surveying of sesame seed-borne fungi:

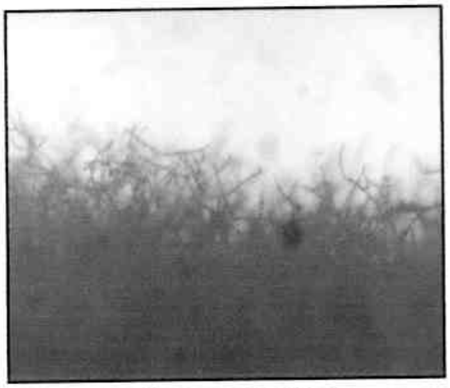
The course of this study was started with a disease survey in the main areas cultivating sesame in Egypt. Samples of sesame seeds of cultivars Giza-32,Shandawel-3 and Tushka-1 were collected from Ismailia, Sharkia, Giza, Beni-Suef and Sohag Governorates then, divided into two groups according to the external symptoms developed on the sesame seed coat *i.e.* apparently healthy and infected ones as shown in **Fig.(1)**.

Data in **Table(5)** indicate that, samples of Sharkia recorded the highest percentage of apparently healthy seeds of the three tested sesame cvs.(average 87.0%), followed by Giza (85.0%), Beni-Suef(84.2%), Sohag (83.2%), and Ismailia (82.6%). On the other hand, the highest percentage of infected sesame seeds was noticed with Ismailia samples(average17.3%), followed by Sohag (16.8%), respectively.

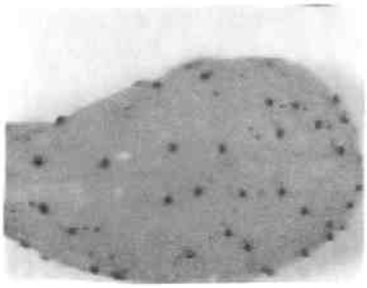
However,the tested samples of Shakia, Giza and Benisuef could be arranged ascendingly for infection as follows (average 13.0,15.0 and 15.8 %, respectively).

Concerning sesame cultivars, the highest percentage of infection was recorded with cv. Giza-32 of Sohag (27.5%), followed by cv.Shandawel-3 of Benisuef and Ismailia (25.5&25.0%,respectively).The lowest percentage of infection was recorded with cv.Tushka-1 of Sohag (7.0%).

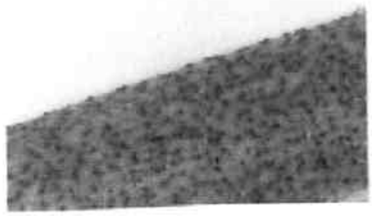
Apparently healthy sesame seeds 25 X



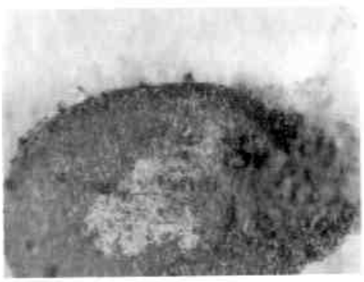
***A. alternata* on sesame seed coat 50 X**



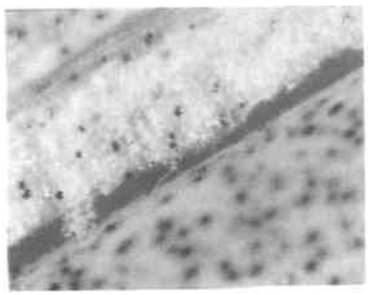
Sclerotia of *M. phaseolina* on sesame seed 50X



Sclerotia of *M.phaseolina* on sesame stem 25X.



Heavily infected sesame seed with *M. phaseolina* on sesame seed 50X



Sclerotia formed on the inner and on the surface of sesame stem tissue infected with *M. phaseolina* 25x

Fig.(1): Showing habit characters on infected sesame seeds and stem with *A. alternata* and/or *M. phaseolina.*

Table(5):Percentage of apparently healthy and infected sesame seeds collected from five governorates.

Governorate	Cultivar	% Seed infection	
		Apparently healthy	Infected
Ismailia	Giza32	87.5	12.5
	Shandawel3	75.0	25.0
	Tushka1	85.5	14.5
Mean		82.6	17.3
Sharkia	Giza32	83.5	16.5
	Shandawel3	87.0	13.5
	Tushka1	90.5	9.5
Mean		87.0	13.0
Giza	Giza32	85.5	14.5
	Shandawel3	82.0	18.0
	Tushka1	87.5	12.5
Mean		85.0	15.0
Benisuef	Giza32	90.5	9.5
	Shandawel3	74.5	25.5
	Tushka1	87.5	12.5
Mean		84.2	15.8
Sohag	Giza32	72.5	27.5
	Shandawel3	84.0	16.0
	Tushka1	93.0	7.0
Mean		83.2	16.8

* Based on dry inspection method of 200 sesame seeds for each cultivar.

2. Relation between field infection of sesame seeds by *M.phaseolina* and the collected seeds from different cultivars:

Symptoms developed on sesame seeds of different cultivars were divided into 3 categories *i.e.* normal,rotten and abnormal seeds of infected samples by *M. phaseolina.*

Data shown in Table **(6)** indicate that, the highest number of infected seeds on blotter were recorded with the examined samples of cv.Tushka1(69),followed by Shandawel3 (64). Concerning types of symptoms of examined sesame seeds, cv. Giza32 of sample No.3 recorded the highest number of infected sesame seeds (15).

For the cv.Shandawel3 the highest No. of infection was 25 with sample No.2 followed by sample No.4(16).The percentage of infection per each sample ranged from (91.0 to 41.7%, respectively).

Concerning samples of cv.Tushka1,the highest No.of infected seeds was recorded with sample No.2 (24) and the least was 10 for sample No.4.Sample No.1 recorded the highest No. of rotted seeds (17),while, sample No.1 yielded the highest % of infection (91.0%) per each sample.

Table(6): Relation between field infection of sesame seeds by *M.phaseolina* and the collected seeds from different cultivars.

Cultivar	Sample No.	No. of tested seeds on Blotter	Types of Symptoms / Seeds			*(%) infection per each sample
			Normal	Rotten	Abnormal	
Giza-32	**1**	10	3	2	5	70.0
	2	11	4	0	7	63.6
	3	15	3	9	3	80.0
	4	13	0	12	1	100.0
Total		49	10	23	16	-
Shandawel3	**1**	11	1	8	2	91.0
	2	25	10	10	5	60.0
	3	12	7	5	0	41.7
	4	16	2	11	3	87.5
Total		64	20	34	10	-
Tushka-1	**1**	22	2	17	3	91.0
	2	24	5	18	1	79.0
	3	13	7	6	0	46.0
	4	10	3	2	5	70.0
Total		69	17	43	9	-

100 seeds from each cultivar were tested.

$$*\% \textbf{ infection per each sample} = \frac{\text{Abnormal seeds+ rotten seeds}}{\text{No.of tested seeds on blotter}} \times 100$$

3. Relation between field infection of sesame seeds by *F.oxysporum* and the collected seeds from different cultivars:

Symptoms developed on sesame seeds of different cultivars were divided into 3 categories *i.e.* normal,rotten and abnormal seeds of infected samples by *F. oxysporum.*

Recorded data in **Table (7)** show that, the examined samples of cv.Giza32 recorded the highest number of infected seeds (60).On the contrary, the lowest number (47) which recorded with Tushka1 sample.

Sample No.4 of cv.Giza32, recorded the highest No.of infected seeds (17).

Concerning % infection per each sample for sesame seeds, the highest percentage of infection per each sample was (75.0%),cv.Giza32 sample No.1& cv.Tushka1 sample No.3, and the least % infection was (27.5%) with sample No.1 for cv. Shandawel3.

The infection per each sample for cv.Giza32 samples was 75.0,73.4,62.5 and 59.0%,respectively. The % infection per each sample for cv.Shandawel-3 was 27.5, 53.8, 57.1 & 68.8%, respectively.

Also,the % infection per each sample for cv.Tushka1 was 60.0,63.6,75.0 & 71.4,respectively.

Table (7):Relation between field infection of sesame seeds by *F.oxysporum* and the collected seeds from different cultivars.

Cultivar	Sample No.	No. of tested seeds on Blotter	Types of Symptoms /Seeds			*(%) infection per-each sample
			Normal	Rotten	Abnormal	
Giza-32	**1**	12	3	4	5	75.0
	2	15	4	8	3	73.4
	3	16	6	4	6	62.5
	4	17	7	5	5	59.0
Total		60	20	21	19	-
Shandawel3	**1**	11	8	2	1	27.5
	2	13	6	7	0	53.8
	3	14	6	2	6	57.1
	4	16	5	8	3	68.8
Total		54	25	19	10	-
Tushka-1	**1**	10	4	2	4	60.0
	2	11	4	7	0	63.6
	3	12	3	5	4	75.0
	4	14	4	6	4	71.4
Total		47	15	20	12	-

100 seeds from each cultivar were tested.

***% infection per each sample =** $\frac{\text{Abnormal seeds+ rotten seeds}}{\text{No.of tested seeds on blotter}} \times 100$

4. Effect of different methods of isolation on sesame seed borne fungi:

This study was conducted to reveal the best method of isolation of sesame seed-borne fungi *i.e.*blotter,PDA and deep freeze method. Isolation was made by different isolation methods from apparently healthy (AH) and infected (INF) sesame seeds,respectively, the isolated fungi were identified as mentioned before and maintained for further studies.

Data in **Table(8)** illustrate that the blotter method is the most convenient method of isolation, *Alternaria sesami* which recorded the highest incidence (4.5&19.0%),followed by *A. alternata*(3.5&17.5%),for AH & INF seeds,respectively. Also, *F.roseum* recorded (2.5&16.5%) for AH & INF sesame seeds, respectively.

Isolation by PDA medium from sesame seeds yielded different fungal species *i.e. A. alternata,A. sesami, Aspergillus flavus, Drechslera sesami, F.solani, F.oxysporum* and *M.phaseolina* which resulted 14.5,18.0,11.0,16.5,12.0,4.6 and 8.5% for INF sesame seeds,respectively.On the other hand the A.H. sesame seeds yielded *A . alternata,A.sesami* and *A.flavus* by (1.5, 2.5 and 5.0%,respectively).

Using deep-freez methods yielded different fungal species,the highest incidence of *M.phaseolina* with infected seeds was 14.5%, whereas, the lowest incidence was recorded with *F.solani* (3.5%), *Alternaria sesami* (10.5%) and *A. flavus* (12.5%), respectively.

Table (8):Incidence of seed-borne fungi in samples, apparently healthy and infected sesame seeds cv. Giza32 by using different methods of isolation.

Isolated fungi	Blotter		PDA		Deep-freeze		Mean	
	*A.H	**INF.	A.H	INF.	A.H	INF.	A.H	INF.
Alternaria alternata	3.5	17.5	1.5	14.5	2.5	12.5	2.50	14.8
Alternaria sesami	4.5	19.0	2.5	18.0	1.5	10.5	2.80	15.8
Aspergillus flavus	0.0	14.5	5.0	11.0	0.0	12.5	1.60	12.7
Drechslera sesami	6.0	11.0	0.0	16.5	7.5	0.0	4.50	9.20
Fusarium oxysporum	0.0	13.5	0.0	4.6	0.0	0.0	0.00	6.03
Fusarium solani	0.0	0.0	0.0	12.0	0.0	3.5	0.00	5.20
Fusarium roseum	2.5	16.0	0.0	0.0	0.0	0.0	0.83	5.50
M.phaseolina	0.0	6.5	0.0	8.5	0.0	14.5	0.00	9.30
Mean	2.1	12.3	1.1	10.6	1.4	6.7	-	-

* A.H% = Apparently healthy sesame seeds
**INF% = Infected sesame seeds

5. Incidence of seed borne fungi in samples of different sesame cultivars on the blotter test:

This survey was conducted by using three sesame cultivars *i.e.* Giza32,Shandawel3 and Tushka1 which were collected from different locations and governorates.

Data in **Table(9)** indicate that, five fungal genera were detected from sesame seeds when used on blotter test method.The cv.Giza32 yielded the highest incidence of fungi *i.e. Alternaria alternata* (11.0 and 23.5%) for AH and INF sesame seeds,respectively.On the other hand, *Aspergillus flavus* recorded the lowest incidence (8.5%) on Giza-32 Also,for the INF sesame seeds,the cv.Shandawel3 yielded (8.5&17.0%) of *Alternaria sesami* for AH and INF sesame seeds.

Also,*F.oxysporum* was isolated only from all the infected tested sesame cvs.,with different incidences .*F.oxysporum* recorded 15.5% for INF samples of cv.Giza32 and 13.5 &14.0%,respectively with cvs.Shandawel3 and Tushka1.

However, the lowest incidence was 7.5% for *Fusarium solani* from the INF seeds.The cv.Tushka 1 yielded 8.5 and 19.5% of *Alternaria sesamicola* for AH & INF sesame seeds .On the contrary *A. sesami* recorded the lowest incidence of infection (8.5%).

Table (9): Incidence of seed-borne fungi in samples of different sesame cultivars for the apparently healthy and infected sesame seeds on the Blotter test.

Isolated fungi	Giza-32		Shandawel-3		Tushka-1		Mean	
	*A.H	**INF.	A.H	INF.	A.H	INF.	A.H	INF.
Alternaria alternata	11.0	23.5	0.0	19.0	2.5	13.5	4.50	18.70
Alternaria sesami	6.5	19.5	8.5	17.0	0.0	8.5	5.00	15.00
Alternaria sesamicola	4.0	12.5	0.0	13.5	8.5	19.5	4.20	15.20
Aspergillus flavus	0.0	8.5	0.0	15.5	0.0	19.0	0.00	14.30
F.oxysporum	0.0	15.5	0.0	13.5	0.0	14.0	0.00	14.30
Fusarium solani	0.0	19.5	0.0	7.5	0.0	18.5	0.00	15.20
Fusarium semitectum	0.0	19.0	0.0	13.5	0.0	14.5	0.00	15.60
M. phaseolina	0.0	14.5	0.0	8.5	0.0	18.0	0.00	13.70
Mean	2.7	16.6	1.1	13.5	1.4	15.6	-	-

* A.H.%= Percentage of apparently healthy sesame seeds.
** INF%= Percentage of infected sesame seeds.

6. Incidence of seed-borne fungi in samples of sesame seeds cv.Giza32 collected from different governorates on the blotter test:

Data in **Table (10)** show that,sesame seeds samples of different governorates of Sharkia, Ismailia,Giza,Benisuef and Sohag revealed different incidence of fungal species from AH & INF samples.

For Ismailia samples *A. alternata* revealed the highest incidence of AH and INF seeds (7.5&19.0%),respectively followed by *Alternaria sesami* (5.0&16.5%) for AH and INF seeds.The infected seeds of Giza revealed the lowest incidence of *A.alternata* (5.0&11.5%),respectively.*A. sesami* recorded the highest incidence (6.5&17.5%) for AH and INF seed samples of Sohag.

On the contrary Benisuef samples yielded the lowest incidence of *Altrenaria sesami*(8.5%&12.5%),respectively. Also, *Aspergillus niger* recorded the highest incidence (19.0%), *Aspergillus flavus* recorded 13.5%, *F.oxysporum* recorded incidences of (13.0,12.0,11.5,9.5&13.5%) for INF samples of Ismailia,Sharkia,Giza & Benisuef and Sohag, respectively.

For Benisuef and Sharkia samples *Fusarium* spp.were detected with different incidences. The highest incidence for *F.moniliforme* recorded 20.5% with Giza samples,*M.phaseolina* recorded (6.0&11.5%) with infected samples of Sharkia and Benisuef,respectively.

Table (10): Incidence of seed-borne fungi for apparently healthy and infected sesame seeds cv. Giza32 obtained from different governorates on the Blotter test.

Isolated fungi	Ismailia		Sharkia		Giza		Benisuef		Sohag		Mean	
	A.H	INF.	A.H	INF.	A.H	INF.	A.H	INF.	A.H	INF.	A.H	INF.
Alternaria alternata	7.5	19.0	1.5	15.5	5.0	11.5	0.0	18.5	0.0	18.5	2.80	16.60
Alternaria sesami	5.0	16.5	7.5	13.5	4.5	13.0	8.5	12.5	6.5	17.5	6.40	14.70
Alternaria sesamicola	0.0	17.5	0.0	0.0	0.0	8.5	0.0	6.5	0.0	11.5	0.00	8.80
Aspergillus niger	0.0	11.0	0.0	13.0	0.0	18.0	0.0	19.0	0.0	10.5	0.00	14.50
Aspergillus flavus	0.0	18.5	0.0	14.0	0.0	12.5	0.0	13.5	0.0	11.5	0.00	14.00
Cladosporium sp.	0.0	11.5	0.0	9.5	0.0	8.5	0.0	15.5	0.0	13.0	0.00	11.60
Curvularia sp.	0.0	9.5	0.0	17.5	0.0	0.0	0.0	8.5	0.0	11.5	0.00	7.40
Fusarium oxysporum	0.0	13.0	0.0	12.0	0.0	11.5	0.0	9.5	0.0	13.5	0.00	11.90
Fusarium solani	0.0	11.5	0.0	15.0	0.0	23.0	0.0	0.0	0.0	12.0	0.00	12.40
Fusarium moniliforme	0.0	18.0	0.0	9.5	0.0	20.5	0.0	13.5	0.0	0.0	0.00	12.30
M.phaseolina	0.0	0.0	0.0	6.0	0.0	9.0	0.0	11.5	0.0	0.0	0.00	5.30
Mean	1.3	13.3	0.8	11.4	0.8	12.4	0.77	11.7	0.59	10.9	-	-

* A.H%=Percentage of apparently healthy sesame seeds.
** INF%= Percentage of infected sesame seeds

7. Incidence of *M.phaseolina* and *F.oxysporum* by using whole seed, and in component plating method:

This study aim to investigate, the location of sesame seed-borne fungi in different sesame seed parts *i.e.* seed coat, endosperm and embryo.

Data shown in **Table (11)** indicate that, whole seed infection yielded different infection levels of *M.phaseolina* which recorded 4.5,11.5,7.5,2.0 and 9.5%, for the 5 seed samples,respectively. The highest infection of *M.phaseolina* (11.5%) was recorded with the sesame seed sample No.2.

Concerning *M.phaseolina* sample No.1, the seed coat yielded 7.0%,whereas, sample No.2 recorded 11.0&6.0% with seed coat and endosperm, respectively,while *M. phaseolina* was not detect in embryo.

On the other hand,isolation of whole seed method recorded the highest % infection of *F.oxysporum* with sample No.4 (16.0%),follwed by sample No.3 (14.5%),respectively.

For component plating method,sample No.1 recorded 12.0,8.0 and 2.0% for seed coat,endosperm and embryo, respectively.As for sample No.5 only the seed coat yielded (8%)infection. However,*F.oxysporum* was detected in embryo in samples No.1&3 as 2.0&3.0%,respectively.

Table(11):Incidence of *M.phaseolina* and *F.oxysporum* by using whole seed, and in component plating method.

Fungi	Sample/ No	Whole seed(blotter) Pre-treated 2.5 %	Component plating(PDA)			
			Seed coat	Ednosperm	Embryo	Mean
M. phaseolina	1	4.5	7.0	0.0	0.0	2.3
	2	11.5	11.0	6.0	0.0	5.6
	3	7.5	8.0	0.0	0.0	2.6
	4	2.0	3.0	0.0	0.0	1.0
	5	9.5	6.0	0.0	0.0	2.0
Mean		7.0	7.0	1.2	0.0	2.7
F.oxysporum	1	11.0	12.0	8.0	2.0	7.3
	2	12.0	9.0	5.0	0.0	4.6
	3	14.5	4.0	2.0	3.0	3.0
	4	16.0	0.0	2.0	0.0	0.6
	5	8.5	8.0	0.0	0.0	2.6
Mean		12.5	6.6	3.4	1.0	-

8. Pathogenicity tests of 10 different isolates of *M. phaseolina* on sesame plants cv. Giza 32 under greenhouse conditions:

Data in **Table (12)** indicate that all tested isolates of *M. phaseolina* recorded different percentages of pre and post infection % at seedling stage. *M. phaseolina* (M1) recorded the lowest percentage of pre-infection (16.6%) whereas M5 recorded 19.7%. Also, M8 recorded 26.7%, followed by isolate M 10 (40.0%) for the wilted plants. For survival plants it is clear from the same data that, there is a significant differences between the survivals of sesame plants, the highest percentage of survival plants (80.0%) was recorded with isolate M7.The lowest percentage of survival plants was recorded with isolate M5(29.7%).

Regarding the healthy plants at mature stage, the lowest percentage of healthy plants(10.0%) was recorded with M5, whereas, the highest percentage of healthy plants(50.0) was recorded with M7 isolate.

Table(12):Pathogenicity test of 10 different isolates of *M. phaseolina* on sesame cv. Giza32 under greenhouse conditions.

M. phaseolina Isolates	Location	(%) Disease incidence				
		Seedling stage			Mature stage	
		% Pre-	% Post-	% Survival	% Mortality	% Healthy
(M1)	Giza	26.6	20.0	53.4	16.6	36.8
(M2)	Giza	20.0	30.0	50.0	20.0	30.0
(M3)	Giza	16.6	26.6	56.8	23.3	33.5
(M4)	Ismailia	23.3	13.3	63.4	40.0	23.4
(M5)	Ismailia	40.3	30.0	29.7	19.7	10.0
(M6)	Benisuef	13.3	16.6	70.1	40.1	30.0
(M7)	Benisuef	6.6	13.4	80.0	30.0	50.0
(M8)	Sharkia	10.0	33.3	56.7	26.7	30.0
(M9)	Sharkia	20.0	20.0	60.0	20.0	40.0
(M10)	Sohag	13.3	10.7	76.0	40.0	36.0
Control		0.0	0.0	100.0	0.0	100.0
LSD.at 5%		5.7	4.8	6.5	7.4	8.5

9. Pathogenicity test of 10 different isolates of *F. oxysporum* on sesame plants cv. Giza 32 under greenhouse conditions:

Data in **Table(13)** show that, all of the tested *Fusarium oxysporum* isolates differed in their reaction from isolate to another.The highest percentage of wilted plants (40.1%) was recorded by *F. oxysporum* F8. Also, the lowest one(13.4%) was recorded with F10. For the healthy sesame plants during the maturity stage, isolate F3 recorded the highest percentage of healthy plants (43.4%), followd by F4 (40.0%). On the other hand, the lowest percentage of healthy plants(15.7%) was recorded with isolate F6 of Benisuef.

For the percentage of survival sesame plants, it can be concluded that, there was a significant differences between the tested isolates of *F.oxysporum.* Also, it is noticeable that F3 and F5 of *Fusarium oxysporum* recorded the highest percentage of survival plants(73.4&73.4%),whereas, the lowest percentage of survival plants(36.4%) was recorded with isolate F7.

Table(13): Pathogenicity test of 10 different isolates of *F. oxysporum* on sesame cv.Giza-32 under greenhouse conditions.

F.oxysporum isolates	Location	(%) Disease incidence				
		Seedling stage			Mature stage	
		% Pre-	% Post-	% Survival	% Wilt	% Healthy
(F1)	Giza	26.6	10.0	63.4	23.4	40.0
(F2)	Giza	16.6	13.3	70.1	40.0	30.0
(F3)	Giza	6.6	20.0	73.4	30.0	43.4
(F4)	Ismailia	10.0	30.0	60.0	20.0	40.0
(F5)	Ismailia	20.0	6.6	73.4	40.0	33.0
(F6)	Benisuef	33.3	20.0	46.7	31.0	15.7
(F7)	Benisuef	30.0	33.3	36.4	20.0	16.4
(F8)	Sharkia	13.3	16.6	70.1	40.1	30.0
(F9)	Giza	26.6	26.6	46.8	16.8	30.0
(F10)	Sohag	16.6	40.0	43.4	13.4	30.0
Control		0.0	0.0	100.0	0.0	100.0
LSD.at 5%		6.9	4.8	6.0	5.6	7.2

10. Serological studies :

The shown **Figs. (2** to **7)** were used to investigate the similarity indicia; similarity indicia were calculated by using all the resulting common antigens (specific and non specific ones) to differentiate between *Fusarium* spp.Data also indicate that there were a noticeable differences between the different species of *Fusarium i.e.F.oxysporum, F.moniliforme , F.solani, F.semitectum* and *F.roseum.*

In **Fig.(7)** the double diffusion reaction of the antiserum of *F.oxysporum* against antigens of 8 host plant *i.e.* sunflower, peanut,sesame cv.Giza-32,sesame cv.Tushka-1,lupine local, soybean, chickpea and fabae bean,respectively concluded that the tested antiserum of *F. oxysporum* are positive in reaction with the two sesame cultivars only cv.Giza-32 &Tushka1and gave a positive reaction with the tested antiserum of *F. oxysporum.*

The phenogram constructed based on taxonomic distances generated from similarity indicia were shown in **Fig.(8)**,the highest homology percentage (up to 90.0%) was expressed between *F.moniliforme* and *F.solani,* followed by 60.0% homology between *F.oxysporum* and *F.roseum*, while less than 50.0% homology was noticed among other *Fusarium* spp. Two species of *Fusarium,i.e.F.moniliforme* and *F.solani* gave the highest homology between them and could put in one group,which differed than other species., *i.e. F. roseum* and *F. semitectum* which did not appeare any homology with the aforementioned group.

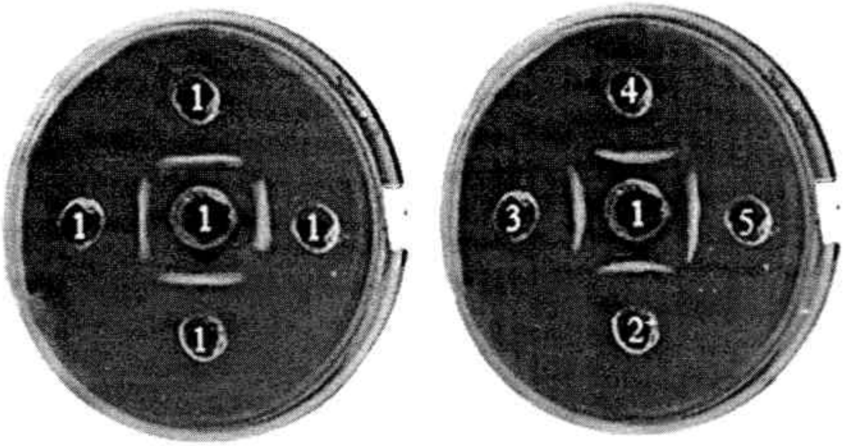


Fig (1): Double diffusion reaction of the antiserum of *F. moniliforme* (1). in the center well against antigens of *Fusarium* spp. in peripheral wells *Fusarium* spp. were *F.oxysporum* (2) *F. solani* (3), *F. roseum* (4) and *F. semitectum* (5).

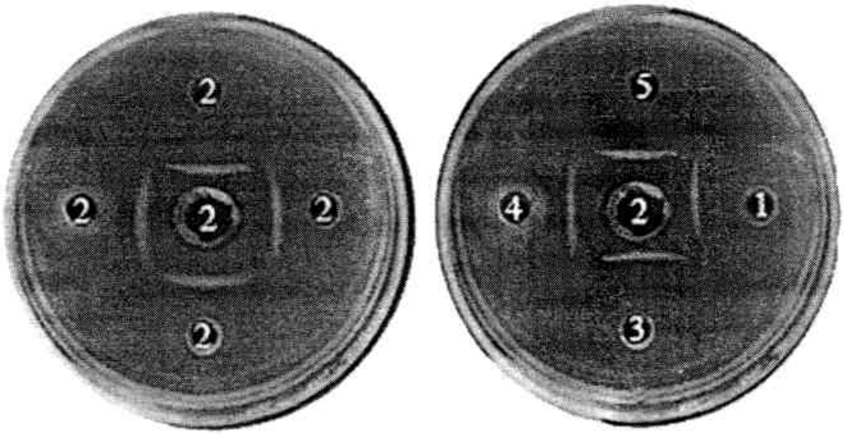


Fig (2) : Double diffusion reaction of the antiserum of *F. solani* (2). in the center well against antigens of *Fusarium* spp. in peripharal wells *Fusarium* spp. were *F.oxysporum* (1) *F. moniliforme* (3) *F. roseum* (4) and *F. semitectum* (5)

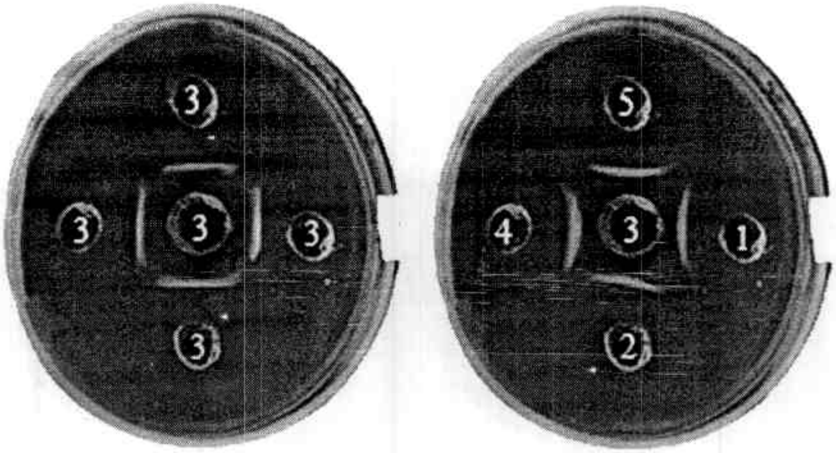


Fig (3):Double diffusion reaction of the antiserum of *F.roseum* (3), in the center well against antigens of *Fusarium* spp. in peripheral wells *Fusarium* spp. were *F.oxysporum*(2) F. solani (1). *F. moniliforme*(4) and *F. semitectum* (5).

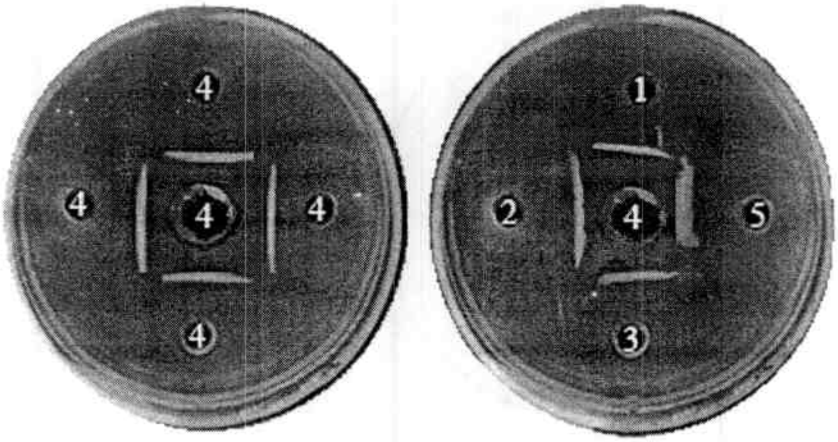


Fig (4) :Double diffusion reaction of the antiserum of *F.semitectum* (4) in the center well against antigens of *Fusarium* spp. in peripheral wells *Fusarium* spp. were *F.oxysporum* (1), *F. solani* (2), *F. roseum* (3), and *F. moniliforme* (5).

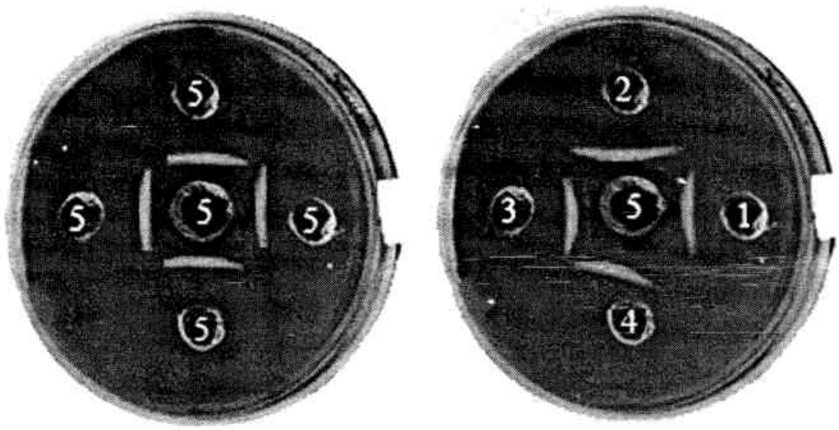


Fig (5):Double diffusion reaction of the antiserum of *F.oxysporum* (5) in the center well against antigens of *Fusarium* spp. in peripheral wells *Fusarium* spp. were *F.roseum* (1), *F. solani* (2), *F. moniliforme* (3), and *F. semitectum* (4).

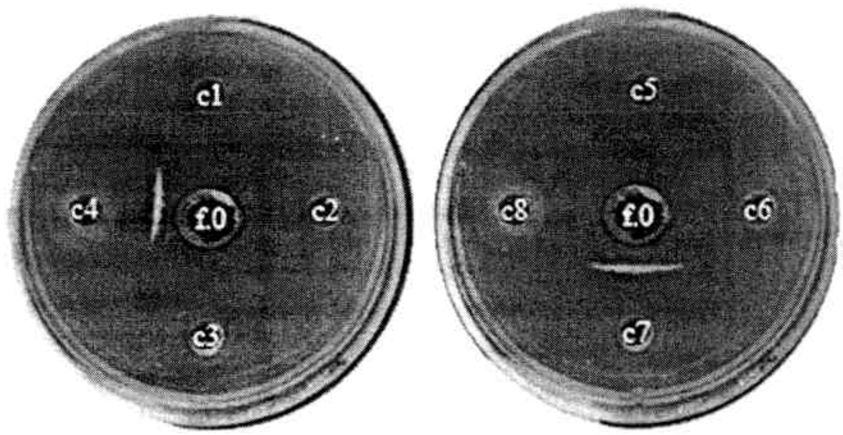


Fig (6): Double diffusion reaction of the antiserum of *F. oxysporum* in the center well against antigens of seeds of sunflower hyprid (C1), peanut cv. Giza 5 (C2),soyabean cv. crawford (C3),sesame cv. Giza-32 (C4),lupine local (C5),chikpea cv. Balady (C6), sesame cv. Tushka 1 (C7), and fabae bean (C8).

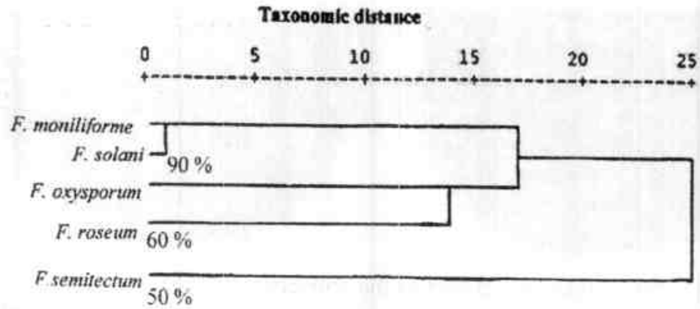


Fig.(8): Phenogram based on average linkage cluster analysis of serological protein patterns obtained by double diffusion test for isolates of five *Fusarium* species.

11. Molecular detection of *Fusarium oxysporum*:

PCR amplification by using specific primer pairs:

The PCR technique provides a sensitive and specific technique for rapid detection and identification of *Fusarium oxysporum* f.sp. *sesami,* using a specific primer, and overcoming problems associated with other traditional detection methods. PCR has been utilized successfully to detect *Fusarium oxysporum* spp. The DNA was amplified by PCR using F1 and F2 primers, the amplification products were analyzed by 1% agarose gel electrophoresis. DNA extracted from 10 isolates of *Fusarium oxysporum* f.sp.*sesami* consistently generated on amplification singal of the expected size using the primer set F1+F2, while no amplificaton was obtained from DNA extracted from control lane11 as shown in **Fig.(9).**

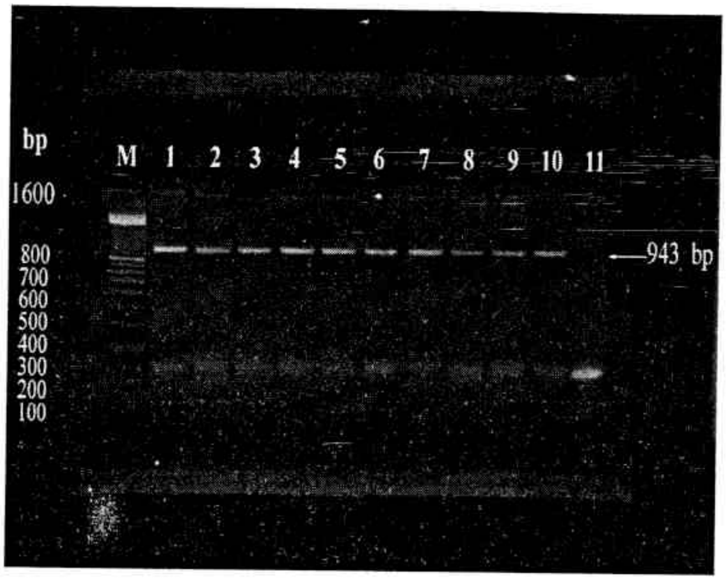


Fig.(9): Detection of *Fusarium oxysporum* f.sp. *sesami* ,isolated from sesame seeds with the polymerase chain reaction-based assay. Lanes 1 to 10 : DNA amplified from *Fusarium oxysporum* f.sp. *sesami* ;Lane 11: Negative control (dd H_2O) and Lane M:molecular weight marker (100-1600 bp DNA ladder, Pharmacia).

12. Specificty of *F. oxysporum* isolates:

In specifity tests with total genomic DNA from 3 fungal species, expected DNA fragments were amplified from *Fusarium oxysporum* f.sp. *sesami* using the F1 and F2 primer. No amplification products were detected for DNAs extracted from total genomic DNA of the other two fungal species as shown in **Fig. (10)**.

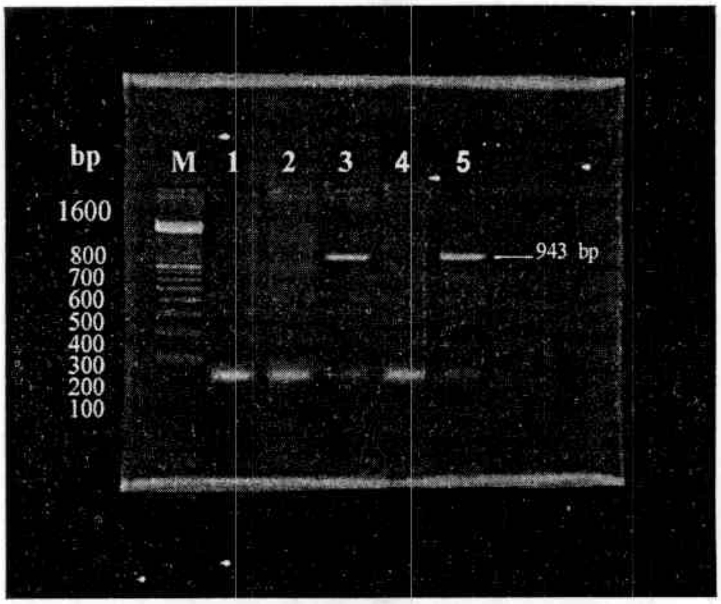


Fig.(10): pecificity of the *Fusarium oxysporum* f.sp.*sesami* by amplification from total genomic DNA of various *Fusarium* spp.: A single fragment of 943 bp specifically amplified from templates of *Fusarium oxysporum* f.sp.*sesami* (Lane 3). No amplifications in reactions of representative isolates of *Fusarium solani, Fusarium moniliforme* (Lane 1 and 2 respectively); Lane 5: Positive control and lane M: molecular weight marker (100-1600 bp DNA ladder, Pharmacia).

13. PCR Sensitivity for *Fusarium oxysporum* isolates:

A range of dilutions of total genomic DNA from cultures of *Fusarium oxysporum* f.sp.*sesami* was tested to determine the sensitivity of PCR assay for DNA from *Fusarium oxysporum* mycelium, 10^{-1} to 10^{-9}, the lowest detectable dilutions of fungal target DNA was 10^{-8} **Fig.(11).**

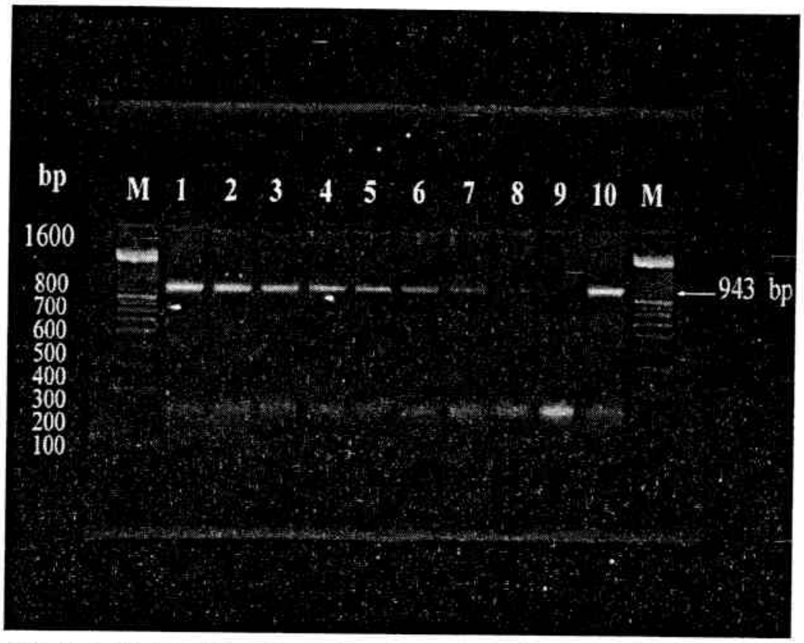


Fig.(11): Sensitivty of the *Fusarium oxysporum* f.sp.*sesami* primer pair. The primer pair was used in the polymerase chain reaction with serial dilutions of *Fusarium oxysporum* total genomic DNA ranging from 10^{-1} to 10^{-9} (Lanes 1 to 9) of total genomic DNA, respecitvely. Total sample volumes are subjected to gel electrophoresis; lane 10: Positive control showing amplicons obtained from 10ng of total genomic DNA of *Fusarium oxysporum* f.sp. *sesami*; M; molecular weight marker (100-1600bp DNA ladder, Pharmacia). Molecular weight in bp of some marker bands is specified on the right margin.

Disease Control Studies:

Laboratory Studies:

1. Effect of different concentrations of three fungicides on linear growth in (mm) of 4 isolates of *M. phaseolina* and *F.oxysporum*:

This investigation was conducted to evaluate the effects of three fungicids at 11 concentrations on the linear growth of *M. phaseolina* (M1, M5, M8 & M10) and *F.oxysporum* (F6, F8, F9 and F10).

A) Effect on linear growth of *M. phaseolina*:

Data in **Table(14)** indicate that, the linear growth of *M. phaseolina* isolates,M1,M5,M8&M10 was significantly inhibited by all the tested fungicidal treatments compared with control treatment (without fungicides).The same data show that reduction in linear growth was increased by increasing the concentration of most tested fungicides. For linear growth, fungicide Vitavax-T proved to be the most effective for reducing mycelial growth of *M.phaseolina* M1(average 25.5mm),followed by maxim and Rizolex-T (avr.28.4mm &32.7mm,respectively), while at conc. 200 ppm was the most effective concentration for the tested isolates.

Concerning isolates of *M. phaseolina* (M5), all the tested fungicides reduced fungal growth at 50 ppm except Vitavax-T reduced mycelial growth at 5.0 ppm which averages of mycelial reduction was (15.9,16.8 & 26.3mm),respectively for Maxim, Vitavax-T and Rizolex-T.As for *M. phaseolina* (M8), the concentration 100 ppm., reduced mycelial growth of isolate M8 except Vitavax-T,which reduced mycelial growth at 50 ppm. Averages of mycelial growth were 24.3, 27.8 and 29.4mm with, Maxim,Vitavax-T and Rizolex-T.Concerning isolate M10,the concentration 200 ppm. proved to be the most suitable for reducing mycelial growth by all the tested fungicides,whereas, averages of mycelial growth with Vitavax-T(21.6),Maxim(23.3) and Rizolex-T (31.9mm).

It can be concluded that,the highest fungicidal concentration was more effective than the lowest ones in reducing fungal mycelial growth *in vitro* studies.

Table(14):Effect of different concentrations of three fungicides on linear growth(mm) of 4 *M. phaseolina* isolates.

Isolate/ Location	Conc. PPM	Fungicide			Mean
		Maxim	Rizolex-T	Vitavax-T	
M1 Giza	0.0	85.0	85.0	85.0	85.0
	0.5	85.0	85.0	85.0	85.0
	1.0	85.0	85.0	79.0	83.0
	5.0	20.2	71.3	18.0	36.5
	10	17.4	15.8	9.5	14.2
	25	11.2	10.5	4.0	8.6
	50	6.3	5.6	0.0	3.9
	100	2.4	0.0	0.0	0.8
	200	0.0	0.0	0.0	0.0
	400	0.0	0.0	0.0	0.0
	800	0.0	0.0	0.0	0.0
	Mean	28.4	32.7	25.5	28.8
M 5 Ismailia	0.0	85.0	85.0	85.0	85.0
	0.5	48.5	85.0	85.0	72.8
	1.0	19.3	74.5	15.3	36.4
	5.0	12.5	20.4	0.0	10.9
	10	6.4	15.6	0.0	7.3
	25	3.2	8.7	0.0	3.9
	50	0.0	0.0	0.0	0.0
	100	0.0	0.0	0.0	0.0
	200	0.0	0.0	0.0	0.0
	400	0.0	0.0	0.0	0.0
	800	0.0	0.0	0.0	0.0
	Mean	15.9	26.3	16.8	19.7
M 8 Sharkia	0.0	85.0	85.0	85.0	85.0
	0.5	85.0	85.0	85.0	85.0
	1.0	45.0	73.0	65.2	61.1
	5.0	20.3	39.5	37.5	32.4
	10	17.5	22.3	20.2	20.0
	25	9.7	11.5	13.5	11.6
	50	4.5	6.7	0.0	3.7
	100	0.0	0.0	0.0	0.0
	200	0.0	0.0	0.0	0.0
	400	0.0	0.0	0.0	0.0
	800	0.0	0.0	0.0	0.0
	Mean	24.3	29.4	27.8	27.2
M 10 Sohag	0.0	85.0	85.0	85.0	85.0
	0.5	72.0	85.0	67.0	74.6
	1.0	53.6	81.5	38.7	57.9
	5.0	23.5	46.5	19.8	29.9
	10	16.2	21.3	12.6	16.7
	25	6.5	18.5	9.7	11.6
	50	0.0	8.9	4.5	4.5
	100	0.0	4.5	0.0	1.5
	200	0.0	0.0	0.0	0.0
	400	0.0	0.0	0.0	0.0
	800	0.0	0.0	0.0	0.0
	Mean	23.3	31.9	21.6	25.6

LSD at 5% for:
Isolates(Iso)=0.21
Conc. (C) = 0.41
Fungicides(F)=2.50
Iso x F = 0.98
Iso x C =0.55
F x C =0.44
Iso x F x C = 1.35

B) Effect on linear growth of *F.oxysporum*:

Data in **Table(15)** show that,the linear growth of *F.oxysporum* isolates were significantly reduced by the tested fungicidal treatment compared with control treatment (without fungicides).Reduction in linear growth was inecreased by increasing the concentrations of most tested fungicides.

Concerning the linear growth,the fungicide Rizolex-T was the most effective for reducing mycelial growth for isolate *F.oxysporum* (F6) which recorded 26.4mm,followed by Maxim (28.5mm) and Vitavax-T (29.5mm), respectively.

Regarding to isolate (F8)of *F.oxysporum* ,the tested fungicide Vitavax-T proved to be the most effective (7.8mm)followed by Rizolex-T (11.7mm) and Maxim(26.8 mm).While in case of isolate (F9)of *F.oxysporum* all the tested fungicides inhibited fungal growth at 100 ppm compared to control treatment

As for isolate of *F.oxysporum* F10 at conc.400ppm all the tested fungicides inhibited mycelial growth.The averages of mycelial growth was 38.4, 40.7, 41.0mm, respectively,for Maxim,Vitavax-T & Rizolex-T,respectively.

Table(15):Effect of different concentrations of three fungicides on linear growth (mm)of 4 *F.oxysporum* isolates.

Isolate/ Location	Conc.PPM	Fungicides			Mean
		Maxim	Rizolex -T	Vitavax -T	
F 6 Benisuef	0.0	85.0	85.0	85.0	85.0
	0.5	85.0	85.0	85.0	85.0
	1.0	61.5	78.0	67.6	69.3
	5.0	34.3	21.0	40.7	32.0
	10	20.2	13.5	23.2	18.9
	25	19.7	7.3	18.5	15.2
	50	8.3	0.0	4.6	4.3
	100	0.0	0.0	0.0	0.0
	200	0.0	0.0	0.0	0.0
	400	0.0	0.0	0.0	0.0
	800	0.0	0.0	0.0	0.0
	Mean	28.5	26.4	29.5	28.1
F 8 Sharkia	0.0	85.0	79.0	6.7	56.9
	0.5	81.0	23.5	52.0	52.2
	1.0	72.8	15.6	17.8	35.4
	5.0	24.5	6.9	9.7	13.7
	10	18.3	3.5	0.0	7.3
	25	9.5	0.0	0.0	3.2
	50	4.2	0.0	0.0	1.4
	100	0.0	0.0	0.0	0.0
	200	0.0	0.0	0.0	0.0
	400	0.0	0.0	0.0	0.0
	800	0.0	0.0	0.0	0.0
	Mean	26.8	11.7	7.8	15.4
F 9 Giza	0.0	85.0	85.0	85.0	85.0
	0.5	81.3	85.0	80.2	82.2
	1.0	20.3	72.5	79.5	57.4
	5.0	19.5	47.5	47.3	38.1
	10	9.4	39.2	18.5	22.4
	25	4.5	18.5	11.4	11.5
	50	1.7	9.4	0.0	3.7
	100	0.0	0.0	0.0	0.0
	200	0.0	0.0	0.0	0.0
	400	0.0	0.0	0.0	0.0
	800	0.0	0.0	0.0	0.0
	Mean	20.2	32.5	29.3	27.3
F 10 Sohag	0.0	85.0	85.0	85.0	85.0
	0.5	85.0	85.0	85.0	85.0
	1.0	81.4	79.5	81.5	80.8
	5.0	67.9	61.6	39.3	56.3
	10	44.8	52.4	76.5	57.9
	25	29.3	49.5	42.4	40.4
	50	19.4	29.8	19.5	22.9
	100	7.5	8.3	12.8	9.5
	200	1.8	0.0	7.5	3.1
	400	0.0	0.0	0.0	0.0
	800	0.0	0.0	0.0	0.0
	Mean	38.4	41.0	40.7	40.1

LSD at 5% for:
Isolates (Iso) = 0.14
Conc. (C) = 0.28
Fungicides(F)=0.17
Iso x F = 0.67
Iso x C = 0.37
F x C = 0.30
Iso x F x C = 1.21

2. Effect of different concentrations of some resistance inducing agents on linear growth in (mm) of 4 isolates of *M. phaseolina* and 4 isolates of *F. oxysporum*:

A) Effect on linear growth of *M. phaseolina*:

Data in **Table (16)** demonstrate that, the linear growth of 4 tested isolates of *M. phaseolina,* was singificantly decreased by all tested chemical inducers.

The linear growth of the tested isolate M1, M5, M8 and M10 was significatnt decreased by all the different chemical inducers listed in the same table at different concentrations.

The highest decrease in the linear growth was noticed with the chemical inducer KCl at concentration 4.0% for all isolates. However,IAA caused a decrease in linear growth (average 42.9 to 40.8 mm) compared to control (85.0 mm), IBA caused a decrease in linear growth for the 4 tested isolates of *M. phaseolina*, ranged from 40.3 to 43.4mm.

For tanic acid the highest decrease in linear growth was recorded with isolate M8 (average 37.1mm).

The inducing chemical compound salicylic acid SA, decreased the linear growth completely for the 4 tested isolates at 8.0mM.Also,bion suppressed the linear growth for all *M. phaseolina* isolates at 8.0 mM..

Table(16):Effect of different concentrations of resistance inducing agents on linear growth (mm) of 4 *M. phaseolina* isolates *in vitro*.

Inducer	Isolate	Concentration (%)							Mean
		0.0	0.25	0.50	1.0	2.0	4.0	8.0	
KCl	M1	85.0	81.5	68.5	56.2	13.2	0.0	0.0	43.5
	M5	85.0	65.7	57.3	37.4	18.4	0.0	0.0	37.8
	M8	85.0	74.8	61.6	42.3	12.8	0.0	0.0	39.5
	M10	85.0	67.2	66.5	46.8	11.4	0.0	0.0	39.5
H_2O_2	M1	85.0	75.4	72.8	56.6	17.7	5.9	0.0	44.7
	M5	85.0	66.7	56.3	46.8	24.5	10.4	0.0	41.4
	M8	85.0	77.0	65.7	30.6	8.5	2.3	0.0	38.5
	M10	85.0	80.2	73.9	34.5	18.7	5.4	0.0	42.5
		Concentration (PPM)							Mean
		0	50	100	200	400	800	1600	
IAA	M1	85.0	85.0	73.9	30.2	6.8	5.2	0.0	40.8
	M5	85.0	85.0	80.3	63.4	7.5	0.0	0.0	45.9
	M8	85.0	85.0	65.7	39.2	16.3	9.5	0.0	42.9
	M10	85.0	85.0	80.4	48.6	11.5	4.6	0.0	45.1
IBA	M1	85.0	85.0	72.3	31.4	6.5	1.5	0.0	40.3
	M5	85.0	85.0	72.4	56.6	4.1	0.0	0.0	43.4
	M8	85.0	85.0	81.9	46.8	3.8	0.0	0.0	43.2
	M10	85.0	85.0	74.0	40.0	2.5	0.0	0.0	40.9
		Concentration (mM)							Mean
		0.0	0.25	050	1.0	2.0	4.0	8.0	
Tanic acid	M1	85.0	82.9	76.8	22.7	6.3	0.0	0.0	39.2
	M5	85.0	76.5	66.3	36.5	8.3	0.0	0.0	38.9
	M8	85.0	66.5	61.5	37.4	8.9	0.0	0.0	37.1
	M10	85.0	80.4	73.9	56.2	11.2	2.5	0.0	44.2
SA	M1	85.0	85.0	81.9	41.2	19.8	5.6	0.0	45.6
	M5	85.0	85.0	72.4	22.8	9.5	2.5	0.0	39.9
	M8	85.0	85.0	74.3	37.8	11.3	4.2	0.0	42.5
	M10	85.0	85.0	65.7	25.1	13.5	8.1	0.0	40.4
Bion	M1	85.0	85.0	72.3	30.8	15.6	4.3	0.0	41.8
	M5	85.0	85.0	81.9	21.4	9.8	2.1	0.0	40.7
	M8	85.0	85.0	75.4	67.5	12.4	3.2	0.0	46.9
	M10	85.0	85.0	65.2	28.2	11.5	4.2	0.0	39.8

LSD. at 5% for:
Isolates (Iso) = N.S. Inducer (Ind) = 1.79 Conc. (C) = 1.79 Iso x Ind = 2.87
Iso x C = N.S. Ind x C = 2.74 Iso x Ind x C = 3.58

B) Effect on linear growth of *F.oxysporum*:

Data in **Table (17)** illustrate that, the linear growth of the 4 tested isolates of *F.oxysporum* was significantly decreased by the tested chemical inducers. The linear growth of isolate F6, F8, F9 and F10 was affected by KCl and the linear growth was suppressed at conc. 2.0% with H_2O_2.

The linear growth (mm) was decreased at coc.of 4.0% with KCl and H_2O_2. Meanwhile, IAA and IBA also decreased the linear growth for all the tested isolates, F10 was the least isolate affected by IAA and IBA and recorded(12.9&17.9 mm, respectively) at conc.1600ppm with IAA and IBA, respectively .

Concerning tanic acid there are a noticeable reduction in linear growth (mm) for all the tested isolates by the aforementioned chemical inducers. F9 recorded the least average of reduction (53.8mm).

whereas, the highest inhibition was recorded with F6 (44.3mm). As for SA, all the tested compounds produced a reduction in linear growth at 4.0mM for all tested isolates. Regarding bion, the reduction was noticed at 8.0 mM for all the tested isolates, whereas, the highest inhibition was recorded with isolate F8(43.9mm),and the least was recorded with F9 (60.6mm).

It could be concluded from the obtained results of the tested compounds that Kcl,followed by SA and Bion as well as H_2O_2 were the best effective compounds in reducing linear growth of tested *Fusarium* isolates.

Table(17):Effect of different concentrations of chemical resistance inducing agents on linear growth (mm) of 4 *F. oxysporum* isolates *in vitro*.

Inducer	Isolate	Concentration (%)							Mean
		0.0	0.25	0.50	1.0	2.0	4.0	8.0	
KCl	F6	85.0	85.0	68.3	37.3	0.0	0.0	0.0	39.4
	F8	85.0	85.0	57.2	56.3	0.0	0.0	0.0	40.5
	F9	85.0	85.0	61.5	36.5	0.0	0.0	0.0	38.3
	F10	85.30	85.0	76.8	48.2	0.0	0.0	0.0	42.2
H_2O_2	F6	85.0	85.0	73.9	48.4	14.6	0.0	0.0	43.8
	F8	85.0	85.0	67.3	41.3	13.8	0.0	0.0	41.7
	F9	85.0	85.0	65.8	22.8	13.8	0.0	0.0	38.8
	F10	85.0	85.0	70.5	48.4	11.9	0.0	0.0	42.9
		Concentration (PPM)							Mean
		0	50	100	200	400	800	1600	
IAA	F6	85.0	81.6	66.7	40.0	23.5	12.8	6.8	45.2
	F8	85.0	85.0	80.3	56.6	24.2	12.4	7.9	50.2
	F9	85.0	65.7	65.7	46.8	40.8	20.2	11.6	47.9
	F10	85.0	85.0	85.0	37.8	22.6	21.7	12.9	50.0
IBA	F6	85.0	74.9	73.9	30.6	19.4	17.7	7.5	44.5
	F8	85.0	73.9	65.8	36.0	24.1	12.8	6.9	43.6
	F9	85.0	66.6	73.9	34.6	27.2	20.1	16.3	46.4
	F10	85.0	75.4	66.6	31.4	27.5	23.0	17.9	46.7
		Concentration (mM)							Mean
		0	0.25	0.50	1.0	2.0	4.0	8.0	
Tanic acid	F6	85.0	85.0	73.9	30.2	16.2	12.4	7.3	44.3
	F8	85.0	85.0	70.7	48.6	43.5	17.8	11.6	51.7
	F9	85.0	85.0	73.9	47.1	43.2	24.5	17.5	53.8
	F10	85.0	85.0	75.4	39.2	17.2	27.0	13.0	48.8
SA	F6	85.0	85.0	74.3	70.1	42.0	0.0	0.0	50.9
	F8	85.0	85.0	73.9	72.4	70.8	0.0	0.0	55.4
	F9	85.0	85.0	72.3	63.4	59.8	0.0	0.0	52.21
	F10	85.0	85.0	85.0	58.6	28.2	0.0	0.0	48.8
Bion	F6	85.0	85.0	81.9	48.3	23.2	14.2	0.0	48.3
	F8	85.0	85.0	72.4	25.3	21.4	18.7	0.0	43.9
	F9	85.0	85.0	85.0	79.3	67.5	22.4	0.0	60.6
	F10	85.0	85.0	74.3	31.3	27.2	23.8	0.0	46.7

LSD. at 5% for:
Isolates (Iso) = 1.60   Inducer (Ind) = 2.11   Conc. (C) = 1.11   Iso x Ind = 2.56
Iso x C = 3.56   Ind x C = 3.23   Iso x Ind x C = 4.86

3. Effect of different concentrations of filtered and autoclaved plant extracts on linear growth in (mm) of *M. phaseolina in vitro:*

Five different aqueous plant extracts were used after sterilizing by filtratrion or autoclaving for evaluating their effect on linear growth of four isolates of *M. phaseolina* M1, M5, M8 and M10.

Concerning the aqueous filtered extracts, the recorded data in **Table(18)** show that, the filtered extract of thyme, caused a complete growth inhibition of isolate *M. phaseolina* (M1) at the concetration of (40%).Also, the filtered extract of eucalyptus,cumin and thyme exracts caused a complete inhibition at (40%),with *M. phaseolina* (M5). While, the filtered cumin and thyme caused a complete inhibition with *M. phaseolina* (M8) at conc. 55% and 40%, respectively. The aqueous filtered extracts of anise,eucalyptus and thyme caused a complete inhibition at 55% and 40%,respectively with isolate of *M. phaseolina* (M10).

Regarding to the autoclaved plant extracts, the obtained data indicate that, generally all the tested plant extracts caused a noticeable inhibition in linear growth of *M. phaseolina* isolates; M1, M5, M8 & M10, respectively. The best inhibition for fungal growth *in vitro* was noticed with the highest concentrations of the plant extracts *i.e.* 40% and 55%, respectively for all the tested plant extracts. The autoclaved extract of anise caused a complete inhibition at conc. 40%, followed by extract of eucalyptus and thyme at conc.55% with *M. phaseolina* (M1).While, all tested plant extracts caused inhibition for linear fungal growth at conc.55% with *M.*

phaseolina (M5) compared to control(85.0mm). However, the autoclaved plant extracts of anise,eucalyptus,cumin and thyme caused a noticealbe reduction in linear growth of M8 at conc.55% while, the autoclaved plant extract of cumin and thyme completely inhibted the linear growth at 55% for isolate(M10) of *M. phaseolina* compared to control.

Table(18): Effect of different concentrations of filtered watery and autoclaved plant extrats on linear growth (mm) of 4 *M. phaseolina* isolates *in vitro*.

Isolate	Plant extract	Filtered extract				Mean	Autoclaved extract				Mean
		10%	25%	40%	55%		10%	25%	40%	55%	
M 1	Roselle	79.0	65.3	51.7	40.7	59.1	85.0	80.1	79.3	60.2	76.2
	Anise	81.5	64.2	50.3	33.1	57.2	82.5	42.8	0.0	0.0	31.3
	Eucalyptus	60.7	44.5	33.6	15.7	38.6	67.8	49.3	23.7	0.0	35.2
	Cumin	78.3	66.8	39.1	26.5	52.7	85.0	85.0	85.0	85.0	85.0
	Thyme	69.3	53.2	0.0	0.0	30.6	59.3	39.7	18.9	0.0	29.5
	Control	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0
Mean		75.6	63.2	43.3	33.5	53.9	77.4	63.7	48.6	38.4	57.0
M 5	Roselle	67.8	39.0	26.8	13.5	36.8	85.0	32.8	18.3	0.0	34.1
	Anise	69.0	47.5	36.1	12.7	41.3	39.8	12.8	0.0	0.0	13.2
	Eucalyptus	79.0	62.3	0.0	0.0	35.3	77.3	62.5	12.6	0.0	38.1
	Cumin	39.0	27.3	0.0	0.0	16.6	85.0	60.5	54.6	0.0	50.2
	Thyme	43.5	32.4	0.0	0.0	18.9	81.6	79.4	26.8	0.0	46.9
	Control	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0
Mean		63.9	24.6	48.9	18.5	38.9	75.6	55.5	32.8	14.1	44.6
M8	Roselle	82.6	71.4	66.7	30.5	62.8	72.8	66.3	43.5	21.3	50.9
	Anise	65.8	67.2	55.6	33.4	55.5	85.0	38.2	0.0	0.0	30.8
	Eucalyptus	65.1	44.5	31.3	29.1	42.5	79.0	70.9	52.0	0.0	50.3
	Cumin	67.2	37.6	16.8	0.0	30.4	64.5	27.3	0.0	0.0	22.9
	Thyme	81.8	76.3	0.0	0.0	39.5	69.8	38.4	19.5	0.0	31.9
	Control	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0
Mean		74.5	63.6	42.6	29.7	52.6	76.2	54.4	33.4	17.7	45.3
M 10	Roselle	80.0	77.3	69.1	44.3	67.8	85.0	80.2	67.3	46.5	69.7
	Anise	67.2	51.4	18.5	0.0	34.3	56.8	48.6	26.1	13.2	36.2
	Eucalyptus	81.3	67.3	0.0	0.0	37.2	56.8	39.2	28.2	13.8	34.5
	Cumin	81.2	77.3	67.5	49.5	68.9	26.7	18.6	11.3	0.0	14.2
	Thyme	29.4	13.5	0.0	0.0	10.7	44.0	38.3	19.4	0.0	25.4
	Control	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0
Mean		70.7	61.9	40.2	29.8	50.6	59.0	51.7	39.5	26.6	44.2

LSD. at 5% for:

Isolates(Iso)= 1.23 Concentration (C)=1.85 Iso x E=2.14 IsoxExC=3.62

Extracts(E) = 2.15 Iso x C=1.63 ExC=1.78

4. Effect of different concentrations of filtered and autoclaved plant extracts on linear growth of *F. oxysporum in vitro*:

Concerning the other four isolates of *F. oxysporum i.e.*,F6, F8, F9 and F10, for the aqueous filtered extracts, data in **Table (19)** indicate that, the filtered plant extract of eucalyptus completely inhibited the fungal growth at conc. of 55%, followed by cumin plant extract at conc. 40% with *F. oxysporum* (F6), while, the filtered roselle plant extract caused a complete inhibition for *F. oxysporum* (F8) at conc. 55%, followed by eucalyptus extract at conc. 55%. The filtered plant extract of roselle,anise,cumin and thyme caused inhibition for F9 isolate at conc. 55%. As for *F.oxysporum* F10 the filtered roselle, eucalyptus and cumin caused a complete inhibition at conc. 55%.

Concerning the autoclaved plant extracts, the recorded data show that the tested plant extracts caused an inhibition in linear growth of *F. oxysporum* isolates F6, F8, F9 and F10, respectively. The highest fungal growth inhibition for *in vitro* was recorded with the highest concentration of plant extracts *i.e* 40%&55%,respectively.The autoclaved extract of roselle caused a complete inhibition at conc. of 40% & 55%, respectively for *F. oxysporum* (F6), while the highest inhibition for isolate F8 of *F. oxysporum* was recorded with autoclaved plant extract of roselle and cumin (18.8&9.7mm,respectively). The autoclaved plant extract of roselle completely inhibited the growth at conc. of 55% for *F. oxysporum* (F9), while autoclaved plant extract of cumin caused a complete inhibition for *F. oxysporum* F10 at 55% concentration compared to control.

Table(19):Effect of different concentrations of filtered watery and autoclaved plant extracts on linear growth (mm) of 4 *F.oxysporum* isolates *in vitro*.

Isolate	Plant extract	Filtered extract				Mean	Autoclaved extract				Mean
		10%	25%	40%	55%		10%	25%	40%	55%	
F 6	Roselle	56.3	44.2	18.3	9.7	32.1	38.2	18.5	0.0	0.0	14.2
	Anise	78.0	63.0	52.3	16.3	52.3	85.0	81.8	79.7	31.8	69.6
	Eucalyptus	68.2	40.1	15.2	0.0	30.9	72.0	53.0	37.0	24.2	46.6
	Cumin	47.2	23.2	0.0	0.0	17.6	42.0	32.8	27.9	19.7	30.6
	Thyme	81.0	63.1	50.4	18.2	53.2	75.0	43.7	22.3	13.2	38.5
	Control	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0
	Mean	69.3	53.1	36.8	21.5	45.2	66.2	52.5	41.9	28.9	47.4
F 8	Roselle	75.8	48.3	16.7	0.0	35.2	78.3	67.2	51.2	18.8	53.9
	Anise	77.8	60.5	44.1	18.7	50.3	85.0	80.7	79.3	67.2	78.0
	Eucalyptus	69.0	48.3	19.6	0.0	34.2	85.0	85.0	85.0	85.0	85.0
	Cumin	78.0	75.4	60.0	57.3	67.7	58.8	32.3	18.9	9.7	29.9
	Thyme	67.2	79.8	54.3	34.1	58.9	68.0	59.7	48.3	32.7	52.2
	Control	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0
	Mean	75.5	66.2	46.6	32.5	55.2	76.7	68.3	61.3	49.7	64.0
F 9	Roselle	67.3	48.2	19.5	0.0	33.6	65.0	54.8	15.6	0.0	33.7
	Anise	69.6	45.5	18.1	0.0	33.3	78.6	60.3	44.5	15.6	49.8
	Eucalyptus	85.0	81.2	79.2	66.7	78.0	85.0	85.0	85.0	85.0	85.0
	Cumin	64.2	42.8	13.8	0.0	30.2	59.6	47.2	22.8	11.5	35.3
	Thyme	67.2	32.5	27.5	0.0	31.8	46.0	31.7	18.3	9.7	26.4
	Control	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0
	Mean	73.0	55.9	40.5	25.3	48.7	69.9	60.7	45.2	34.5	52.6
F 10	Roselle	44.3	32.2	18.5	0.0	23.7	67.8	37.8	29.3	19.8	38.7
	Anise	85.0	85.0	85.0	85.0	85.0	58.0	32.0	19.3	9.7	29.8
	Eucalyptus	68.7	49.3	18.7	0.0	34.2	79.3	65.2	48.3	19.3	53.1
	Cumin	58.5	39.4	0.0	0.0	24.5	85.0	61.5	0.0	0.0	36.6
	Thyme	79.4	65.4	53.1	43.8	60.4	85.0	80.1	46.8	23.3	58.8
	Control	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0
	Mean	70.1	59.4	43.4	35.6	52.1	76.7	60.3	38.1	26.2	50.3

LSD. at 5% for:

Isolates(Iso)= 2.13 Concentration (C)=2.96 Iso x E=3.11 IsoxExC=3.45

Extracts(E) = 1.15 Iso x C=2.87 ExC=1.95

5. Antagonistic effect of some *Trichoderma* spp. against four isolates of *M. phaseolina*:

The aim of this study is to investigate the antagonistic effect of three species of *Trichoderma i.e., T. harzianum, T. viridi and T.hamatum* on linear growth of *M. phaseolina* isolates.

Data presented in **Table (20)** indicate that, the tested antagonistic *Trichoderma* spp. reduced significantly the mycelial growth of the four tested *M. phaseolina* isolates M1, M5, M8 and M10. The four isolates of *T. harzianum* T1, T2, T3, and T4, reduced average of fungal growth of *M. phaseolina* isolates M1, M5, M8 and M10 (57.9, 59.8, 62.3 and 59.6 %), respectively. The highest reduction was recorded in case of *T. harzianum* (T4) againest *M. phaseolina* (M1) followed by *T. harzianum* T2 and T1,respectively.

Data in the same table also show that, *T. viride* T5, T6 and T7 caused a reduction in linear growth (60.2%, 50.6% &59.4%, respectively).The highest effective isolate was *T.viridi* (T7) againest *M. phaseolina* (M1),followed by T5.

For *T. hamatum* isolates; T8, T9 and T10 recorded reduction in linear growth (61.4, 57.7 and 51.7 %), respectively as compared to control.

As for the three tested *Trichoderma* spp., *T. harzianum* (T3),followed by *T. hamatum* (T8) and *T. viridi* (T5) were the best effective species in reducing growth of *M. phaseolina* isolates.

Table(20):Effect of some antagonistic fungal isolates on growth reduction(mm)of 4 *M. phaseolina* isolates *in vitro*.

Antagonistic fungus	Isolate/ No.	%Reduction in linear growth				Mean
		M1	M5	M8	M10	
T.harzianum	T 1	70.7	44.2	53.3	63.4	57.90
	T 2	70.8	54.8	52.2	61.3	59.80
	T3	66.9	61.0	59.2	62.0	62.30
	T 4	71.5	45.7	59.2	62.0	59.60
T. viridi	T5	70.7	49.4	60.8	59.8	60.20
	T6	46.8	46.6	48.3	60.6	50.60
	T7	72.3	44.3	58.3	62.7	59.40
T. hamatum	T 8	75.4	43.4	63.4	63.5	61.40
	T 9	68.9	46.5	58.3	57.3	57.70
	T10	74.6	37.8	55.0	39.3	51.70
Control		0.0	0.0	0.0	0.0	0.00

LSD.at 5% for:

Isolates (I so) = 1.31 Antagonistic fungi (A) = 2.82

Interaction(I so x A) = 3.87

6. Antagonistic effect of some *Trichoderma* spp. against 4 isolates of *F. oxysporum:*

Data shown in **Table(21)** indicate that, all tested antagonistic *Trichoderma* spp. caused a significant reduction in fungal linear growth of the four tested isolates of *F. oxysporum*, F6, F8, F9 and F10. The four isolates of *T. harzianum* T1, T2, T3 and T4, supressed the growth of *F. oxysporum* isolates which recorded 63.3, 62.2, 64.5 and 62.6%,respectively average reductions. Whereas, *T. viride* isolates T5, T6 and T7 produced a rdeuction in linear growth which recorded (58.4%,60.7% and 57.5%), respectively for the tested *F. oxysporum* isolates F6, F8, F9 and F10. Regarding to *T. hamatum* isolates, T8, T9 and T10 gave a reduction on linear growth average (63.8, 50.9 & 61.6%), respectively with the tested isolates of *F.oxysporum.*

Table(21):Effect of some antagonistic fungal isolates on growth reduction of 4 *F. oxysporum* isolates *in vitro*.

Antagonistic fungus	Isolate/ No.	(%)Reduction in linear growth				Mean
		F6	F8	F9	F10	
T.harzianum	T 1	50.0	58.1	73.8	70.8	63.30
	T 2	51.4	63.2	59.3	75.5	62.30
	T3	55.7	62.6	70.8	68.9	64.50
	T 4	53.2	52.6	71.3	73.9	62.70
T.viridi	T5	49.9	61.8	50.5	71.3	58.40
	T6	47.9	59.8	61.0	74.6	60.70
	T7	52.0	64.1	54.8	59.3	57.50
T.hamatum	T 8	57.6	67.5	63.4	66.6	63.80
	T9	50.1	49.6	60.0	43.7	50.90
	T 10	62.0	63.4	57.3	63.0	61.60
Control		0.0	0.0	0.0	0.0	0.00

LSD.at 5% for:
Isolates (I so) = 3.12 Antagonistic fungi (A) =2.17

Interaction I so x A = 4.58

Greeenhouse Studies:

1.Effect of three fungicides and two biocides as seed dressing on the incidence of mortality and wilt disease caused by *M. phaseolina and F.oxysporum* :

This study was conducted to study the effect of three fungicides and two commercial biocides on controlling the mortality and wilt diseases which caused by *M. phaseolina* and *F.oxysporum* on sesame plants under greenhouse conditions.

Data in **Table (22)** indicate that, all the tested fungicides significantly decreased the mortality plants due to the infection by *M. phaseolina.* Seed treatment with the fungicide Rizolex-T decreased the percentage of total infection to 9.7%, followed by Vitavax-T which gave 13.2%,while Maxim showed the least effect(40.0%),respectively.Whereas % efficacy was 87.8& 83.4%,with Rizolex-T and Vitavax-T,respectively.

As for Rhizo-N and Plant-guard they decreased % infection (53.0 & 35.0%),respectively, as compared with control treatment (79.5%) and the % efficacy was (33.3 &55.9 %, respectively).

Concerning *F. oxysporum,* all the tested fungicides significantly decreased the wilted plants due to the infection with *F. oxysporum*.The highest decrease of infected plants was recorded with Rizolex-T and Maxim(20.0&21.3%), respectively. On the other hand,Rhizo-N and Plant-guard recorded the least % of decreasing infection 59.7 & 35.3%,respectively as compared with control treatment (68.0%).The % efficacy of Rhizo-N and Plant-guard as seed dressing was 12.2 & 48.1%,respectively.

Table (22): Effect of three fungicides and two biocides applied as seed dressing on the disease incidence of *M .phaseolina* and *F.oxysporum*.

Fungicide	Disease incidence with *M. phaseolina*					Disease incidence with *F. oxysporum*				
	% Pre-	% Post-	% Mortality	Total infection	% Efficacy	% Pre-	% Post-	% Wilt	Total infection	% Efficacy
Maxim	12.3	17.7	10.0	40.0	49.7	9.6	5.7	6.0	21.3	68.7
Rizolex -T	0.0	4.4	5.3	9.7	87.8	5.2	7.3	7.5	20.0	70.6
Vitavax-T	2.3	7.7	3.2	13.2	83.4	10.0	9.8	5.2	25.0	63.2
Rhizo-N	16.8	21.0	15.2	53.0	33.3	25.5	18.2	16.0	59.7	12.2
Plant-guard	6.5	16.7	11.8	35.0	55.9	5.5	17.8	12.0	35.3	48.1
Control	20.5	25.5	33.5	79.5	-	24.6	23.1	20.3	68.0	-
LSD at 5%	7.8	8.6	9.8	12.6	-	9.8	10.5	7.6	11.5	-

* (%) Efficacy relative to control.

2. Effect of soaking sesame seeds in chemical inducing resistance agents on controlling mortality disease caused by *M. phaseolina* :

This experiment was conducted by using seven chemical inducing agents *i.e.*,potassium chloride (KCl),hydrogen peroxide (H_2O_2), indole acetic acid (IAA),indole butyric acid (IBA),tanic acid (TA),salycilic acid (SA) and bion at three concs. for investigating their effects on disease incidence, also,to determine phenols and sugar content in case of only treated soil with *F.oxysporum*.

Data shown in **Table (23)** indicate that, salycilic acid and bion were the most effective treatments for decreasing pre-emergence damping-off (4.6 & 3.6%,respectively), followed by indole acetic acid (IAA),tanic acid (TA),indole butyric acid (IBA) and potassium chloride (KCl) which recorded 7.4,7.7,9.6,&9.6%,respectively.Whereas, the least effective inducer was hydrogen peroxide H_2O_2 (13.1%) .

The most effective concentration for controlling pre-emergence damping-off was salicylic acid at 8 mM, bion at 8 mM ,tanic acid at 8 mM (5.8%), IBA at 400 ppm (5.6%),H_2O_2 at 4%(4.6%).Whereas,H_2O_2 and KCl at 4% gave(4.6 and 6.5%),respectively compared with control treatment(29.5%).

For the post emergence damping-off, the obtanied data show that,bion, gave the highest significant decrease in post-emergence damping-off at all concs.,followed by SA and IAA (1.6&3.3%),followed by tanic acid, KCl, IBA and H_2O_2 (4.2,6.4,7.4 & 9.4%),respectively.The highest decreases in post-emergence damping-off were noticed with KCl and H_2O_2 at

4%(3.5 & 4.3%),respectively.IAA and IBA caused a reduction in post-emergence at 400 ppm.(0.0 & 2.5%, respectively). Tanic acid, SA and bion completely decreased the post-emergence damping-off at 8mM.

Concerning the survived plants, data also show that,tanic acid,SA and bion caused the highest increase in the average of survived plants (100.0%),compared to control treatment (48.0%).

Table(23): Effect of some chemical inducers as seed soaking on the incidence of mortality disease caused by *M. phaseolina* under greenhouse conditions.

Disease incidence	Inducer	% of disease incidence at different concentrations				Mean
		Conc.1	Conc.2	Conc.3	Conc.4	
% Pre-emergence	KCl	12.5	10.5	8.9	6.5	9.6
	H_2O_2	20.7	16.4	10.5	4.6	13.1
	IAA	10.0	9.8	6.5	3.2	7.4
	IBA	13.5	11.5	7.6	5.6	9.6
	Tanic acid	14.7	10.6	5.8	0.0	7.7
	SA	11.5	8.4	0.0	0.0	4.9
	Bion	8.9	5.7	0.0	0.0	3.6
	Control	29.5	29.5	29.5	29.5	29.5
	Mean	15.2	12.8	8.6	6.2	-
% Post-emergence	KCl	8.6	7.8	5.6	3.5	6.4
	H_2O_2	13.4	12.2	7.8	4.3	9.4
	IAA	7.4	5.7	0.0	0.0	3.3
	IBA	11.4	8.9	6.7	2.5	7.4
	Tanic acid	9.8	6.8	0.0	0.0	4.2
	SA	6.5	0.0	0.0	0.0	1.6
	Bion	0.0	0.0	0.0	0.0	0.0
	Control	22.5	22.5	22.5	22.5	22.5
	Mean	9.9	7.9	5.3	4.1	-
%Survival Plants	KCl	78.9	81.7	85.5	90.0	84.2
	H_2O_2	65.9	71.4	81.7	91.1	77.5
	IAA	82.6	84.5	93.5	96.8	89.3
	IBA	75.1	79.6	85.7	91.9	83.1
	Tanic acid	75.5	82.6	94.2	100.0	88.2
	SA	82.0	91.6	100.0	100.0	93.4
	Bion	91.1	94.3	100.0	100.0	96.4
	Control	48.0	48.0	48.0	48.0	48.0
	Mean	74.9	79.2	86.1	89.7	-

LSD.at 5% for:	Pre-	Post-	Survival
Inducer (I)=	2.12	3.17	4.94
Concentration(C)	1.25	2.39	3.33
IxC=	3.28	5.16	6.48

* KCl and H_2O_2 used at 0.5, 1, 2 and 4 %, IAA and IBA used at rate 50,100, 200 and 400 ppm., Tanic acid, SA and Bion used at 1, 2.4 and 8mM.

3. Effect of soaking sesame seeds in chemical inducing agents on controlling wilt disease caused by *F.oxysporum*:

Data in **Table (24)** show that,IAA and SA were the most effective inducers for decreasing pre-emergence damping-off (3.6 &3.8%,respectively), followed by bion, IBA, KCl and H_2O_2(7.9, 8.4, 9.6 and 10.1%,respectively). However, the most effective concentration in controlling pre-emergence damping-off was recorded at 400 ppm and 8mM, for IAA and SA . Meanwhile,the highest pre-emergence damping-off was recorded with control treatment (27.5%).

As for the post-emergence damping-off, data indicate that IAA, SA and IBA caused the highest decrease in post-emergence damping-off(1.6, 2.2 & 4.4%,respectively). Meanwhile, H_2O_2 recorded the least effect (8.9%),whereas, IAA and SA caused the highest decrease at 400 ppm and 8mM, (1.6& 2.2%, respectively),followed by IBA,Tanic acid at 400 ppm and 8mM(4.4 & 8.6%,respectively).With regard to the survival plants, IAA& SA caused the highest percentage of survival plants (94.8, 94.0% & and 87.2%,respectively).

However, the highest increase in survival plants caused at 400ppm and 8mM, for IAA and SA(100.0%),respectively as compared with control treatment(50.0%),while the least effective treatment was recorded with H_2O_2 and tanic acid at 0.5% and 1mM (70.9 & 71.0%, respectively), compared with the control.

Table(24):Effect of some chemical inducers as seed soaking on the incidence of damping-off disease caused by *F.oxysporum* under greenhouse conditions.

Disease incidence	Inducer	% of disease incidence at different concentrations				Mean
		Conc.1	Conc.2	Conc.3	Conc.4	
% Pre-emergence	KCl	13.4	11.8	8.5	4.5	9.6
	H_2O_2	15.6	12.4	7.3	5.2	10.1
	IAA	8.7	5.6	0.0	0.0	3.6
	IBA	11.8	9.5	7.6	4.8	8.4
	Tanic acid	16.3	10.3	8.3	3.5	9.6
	SA	10.5	4.7	0.0	0.0	3.8
	Bion	12.4	9.4	6.5	3.5	7.9
	Control	27.5	27.5	27.5	27.5	27.5
	Mean	14.5	11.5	8.2	6.1	-
% Post-emergence	KCl	10.5	8.7	5.4	0.0	6.2
	H_2O_2	13.5	11.2	8.5	2.5	8.9
	IAA	6.5	0.0	0.0	0.0	1.6
	IBA	8.4	5.7	3.5	0.0	4.4
	Tanic acid	12.7	10.4	6.7	4.5	8.6
	SA	5.4	3.5	0.0	0.0	2.2
	Bion	10.2	8.4	6.5	0.0	6.3
	Control	22.5	22.5	22.5	22.5	22.5
	Mean	11.2	8.8	6.6	3.7	-
% Survival Plants	KCl	76.1	79.5	86.1	95.5	84.3
	H_2O_2	70.9	76.4	84.2	92.3	80.9
	IAA	84.8	94.4	100.0	100.0	94.8
	IBA	79.8	84.8	88.9	95.2	87.2
	Tanic acid	71.0	78.9	85.0	92.0	81.7
	SA	84.1	91.8	100.0	100.0	94.0
	Bion	77.4	82.2	87.0	96.5	85.7
	Control	50.0	50.0	50.0	50.0	50.0
	Mean	74.3	79.7	85.1	90.2	-

LSD.at 5% for:	Pre-	Post-	Survival
Inducer (I)=	2.15	4.17	5.56
Concentration (C)	3.89	2.34	4.38
IxC=	4.23	7.14	8.26

* KCl and H_2O_2 used at 0.5, 1, 2 and 4 % . IAA and IBA used at rate 50, 100, 200 and 400 ppm., Tanic acid, SA and Bion used at 1,2,4 and 8 mM.

4. Effect of soaking sesame seeds in chemical inducing agents on phenolic content:

Data in **Table (25)** show that, the levels of free phenols content in treated sesame leaves was higher than untreated ones. (control).The highest mean level was recorded in case of IBA treatment(11.13mg);followed by bion(10.67mg); H_2O_2 (9.41mg); SA (9.36); KCl (9.35mg); Tanic acid (8.51mg) and IAA (8.42mg), compared with the respective control value (7.21mg).

As for conjugated phenols, data indicate that, the highest amount of conjugated phenols was recorded with bion(2.75 mg),followed by IBA(2.45mg),whereas, the least amount was recorded with KCl treatment (0.37mg) compared with control (0.80 mg).

Concerning the total phenols, data show that, there were a great differences in the amounts of total phenols. It is worthy to mention that, the highest amount was recorded with IBA (13.58 mg),followed by bion(13.43mg). On the other hand, the least amount was in case of treatment with IAA (9.57mg) compared with control treatment (8.01mg).

Table(25): Determination of phenolic compounds; free, conjugated and total phenols in sesame leaves resulted from treated seeds with different inducers (mg/5g fresh weight).

Phenolic compound	Inducer	* Phenolic content at different concentrations				Mean
		Conc.1	Conc.2	Conc.3	Conc.4	
Free phenols	KCl	7.79	10.89	9.80	8.95	9.35
	H_2O_2	9.45	7.18	11.10	9.91	9.41
	IAA	9.44	6.97	10.54	6.75	8.42
	IBA	11.15	10.50	12.25	10.63	11.13
	Tanic acid	10.22	8.30	9.15	6.37	8.51
	SA	10.19	9.87	9.45	7.95	9.36
	Bion	9.40	13.20	10.75	9.36	10.67
	Control	7.21	7.21	7.21	7.21	7.21
Conjugated phenols	KCl	0.19	0.16	0.40	0.73	0.37
	H_2O_2	2.50	0.39	1.69	1.25	1.46
	IAA	1.85	1.23	0.38	1.12	1.14
	IBA	2.12	1.67	2.35	3.65	2.45
	Tanic acid	3.10	2.13	1.24	1.99	2.11
	SA	1.90	1.36	1.30	1.60	1.54
	Bion	3.20	3.15	2.28	2.37	2.75
	Control	0.80	0.80	0.80	0.80	0.80
Total phenols	KCl	7.98	11.05	10.20	9.68	9.73
	H_2O_2	11.95	8.11	12.79	11.16	11.00
	IAA	11.29	8.20	10.92	7.87	9.57
	IBA	13.27	12.27	14.60	14.28	13.58
	Tanic acid	13.32	10.43	10.39	8.36	10.62
	SA	12.09	11.23	10.75	9.55	10.90
	Bion	12.60	16.35	13.03	11.73	13.43
	Control	8.01	8.01	8.01	8.01	8.01

* KCl and H_2O_2 were used at Conc. 0.5, 1.2 and 4% . IAA and IBA were used at rate of 50, 100, 200 and 400 ppm. Tanic acid, SA and Bion were used at 1.2, 4, 8 mM.

5. Effect of soaking sesame seeds in chemical inducing agents on sugar content of sesame leaves:

This study aims to determine sugars content *i.e.* reducing sugars, non reducing and total sugars, the determination was expressed (as mg glucose per 5 gm fresh weight). The leaves of sesame plants grown from seeds previousley treated with different chemical inducers were used in this study.

Data in **Table(26)** illustrate that, treating sesame seeds with most tested chemical inducers caused a clear increase in the level of sugar content in leaves of sesame plants with respect to control treatment .

Concerning the reducing sugars, the highest amount of reducing sugars was induced by KCl treatment (2.24mg) followed by SA (2.18mg); IBA (1.79mg); H_2O_2 (1.71mg); bion (1.33mg) with respect to control treatment (0.86mg).

As for the non reducing sugars,bion caused the highest level of non reducing sugars (1.48mg) followed by IAA (1.41mg) compared with control (0.20mg).While,the total sugars was highest (3.02mg) with SA treatment followed by IAA (2.97mg), whereas,control treatment recorded (0.20mg). Also, tanic acid gave the least content(2.37mg),compared with control treatment (1.06mg).

Table(26):Determination of reducing, non-reducing and total sugars content in sesame leaves resulted from treated seeds with different chemical inducers (mg/5g fresh weight).

Sugar compound	Inducers	* Sugar content at different concentrations				Mean
		Conc.1	Conc.2	Conc.3	Conc.4	
Reducing Sugars	KCl	3.06	1.85	1.95	2.09	2.24
	H_2O_2	1.97	1.14	2.07	1.67	1.71
	IAA	1.59	1.87	1.06	1.72	1.56
	IBA	2.79	1.64	1.16	1.58	1.79
	Tanic acid	2.06	2.11	0.85	1.17	1.55
	SA	2.34	3.14	2.19	1.08	2.18
	Bion	1.78	0.77	1.18	1.59	1.33
	Control	0.86	0.86	0.86	0.86	0.86
Non-reducing Sugars	KCl	0.97	0.09	0.07	0.25	0.34
	H_2O_2	1.25	0.15	1.55	0.66	0.90
	IAA	1.16	0.45	1.74	2.30	1.41
	IBA	1.75	0.67	0.78	0.44	0.91
	Tanic acid	1.55	0.67	0.97	0.11	0.82
	SA	1.16	1.10	0.06	1.02	0.84
	Bion	0.93	1.79	1.08	2.13	1.48
	Control	0.20	0.20	0.20	0.20	0.20
Total Sugars	KCl	4.03	1.94	2.02	2.34	2.58
	H_2O_2	3.22	1.29	3.62	2.33	2.61
	IAA	2.75	2.32	2.80	4.02	2.97
	IBA	4.54	2.31	1.94	2.02	2.70
	Tanic acid	3.61	2.78	1.82	1.28	2.37
	SA	3.50	4.24	2.25	2.10	3.02
	Bion	2.71	2.56	2.26	3.72	2.81
	Control	1.06	1.06	1.06	1.06	1.06

* KCl and H_2O_2 were used at Conc. 0.5. 1.2 and 4% . IAA and IBA were used at rate of 50, 100, 200 and 400 ppm. Tanic acid, SA and Bion were used at 1.2. 4, 8 mM.

6. Effect of filtered and autoclaved watery plant extracts on controlling mortality disease caused by *M. phaseolina*:

The main objective of this experiment is studying the effect of soaking sesame seeds in both cool filtered plant extracts and hot autoclaved aqueous plant extracts on the incidence of sesame pre and post-emergence damping-off which caused by *M. phaseolina* and on % of healthy survival plants.

Data in **Table (27)** reveal that, the investigated filtered plant extracts significantly increased the percentage of healthy plants. The filtered roselle increased healthy plants (80.0%), followed by filtered eucalyptus (69.0%) compared with control treatment.The least effective plant extract was noticed with filtered cumin (50.0%).

The autoclaved plant extracts increased the percentages of healthy plants, therefore the autoclaved roselle increased healthy plants (80.0%),while the autoclaved eucalyptus increased healthy plants (70.4%),compared to control treatment(31.7%).Whereas, the the least percentage of healthy plants was recorded with autoclaved cumin (60.0%),followed by autoclaved anise (66.2%) in compared to control.

Table(27):Effect of filtered and autoclaved watery plant extracts on the disease incidence of sesame plants caused by *M. phaseolina in vivo*.

Plant extract	Emergence				Survival plants			
	% Pre		% Post		%Mortality		% Apparently Healthy	
	Filtered	Autoclaved	Filtered	Autoclaved	Filtered	Autoclaved	Filtered	Autoclaved
Roselle	7.6	4.0	4.3	6.7	8.1	9.3	80.0	80.0
Anise	12.3	12.5	20.2	11.3	7.5	10.0	60.0	66.2
Eucalyptus	11.7	10.0	9.3	12.2	10.0	7.4	69.0	70.4
Cumin	12.3	11.4	19.5	20.5	18.2	8.1	50.0	60.0
Thyme	12.3	12.5	7.5	10.0	11.0	8.5	69.0	69.0
Control	20.3	20.3	27.7	27.7	20.3	20.3	31.7	31.7

LSD.at5% for:	Pre-	Post-	Mortality	Healthy
Extraction method	1.12	1.15	1.12	2.32
Plant extract	1.23	2.69	3.59	4.35
Intreaction	2.32	3.12	4.17	5.25

7. Effect of filtered and autoclaved watery plant extracts on controlling wilt disease caused by *F. oxysporum*:

This experiment is conducted to study the effect of soaking sesame seeds in both cool filtered plant extracts or hot autoclaved aqueous plant extracts on the incidence of sesame pre and post-emergence damping-off which caused by *F.oxysporum.*

Data in **Table (28)** indicate that, all tested plant extracts increased significantly the percentage of healthy survival plants of both filtered and autoclaved plant extracts. The highest percentage of healthy plants was recorded with filtered anise (80.0%),while the least one was recorded with filtered eucalyptus (60.1%) compared with control treatment. However, the least % of healthy plants for filtered extract was recorded with filtered eucalyptus (60.1%), followed by cumin and thyme (70.0&79.0%), respectively.

Regarding to the autoclaved extracts, the autoclaved anise extract recorded the highest percentage of healthy plants (75.0%), followed by autoclaved eucalyptus (70.6%) compared with control treatment.

However, the least % of healthy plants was noticed with autoclaved thyme extract(69.0%),followed by autoclaved cumin (70.2%), respectively.

Table(28): Effect of filtered and autoclaved watery plant extracts on the disease incidence of sesame plants caused by *F. oxysporum in vivo*.

Plant extract	Emergence				Survival plants			
	% Pre		% Post		%Wilt		%Apparently Healthy	
	Filtered	Autoclaved	Filtered	Autoclaved	Filtered	Autoclaved	Filtered	Autoclaved
Rosselle	12.5	10.0	11.2	12.0	7.3	8.0	69.0	70.0
Anise	10.6	4.6	0.0	10.2	9.4	9.8	80.0	75.0
Eucalyptus	11.3	11.3	20.6	9.8	8.0	8.3	60.1	70.6
Cumin	15.5	12.5	7.9	7.3	6.6	10.0	70.0	70.2
Thyme	7.8	8.9	3.4	11.2	9.8	10.9	79.0	69.0
Control	20.3	20.3	27.7	27.7	20.3	20.3	31.7	31.7

LSD.at5% for:	Pre-	Post-	Wilt	Healthy
Extraction method	1.12	1.10	1.12	2.32
Plant extract	2.28	2.69	2.39	4.39
Intreaction	3.63	4.14	4.76	5.37

8. Effect of antagonistic fungi on disease incidence of sesame plants:

In this experiment, three antagonistic fungi with 10 isolates of *Trichoderma* spp.,were used individually in the form of seed coating to study their effects on pre and post-emergence damping-off as well as wilt disease incidence which caused by *M.phaseolina* and *F.oxysporum* under greenhouse conditions. The antagonistic fungi were *T. harzianum* (4 isolates), *T. viride* (3 isolates) and *T. hamatum* (3 isolates).

A) Disease incidence caused by *M. phaseolina*:

Data in **Table(29)** show that, all the antagonistic fungi were significantly effective on controlling disease incidence caused by *M. phaseolina* as survival and healthy plants.

Regarding to the percentage of infection of the tested isolates of *Trichoderma* spp., it's worthy to mention that,isolates of *T. harzianum* T2 recorded the least percentage of infection (11.7%).On the other hand,*T. hamatum* T9 recorded the highest % of infection (48.5%),respectively.

The higest percentage of efficacy was noticed with *T. harzianum*; T2 (83.3%), followed by *T. hamatum* T10 (71.4%). While, the lowest percentage of efficacy was noticed with *T. hamatum*,T9 (30.7%),compared with control treatement (70.0%).

Table(29):Effect of some antagonistic fungi on the disease incidence on sesame plants caused by *M. phaseolina in vivo*.

Antagonistic fungus	Isolate/No	Disease incidence				% Efficacy
		% Pre-	% Post-	% Mortality	Total infection	
T.harzianum	T 1	8.7	10.5	9.7	28.9	58.7
	T 2	0.0	7.5	4.2	11.7	83.3
	T3	13.3	8.5	8.2	30.0	57.1
	T 4	12.5	6.6	11.5	30.6	56.3
T.viridi	T5	14.6	8.5	8.5	31.6	54.8
	T6	10.0	12.3	15.0	37.3	46.7
	T7	12.5	13.3	11.2	37.0	47.1
T.hamatum	T 8	20.0	4.3	9.5	33.8	51.7
	T 9	16.5	19.7	12.3	48.5	30.7
	T10	13.3	0.0	6.7	20.0	71.4
	Control	25.3	30.2	14.5	70.0	-
LSD.at 5%		4.36	3.75	6.19	7.46	-

% Efficacy relative to control of total infection.

B) Disease incidence caused by *F.oxysporum*:

Data in **Table (30)** indicate that, the antagonistic fungi were significantly effective on controlling disease incidence caused by *F. oxysporum* as survival and healthy plants.

As for the the highest percentage of infection, was produced by *T. harzianum*, T1 (45.7%) followed by *T. viride*, T7 (46.6%) and finally *T. hamatum*, T9 (46.1%),respectively.

The highest percentage of efficacy was produced by *T. hamatum*; T10 (88.1%) followed by *T. viride* T5 and *T. harzianum* T3 (73.3 & 64.4%,respectively) compared with control treatment (80.0%).

Table(30):Effect of some antagonistic fungi on the disease incidence of sesame plants caused by *F.oxysporum in vivo.*

Antagonistic fungus	Isolate/No	Disease incidence				% Efficacy
		% Pre-	% Post-	% Wilt	Total infection	
T.harzianum	T 1	11.6	8.7	25.4	45.7	42.9
	T2	12.5	6.6	13.5	32.6	59.3
	T3	9.0	8.9	10.6	28.5	64.4
	T 4	12.8	8.2	19.0	40.0	50.0
T. viridi	T5	5.6	3.4	12.5	21.5	73.3
	T6	7.8	10.5	16.4	34.7	56.6
	T7	18.5	19.4	8.7	46.6	41.7
T.hamatum	T 8	9.0	12.3	9.3	30.6	61.7
	T 9	15.6	20.5	10.0	46.1	42.4
	T10	4.2	0.0	5.3	9.5	88.1
	Control	20.5	29.6	29.9	80.0	-
LSD.at 5%		4.63	5.82	7.56	8.93	-

% Efficacy relative to control of total infection.

Field Studies:

1. Effect of seed dressing and /or soil treatment with some fungicides or biocides on mortality, wilt disease and total seed yield of seasme cv. Giza-32 in Ismailia governorate seasons 2002&2003:

This investigation was conducted during two successive seasons 2002 & 2003 in two different Governorates; Ismailia and Giza on sesame plants cv. Giza32 under open field conditions to evaluate the effect of different fungicides or biocides in controlling the disease.

A) Season 2002 in Ismailia Governorate:

Data in **Table(31)** indicate that, the tested fungicides Maxim, Rizolex-T and Vitavax-T,were significantly decreased the incidence of sesame seedlings with damping-off followed by the commercial biocides Rhizo-N and Plant-guard,respectively compared to the control treatment.

Regarding to soil treatment, data indicate that all tested fungicides were significantly effective in controlling disease incidence with different degrees.

Concerning sesason 2002 in Ismailia the combined treatments between soil/seed treatment, show that, Rizolex-T/ Maxim treatment recorded (8.9%),whereas, Vitavax-T/ Maxim treatment recorded 7.4%, Rizolex-T/Vitavax-T(9.3%)Vitavax-T/Vitavax-T(10.5%) compared with control treatment.

As for the commercial biocides, Rhizo-N and Plant-guard the disease incidence was decreased in compination with the fungicides *i.e.* Rizolex-T/ Rhizo-N (13.9%) Rizolex-T/Plant-guard (13.2%), Vitavax-T/Rhizo-N (11.7%), Vitavax-T/ Plant-guard (14.6%) compared with control treatment.The highest percentage of efficacy for disease control was recorded with Rizolex-T as seed/soil treament (69.5%),followed by Vitavax / Maxim (66.8%).

Concerning seed yield,data in **Table(31)** also,indicate that, treating sesame seeds with different fungicides or biocides produced an increase in seed yield of sesame plants.

The best results for seed yield was noticed with combined treatments *i.e.* Rizolex-T/Maxim which gave 315.1kg/fed. However, Rizolex-T/Rizolex-T gave 310.7 kg/fed., compared with the control treatment .

As for the commercial biocides; Rhizo-N and Plant-guard the combined treatment was less effective than the chemical fungicides as mentioned before, where, Rizolex-T/Rhizo-N gave 189.5kg/fed. Aslo, Vitavax-T/Rhizo-N gave 189.5kg/fed. Rizolex-T/Plant-guard(199.5kg/fed.) while Vitavax-T/Plant-guard (195.4 kg/fed.) compared with control treatment.

The highest percentage of efficacy for seed yield was recorded with Rizolex-T/Maxim(171.9%),followed by Rizolex-T/Rizolex-T (168.0%),while the least efficacy was noticed with Rhizo-N (63.5%).However, Vitavax-T/Rizolex-T recorded high efficacy in increasing seed yield (163.2%)compared with control treatment.

Table(31): Effect of seed dressing and /or soil treatment with some fungicides or biocides on the incidence of damping -off disease and total seed yield of seasmecv.Giza- 32 in Ismailia governorate during season 2002 .

Soil treatment / Seed dressing	% infection					
	Rizolex-T		Vitavax-T		Control	
	% infection	% Efficacy	% infection	% Efficacy	% infection	% Efficacy
Maxim	8.9	63.8	7.4	66.8	18.8	37.5
Rizolex-T	7.5	69.5	9.8	56.0	15.7	47.8
Vitavax-T	9.3	62.2	10.5	52.9	19.5	35.2
Rhizo-N	13.9	43.5	11.7	47.5	17.8	40.9
Plant-guard	13.2	46.3	14.6	34.5	19.4	35.5
Control	24.6	-	22.3	-	30.1	-
Soil treatment / Seed dressing	**Seed Yield kg/feddan**					
	Rizolex-T		Vitavax-T		Control	
	Seed Yield	% Efficacy	Seed Yield	% Efficacy	Seed Yield	% Efficacy
Maxim	315.1	171.9	224.8	89.7	146.7	27.8
Rizolex-T	310.7	168.0	311.8	163.2	181.2	57.8
Vitavax-T	297.5	156.7	213.4	80.1	156.7	36.5
Rhizo-N	189.5	63.5	189.5	59.9	179.8	56.6
Plant-guard	199.5	72.1	195.4	64.9	156.5	36.3
Control	115.9	-	118.5	-	114.8	--

LSD.at 5% for :		% infection	Seed yield Kg/feddan
Seed dressing	(A) =	1.35	6.63
Soil treatment	(B) =	1.96	8.56
Interaction	(A*B) =	2.28	9.67

B) Season 2003 in Ismailia governorate:

Regarding to soil treatment, recorded data indicate that, all tested fungicides were significantly effective in controlling disease incidence with different degrees.

Data in **Table (32)** show that,the combined seed/soil fungicide treatments was effective *i.e.* Rizolex-T/Maxim (6.5%) and the highest percentage of efficacy (75.3%) was recorded with Rizolex-T/Maxim.

Applying soil/seed treatments by using Rizolex-T / Rizolex-T,decreased % of infection (8.4%),followed by Rizolex-T/Vitavax-T(8.2%),while the percentage of efficacy was (68.1&68.8%),respectively.Treating sesame seeds with Vitavax-T/and soil with Rizolex-T,decreased % of infection (9.5%) with efficacy (66.1%),whereas,the lowest effective treatment was recorded with vitavax-T/Plant-guard (18.3%) with efficacy (34.7%) compared with control treatment.

As for sesame seed yield data also show that Rizolex-T/Rizolex-T recorded (321.0 kg/fed) and the % efficacy was 155.6%.The lowest seed yield was 210.5 & 211.4 kg/fed with Rizolex-T/Rhizo-N and Rizolex-T/Plant-guard, where the percentage of efficacy was 67.6%&68.3%, respectively. Vitavax-T/rizolex-T gave the highest seed yield (334.7 kg/fed),followed by Vitavax-T/Vitavax-T (219.5kg/fed) and the percentage of efficacy was 170.8&77.6%,respectively compared with the control.

Table(32): Effect of seed dressing and /or soil treatment with some fungicides or biocides on the incidence of damping -off disease and total seed yield of seasme cv.Giza-32 in Ismailia governorate, during season 2003.

Seed dressing \ Soil treatment	% Infection					
	Rizolex-T		Vitavax-T		Control	
	% infection	% Efficacy	% infection	% Efficacy	% infection	% Efficacy
Maxim	6.5	75.3	11.2	60.0	14.5	51.2
Rizolex-T	8.4	68.1	9.5	66.1	18.6	37.4
Vitavax-T	8.2	68.8	10.4	62.9	20.2	32.0
Rhizo-N	15.6	40.7	13.8	50.7	18.5	37.7
Plant-guard	16.5	37.3	18.3	34.7	20.8	30.0
Control	26.3	-	28.0	-	29.7	-
Seed dressing \ Soil treatment	**Seed Yield kg/feddan**					
	Rizolex-T		Vitavax-T		Control	
	Seed Yield	% Efficacy	Seed Yield	% Efficacy	Seed Yield	% Efficacy
Maxim	280.2	123.1	198.5	60.6	180.2	63.5
Rizolex-T	321.0	155.6	334.7	170.8	119.2	8.5
Vitavax-T	216.8	72.6	219.5	77.6	169.5	54.1
Rhizo-N	210.5	67.6	201.5	63.2	189.7	72.1
Plant-guard	211.4	68.3	198.7	70.8	188.3	70.9
Control	125.6	-	123.6	-	110.2	-

LSD.at 5% for :	% infection	Seed yield
Seed dressing (A) =	1.56	6.84
Soil treatment (B) =	2.40	7.32
Interaction (A*B) =	5.75	9.34

2. Effect of seed dressing and /or soil treatment with some fungicides or biocides on the mortality,wilt disease and total seed yield of seasme cv.Giza-32 in Giza Governorate during seasons 2002 and 2003:

A) Season 2002 in Giza governorate:

Data in **Table(33)** show that, Maxim,Rizolex-T and Vitavax-T were significantly decreased the incidence of seedling damping-off of sesame plants followed by the commercial biocides Rhizo-N and Plant-guard,respectively compared with control treatment.Regarding to soil treatment, data indicate that, all tested fungicides were significantly effective in controlling disease incidence.Concerning the combined treatments between soil/seed treatment, obtained data show that, seed/soil fungicide treatment proved to be effective, the fungicide Rizolex-T/Maxim recorded (7.6%),Rizolex-T/Rizolex-T (5.4%) and %efficacy was 71.1&79.5%,respectively compared with control tretment.

For commercial biocides Rhizo-N and Plant-guard, the disease incidence was decreased slowely compared with the fungicides *i.e* Rizolex-T /Rhizo-N (12.2%) and Rizolex-T/Plant-guard (14.7%),respectively.where the efficacy of reducing the disease incidence was (53.6&44.2%,respectively).Also,Vitavax-T/Rizolex-T proved the effective efficacy in controlling the disease(73.6%).On the other hand,Vitavax-T/Plant-guard recorded the least % of efficacy (50.5%) compared with control treatment. Data in the same table,indicate that the use of the tested fungicides caused an increase in seed yield of sesame and the combined treatment proved the best increase in seed yield *i.e.*

Rizolex-T/Maxim (325.0 kg/fed),while Rizolex-T/Vitavax-T gave 298.7 kg/fed and the highest efficacy was recorded with Rizolex-T/Maxim(162.5%).However,the highest percentage of efficacy was recorded with Vitavax-T/Rizolex-T (134.0%) , followed by Vitavax-T/Vitavax-T(83.6%) as compared with control treatment.For Rhizo-N and Plant-guard,the combined treatment Rizolex-T/Rhizo-N recorded 211.4kg/fed,while Vitavax-T/Rhizo-N (213.0kg/fed), Rizolex-T/ Plant-guard (198.9 kg/fed) when compared with the control treatment.

Table(33):Effect of seed dressing and /or soil treatment with some fungicides or biocides on the incidence of damping-off disease and total seed yield of seasme cv. Giza-32 in Giza governorate during season 2002.

Soil treatment / Seed dressing	% Infection					
	Rizolex-T		Vitavax-T		Control	
	% infection	% Efficacy	% infection	% Efficacy	% infection	% Efficacy
Maxim	7.6	71.1	8.1	70.3	16.7	40.8
Rizolex-T	5.4	79.5	7.4	73.6	18.4	34.7
Vitavax-T	8.4	68.1	9.5	65.2	18.5	34.4
Rhizo-N	12.2	53.6	12.5	54.2	15.6	44.7
Plantguard	14.7	44.2	13.5	50.5	18.4	34.8
Control	26.3	-	27.3	-	28.2	-
Soil treatment / Seed dressing	**Seed Yield kg/fed**					
	Rizolex-T		Vitavax-T		Control	
	Seed Yield	% Efficacy	Seed Yield	% Efficacy	Seed Yield	% Efficacy
Maxim	325.0	162.5	197.8	65.3	146.0	44.8
Rizolex-T	268.6	116.9	280.2	134.0	197.0	95.4
Vitavax-T	298.7	141.3	219.8	83.6	199.5	97.9
Rhizo-N	211.4	70.7	213.0	77.9	198.5	96.2
Plantguard	198.9	60.7	199.4	66.5	180.7	79.3
Control	123.8	-	119.7	-	100.8	-

LSD.at 5% for :	% infection	Seed yield
Seed dressing (A) =	1.32	6.86
Soil treatment (B) =	1.58	7.21
Interaction (A*B) =	3.59	10.12

B) Season 2003 in Giza governorate:

Data in **Table (34)** illustrated that soil/seed treatment, of the tested fungicides were significantly effective in controlling disease incidence with different degrees.

Concerning the combined treatments between soil/seed dressing, data show that,soil/seed dressing proved to be effective against the disease.

Rizolex-T/Maxim gave(9.7%),Rizolex-T/Rizolex-T(8.7%) , Rizolex-T/Vitavax-T(11.5).Concerning the biocides Rhizo-N and Plant-guard,the percentage of infection was 14.8 and 15.9%, respectively compared with control,while,the highest efficacy was 65.2% with Rizolex-T/Rizolex-T treatment.whereas Vitavax-T/Vitavax-T decreased the % infection(7.6).Vitavax-T and Rizolex-T(8.5),where,the efficacy was 69.6% and 66.0%, respectively.

For sesame seed yield, data in the same table,indicate that,the highest seed yield was 332.7&298.6 kg/fed with Rizolex/Maxim and Rizolex-T/Rizolex-T, respectively, and the % efficacy was 176.8 and 147.8,respectively.The least efficacy was noticed with Rhizo-N and Plant-guard (67.2&79.0%). However,Vitavax-T/Rizolex-T recorded 315.1kg/fed with efficacy (182.3%).The least efficacy was detected with Vitavax-T/Rhizo-N of soil/seed dressing (50.0%),followed by Vitavax-T/Plant-guard(85.8%).

Table(34): Effect of seed dressing and /or soil treatment with some fungicides or biocides on the incidence of damping-off disease and total seed yield of seasme cv.Giza -32 in Giza governorate,during season 2003.

Soil treatment / Seed dressing	% Infection					
	Rizolex-T		Vitavax-T		Control	
	% infection	% Efficacy	% infection	% Efficacy	% infection	% Efficacy
Maxim	9.7	61.2	10.3	58.8	13.6	55.7
Rizolex-T	8.7	65.2	8.5	66.0	19.5	36.5
Vitavax-T	11.5	54.0	7.6	69.6	13.2	57.0
Rhizo-N	14.8	40.8	12.4	50.4	19.6	36.2
Plant-guard	15.9	36.4	17.6	29.6	19.3	37.1
Control	25.0	-	25.0	-	30.7	-
Soil treatment / Seed dressing	**Seed Yield kg/feddan**					
	Rizolex-T		Vitavax-T		Control	
	Seed Yield	% Efficacy	Seed Yield	% Efficacy	Seed Yield	% Efficacy
Maxim	332.7	176.8	210.8	88.3	195.5	77.3
Rizolex-T	298.6	147.8	315.1	182.3	200.1	81.4
Vitavax-T	321.9	166.7	224.8	101.4	187.6	70.2
Rhizo-N	201.4	67.2	167.4	50.0	118.5	7.5
Plant-guard	215.7	79.0	207.3	85.8	125.4	13.7
Control	120.5	-	111.6	-	110.3	-

LSD.at 5% for :	% infection	Seed yield
Seed dressing (A)=	1.40	7.34
Soil treatment (B)=	1.84	6.79
Interaction (A*B)=	3.92	10.12