

POSSIBILITIES OF BIOLOGICAL PROTECTION OF FORESTS AGAINST HARMFUL ORGANISMS

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Annotation

The main goal of the biological protection of forest trees is to obtain environmentally friendly products while maintaining the biological diversity of biocenoses. The use of biological protection in forests helps to reduce chemical treatments and preserve the number of beneficial organisms in nature. Until now, in the conditions of the Republic of Uzbekistan, the need to use a biological method of combating pests of forest and ornamental trees has not been felt. Based on this, information is provided on the possibility of using a biological method of combating harmful organisms.

Keywords: biological protection, harmful organisms, phytophages, phytopathogens, fungicides, insecticides, monitoring, population.

ЎРМОНЛАРНИ ЗАРАРЛИ ОРГАНИЗМЛАРДАН БИОЛОГИК УСУЛДА ЎИМОЯ ҚИЛИШ ИМКОНИАТЛАРИ

Ўсимликлар карантини ва ўимояси илмий-тадқиқот институти

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Аннотация:

Ўрмонларда дарахтларни биологик ўимоясининг бош мақсади – биоценозлардаги биологик хилма-хилликни сақлаган ҳолда юқори сифатли (экологик хавфсиз) маҳсулот олишдир. Биологик усуллар туфайли кимёвий ишлар сонини қисқартириш ва табиий кушандаларнинг табиатдаги сонини тиклаш имконияти туғилади. Ўзбекистон республикаси шароитида, ҳозирги вақтгача, ўрмон ва манзарали дарахтларнинг зарарли организмларига қарши курашда биологик усулни қўллашга эҳтиёж бўлмаган. Ўрмонларни зарарли

организмлардан биологик усулда ҳимоя қилиш имкониятлари ва бошқа муҳим мълумотлар келтирилган.

Калит сўзлар: Фитофаглар, фитопатогенлар, зарарли организмлар, табиий кушандалар, популяция, фитосанитария, мониторинг, фунгицид, инсектицид.

Biological protection of plants in a broad sense means the use of living organisms, substances produced by their activity, or synthetic analogues in order to reduce the damage caused by pests and disease-causing agents. In a narrow sense, the classical biological method means the use of living organisms in the fight against harmful organisms: parasites, predators and pathogenic microorganisms. The essence of the biological protection method is to use the antagonistic relationship between the pests of forest and agricultural crops and their parasites and predators (entomophages and acariphages), especially insects, mites and pests with bacterial, fungal, viral and complex diseases.

Biological protection of forests from harmful organisms is based on interspecific relationships between groups of antagonistic living organisms found in nature. In this case, existing living organisms or their substitute analogues are used against harmful organisms. The classical view of the biological method involves the use of parasites, pathogens and their hosts in the fight against harmful organisms. They are called biological control agents. As a result of the use of these agents, it is possible to reduce the number of pests and the damage caused by diseases.

The difference between the biological control method and the chemical control is that environmental pollution is prevented, the negative impact of harmful chemicals on plants, people and forest biocenosis is reduced, and the number of harmful organisms is not allowed to increase for a certain period of time. Knowledge, attention and demandingness are required from specialists in the field when using the biological control method.

When carrying out biological protection works in forestry and planning them, it should be taken into account that the pest and its agent, beneficial entomophages, interact in one ecological system.

An ecological system is such a natural (natural-anthropogenic) complex that its members are directly connected to each other and consists of 2 different organisms living in the same environment. This definition of the ecological system was given by the English geobotanist Tensley in 1935, and this concept entered science in the middle of the 19th century.

Since the goal of protecting trees from harmful organisms in forests is to control their numbers in pest populations, this can be done through the direct use of biological control methods.

The balance of harmful and beneficial organisms in any natural population is determined by the following indicators: birth (generation left by a female pest in a certain time unit); mortality (death of species per unit of time) and migration rate

(Figure 1). One of the main directions of using the method of biological control in the forest biocenosis is aimed at reducing the number of pests and, on the contrary, increasing the number of beneficial insects (entomophages). Another approach is to increase the rate of migration of harmful insects by "scaring" them.

The basis of biological protection of trees from pests, diseases and weeds in forestry is the correct use of interspecies relationships formed by evolution in nature.

Macro and microbiological terms are used in the protection of forest trees, as in biological protection of plants. Microbiological method - from microorganisms and products produced as a result of their life activity, macrobiological method - from macro-organisms (insects, birds, fish, vertebrates, plants).

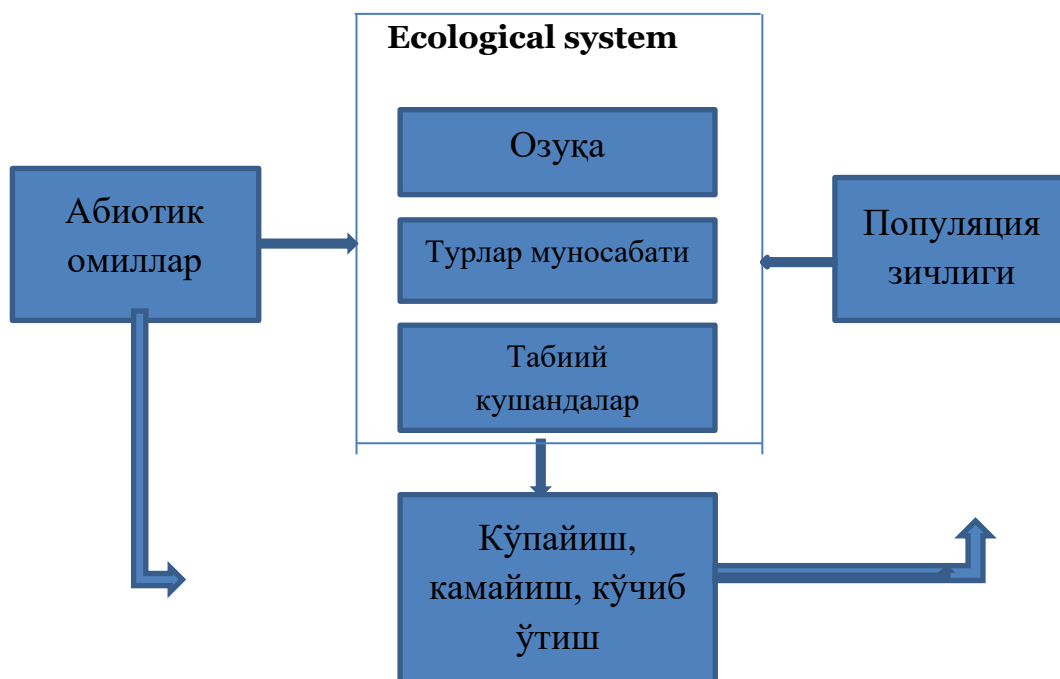


Fig. 1. Regulation of their density in the population of pests in nature is to use. These methods are part of the biological protection of plants, and their content is somewhat broad.

According to M.S. Sokolov, plant biological protection is a field of fundamental and applied sciences, the subject of its research is bioagents and bioregulatory organisms, natural or genetic changes and their genetic products. This field combines representatives of many independent disciplines, such as ecology, entomology, phytopathology and microbiology.

Biological protection includes the following agents:

- insect predators, parasites and entomopathogens;
- herbivores and phytopathogens against weeds;
- Antagonistic microorganisms against diseases, their metabolites and inducers of plant resistance.

forests is to obtain high-quality (ecologically safe) products while preserving biological diversity in biocenoses.

Biological control is not primarily the eradication of harmful species, but rather the control of their quantity through biological control, based on four main strategies:

- 1) Introducing a biological agent from a distant range into a population of a harmful species and ensuring that the agent is established in the population for a long period of time in order to systematically manage the numbers of phytophages, phytopathogens and weeds. This strategy was first successfully used in the second half of the 19th century in California (USA) to eliminate the Australian hookworm by means of the rhodolia beetle introduced from Australia. Therefore, this strategy is often called the perfect strategy.
- 2) One-time distribution (or introduction) of a biological agent into the agroecosystem in order to control the amount of harmful organisms for a long time (but not permanently), to ensure their further reproduction and development;
- 3) Dissemination of a biological agent many times in order to quickly stop the reproduction and development of harmful species;
- 4) Preservation of useful species in nature by various methods, enhancing their activity and taking into account.

This is a kind of general strategy to protect plants from pests, diseases and weeds to one degree or another.

The effect of entomophages on changes in the number of pests can be divided into 2 groups: functional (each entomophage is responsible for the density (number) of the pest population) and quantitative (the increase in the number of pests depends on the increase in the number of natural entomophages), the diagram of their interconnection is shown in Fig. 2.

In mathematical models (Lotka, Volterra, Nicholson-Bailey) representing the relationship between the population of pests and their natural enemies, the change in the number of natural entomophages, as well as the tasks of regulating their number, have been solved [4,5].

At this point, it is appropriate to stop at the method of environmentalist Gauze. He developed the ideas of Lotka and Volterra and concluded from his experiments in 1931-1935: "two identical species cannot live in the same place if their ecological requirements are the same."

As an example, in the "parasite-host" system, the parasite *Diprion similis* (Wisconsin, USA) consists of two species - *Exenterus amictorius* and *Monodontomerus dentipes*. Their activity is divided by time, the first of them infects the pests of the first generation, and the second infects those of the second generation. *E. amictorius* infects 45-60% of first-generation cocoons of the pest, while *M. dentipes* infects up to 5% of worms. When passing to the second generation, damage is 10-12% and 18-53%, respectively.

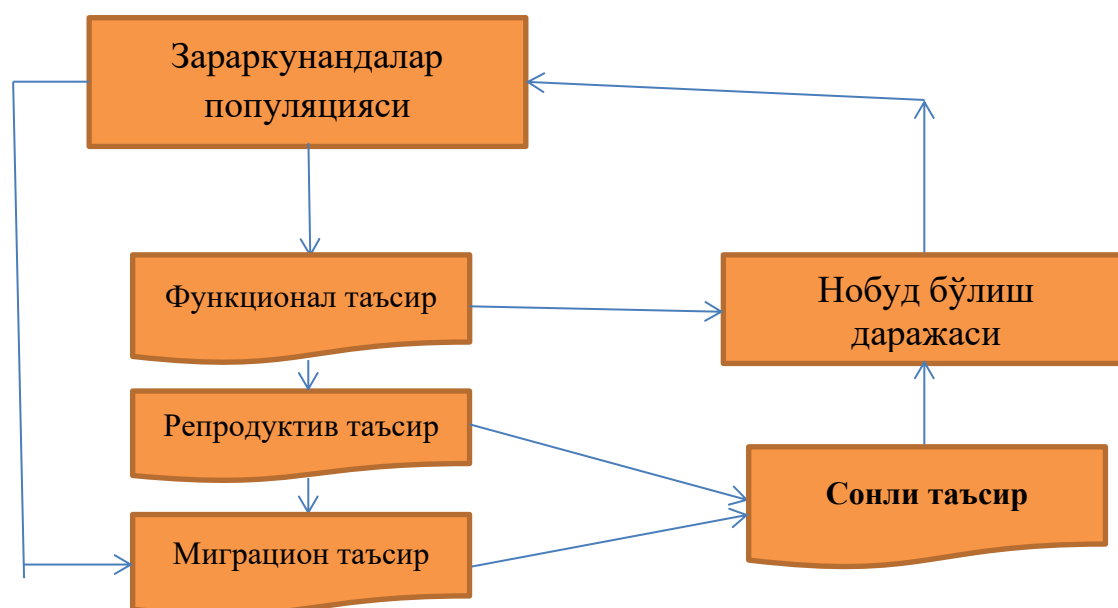


Fig. 2. The relationship between pest populations and their natural killers

The essence of biological protection of forests against harmful organisms is primarily biocenotic management. The creation of a forest biological protection system is based on several principles. First of all, this is the organization of phytosanitary monitoring in forests and forecasting the dynamics of the number of not only harmful species, but also entomophages, entomopathogens and antagonistic microbes. If the number of beneficial species does not reach the efficiency criterion, it is necessary to distribute entomophages or use biopreparations.

In addition, on the one hand, the high biological activity of biological agents, and on the other hand, the optimal growth and development of the protected plant should coincide. The use of resistant, including transgenic varieties and fungicidal (bactericidal) or plant growth-accelerating preparations provides a reliable protective effect.

It is necessary to follow the principle of mutual and plant compatibility of all biological means used. Based on this point of view, the system of biological protection of plants is a set of methods of using resistant varieties, distribution of entomoacarifages and application of biopreparations, it is carried out on the basis of phytosanitary monitoring and taking into account the activity of useful species, thus achieving biocenotic balance.

Thus, in the ecological protection of forests, biological means perform the function of the mechanism of activation. Due to biological methods, it is possible to reduce the number of chemical works and restore the number of natural killers in nature.

Summary

In the conditions of the Republic of Uzbekistan, until now, there was no need to use biological methods in the fight against harmful organisms of forest and ornamental trees. For this reason, great attention is paid to the protection of agricultural crops using biological control methods.

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