

Effect of *Penicillium commune* fungus infiltrate in controlling nymphs and adults of *Bemisia tabaci*(Homoptera: Alyrodidae) on eggplant *Solnium melongena* in laboratory.

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Abstract :

A laboratory study was conducted with the aim of testing the efficiency of the fungus *Penicillium commune* in some aspects of the life performance of the, *Bemisia tabaci*. The results of the study showed that the fungus filtrate *P. commune* has an effect on the nymphal and the adults phase , with the highest mortality rate of 89.8% at the time period of 72 hours, and the concentration of 75% for the nymphal role , As for the adult role, it also gave the highest percentage of mortality at the time period of 72 hours, which amounted to 78.5% at a concentration of 75%.

Key word : *Bemisia tabaci* , *Penicillium commune*

Introduction

: The eggplant plant, *Solnium melongena* L., is one of the crops of the *Solanaceae* family, which includes about 2000 species, including annuals and perennials. The eggplant plant is found wild in the central regions of India and southeast China, and has moved to the rest of the world (1). In Iraq, eggplant is considered one of the important crops economically and nutritionally, and the cultivated areas have increased, especially in greenhouses, due to the increasing market need, where the cultivated area reached 54,469 dunums, with a production rate of 207,202 tons (2). Vegetable crops, including the eggplant crop, are infected with many diseases and insect pests that have a significant economic impact. Among these important pests are the tomato fruit worm *Heliothis armigera* and the two-spotted dream *Tetranychus urticae*, the most important of which is the *B. tabaci*. economical (3). using of chemical pesticides repeatedly in pest control caused the emergence of new strains resistant to the action of those pesticides that were repeatedly used in their control, and this naturally requires continuing to find new effective pesticides that soon also lose their effect with repeated use, so the *P. commune* fungi was chosen in an attempt In order to invest it as a

safe alternative to chemical pesticides, the fungus belongs to the kingdom of high or real fungi. This fungus grows widely in nature and is often found in the plant rhizosphere (4), This type of fungus uses statins as a defense mechanism against other microorganisms that require sterols or isoprenoid compounds, and statins inhibit HMG-CoA reductase, an enzyme that plays a major role in the production of cholesterol (5).

Materials and methods:

Insect collection, breeding and diagnosis:

Several pairs of adult insects (males and females) were collected from eggplant farms planted under greenhouses and placed in breeding boxes with dimensions of 200 cm x 60 cm x 120 cm. placed wire on the sides of the cage. Petri dishes containing eggplant leaves were placed inside the cage to feed the insects. The insect was diagnosed. By Assistant Professor Dr. Razzaq Shaalan Akl, University of Baghdad / Natural History Museum and Research Center.

Preparation of *P. commune* filtrate

The liquid food medium (PDB) was prepared as in paragraph B, and the antibiotic

Tetracycline was added to it at a rate of 250 mg / L, and the medium was distributed in glass containers with a capacity of 250 ml and an amount of 150 ml and inoculated with three discs with a diameter of (5) mm by piercing the cork from the edge of the purified fungal colony on PDA culture medium Diagnosed at 7 days old .The glass containers were incubated at a temperature of 2 ± 25 °C, taking into account that the containers were shaken every (3-4) days in order to distribute the fungal growth. After 28 days, the filtrate was filtered using Whatman No. 1 filter paper. 1 and then re-filtration using the Millipore fine filter. The filter was used in the subsequent experiments. (6).

Treatment of insects

Effect of *P. commune* infiltrates on the percentage of nymphal and adult mortality of *B. tabaci*

It used petri dishes with a diameter of 9 cm and placed in each of them sterile filter paper in order to place the leaves of the eggplant plant on them after wrapping their necks with cotton swabs moistened with water for the purpose of feeding the insect, and put in each replicate (10) nymphs of the *B. tabaci* by (3) repetitions for each concentration. The repeaters were sprayed with extract concentrations (25%, 50%, 75%) by withdrawing a quantity of the filtrate by a sterile medical syringe and completing it by adding sterile distilled water to 100 ml to prepare the previous concentrations. The control treatment was a distilled water only, at the rate of (3) ml / refined by a sprayer. handy to ensure coverage .The dishes were sprayed at a distance of 5 cm. The dishes were incubated in the incubator at a temperature of 30 ± 2 C. The percentage of mortality was calculated after (24, 48, 72) hours.the same method was followed for the adult role.

Statistical analysis: The experiments were analyzed according to the factorial experiment

model and with a completely randomized design (C.R.D) and using the Least significant difference (L.S.D) test under the probability level (0.05) to show the significance of the existing differences. The percentage of mortality was corrected according to the equation (7)

Results and discussion:

Table (1) shows the effect of the fungus filtrate on the nymphal phase where the highest percentage of the mortality rate reached 79.9 at a concentration of 75%, and the lowest percentage of mortality at a concentration of 25% reached 37.4 . It is also noted that there is a direct proportion between the time period and the concentrations, that is, where the time period increases, the percentage of death rate increases, reaching 37.4%, 57.1%, and 79.9% in concentrations 25%, 50%, and 75% at (24, 48, 72) hours. As for the interference, the highest percentage of the mortality rate was 89.8% at the concentration of 75%, and the results of the analysis indicated that there were significant differences in the results obtained compared with the control treatment.

Table (2) indicates the effect of fungus filtrate concentrations on the death of the adult role *B.tabaci*, the results of the statistical analysis indicated the significant differences. It was observed that the effect of increasing the concentration of the filtrate caused an increase in the death rates of the adult period, and the highest percentage 70.6% concentration 75% of the death 30.5% concentration 25% rate was the lowest percentage. As for the effect of the time period factor, the death rates increased with the increase of the time period reaching 30.1% , 37.3 % , 45.1% in (24, 48, 72)hours, compared with the control treatment.

Table (1) The effect of different concentrations of the fungus *P. commune* on the percentage of the nymphal period mortality of the *B.tabaci*

average concentrations	72	48	24	Time period (day) / concentrations
0.5	0.7	0.7	0.3	0
37.4	46.8	36.7	28.7	25
57.1	69.0	59.1	40,3	50
79.9	89.8	79.0	71.0	75
—	68.7	58.5	46.8	average Time (period (day
4.2	L.S.D value (0.05) for concentrations			
3.7	L.S.D value (0.05) for the time period			
5.3	L.S.D value (0.05) for interaction			

Table (2) The effect of different concentrations of the fungus *P. commune* on the percentage of the mortality rate of the adult role of the *B.tabaci*

average concentrations	72	48	24	Time period (day) / concentrations
1.0	0.9	0.6	0.00	0
30.5	41.8	29.3	20.5	25
48.5	59.2	47.2	39.1	50
70.6	78.5	72.3	61.0	75
—	45.1	37.3	30.1	average Time (period (day
3.7	L.S.D value (0.05) for concentrations			
6.2	L.S.D value (0.05) for the time period			
4.6	L.S.D value (0.05) for interaction			

The reason for the increase in the mortality rate may be due to the efficiency of the fungal filtrate because it contains fungal toxins, where the percentage of death increases relatively with the increase of the concentration and the time period. It has a

solid wall that the fungus needs a longer time to penetrate (8). In a study conducted by (9), he indicated that the filter *A. niger* achieved a mortality rate of (90%) 48 hours after the treatment of the nymphal role of the aphid insect. The reason may be due to mycotoxins

secreted by fungi, which affect vital activities, as they may disrupt some tissues. killing it, or it may affect the growth and development of the insect. As well indicated (10) showed that the phylum Imperfect fungi have the ability to attack the insect, due to its secretion of enzymes that analyze the body wall, such as Lipase, Chitinase, and Protease. The study also agrees with its findings (11) where the fungus filter *Trichoderma harzianum* gave a mortality rate for nymphs and whole wheat (31.49, 41.44, 46.30%) for concentrations (25, 50, 75)%, respectively, in nymphs, while the adult role was (28.05, 37.00, 42.30) % for concentrations (25, 50, and 75), respectively.

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