

# STUDY OF THE PHYTOSANITARY STATE OF LANDSCAPE AND FOREST TREES IN ZOMIN AND BAKHMAL FOREST FACILITIES

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## Abstract

Phytosanitary inspections conduct in the Zomin and Bakhmal forest areas of Jizzakh region. Observations conduct to study the sanitary, entomological and phytopathological condition of all types of ornamental and forest trees and shrubs in the. "Zomin" National Nature Park, Zomin State Forestry and Zomin State Reserve in the Zomin district, as well as the natural conditions of plants, natural reproduction processes, and the incidence of pests and diseases. During the study, the phytosanitary condition of ornamental and forest trees (juniper, pine, poplar, hawthorn, walnut, white birch, almond and fir) in the Usmanlisoy and Suffa areas of the Zomin National Nature Park of Jizzakh region, and the Usmanlisoy and Arikisoy areas of the Zomin Forestry study.

**Keywords:** Forestry, ornamental tree, phytosanitary, pest, diseases, fungus, damage.

## Introduction

Of the total area of 23,890.2 hectares of the Zomin National Nature Park, 17,213.9 hectares covered with forest. Of these, 294.4 hectares cultivated forests, 69.6 hectares non-contiguous forests, 1,655.5 hectares sparse forests, and 155.2 hectares barren lands. Of the total area of 63,256 hectares of the Zomin State Forestry, 26,911 hectares cover with forest. Of these, 4,523 hectares cultivated forests, 1,746 hectares non-contiguous forests, 2,478 hectares sparse forests, and 48,873 hectares barren lands. The Zomin State Reserve, Bakhmal Forestry, Bakhmal Farmers' Association, Zomin Forestry and the neighboring Republic of Tajikistan locate in the territory bordering the State Border, with a total area of 26,840 hectares. Based on observations made by the security expedition team for scientific research, it notes:

These areas are mainly cover with junipers that are 150-300 years old and older. It founds that there are mainly 3 types of junipers in the region: "Zarafshon", "Yarim sharsimon" and "Turkiston", and It widespreads among the shrubs, honeysuckle (*Lonicera*), rosehip (*Rosa*), barberry (*Berberis oblonga*), ephedra (*Ephedra*), and among the medicinal herbs - common field





tea, common bougainvillea, goosefoot, deergrass, astragalus, nutmeg, Turkistan marigold, mountain basil, cumin and other species.

On the slopes of the Zomin Mountains, at an altitude of 1,800-3,000 meters above sea level, Turkestan juniper (*Juniperus turcestanica*), hemispherical juniper (*Juniperus semiglobosa*), and Zarafshan juniper (*Juniperus zervschanica*) well develop, favorable conditions have been created for the natural regeneration of juniper.

Today, it determines that the natural regeneration of junipers on the slopes of the Zomin Mountains occurs in different ways, depending on the soil and climatic conditions of the area.

### Research locations and methods

In 2024, as part of the visit of specialists from the Federal State Budgetary Institution "All-Russian Plant Quarantine Center" (FSBI "VNIKR") to the Republic of Uzbekistan, joint phytosanitary surveys conducted together with scientists from VNIKR in the Zomin and Bakhmal forestry of the Jizzakh region. Observations made to study the sanitary, entomological and phytopathological condition of all types of ornamental and forest trees and shrubs in the "Zomin" National Nature Park, Zomin State Forestry and Zomin State Reserve in the Zomin district, as well as the natural conditions of plants, natural reproduction processes, and the incidence of pests and diseases. During the study, the phytosanitary conditions of ornamental and forest trees (juniper, pine, poplar, hawthorn, walnut, white birch, almond and fir) in the Osmanlisoy and Suffa areas of the Zomin National Nature Park of Jizzakh region, and the Osmanlisoy and Arikisoy areas of the Zomin forestry study. Samples taken for laboratory analysis and study of diseases and pests found in forest trees in these areas.

According to these coordinates in the Kulsoy area of the Zomin reserve 1-39.638722, 68.482556, 2-39.606587, 68.367177, 3-39.617215, 68.480718, 4-39.617252, 68.481893, 5-39.617806, 68.482556, 6-39.722168, 68.486642, 7-39.718777, 68.500717, 8-39.718353, 68.502210, 9-39.643186, 68.504637, 10-39.714528, 68.444444, 39.662757, 68.494437 The phytosanitary conditions of ornamental and forest trees (juniper, pine, poplar, hawthorn, walnut, white birch, almond and alder) study. The research focuses on spruce forests and pine forests. It studies trees such as juniper, spruce, crimean pine, camellia, as well as hawthorn, poplar, willow, birch, walnut. Monitoring of the distribution, damage, and bioecological development characteristics of pests of ornamental and forest trees carry out using the methods of Yu.N. Baranchikov, A.N. Bobrinsky, A.V. Golubev, P.V. Gordienko, determination of the species composition of forest harmful organisms carry out using the methods of Ye.A. Bondarenko, R.N. Glebov, G.I. Zarudnaya, B.G. Popovichev, and insect damage carry out using the methods of V.I. Tansky.

### Results

Monitoring has conducted to determine the presence of pests and disease-causing fungi on weak trees.





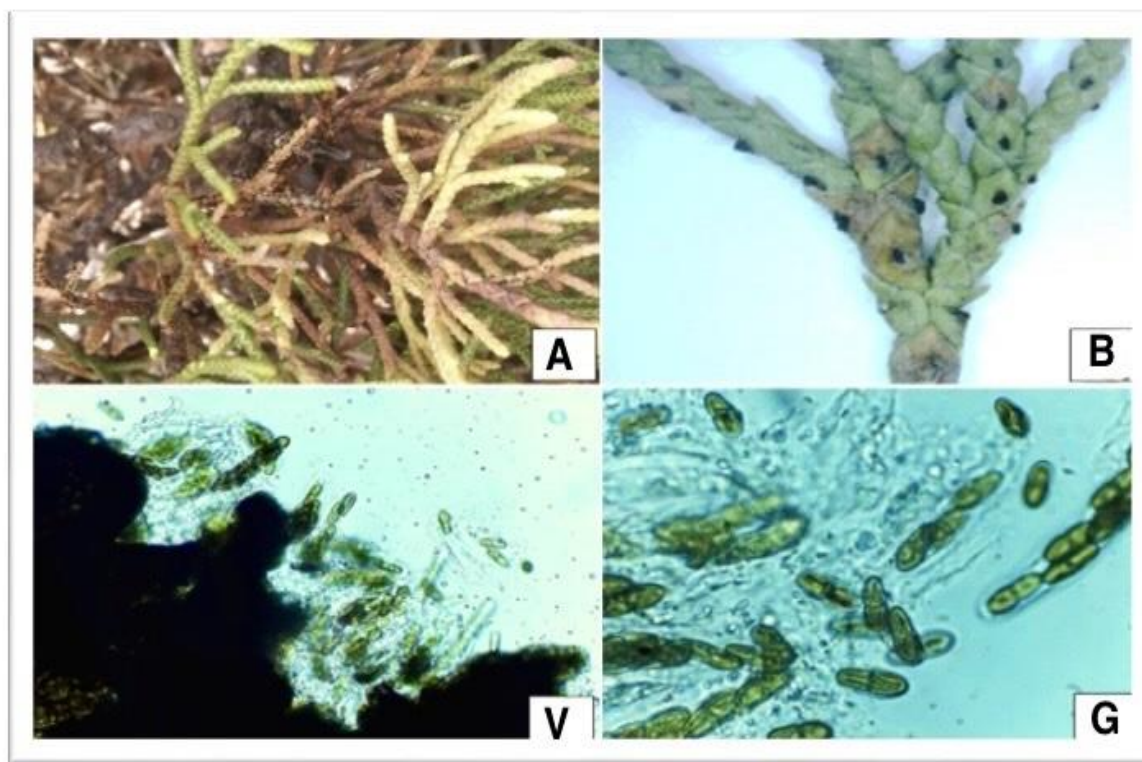
**Picture 1. Appearance of diseased and weakened trees and the process of taking samples from them**



In parallel with these research studies, the entomofauna of the target and accompanying plants has studied. The collection of entomological materials carry out using generally accepted methods. As a result of mycological studies conducted on forest trees in the territory of the Zomin National State Park, the following types of diseases identified:

**Black spot disease of juniper.** The causative agent of the disease is *Seynesiella juniperi* (Desm.) G. Arnaud.

**Symptoms:** This disease causes black spots on the needles and young branches of the Zarafshan juniper - *Juniperus seravschanica* Kom. The disease leads to the destruction of the needles and young branches of the plant.



**Picture 2. Spot disease of Zarafshan juniper:**

A, B – infected plant leaf, V, G – thierothecium, asci and ascospores.

**Rust disease of juniper (*Juniperus Kitam.*).** Pathogen: *Gymnosporangium fusisporium* Ed.Fisch.

**Symptoms:** This rust disease occurs in almost all types of juniper in the Zomin district. Rust disease mainly affects juniper branches. The affected part of the branch thickens, forms nodules and cracks. As a result, after a certain period of time, the infected juniper branch completely dries out.

**Picture 3. Spot disease of**



### Zarafshan juniper:

A, B - leaf of an infected plant.

**Juniper rot disease.** Pathogens *Rigidoporus juniperinus* Gafforov, L.W.Zhou, E. Langer sp. nov., *Coniferiporia uzbekistanensis* L.W. Zhou, Xue W. Wang & Gafforov, sp.nov., *Phellinus punctatus* (Fr.) Pil.Atl.Polyp.

**Symptoms:** These fungi grow and develop on the trunk and surface of the roots of the Zarafshan juniper - *Juniperus seravschanica* Kom., causing internal rot. As a result, the perennial trees dry out.



**Picture 4. Internal white rot disease of the trunk of Zarafshan juniper:**

A, B – fruiting bodies of the fungus on the trunk of a spruce tree



**Diplodia disease of juniper.** The pathogens of the disease is *Diplodia juniperi* Westend.

**Symptoms:** The needles and young branches of the spruce will damage.

**Hawthorn rust (*Gymnosporangium*).** Division: Basidiomycota, class: Pucciniomycetes, family: Pucciniaceae.

*Gymnosporangium globosum* is a plant pathogen that causes hawthorn rust. In early spring, reddish-brown spots begin to appear on the back of hawthorn leaves. Later, yellow thorns (spines) will appear on the fruits. These thorns may be up to 4 mm long. These symptoms are clearly visible under natural conditions. This disease can be found on the branches, fruits, and leaves of the tree.



**Picture 5. Hawthorn rust disease**

The causative fungus overwinters in the trunk of infected trees. In early spring, when the tree branches covered with green leaves, it produces teliospores. The basidium then produces basidiospores, which spread by wind and rain and begin to damage plant tissues (branches, fruits, leaves).

### Entomological researches

Among the widespread pests that on the slopes of the Zomin Mountains, it determined that the Central Asian mealybug (*Planococcus vovae* (Nassonov)), which currently causes great damage to juniper plants, the urban mustache beetle, the odd silkworm, the poplar pore-forming moth, and the juniper golden beetle (*Anthaxia conradti* Sem.) and the juniper cedar bark beetles (*Phloeosinus turcestanicus* Sem.) and other trunk pests infected old juniper trees.

As a result of the monitoring, the following pests observed: the juniper golden beetle - *Anthaxia conradti*, the juniper borer *Phloeosinus turcestanicus* Sem., the city mustache *Aeolesthes sarta*, the *Calosoma sycophanta*- caterpillar hunter, and several species of weevil *Polydrusus inustus* Germar, *Eusomus ovulum* Germar, *Cionus* sp., *Sitona* sp., and *Tychius* sp.

Among the identified specific pests of juniper, only one finding of the juniper bark beetle *Phloeosinus turkestanicus* Semenov, 1902. can be note. During the period of additional feeding, adult beetles bite the young shoots of juniper, gnawing away the entire wood. As a result of such damage, only a hollow tube remains from the stem, and the young shoots damage in this way break off and fall to the ground along with the needles. However, when found in small numbers and in isolated cases, this pest is not consider dangerous.



Picture 6. Gypsy moth - *Ocneria dispar* L.



Picture 7. Poplar moth - *Lithocolletis populifoliella* Tr.

During the research, in addition to harmful (phytophagous) insects, several species of entomophagous insects that feed on numerous plant pests found. *Coccinella septempunctata* Linnaeus, 1758, *Psyllobora vigintiduopunctata* (Linnaeus, 1758), *Adalia bipunctata* (Linnaeus, 1758), *Harmonia quadripunctata* (Pontoppidan, 1763) belonging to the subfamily Coccinellidae, as well as beneficial insects *Calosoma sycophanta* Linnaeus, 1758, and *Empusa pennicornis* (Pallas, 1773), Mantis sp., belonging to the subfamily Braconidae, which play a main role in controlling the number of pests of agricultural and forestry plants found.

Thus, from all of the above, it is clear that no quarantine insects detected during the study of the most important tree species and adjacent grasslands of the Zomin National Nature Park in the Jizzakh region.

### Conclusion and recommendations

1. At an altitude of 1,500-3,000 meters above sea level, it is recommended to plant seedlings of the Hemispherical and Zarafshan juniper in a 6x6 meter pattern using the field method and between the rows, three-leafed, na'matak, and black spruce plants from seeds and seedlings;
2. Taking into account the level of natural reproduction of junipers in the territory of the Zomin State National Nature Park, it is necessary to monitor the incidence of diseases annually, conduct inspections and observations of erosion by regularly inspecting the root system of trees and the condition of the soil;





3. It is required to organize regular inspection and certification of the types, health, and sanitary conditions of newly imported ornamental tree and shrub seedlings in the laboratories of the Plant Quarantine and Protection Agency;
4. It is recommended to plant auxiliary tree and shrub species (pine, maple) that help spruce seedlings grow in open areas and to carry out forest restoration work.

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