

**ИЗУЧЕНИЕ ПАТОГЕННЫХ ХАРАКТЕРИСТИК
ЭНТОМОПАТОГЕННЫХ ГРИБОВ ДЛЯ ВРЕДНЫХ САРАНЧИ**

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**STUDY OF THE PATHOGENIC CHARACTERISTICS OF
ENTOMOPATHOGENIC FUNGI TO HARMFUL LOCUSTS**

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Аннотация. Из 5 видов выявленных у саранчовых энтомопатогенных грибов, 3 вида оказались высокопатогенным для личинок второго возраста итальянского пруса. Предлагается для дальнейшего изучения штамм ВД-85 гриба *B.brongniartii*.

Annotation. The article gives information about 5 species of entomopathogenic fungi identified in locusts, which are 3 species recorded as highly pathogenic for second-instar nymphs of the Italian locust. Strain VD-85 of the fungus *B.brongniartii* is proposed for further study.

Key words: Entomopathogen, fungi, insects, bacteria, microorganisms, larvae.

Ключевые слова: Энтомопатоген, грибы, насекомые, бактерии, микроорганизмы, личинки.

It is important to protect plants from harmful organisms in the production of high-quality and ecologically clean products from agricultural crops. In recent times, plant protection is becoming a developed and perfected agricultural direction on a new scientific biological basis.

Over the years, the use of toxic chemicals has led to a number of negative consequences. As a result of the practical use of chemicals that damage the

environment and have a negative effect on human health, causing enormous environmental and economic damage, the problem of their less use in agriculture has arisen.

For this, it was necessary to find other preparations that could replace pesticides or to apply new methods instead of chemical methods. Therefore, in recent years, important biological research on the use of beneficial insects and microorganisms has been rapidly developed, in-depth study of the biological properties of harmful organisms - insects, plant diseases, weeds.

Entomopathogenic fungi, unlike other entomopathogenic microorganisms, can pass through the outer cover of insects and show disease (Nurjanov, 2019). We have isolated entomopathogenic fungi that cause disease in locust species, which cause great damage to agricultural crops, and studied their pathogenicity against the larvae of these locusts.

Materials and methods of scientific research.

It is known that there are more than 250 species of stilts in our Republic. Among them, locusts (*Locusta migratoria migratoria* L.) and oasis locusts (*Calliptamus italicus italicus* L.), which we are studying, are widespread in the Lower Amudarya region and form large reservations mainly in the territory of the Republic of Karakalpakstan (Nurzhanov, 2019). In our research, we have fully studied the microbiome of grasshoppers collected from this area. Microorganisms were isolated from locusts brought to laboratory conditions, and we studied their morpho-cultural, physiological, and pathogenic characteristics. Locust larvae, adults or pupae were collected and observed to isolate microorganisms. When the insects were observed with binoculars and found to have fungi in the outer layer, they were planted in the prepared nutrient media in a Petri dish using a bacterial hook. If fungi were not detected in the cuticle of insects, they were studied in wet chambers under sterile conditions. For this, a Petri dish was taken, a filter paper and a glass slide were placed inside it, and the studied insects were placed on it. Such prepared moist chambers are stored and monitored in a thermostat at 25-28°C for 5-7 days. During this period, insects with fungus growing on their bodies were studied. With the help

of a bacterial loop, fungal spores are taken and planted in the nutrient medium in a petri dish, and they are kept in a thermostat at a temperature of 27-280 C and observed for 2, 4, 6 days.

Entomopathogenic fungi were treated by spraying their suspension on the body of insects to determine their virulence properties.

We used a Goryaev camera to determine the amount of spores in the suspension. Different solutions (from 1×10^3 to 1×10^8) were prepared and the insects of the experimental variants were treated. In the analytical version, insects were treated with plain water. The studied insects were kept in special insectaries and were fed with plants.

The results obtained

Factors affecting the pathogenic properties of microorganisms include the degree of virulence of microorganisms, the susceptibility of insects to diseases, and external factors.

For the practical use of fungi isolated from locusts, we studied their pathogenicity against 2-year-old larvae of the oasis locust. For this, 2-year-old larvae of the locust were taken and treated with a spore suspension prepared from the culture of fungi. In addition to the fungi isolated from the Asian locust and the voxa locust, the pathogenicity of the VD-85 strain of the *Beauveria brongniartii* fungus isolated from the Moroccan locust (*Dociaustarus maroccanus* Thunb) was determined for the larvae of the voxa locust. The results of the experiments are presented in Table 1. As can be seen from the data presented in the table, for the 2-year-old larvae of the voxa locust, the VD-85 strain of the fungus *Beuveria brongniartii* and the fungi *Aspergillus flavus*, *Aspergillus ochraceus* can be included among the fungi showing high pathogenicity. This type of entomopathogenic fungi was able to kill 95.8%, 70.0% and 68.0% of the larvae of the insect during the 10th day. It was found that the *Fusarium oxysporum* fungus has the ability to kill larvae in the amount of 43.3%. Among the studied fungi, it was found that *Paecilomuces varioti* has very low virulence properties for voxa larvae. Thus, it was found that the entomopathogenic fungi *A. flavus*, *A. ochraceus* and *B. brongniartii* fungi isolated

from locusts have high pathogenicity for voxa locust. Among the studied species of fungi, the species belonging to the genus *Aspergillus* are practically prohibited from being used in plant protection. Because it has been determined that the toxins produced by this type of fungi can affect warm-blooded animals, therefore, they are practically not used as entomopathogenic microorganisms. Therefore, we propose to study the VD-85 strain of the fungus *B. brongniartii* for practical use against locusts.

Table 1

Pathogenicity of entomopathogenic fungi for 2-year larvae of the locust

A type of fungus	Suspension titer	Death of larvae %		
		on the 3rd day	on the 7rd day	on the rd 10day
<i>A. flavus</i>	1x10 ⁸	13.3	36.7	70.0
<i>A. ochraceus</i>	1x10 ⁸	7.3	30.0	68.0
<i>P. varioti</i>	2x10 ⁷	0	3.3	13.3
<i>F. oxysporum</i>	7x10 ⁷	3.3	23.3	43.3
<i>B. brongniartii</i> ВД-85	1x10 ⁷	4.2	72.0	95.8
Analytical	-	2.0	4.7	7.3

Summary. Larvae of 5 types of entomopathogenic zambrug, *A. flavus*, *A. ochraceus* and *B. brongniartii* species isolated from locusts of forest (*Locusta migratoria migratoria* L.), oasis (*Calliptamus italicus italicus* L) and Moroccan (*Dociaustarus maroccanus* Thunb.) was found to have high virulence properties and recommended to study the VD-85 strain of *B. brongniartii* fungus in practical control of locusts.

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