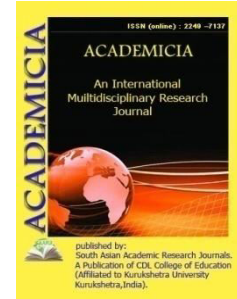




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**CUCUMBER PERONOSPOROSIS DISEASE**

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**ABSTRACT**

*Peronosporosis, which occurs in cucumber plants, is one of the most dangerous diseases, causing significant damage to the quality and quantity of the harvest. Chemical control measures are effective in timely protection of cucumbers from peronosporosis. Several drugs against this disease have been tested at different consumption rates. As a result, Score 250 em.k. (0.2 l / ha) and Fundazol 50% n.kuk. (1.0 kg / ha) Biological efficiency was achieved in the variants using fungicides up to 91.1%. In the protection of cucumber plant from peronosporosis disease Score 250 em.k. (0.2 l / ha) and Fundazol 50% n.kuk. (1.0 l / ha) has been proven to produce high and quality crops from the plant by applying fungicides in the morning or evening cool.*

**KEYWORDS:** *Cucumber, Peronosporosis, Disease, Damage, Disease Development, Chemical Control, Fungicide, Biological Effectiveness.*

## INTRODUCTION

The role and importance of the agricultural sector in ensuring food security of the world's population is growing. In particular, it is important to continuously meet the demand of the population for cucumbers in all regions of the country, integrate theoretical and practical knowledge and introduce into production timely protection from pests (pests, diseases and weeds) to further increase the quantity and quality of crops. About 1,000 types of chemicals are used to control diseases that occur in agricultural crops. By timely application of these drugs at different rates, agroclusters, farms and the population, as well as the population, help to maintain yields on farmland.

Cucumbers grown in the open fields of the country lose more than 50% of their harvest without the application of measures to combat peronosporosis (fake flour dew).

The disease is caused by oomycetes *Pseudoperonospora cubensis*, synonyms *Peronoplasmopara cubensis* and *Peronospora cubensis*. In countries around the world where peronosporosis is prevalent, the disease is one of the most dangerous diseases of cucumber in open fields and especially in greenhouses, and is the main disease of cucumber. Peronosporosis causes great damage to the cucumber crop and is an economically important disease. It is known that in some regions up to 80% of cucumber crop is lost due to this disease. In the United States, *P. cubensis* causes a loss of \$ 246.2 million worth of crops annually [1, 11].

All melon crops are prone to the disease, but often cause great damage to cucumbers. Peronosporosis in cucumbers and other pumpkin plants occurs in all parts of the world, in more than 70 countries [6].

Scientists have determined that peronosporosis is the dominant disease in greenhouses in some parts of Russia [13].

**Symptoms of the disease.** With peronosporosis, only the leaves of the plant are affected, but when the disease develops strongly, the fruits, stems, leaf bands, and flower bands are also damaged [7].

Symptoms of the disease vary depending on the type of host plant and weather conditions. On the adaxial (upper) side of previously damaged leaves appear indistinct light-green areas. Then they quickly turn yellow and take the form of irregular or bordered (serrated) by small veins of the leaf, the leaves become opaque and their edges are twisted upwards. Over time, the spots may retain their yellow color or take the form of brown, necrotic spots and completely cover the leaf. When the moisture is stored in the leaves for a long time, on their abacisal (lower) side, in front of the yellow spots on them, brownish-brown spots appear. Later, if high humidity is maintained, their surface is covered with a soft white or light gray mold layer consisting of sporangiophores and sporangia, at high humidity this layer turns gray, dark red or purple.

The disease spreads rapidly to the newly growing leaves. Strongly damaged leaves harden and dry out, and most of them fall off (plants can lose all their leaves), resulting in short stalks and a sharp decline in fruit yield. Resistant plants are severely damaged and they die within 2 weeks, according to other reports, 4-10 days after the first symptoms of the disease appear [7, 5, 6].

**Infected plants.** The family Cucurbitaceae includes more than 118 genera and 825 species. Among them are 12 cultivated species, with *P. cubensis* infecting 9 of their species in nature as

well as a number of semi-domesticated and wild species. In artificial insemination experiments, 60 species of 20 families of squash families were infected [7, 2].

In the old literature, it was noted that the oospores of *P. cubensis* were stored in plant debris for a long time (up to 6 years) and served as the primary source of infection in the spring. However, it has now been established that oospores of this species are very rare in nature and it is very unlikely that they can overwinter in the fields of all countries and regions where winters are cold [12, 14, 7, 1, 2, 5, 11].

It is noted that the pathogen is stored in live plants in regions with hot and cold winters and greenhouses, and that the sporangia formed in them fly to the northern regions with wind and are very likely to be the primary source of disease in the fields there. Evidence has also been obtained confirming that this is probably close to the truth. For example, plant-derived sporangia of the pathogen have been confirmed to fly 1,000 km alive in the United States, with winds flying from Poland and the Czech Republic to Finland and Sweden.

In such cases, oospores can grow in moist soil in the field and damage the leaves of cucumber grass. Sporangia of the pathogen are formed on the damaged leaves and spread in the field or in other fields, ensuring the development of secondary and subsequent generations of the disease. Sporangia are formed 4-5 days after injury; they are scattered throughout the field by wind, raindrops, workers' clothing, and work tools. The presence of 15 ° C temperature and drop moisture in the field for 6-12 hours creates optimal conditions for the formation of sporangia [5].

*P. cubensis* can be stored in the fruits and seeds of pumpkin plants. Sporangia fall on the upper side of leaves in early spring and grow in the presence of a drop of moisture at least 2 hours, at a temperature of 5-30 ° C, for which the optimum is 15-20°C. In this case, zoospores emerge from the sporangium and damage the leaves [2, 12, 7].

It is impossible to get high yields of cucumber plants without chemical protection from peronosporosis, because often the level of resistance of varieties can not ensure the abandonment of the application of fungicides. This requires regular inspection of the fields during the growing season, spraying the crop immediately (on the same day) with the appearance of the first signs of the disease. In areas where peronosporosis is observed annually, the first (prophylactic) treatment with a fungicide should be carried out before the onset of the disease. Timely application of chemical protection prevents the formation of resistance to fungicides in the pathogen. In many regions, when the weather is favorable for the disease, complete protection of the crop from peronosporosis is required once every (5-) 7 days, a total of 10-11 times. In cucumber fields, the 6th species of *P. cubensis* appeared early, yielding 100% in the U.S. when the fungicide was not sprayed, and 50% when applied after the fungicide had developed symptoms [4].

Fungicides belonging to 16 chemical groups are used in the world against diseases caused by oomycetes (including peronosporosis of cucumber). The most important of them are phenylamides, strobilurins (azoxystrobin, pyraclostrobin, famoxadone, etc.), carboxylic acid amides (dimetomorph, flumorph, etc.), acylalanins (metalaxyl-M), triazoles (propelcobotamyl), dicotyledonbaryl, dicotyledons, methyram, etc.), phthalimides (folpet, etc.), carbamates (propamocarb, etc.), chlorothalonil, copper chloride, sulfur, tsimoxanil, fosethyl-Al, fluazinam, thiazofalide, etaboxam and new compounds fluopicamide, tsiazide, tsiaz drugs containing

oxatiapiproline. Previously, gimexazole, fentin acetate, etridiazole fungicides, and plant growth-regulating atsibenzoles-S-methyl have also been used against oomycetes [3, 7, 2].

According to the analyzed literature, peronosporosis is a widespread disease in cucumber plants grown all over the world and has been studied to cause significant damage to crop quality and quantity.

**Object and methods of research.** The research was conducted in 2020 on the area of the farm "Yuldosh Polvon" (1.0 ha) in Bulungur district of Samarkand region, as well as laboratory work at the Research Institute of Plant Protection.

Research has been carried out on the basis of generally accepted methods in mycology and agricultural phytopathology.

Cucumber infestation with peronosporosis was accounted for on the following 6-point scale [16, 8].

- 0 - no signs of damage;
- 1 - there is a single spot on the leaves (first lesion);
- 2 - 5% of the leaf plate surface is damaged;
- 3 - 26-50% of the surface of the leaf blade is damaged;
- 4 - 51-75% of the surface of the leaf blade is damaged;
- 5 - 76-100% of the surface of the leaf blade is damaged;

The development of the disease was calculated according to the following formula [9].

$$K_p = \frac{\sum nv}{N \cdot G} \cdot 100$$

here:

$K_p$  = disease development;

$\sum$  – summa;

$n$  – the number of damaged leaves to a certain point;

$v$  – certain points;

$N$  – the number of leaves in the account;

$G$  – maximum score on the scale.

The biological effectiveness of fungicides used against the disease is calculated by the following formula [15].

$\Pi_H - \Pi_T$

Б.с. = ----- × 100

$\Pi_H$

B.c. – biological efficiency, %,

П.н. – controlled disease progression, %,

П.т. – disease progression in practice, %.

**Research results.** Against peronosporosis of cucumber in 2020 Score 250 em.k. (0.15-0.2 l / ha) and Fundazol 50% n.kuk. (0.8–1.0 kg / ha) fungicides were tested at different consumption rates. As a template Kurzat R n.kuk. (3.0 kg / ha) drug was selected (see table).

**table**

Biological efficacy of fungicides applied to cucumber peronosporiosis (at the rate of 400 l / ha working solution). Samarkand region, Bulungur district, Yuldosh polvon f / x 2020 y.

№	Preparations	Application rate, l/kg/ha	Damage, %	Illness development, %	Biological efficiency, %
1	Control - (not chemically treated)	-	25,3	10,1	
2	Kurzat R n.kuk. (tsimoxanil + copper chloroxide) (standard)	3,0	5	1,3	87,1
3	Score 250 em.k. (diphenconazole)	0,15	7,7	2,1	79,2
		0,2	3,7	1,0	90,1
4	Fundazol 50% n.kuk. (benomil)	0,8	7,0	2,0	80,2
		1,0	4,0	0,9	91,1

According to the study, the incidence of peronosporiosis in the control variant was 25.3% in cucumber leaves and disease progression was 10.1%.

Cucumbers are tested for peronosporiosis Score 250 em.k. (0.2 l / ha) and Fundazol 50% n.kuk. (1.0 kg / ha) high results were obtained in the variants using fungicides. At the same time, the biological efficiency reached 91.1%. Injury was observed up to 4.0% and disease progression up to 1.0%.

Tested at a small consumption rate, the Score is 250 em.k. (0.15 l / ha) and Fundazol 50% n.kuk. (0.8 kg / ha) The biological efficacy of fungicides ranged from 79.2% to 80.2%, i.e., less than 85.0%. Leaf damage was 7.0–7.7% and disease progression was 2.1%.

As a standard cucumber against peronosporiosis Kurzat R n.kuk. (3.0 kg / ha) during chemical treatment with the fungicide, the damage was 5% and the development of the disease was 1.3%, and the biological efficiency was up to 87.1%.

In summary, the Cucumber Plant's score against peronosporosis is 250 em.k. (0.2 l / ha) and Fundazol 50% n.kuk. (1.0 l / ha) application of fungicides in the cool of the morning or evening allows you to get a high and quality crop from the plant.

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