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Issue Article

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FUNGI ISOLATED FROM SUCKING PESTS IN GREENHOUSE CONDITIONS AND THEIR BIOLOGICAL CHARACTERISTICS

Abstract: *This article presents the results of the study on the efficacy of the use of entomopathogenic fungi against sucking pests found in the greenhouses in Kibray, Zangiota, Parkent, Yukorichirchik, Urtachirchik, Chirchik districts of Tashkent region.*

Key words: *Entomopathogen, fungus, biological control, pest, pure culture, Petri dish, suspension, sucking pest, conidia.*

Language: *English*

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Introduction

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In the world, cultivation of agricultural crops in greenhouses has been widely implemented in the last few decades and is developing rapidly. Because the production of agricultural products on protected land is distinguished by its productivity. In about 120 countries around the world, greenhouse production has become an independent branch of agriculture, and today, agricultural products are grown on more than 620,000 hectares of greenhouses worldwide. Of these, 402,000 hectares are occupied by vegetable crops, the main part of which is tomatoes, cucumbers, peppers and lettuce. The yield and quality of vegetable crops grown in greenhouses are seriously damaged by pests and diseases. Various pesticides are widely used to control such harmful organisms. This leads to deterioration of the ecological situation. Therefore, in this case, biopesticides have a special place [1,2,3].

The use of chemical pesticides against the pests of the crops on protected land causes the emergence of the pests that are resistant to the standards of insecticides allowed for use in greenhouses. As a result, greenhouse whitefly, spider mite, russet mite, peach aphid and field aphids become dangerous pests. Increasing the amount of the preparation to be used, and the rate of application has a negative effect on the

health of the workers in the greenhouse, it also leads to an increase in the toxic amount of the used preparation that remain in the products grown there [4,5]. Therefore, the use of entomopathogenic fungi as a biological control measure against these pests in greenhouse conditions is of great importance.

The studies were conducted on fungi isolated from sucking pests and some of their biological characteristics, and on the efficacy of using entomopathogenic fungi against the sucking pests in greenhouses in Kibray, Tashkent, Zangiota, Parkent, Yukorichirchik, Urtachirchik districts of Tashkent region.

Experiments were conducted on the bases of the study to isolate pure cultures of fungi from dead insects, to study their species composition and to determine their pathogenicity.

Diseased and dead samples of the greenhouse whitefly and field aphid collected from the greenhouses of the Tashkent region were planted in light agar nutrient medium in Petri dishes in a laminar box under sterile conditions.

It was found that the fungi isolated from the samples of dead and diseased greenhouse whitefly and field aphid common in the greenhouses of Kibray, Tashkent, Zangiota, Parkent, Yukorichirchik and Urtachirchik districts of Tashkent region belonged to 32 species.

As a result of the research, it was found that the species composition of the biotrophic fungi isolated from the sucking pests in the greenhouse was not so high, but mainly facultative parasites and saprophytic fungi were found more often. Biotrophic parasites were found to include: *B.bassiana*, *E. thaxteriana*, *E.coronate*, *E.virulenta, P.javanicus, P.varioti, S.brevicaulis* species, while facultative parasites include; *A.flavus, A.niger, A.ochraceus, C.acremonium, F. sambucinum, F.lateritium, M.hiemalis, R.nigricans, S.alternansm* fungi species. The rest of the isolated fungi were noted to be saprophyte species.

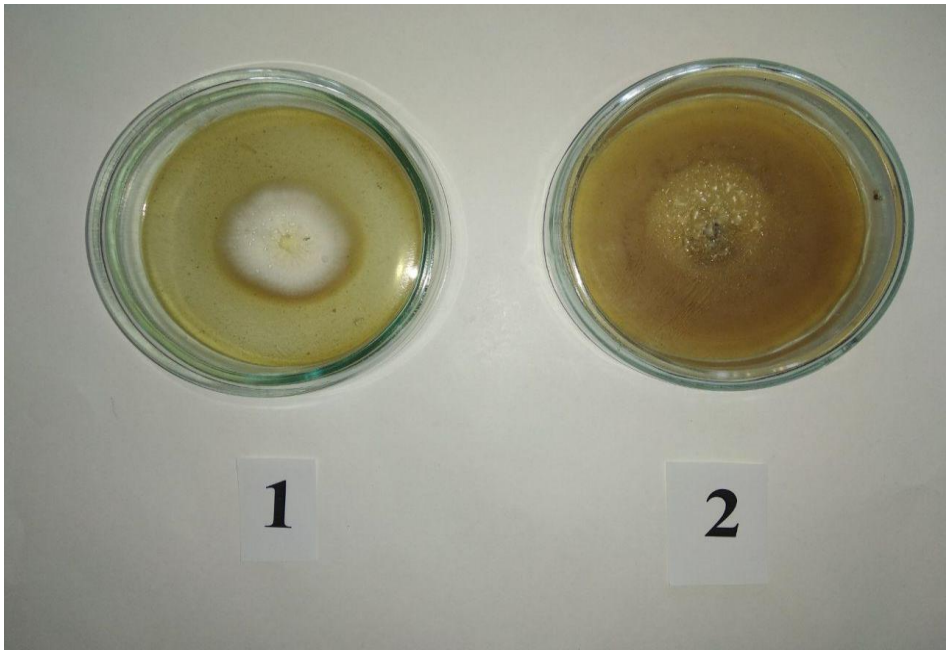
Based on the results of the research, among the fungi isolated in the greenhouses of Tashkent region, it was found that the diseases of the greenhouse whitefly and field aphids were mainly caused by *P.varioti* and *B.bassiana* fungi belonging to *Deuteromycetes* class.

Entomopathogenic fungi were grown in artificial nutrient media and studied for their pathogenicity against greenhouse whitefly in laboratory conditions. Several strains of these fungi were tested for their pathogenicity against different ages of greenhouse whitefly. When artificially infesting greenhouse whitefly with the suspension of *P.varioti* and *B.bassiana* fungi, the symptoms of the disease in insects were the same as the external symptoms typical for diseases caused by the same entomopathogenic fungi.

The obtained results showed that EMR-57 and EMR-36 strains of *P. varioti* manifested high virulence against the larvae and nymphs of the whitefly, it made 31.0% and 24.2% in 3 days and 57.0% and 64.9% in 7 days, 62.4% in 65.9% in 14 days compared to the number of pests before treatment. EMR-57 strains against imagos manifested 11.8% in 3 days, 62.3% in 7 days and 63.5 in 14 days. The virulence of EMR-33 and EMR-20 strains against larvae and nymphs was 17.8% and 11.4% in 3 days, 41.4% and 31.8% in 7 days and 53.5% and 43.2% in 14 days. Against the imagos, this indicator was 5.6% and 6.5%, 21.1% and 18.2%, and 43.7% and 57.1%, respectively. The EMR-5 strain virulence was 12.2% in 3 days, 29.8% in 7 days, and 33.0% in 14 days against larvae and nymphs, while against imagos 4.3%, 10.5%, 38.6%, respectively.

Differences in virulence against the greenhouse whitefly were also observed among *B. bassiana* fungus strains. The virulence of EMV-71 strain against larvae and nymphs was 28.1% in 3 days, 59.5% in 7 days and 61.8% in 14 days. This indicator was 9.3%, 52.0% and 65.3%, respectively, against imagos. EMV-69 and EMV-8 strains infected 21.0% and 15.8% of larvae and nymphs in 3 days, 45.0% and 35.6% in 7 days, 55.0% and 48.9% in 14 days. EMV-69 and EMV-8 strains infected 7.2% and 4.8% imagos in 3 days, 51.8% and 41.7% in 7 days and 55.4% and 44.0% of imagos in 14 days.

Eggs of the greenhouse whitefly were found to be relatively resistant to all these fungal strains.



Pic.1. fungi isolated from sucking pests in greenhouse conditions and their biological characteristics

As a result of the conducted experiments, it was observed that the strains of entomopathogenic fungi differ from each other in their virulence characteristics at different stages of the development of the greenhouse whitefly from its egg stage to the imago.

By observing the development of the above entomopathogenic fungi, it can be concluded that the preservation of these fungi in laboratory conditions and saprophytic reproduction led to a change in the pathogenicity and virulence properties of their parasitic race and population in nature against insects in different extent.

When selecting strains of entomopathogenic fungi with high virulence, the main focus is on their virulence properties. Therefore, in the preparation of biopreparations, their properties were always studied and strains were chosen by selection methods. Among these methods, the easiest is to study the morphological and cultural characteristics of entomopathogenic fungi during the cultivation of pure cultures in laboratory conditions. Morphological-cultural characteristics of the fungus *B.bassiana* were studied in strains of pure cultures isolated from dead specimens in the greenhouse. As a result of the conducted experiments, when the morphological and

cultural characteristics of the strains of *B.bassiana* fungus were studied, it was found that they have a heterogeneous nature. Phenotypic heterogeneity of entomopathogenic fungi indicates that they have great selective potential. This is the basis for concluding that it provides a great opportunity to isolate strains with high virulence and to use them as a starting material for creating effective biopreparations that are used against harmful pests and they do not have a negative impact on the environment.

One of the most important conditions for obtaining a preparation with high efficiency is the use of fast-growing and high-spore-forming strains isolated from the natural population of fungi.

In scientific studies, 37 strains isolated from the natural population of the fungus *B.bassiana* were used from diseased and dead specimens of sucking pests in the greenhouse.

In the selection of strains of entomopathogenic fungi, their rapid growth, speed of conidia formation, germination and virulence degree were taken as the main criteria. In addition, changes in their morphological and cultural characteristics were also studied when they were grown in different nutrient media. The mycelial growth and conidia formation rate of *B.bassiana* strains were observed for 25 days after inoculation in nutrient media. The most and fastest formation of conidia of the entomopathogenic fungus was observed in the strains grown on potato nutrient medium. The observed difference in the relative growth rate of the strains grown on these media during the initial period was almost unnoticeable by 25 days. It was found that the titer of conidia produced by *B.bassiana* in the nutrient media was: $32{,}4 \cdot 10^6$ kqb/ml in beer wort, $15{,}7 \cdot 10^6$ kqb/ml in Chapek and $68{,}9 \cdot 10^6$ kqb/ml in the potato medium.

The diameter of the colonies formed by the strains used in the experiment in different nutrient media differed little from each other. The strains of the fungus *B.bassiana* isolated from nature showed the highest results for all parameters in the nutrient medium of potato with peptone among the nutrient media available for the experiment.

Based on the results obtained on the basis of experiments, it was concluded that as the main criterion for selecting strains for the production of entomopathogenic biopreparation based on *B.bassiana* fungus, the titer of conidia produced by them, the rate of growth of strains in agar nutrient media and the rapid formation of conidia produced by them, dense colonies presence of conidia layer and virulence characteristics should be considered. At the same time, it is necessary to eliminate folds in the colony formed by strains.

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