SUMMARY

Sesame *(Sesamum indicum* **L.)** is one of the most important oil seed crops in A.R.E. and in many other parts of the world due its economic importance.Cultivation of sesame in Egypt is confined to the sandy soil in Ismailia, Sharkia, Giza Beni-Suef and Sohag governorates.

Sesame seedling mortality and wilt disease is one of the most important diseases that affecting yield and seed quality. Sesame plants are considered a subject to invasion by various soil and seed-borne fungi during the growing season. For this reason, sesame producers in Egypt began to complain from the decline in yield and seed quality which subjected this important crop to lose its good reputation in foreign markets.Experiments were carried out under laboratory, greenhouse, and field conditions.

The obtained results could be summarized as follows:

1- Five governorates *i.e.* Ismailia, Sharkia,Giza, Beni-Suef and Sohag were surveyed for seed-borne fungi associated with sesame seeds of three cultivars *i.e.* Giza-32, Shandawel-3 and Tushka-1 for apparently healthy and infected sesame seeds by using dry inspeciton method. Data showed that Ismailia and Sohag governorates recorded the highest percentage of infection (17.3& 16.8 %,respecitvely), where the percentage of apparently healthy sesame seeds was 82.6 and 83.2%,respectively for the aforementioned locations.

2- Studying the relation between field infection of sesame seeds by *M. phaseolina* and the collected sesame seeds from different cultivars revealed that, the highest number of infected seeds on blotter were recorded with the examined samples of cv. Tushka 1 (69), whereas,types of infection per each sample was ranged from 63.6 to 100% for cv.Giza-32 sample No.2 & No.4 , respectively.

3- Investigating the relation between field infection of sesame seeds by *F. oxysporum* and the collected sesame seeds from different cultivars, data showed that, sample No.4 of cv. Giza-32 recorded the highest No. of infected seeds (17), whereas the least(11)with sample No.1 of cv.Shandawel-3& sample No.2 of cv.Tushka-1.

4- Using different methods of isolation, illustrated that, blotter method was the best method of isolation. On the other hand, isolation by PDA medium from seeds yielded different fungal species *i.e. Alternaria alternata, A. sesami* and *Drechslera sesami,* which resulted 14.5, 18.0 & 16.5%,respectively. Whereas, deep-freez method yielded different fungi species and the highest incidence of *M. phaseolina* was 14.50%.

5- Assessment the incidence of seed-borne fungi in samples of different sesame cultivars on the blotter test indicated that 4 fungal genera were detectd from sesame seeds on blotter. Cultivar Giza-32 yielded the highest incidence of fungi *i.e. A.alternata* (23.5%).0n the other hand, *Aspergillus flavus* recorded the lowest incidence (8.50%) with INF sesame seeds.

6- Concerning the incidence of sesame seed-borne fungi in samples of sesame cv. Giza-32 collected from different governorates on the blotter test. Data illustrated that Ismailia samples yielded the highest incidence of *A. alternata* for apparently healthy (AH) and infected (INF) sesame seeds (7.5 &19.0%),respectively.On the contrary Benisuef samples yielded the lowest incidence of *A. sesami* (8.5% & 12.5%), respectively.

7- Studying the incidence of *M. phaseolina* and *F. oxysporum* by using whole seed, and in component plating method showed that, whole seed examination yielded different levels of *M.phaseolina* which recorded 4.5, 11.5, 7.5, 2.0 and 9.5% of 5 seed samples, respectively infected by *M.phaseolina.* For component plating method, sample No.1 recorded 12.0, 8.0 and 2.0%, for seed coat, endosperm and embryo, respectively with *F. oxysporum* infection.

8- Investigating the pathogenicity of different isolates of *M. phaseolina* (M1,M5,M8&M10) on sesame plants *in vivo* indicated that, the tested isolates of *M. phaseolina* gave different percentages of mortality,where *M. phaseolina* (M 1) recorded the lowest percentag of mortality (16.6%). Whereas, M5 recorded (19.7%).Also, M8 recorded 26.7%, followed by isolate M10 (40.0%). Pathogenicity tests of different isolates of *F.oxysporum* (F6,F8,F9 &F10) on sesame plants cv. Giza 32 under greenhouse conditions show that, the highest percentage of wilted plants (40.1%) was recorded with *F.oxysporum* (F8), and the lowest one was found with *F.oxysporum* F10 (13.4%).

9- Testing the antiserum of 5 *Fusarium* spp., *F.moniliforme, F.solani, F.oxysporum, F.roseum* and *F.semitectum* to study

serological realtions between them.Also,investigating the host range of *F.oxysporum* antiserum against, extracted antigens of eight host plants, indicated that the highest homology percentage (up to 90.0%) was expressed between *F. moniliforme* and *F.solani* followed by 60.0% homology beteween *F.oxysporum* and *F.roseum.* Also, for the double diffusion reaction of the antiseurm of *F.oxysporum* against antigens of 8 host plant, data illustrated that,there is a specifity for infection with sesame cv. Giza-32 & sesame cv. Tushka-1.

10-Molecular detection of *Fusarium oxysporum,isolates* by using F1 & F2 primers, showed a positive reaction with ten *F.oxysporum* isolates Lanes 1 to 10. Specificty for *Fusarium oxysporum* isolates extracted DNA of various *Fusarium* spp., *F. solani, F. moniliforme* and *F.oxysporum* showed a positive reaction with *F. oxysporum* isolate only (lane3) compared with positive control lane5.Concerning sensitivity of the *Fusarium oxysporum* primer pair with 10 *F.oxysporum* isolates, there were a range form 10^{-1} to 10^{-9} which were noticed on Lanes 1 to 9,respectively.

11- The efficacy of different concentrations of three fungicides (rizolex-T,maxim and vitavax-T) on linear growth of 4 isolates of *M. phaseolina.* The linear growth of *M.phaseolina* isolates, Ml, M5, M8 and M10 was significantly decreased by the tested fungicides at different concentrations, while, conc.200ppm gave the best suppression for mycelial growth.

12- The efficacy of different concentrations of three fungicides on linear growth of 4 isolates of *F.oxysporum* the study illustrated that maxim was the most effective for reducing

mycelial growth with *F.oxysporum* (F9) which suppressed linear growth with isolate F9 (20.2mm) followed by rizolex-T with isolate F8(l 1.7mm) and vitavax-T (7.8mm), respectively.

13- Experiments of studying the effect of different concentrations of some resistance inducing agents on linear growth (mm) of 4 isolates of *M.phaseolina,showed* that, the linear growth of the tested isolates (M1, M5, M8 and M10) was significantly suppressed by all chemical inducers *i.e.* KC1, $H_2$01,IAA, IBA, Tanic acid SA and Bion, respectively.The highest decrease in linear growth was noticed with the chemical inducer KCl at conc.4.0% for all isolates(M1,M5,M8 and M10).However,IAA caused a decrease in linear growth (42.9mm),followed by 45.9mm with M8 & M5,respectively compared with control(85.0mm).

14- Investigating the effect of different concentrations of the abovementioned resistance inducer agents on linear growth of *F.oxysporum* isolates.Data indicated that linear growth was affected and decreased at conc. 4.0% with isolates F6,F8,F9 and F10,respectively.Meanwhile,IAA and IBA also suppressed the linear growth for all tested isolates of *Fusarium* at conc.1600 ppm, isolate F10 was the least one affected with IAA and IBA which gave (12.9 & 17.6 mm, respectively) with IAA and IBA.

15- Different concentrations of filterd and/or autoclaved plant extracts significanly reduced linear growth (mm) of *M. phaseolina in* vitro,filtered extracts of eucalyptus,cumin and thyme, caused a high inhibition of mycelial growth of *M. phaseolina* isolate (M1) at the concetration of 55%(15.7,26.5 and 0.0,respectively). Also, the filtered extract of eucalyptus,cumin

and thyme exracts caused a complete inhibition at (55%),with *M. phaseolina* (M5).As for the autoclaved plant extrats, the obtained results indicated that, generally all tested plant extracts caused a noticeable inhibition in linear growth of *M. phaseolina* isolates; M 1, M5, M8 and 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% for most tested plant extracts. The autoclaved extract of anise caused a high inhibition at conc. 40%, followed by extract of eucalyptus and thyme at 55% with *M. phaseolina* (M1).

16- Filtered and autoclaved plant extracts successfully suppressed linear growth of *F. oxysporum in* vitro.Plant extract of filtered eucalyptus completely inhibited the fungal growth at conc. of (55%), followed by the plant extract cumin at conc. 40% with *F. oxysporum* (F6). While, the filtered plant extract of roselle caused a complete inhibition for *F. oxysporum* (F8) at conc.55%, followed by eucalyptus plant extract at conc.55%. Concerning the autoclaved plant extracts the results showed that, the tested plant extracts caused inhibition in linear growth of *F. oxysporum* isolates F6, F8, F9 and F10, respectively. The highest inhibition for fungal growth *in vitro* was recorded with highest concentration of plant extracts *i.e* 40&55%,respectively.The autoclaved extract of roselle caused a complete inhibition at conc. of 40% and 55%, respectively for isolate F6 of *Fusarium oxysporum,* while the highest inhibition with isolate F8 of *F. oxysporum* recorded with autoclaved plant extract roselle and Cumin at con.55% of (18.8 and 9.7mm),respectively.

17-Studying the antagonistic effect of three species of *Trichoderma i.e. T. harzianum, T.viridi* and *T.hamatum,* against four isolates of *M. phaseolina,* the tested antagonistic *Trichoderma* spp. caused a significant reduction on mycelial growth of the four studied *M. phaseolina* isolates M1, M5, M8 and M10. The four isolates of *T. harzianum* T 1, T2, T3, and T4, reduced linear growth of *M. phaseolina* isolates M 1 , M5, M8 and M10 average of 57.9, 59.8, 62.3 & 59.6 %, respectively.

18- Antagonistic effect of some *Trichoderma* spp.against 4 isolates of *F. oxysporum, 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, suppressed linear growth of *F. oxysporum* isolates, which recorded 63.30, 62.20, 64.50 and 62.60%, respectively.

19-Efficacy of different fungicides and biocides as seed dressing on disease incidence resulted by *M. phaseolina and F.oxysporum,* the study illustrated that, the tested fungicides significantly decreased the mortality plants due to infection by *M.phaseolina.Treating* sesame seeds with fungicide Rizolex-T, casued the highest % efficacy (87.8%),followed by Vitavax-T (83.4%) with artificially infested soil with *M. phaseolina.* Concerning artificially infested soil with *Fusarium oxysporum,* all the tested fungicides significantly decreased the wilted plants due to *F.oxysporum* infection.The highest percentage of efficacy was recorded with Rizolex-T and Maxim (70.6&63.2%), respectively.On the other hand. Rhizo-N and Plant-guard

produced the least efficacy(12.2&48.1%,respectively) compared with control.

20- The effect of soaking sesame seeds in different chemical inducing agents on controlling mortality disease caused by *M.phaseolina* were studied, applying potassium chloride (KCI),hydrogen peroxide (H202),indole acetic acid (IAA),indole butyric acid (IBA),Tanic acid (TA),salycilic acid (SA) and Bion for testing their effects on disease incidence, level of phenols and sugar content in case of *F.oxysporum* treatment. The most effective concentration for controlling pre-emergence damping-off in infested soil with *M. phaseolina* was salicylic acid at 4 mM,bion at 4 mM ,tanic acid at 8 mM , IBA at 400 ppm (5.6%),$H70_2$ at 4%(4.6%),at conc. of 4% KCl gave (6.5%), respectively.

21- Studying the effect of soaking sesame seeds in chemical inducing agents on controlling wilt disease caused by *F. oxysporum,* results indicated that, IAA and SA were the most effective inducers for decreasing pre-emergence damping-off, respectively, followed by Bion, IBA, KC1 and H202(9.4, 9.6, 11.5 and 11.8%). However, the most effective concentration for controlling pre-emergence was recorded at 400ppm and 8mM, for IAA and SA. Whereas, the least effective concentration was recorded with control treatment (27.5%), the highest increase in survival plants was recorded at 400ppm and 8mM (100.0%) for IAA and SA, respectively compared with control treatment (50.0%), while the least effective treatment was recorded with H_2O_2 and Tanic acid at 0.5% & 1mM (70.9 & 71.0%, respectively).

22- Investigating the effect of soaking sesame seeds in chemical inducing agents on phenolic content showed that, the levels of free phenols content resulted from treated sesame leaves was higher than untreated (control), the highest level was recorded in case of treatment with IBA (11.13mg) followed by Bion(10.67mg); $H_2$02 (9.41mg); SA (9.36mg); KC1 (9.35mg); Tanic acid (8.51mg) and IAA (8.42mg),compared with control. For conjugated phenols, the highest amount of conjugated phenols was recorded with Bion(2.75 mg), wherease, the least amount recorded with KCl treatment (0.37mg) compared with control (0.80 mg).Concerning total phenols, data showed that, there are a great differences in the amounts of total phenols, and the highest amounts of total phenols(13.58 mg) was recorded with IBA treatment.

23- The Effect of soaking sesame seeds in chemical inducing agents on sugar content of sesame leaves indicated that most of tested chemical inducers caused a clear increase in the level of sugar content (reducing,non reducing and total sugares) in the induced sesame plants with respect to control treatment (untreated sesame seeds).

24- Controlling mortality disease caused by *M. phaseolina* by filtered and/or autoclaved watery plant extracts, the examined filtered and autoclaved plant extracts significantly increased the percentage of healthy plants. Filtered roselle increased healthy plants (80.0%), followed by filtered eucalyptus (69:0%) compared with control treatment. whereas; the highest percentage of efficacy was recorded with filtered roselle

(71.6%), followed by filtered eucalyptus (56.0%). The autoclaved plant extracts increased the percentages of healthy plants, the autoclaved roselle increased healthy plants (80.0%), while the autoclaved eucalyptus increased healthy plants(70.4%) Also, the effect of filtered and autoclaved watery plant extracts in controlling wilt disease caused by *F.oxysporum* was also studied, 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%), followed by filtered thyme (79.0%) compared with control treatment.

25- Efficacy of antagonistic fungi on disease incidence of sesame plants caused by *M.phaseolina* was studied, all antagonistic fungi were significantly effective in controlling disease incidence caused by *M. phaseolina* on survival and healthy plants. The highest percentage of healthy plants was produced by *Trichoderma harzianum; T2* (88.3%), followed by *T. harnaturn T10* (80.0). For disease incidence caused by *F.oxysporum.* The highest percentage of healthy plants was produced by *Trichoderma hamatum, T10* (90.5%) followed by *T. viride* T5 (78.5%). While, *T. harzianurn, 13* showing percentage of healthy plants (71.5%) in this category of fungi compared with control treatment.

26- Effect of seed dressing and /or soil treatment with some fungicides or biocides on mortality, wilt disease and total seed yield of sesame cv. Giza-32 on Ismailia during seasons 2002&2003.Data indicated that, all 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 with control treatment.

a) Season 2002 on Ismailia:

All tested fungicides were significantly effective in controlling disease incidence with different percentages. Applying 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 Nitavax-T (9.3%), Vitavax-T/ Vitavax-T (10.5%) compared with control treatment.

The commercial biocides, Rhizo-N and Plant-guard decreased the disease incidence in combination with the fungicides *i.e.* Rizolex-T/ Rhizo-N (13.9%) Rizolex-T/ Plant-guard (13.2%), Vitavax/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 treatments (69.5%), followed by Vitavax-T /Maxim (66.8%).

Concerning seed yield, treating sesame seeds with different fungicides or biocides produced an increase in seed yield of sesame plants. The best result for seed yield was noticed with combined treatments *i.e.* Rizolex-T/Maxim, which gave 315.1 kg/fed. However Rizolex-T/ Rizolex-T gave 310.7 kg/fed, when compared with control treatment.

As for the commercial biocides, Rhizo-N and Plant-guard 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 189.5 kg/fed. Also, Rizolex-T/ Plant-guard (199.5kg/fed.), while Vitavax-T/Plant-guard(195.4kg/fed.) compared with control treatment.

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

b) Season 2003 on Ismailia:

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 to 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 control.

27- Effect of seed dressing and /or soil treatment with some fungicides or biocides on mortality and wilt disease and total

seed yield of sesame cv. Giza-32 during seasons 2002&2003.The tested fungicides 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 &Plant-guard, respectively compared with control treatment.

a) Season 2002 on Giza:

Soil treatments, indicated that, the tested fungicides were significantly effective in controlling disease incidence, the combined treatments between soil/seed treatment, show that, seed/soil fungicides proved be effective, the fungicide Rizolex-T/Maxim recorded (7.6%), Rizolex-T/Rizolex-T (5.4%)with% efficacy (71.1&79.5%, respectively). Results indicated that the tested fungicides caused an increase in seed yield of sesame and the combined treatment proved to be the best in increasing seed yield *i.e.* Rizolex-T/Maxim (325.0 kg/fed), while Rizolex-T / Vitavax-T gave 298.7kg/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-TNitavax-T(83.6%)compared to control treatment. For Rhizo-N and Plant-guard, the combined treatment for Rizolex-T/Rhizo-N recorded 211.4kg /fed, while Vitavax-T/Rhizo-N(213.0kg/fed), Rizolex-T/Plant-guardn (198.9 kg, /fed) compared to control.

b) Season 2003 on Giza:

Concerning the combined treatments between soil/seed dressing, data show that,soil/seed dressing proved to be effective against the disease.Also, Rizolex-T/Maxim gave(9.7%),Rizolex-

T/Rizolex-T ($^{8.7}$%),Rizolex-TNitavax-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-TNitavax-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%).