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Research Article

RESEARCH ON THE MICROBIOLOGICAL METHOD OF COMBATING HARMFUL INSECTS AROUND THE WORLD

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ABSTRACT

The most common insect disease is muscardine. The causative agent - the Bressian's Boveria - affects more than 60 species of insects that live in the country. In nature, this fungus can be retained on plant remains. It is transported by insects and mites. One type of muscardine was described by I.I. Mechnikov. The discovery of this fungus on the bug beetle initiated research on the microbiological method of combating harmful insects around the world. It is now known that the toxins released by the green muscardine are capable of killing blood-sucking mosquitoes. On the nut-tree false parasitic the fungus of the genus Cordyceps is parasitic.

KEYWORDS

Mushrooms, parasites, aspergillus, epiphytes, saprotrophs, entomofluor coronata, hypha bodies, multiply.

INTRODUCTION

Almost all representatives of this group of fungi are parasites of insects. Aerial conidia, which are abundant in entomopathogenic fungi, indicate that they arose during the transition of lower aquatic fungi to a

terrestrial lifestyle. Mushrooms have a wide specialization, i.e., they can develop on different substrates of animal and plant origin. Most of them are cosmopolitan - they are found wherever there is a host,

optimal temperature and appropriate humidity. Entomopathogenic fungi penetrate the insect body through the integument, using enzymes (chitinase, protease, lipase) released during spore germination. Some species have club-shaped thickenings, due to which the mycelium, developing, is inside the cuticle of the host insect. *Aspergillus* fungi enter the body of the insect through the spiracles. The method of penetration of the fungus into the body of an insect mainly depends on its specialization. For example, muscardine fungi, which are distinguished by a certain confinement, having penetrated into the body through the outer layer of the epitulum, after 38-42 hours fill the body cavity with unicellular fragments of mycelium (hyphae bodies, blastospores) - they float freely in the hemolymph, multiplying by division and budding. All this leads to the destruction of body tissues. The action of toxins is also detrimental to insects. [1,4].

MATERIALS AND METHODS OF RESEARCH

The most common insect disease is muscardine. The causative agent - *Boveria Bassian* - affects more than 60 species of insects living in the country. In nature, this fungus can survive on plant debris. It is carried by insects and mites. One type of muscardine was described by I. I. Mechnikov. The discovery of this fungus on the bread beetle marked the beginning of research on the microbiological method of combating harmful insects throughout the world. It is now known that the toxins released by green muscardine are capable of killing blood-sucking mosquitoes [2,4].

Mushrooms from the genus *Aspergillus* are typical saprotrophs, but under certain conditions they are able to develop and bear fruit in the tissues of living insects. These fungi produce toxins and are capable of infecting pupae of peacock eyes, mites, locusts (Desert and Asiatic locusts), termites and bed bugs.

This mushroom proved to be especially effective in the fight against whiteflies. The death of pest larvae after spraying with a mushroom suspension reaches 80%. Mycophilic fungi parasitize on ptomopathogenic fungi. For example, marsupial fungus melanospore parasitizes on *Boveria Bassian*. Almost all representatives of the family of entomophoric fungi are parasites of insects. The genus *Entomophthora* includes more than 60 species. Sporulation in these fungi is very rare. The group is transitional from lower aquatic fungi to terrestrial ones [2,3].

RESEARCH RESULTS

Entomophthora sphaerosperma, a parasite of cabbage whitefish, cabbage moth, a number of aphids, thrips, apple sucker, etc. (representatives of 4 orders), belongs to broadly specialized species. It is known that another species - *Entomophthora coronata* - affects not only many species of insects, but also warm-blooded animals - horses, mules - and even humans. Entomophoric fungi in the body of the affected insect form a unicellular mycelium, which breaks down into hyphae bodies. These bodies are carried by the blood stream throughout the body of the host and replace the destroyed tissues. The death of an insect occurs from a violation of blood circulation and from released toxins. These fungi reproduce by conidia, which are formed on the body of an insect, as a rule, after its death. Sometimes they appear on an infected but still moving insect and thus spread the disease. In autumn, the affected insects often perish on top of herbaceous or shrubby plants in a characteristic posture that contributes to the maximum spread of conidia. Under unfavorable conditions, resting spores are formed. These spores are more often formed inside the body of an insect, sometimes on the surface. Resting spores have a different structure and color, they contain a large amount of fat. Resting spores enter the soil with

insect corpses and can remain there for a long time, and under optimal conditions, germinating, give insect epizootics.

Mosquitoes, most often females, are also exposed to diseases caused by entomophoric fungi. This phenomenon is being studied and it is possible that biological control measures will also be applied against mosquitoes. Pea aphid entomophorosis is quite common. It was found that the death of aphids in the autumn period reduces their number for the next year [4].

CONCLUSIONS

In addition to entomopathogenic fungi, there are also obligate parasites (zoopagic) living on amoebas, nematodes, and insect larvae. They permeate the entire body of the victim with thin hyphae. The surface of fungal hyphae is sticky, which allows them to attach to prey. Fungi of the genus Acaulopage, Endocochlus, and Zoopag are parasitizing on amoebas. These fungi live in soil, leaf humus and manure. The most common is the species that parasitizes on the nematode - stylopaga khadra. All entomophoric fungi are of great importance for the organization of biological control measures.

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