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BIOLOGICAL EFFICIENCY OF DUPLET TT 22.5% EM.C. PREPARATION AGAINST THE MAIN DISEASES OF JUNIPER

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Annotation. In the article, Duplet TT 22.5% em.k drug was used in juniper against phomopsis, rust, diplodiosis, microterium diseases at a consumption rate of 0.5 l/ha. The biological efficiency of the drug against diseases was phomopsis 82.2%, rust 85.7%, diplodiosis 84.9%, microtherium 85.1%, and other data were given.
Key words: juniper, disease, drug, biological efficiency.

Introduction. The world of plants is considered the most important resource in human life, and when they are used wisely, it becomes an inexhaustible source of raw materials. Plant diversity is an important life source, actual and potential resource for all countries. Plants are important in the sustainable development of society, in solving its economic, cultural, aesthetic and ecological needs.

In the climatic conditions of our republic, the spread of diseases that harm conifers and the environmentally safe control measures against them have not been sufficiently studied. Coniferous trees are mainly distributed in mountainous and densely populated urban areas. If we take into account the limited possibilities of using highly toxic insecticides from an environmental point of view in carrying out measures to protect them due to their strong damage by diseases, it is of great scientific and practical importance to carry out scientific and research activities directed to the above problems. It is important to develop the theoretical and practical basis for the cultivation of conifer species new to the climatic conditions of Uzbekistan and protection from their main diseases. In order for conifers to grow well and look beautiful, it is important to carry out all necessary agrotechnical measures, fertilizing and watering in a timely manner and to protect them from pests and diseases in a timely manner. In the world and in the conditions of our Republic, some research works against diseases of conifers have been carried out.

A.S.Yudina, A.Yu.Tatarintseva, M.V.Kocherginalar (2020) Ornamental shrub species perform ecological functions and play an important aesthetic role in landscape architecture plantings of the city of Voronezh. Coniferous species enrich the environment with phytoncides that have a beneficial effect on the human body. When planting landscape architecture objects in the city of Voronezh, the main types of diseases in the assimilation of ornamental shrubs are powdery mildew, spotting, rust, deformation, false powdery mildew, needle cast. They can be moderately harmful to plants and in small quantities. Bushes were studied in 3 groups according to their resistance to infectious diseases. Among the most resistant, they noted that Thunberg's cypress, blood-red swine, "Blue Carpet" silver fir, western camellia and several other species are included. In order to increase the biological stability of seedlings and reduce the spread of pathogens in them, they conducted research on the combined protection of quarantine, monitoring, agrotechnical and forestry methods, as well as chemical protection of plants.

According to A.V.Popova, M.V.Kochergina (2023) evaluates the condition of ornamental tree species and shrubs in the conditions of Semiluksky district of Voronezh region and suggests measures to improve it. In the process of inventory, the main factors that reduce the resistance of plants are non-compliance with the rules of planting and care, the plants do not receive the necessary nutrients, as a result, they lose their resistance to pests and pathogens. As measures aimed at improving the health of plants, they recommended an integrated protection system, which includes agrotechnical care, chemical or biological protection, and monitoring the condition of plants aimed at timely detection of signs and factors of their weakening.

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A total of 11 types of micromycetes were identified in coniferous trees in Andijan region. Fusarium in the nursery: *Fusarium oxysporum* Schlecht. and *F. solani* (mart.) Sacc., *Verticillium dahlia* Klebn. species such as the Fusarium genus is more common. Among perennial trees, spruce rust disease (the causative agent is *Gymnosporangium confusum* Plowr.) damage to needles (phomopsis, rust), on shoots and branches (diplodiosis, phomopsis) on spruce needles and buds (*Hormiscium pinophilum* (Nees.) Lind., *Fumago vagans* Pers.) diseases such as 9 species of micromycetes from 7 genera of 3 families belonging to 3 orders causing root rot, spruce rust and black spot of conifers were identified. Maxim in lysimeter experiment, 2.5% sus.c. (0.2 and 0.4 l/t), Vitavaks 200, 75% m.pow. (3.0 and 4.0 kg/t) and Topsin-M, 70% m.pow. (1.0-1.5 kg/t) were used. Fundazol, 50% m.pow, is good against root rot disease as a model. (2.0 kg/ha) drug was used. The best results are Maxim, 2.5% sus.c. (1.5 l/t) and Topsin-M, 70% m.pow. (1.5 kg/t) were shown by seed treatment (Siddikova, Nuraliev, 2020).

According to T.V.Nejentseva (2023), the purpose of research in Russian botanical gardens is to study the ecological and biological characteristics of Juniperus species and varieties in order to solve the practical problems of optimizing landscapes and cultural communities in the region. The following types of diseases that cause small amounts of damage to needles are recorded; in juniper, needle cast -*Juniperus chinensis, J. Chinensis* sp; Stricta and spruce rust - *J. sabina* sp. Tamarissifolia. Sustainable ornamental tree species and forms are recommended for propagation in industrial nurseries and for use in landscaping.

The negative impact of weather, climate and anthropogenic factors (industrial and transport pollution) on the development of non-infectious and infectious diseases of conifers in Uzbekistan, as well as a greater susceptibility to non-parasitic diseases associated with violations of agrotechnics of agricultural cultivation, and the most common disease in nurseries wilt, death of branches (diplodiosis, phomopsis, alternariosis), less cancer, rust and needle cast were found. It was noted that these diseases lead to a significant loss of the decorative properties of plants, a general weakening and a reduction in life expectancy.

The issue of the composition of phytopathogenic fungi damaging coniferous plants in the Botanical Garden of the Academy of Sciences of the Republic of Uzbekistan was considered. Among the diseases noted were seed drop caused by fusarium and verticillium fungi and spruce rust in large trees. Also, a rare disease that has not been detected in Uzbekistan until now - simple needle cast was recorded. The causative agent of the disease is *Lophodermium* sp. The causative agent of ordinary needle cast was identified by the authors as *Lophodermium* sp. recognized because the dimensions described by the authors are very different from the diagnosis.

Materials and research methods. 6 types of pathogenic fungi belonging to 3 classes, 5 genera, 5 families and 5 genera of Juniperus species were identified in Zomin National Nature Park and Zomin State Reserve. Among them, *Gymnosporangium fusisporum*, *Gymnosporangium turkestanicum* and *Microthyrium* species are recorded as dangerous pathogens for spruce. A brief description and photos of these species are provided. GIS maps of common species such as *Gymnosporangium fusisporum*, *Microthyrium* juniperi and *Hyphodontia zhixiangii* have also been compiled (Iminova, Mustafaev, Islamiddinov, Ortikov, 2020).

So far, in the conditions of Uzbekistan, phomopsis (the causative agent is *Phoma eguttulata*), rust (*Gymnosporangium confusum*), diplodiosis (*Diplodia pinea*) and microterium are the main types of diseases detected in spruce. If these diseases are not dealt with in time, fir trees can lose their decorative ability and even completely dry up. Based on the above, Duplet TT, 22.5% em.c. The drug was tested against phomopsis, rust, diplodiosis, microterium diseases of juniper.

Control measures. Chemical treatments were carried out using a manual motorized sprayer at a rate of 1000 liters of working fluid. The experiments were carried out from 8 to 10 am, air temperature was 22 ^{o}C, wind speed was 1 m/sec. The scale for assessing the degree of damage to spruce trees by phomopsis, rust, diplodia, microterial diseases:

0-healthy leaves;

1- single spots on the leaf surface occupying up to 1% of the leaf surface;

2- individual spots on the leaf surface occupying 1-10% of the leaf surface;

3- 15-25% of the leaf surface is infected;

4- 26-50% of the leaf surface is infected;

5- 50% of the leaf surface is infected, the spots are covered with a dark coating of spores.

The scale for assessing the damage of branches and needle leaves with phomopsis, rust, diplodiosis, microterium diseases:

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0-healthy branches;
1-small spots, rare small spots;
2-spots small, isolated, tested;
3-Single spots up to 5 mm in diameter (2-3), with a light coating of sporulation, tested;
4-significant number of spots, large (5-10 mm), joining, with a dark coating of sporulation, there may be cracks;
5-numerous spots, large (10 mm), combined, with a dark coating of sporulation, with deep cracks.
The percentage of development of the disease is determined using the following formula

$$П = \frac{э(а \cdot б) \cdot 100}{Н \cdot К}$$

Here:
P- Percentage of disease development, %;
Э (а· б) is the sum of the number of damaged plants (a) multiplied by the corresponding damage indicator (c);
H - Total number of counters;
K-The highest damage index on the scale.
The biological effectiveness of the drugs was calculated based on the disease development index.

$$Б.Э = \frac{Пк - По}{Пк} x100$$

Here:
Б. Э.- biological efficiency,%;
$П_к$- Disease development in control, %;
$П_о$- Disease development in experiment, %.
Implementation of experiments, subsequent records and calculation of biological efficiency were carried out based on the "Methodological instructions..." (2004) approved by the State Chemical Commission of the Republic of Uzbekistan. Since the effectiveness of the drugs depends on the time of treatment, that is, on the state of the disease, we performed 1 treatment. Treated with a motorized hand sprayer against diseases.

Table 1 shows the results of the test to determine the biological effectiveness of the drug Duplet TT, 22.5% em.c. (125 g/l tebuconazole, 100 g/l + triadimefon) against the disease of spruce. When the drug was used at the consumption rate of 0.5 l/ha, the biological efficiency was 82.2% on the 14th day of the calculation. These obtained results are close to the indications of the model Torso, 22.5% em. c. drug at the consumption rate of 0.5 l/ha and were as follows. Here, on the 14th day of the calculation, a biological efficiency of 83.0% was observed (Table 1).

Table 1

Intensity and biological efficiency of Juniper with phomopsis disease

(Experience of juniper production against phomopsis disease in Zomin district, Jizzakh region)

Options	Drug consumption rate, l/ha	**Incidence (%)**		Biological efficiency, %
		Disease	*Disease progression*	
Duplet TT, 22,5 % em.c.	0,5	6,25	0,75	82,2
Torso, 22,5 % em.c. (template)	0,5	7,1	0,8	83,0
Control (unprocessed)	-	6,75	9,5	-

Table 2 shows the results of the test to determine the biological effectiveness of the drug Duplet TT, 22.5% em.c. against the rust disease of spruce.

Table 2

Intensity and biological efficiency of Juniper with rust disease

(Experience of juniper production against rust disease in Zomin district, Jizzakh region)

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Options	Drug consumption rate, l/ha	Incidence (%)		Biological efficiency, %
		Disease	*Disease progression*	
Duplet TT, 22,5 % em.c.	0,5	9,31	1,2	85,7
Torso, 22,5 % em.c. (template)	0,5	8,22	1,6	83,2
Control (unprocessed)	-	7,92	9,4	-

When the drug was used at the rate of 0.5 l/ha, the biological efficiency was 85.7% on the 14th day of the calculation. These obtained results are close to the indications of the sample Torso, 22.5% em.c. preparation at the rate of 0.5 l/ha and were as follows. Here, on the 14th day of the calculation, the biological efficiency was 83.2%.

The results of the test to determine the biological effectiveness of Duplet TT, 22.5% em.c. juniper against diplodiosis disease are presented in Table 3. It can be seen from the table that when the drug is used at the consumption rate of 0.5 l/ha, the biological efficiency was 84.9% on the 14th day of the calculation. The obtained results are close to the indications of Torso, 22.5% em.c. drug at the rate of 0.5 l/ha and were as follows. Here, on the 14th day of the calculation, the biological efficiency was 81.3% (Table 3).

Table 3

Intensity and biological efficiency of Juniper with diplodiosis disease

(Experience of juniper production against diplodiosis disease in Zomin district, Jizzakh region)

Options	Drug consumption rate, l/ha	Incidence (%)		Biological efficiency, %
		Disease	*Disease progression*	
Duplet TT, 22,5 % em.c.	0,5	5,1	0,32	84,9
Torso, 22,5 % em.c. (template)	0,5	6,3	0,81	81,3
Control (unprocessed)	-	6,9	7,2	-

The results of the study on determining the biological effectiveness of the drug Duplet TT, 22.5% em.c. against the microtherium disease of juniper are presented in Table 4. It can be seen from the table that when the drug is used at the consumption rate of 0.5 l/ha, the biological efficiency was 85.1% on the 14th day of the calculation. The obtained results were as follows when using Torso, 22.5% em.c. drug at a consumption rate of 0.5 l/ha. Here, on the 14th day of the calculation, the biological efficiency was 84.4%. From the obtained results, it can be concluded that Duplet TT, 22.5% em.c. preparation is effective against spruce microtherium disease at the consumption rate of 0.5 l/ha.

Table 4

Intensity and biological efficiency of Juniper with microtherium disease

(Experience of juniper production against microtherium *disease in Zomin district, Jizzakh region)*

Options	Drug consumption rate, l/ha	Incidence (%)		Biological efficiency, %
		Disease	*Disease progression*	
Duplet TT, 22,5 % em.c.	0,5	13,3	1,9	85,1
Torso, 22,5 % em.c. (template)	0,5	14,1	2,2	84,4
Control (unprocessed)	-	12,1	11,8	-

In conclusion, Duplet TT 22.5% em.c. drug was recommended for use in juniper at a consumption rate of 0.5 l/ha twice a year against phomopsis, rust, diplodiosis, and microtherium diseases.

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