

## DISEASES OF OKRA (HIBISCUS ESCULENTUS L.) AND MEASURES TO CONTROL THEM

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### Abstract

The article presents the results of research on the efficacy of fungicides against *Rhizoctonia solani*, *Fusarium* spp, *Alternaria solani*, on okra (*hibiscus esculentus* l.). The preparations studied for biological efficiency.

**Keywords:** fungicide, pest, disease, chemical control, plant, okra, efficiency, yield, root rot, fusarium, *Alternaria*, variant, template, control.

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### INTRODUCTION

Food security depends on a wide range of socio-economic, demographic, and environmental factors and is one of the main components of the country's development. A national food security policy is developed and implemented on the four components of food security (availability of food, affordability, use, and sustainability).

Root rot according to the monitoring conducted in the last years in 2018-2022. (*Rhizoctonia solani*), fusarium wilt (*Fusarium* spp) and *Alternaria solani* disease are observed to cause severe damage to vegetable crops. The first symptoms of the disease appear on the leaves of the plant during the flowering period, and small, scattered chlorotic spots are formed on the lower leaf body. As a result of the growth and development of the diseases, the spots become larger and spots appear on the stems in the form of small round, dark or brown stripes.

On the underside of the leaf, brown or olive-colored conidiophores and conidia are formed.

A.M. Mominov, V.I. showed that the alternation disease occurs in cabbage, potatoes, and tomatoes in vegetable crops grown in the conditions of our republic. Pestsov (1986) and others reported.

According to B.A. Khasanov (2009, 2019), *Alternaria* disease is widespread in vegetable crops, *Alternaria alternata* in tomatoes, *Alternaria solani* in potatoes, *Alternaria radical* in carrots, *Alternaria brassica* in white cabbage, purple-red spotting in onions. *Alternaria porri* and polys crops are affected by *Alternaria cumerinum* disease.

According to the studies of J. Rotem, and J. Reichert (1964), the disease mainly spreads quickly in vegetable crops in areas with high rainfall, high air humidity, and temperature (24-29°C).

*Alternaria* disease hurts the quality of vegetable crops. In the studies of K.M. Konyaeva and others (1980), 30-60% of potatoes in the European part of the Russian Federation, 40-50% in the researches of U.S. Nelen, L.N. Vasilva in the Far East. yield loss was noted.

*Alternaria* disease is widespread in Europe, North America, and Asian countries, causing severe damage to tomato plants, and it has been determined that 20-40% of the crop can be lost (A.F).

*Alternaria* species, which cause *Alternaria* disease, have spread strongly in recent years in almost all crops, including potato crops, in the conditions of our Republic. Research on the study of this disease and the development of effective control measures has not been carried out sufficiently.

S.S.Alimukhamedov, M.U. Kholdorov and Dr. According (2019, 2020, 2021, 2022) fungicides for vegetables, potato seeds, and potato tubers are 2.5% s.k. -0.4l/t; When planted with Seles-top 31.5% s.k.-0.6l/t, root rot, fusarium wilt and the development and damage of other diseases are maintained for 40-50 days, and chemical treatment is prevented up to 2 times compared to the control, and a quality harvest is obtained. was achieved.

## METHODS AND MATERIALS

Fruits, seeds, and leaves of okra of Tashkent variety and Burgundy varieties served as the object of research. The field experiments were carried out based on methodological manuals (B.J.Azimov., B.B.Azimov 2002) "Methodology of conducting experiments in vegetable growing, rice growing and potato growing". The spread of diseases in the okra plant was determined by the formula (Chumakov, 1974):

$$P = \frac{n \cdot 100}{N} \quad \text{in this}$$

R- prevalence of the disease, %.

n- the number of diseased plants in the sample, pcs.

N- the total number of plants in the sample, pcs.

### Methods of determining the development of diseases.

The development of diseases in plants is determined based on a 5-point scale. In this;

0- healthy plants;

1- 10% damaged;

2- 11-25% affected;

3- 26-50% damaged;

4- More than 50% were affected (Dementwa 1985)

The development of diseases is found based on the formula (Chumakov, 1974).

$$R = \frac{\sum (a \cdot b)}{N} \quad \text{in this}$$

R is the average disease development rate, %, or score.

S (an x v) is the sum of the number of plants (a) and the corresponding damage percentage (v) or score.

The total number of plants from which the N-calculation was obtained.

## RESULTS OBTAINED.

**Root rot. (Rhizoctonia solani).** Root rot during germination of okra

seeds. (Rhizoctonia solani) affected up to 12-15%. It is aggravated during spring cold and wet weather. This disease appears in germinating seeds and until okra grasses have formed 4-5 tillers. First of all, a brown spot is formed in the root neck of the infected grass, it grows, surrounds the stem, the root turns black, the plant withers and dies, and the bark becomes shriveled.



**Fusarium disease:** the lower leaves of okra, often on one side, turn yellow and the plants become pale. Withered leaves dry, but do not fall, they hang on the branches, causing the plant to wither.



Wilt disease on okra leaves and stems

In the following years, root rot is one of the main diseases causing damage to vegetable crops. (*Rhizoctonia solani*), strongly damaged by fusarium wilt (*Fusarium spp*) and drying of the plant is observed. To prevent disease development, spread, and damage to the okra plant, okra seeds are pre-treated with fungicides against diseases.

The obtained results showed that okra seeds were treated and planted 20 days before planting with chemical preparations. After full germination of the okra plant, the effects of the applied seed fertilizers against the development of diseases were calculated on the 10th, 20th, 30th, 40th, and 50th days. The results of the development of Fusarium disease, when treated with chemical fertilizers, are presented in Table 1.

**Table 1. When planting okra seeds with medicated seeds impact on the development of Fusarium disease.**

Options	Standard of use l, kg/t	Progression of the disease, in the calculation of points				
		10 day	20 day	30 day	40 day	50 day
Control	d/c	0	1,7	2,5	2,8	3,5
Max 2.5% s.c	0,4	0	0,0	1,3	1,5	2,5
Celeste Top 31.2% s.c	0,6	0	0,0	1,0	1,3	2,4
Biological efficiency %						
Control	d/c	0	0,0	0,0	0,0	0,0
Max 2.5% s.c	0,4	0	100,0	48,0	46,4	28,5
Celeste Top 31.2% s.c	0,6	0	100,0	60,0	53,5	31,4

The level of development and damage of Fusarium disease in our experimental variants was monitored based on the scoring system. Seeds Maxim 2.5% d.c. - in our version, which was used at the rate of 0.4 l/t, no damage was observed until the 20th day of the development of fusarium disease, by the 30th day, 1.3 points, the efficiency was 48%, by the 40th day, the incidence was 1.5 points, the efficiency was 46,4%, by the 50th-day morbidity was 2.5 points, efficiency was 28.5%. When Celest Top 31.2% s.k. - 0.6 l/t is used, in our variant, the development of fusarium disease was not observed until the 20th day, and by the 30th day, we scored 1.0 points, the efficiency was 60%, and by the 40th day, the disease 1.3 points, the efficiency was 53.5%, morbidity by the 50th day was 2.4 points, the efficiency was 31.4%.

Compared to the control, it was observed that in our options where chemical preparations were used, the development of the disease and damage was maintained for 30-40 days.

Okra seeds fungicides Maxim 2.5% s.k -0.4l/t; Root rot when planted treated with Seles-top 31.5% d.c.- 0.6l/t. (*Rhizoctonia solani*), fusarium wilt (*Fusarium spp*) disease development and damage up to 30-40 days, as well as up to 2 times of chemical treatment compared to the control was prevented, and quality harvest was achieved.

**Anthracoze: *Alternaria solani*.**

Anthracoze from a common disease in our conditions: *Alternaria solani* disease. Okra plants develop sunken pads and necrosis when infected. Slightly concave, brown, or reddish-brown spots appear on the root neck and leaves. Root hairs become hairless, leaves turn yellow, and slowly dry from the bottom.



The experiments were carried out in the Okra variety. Alternariosis (*Alternaria solani*) disease in the okra plant started to produce small, chlorotic spots on the leaves at the stage of budding and flowering. The spots gradually progressed to the round dark liver or brown spots. The disease began to develop spots on the upper leaves and stems from the lower leaves. On the third day of May and the first ten days of June, brown, olive-colored dust began to appear on top of the spots formed during the flowering and fruiting period of the plant.

In the experimented field, when 2-3 points 25% with *Alternaria* disease started to develop, it was treated with fungicides.

According to the received data, Ordan 73.1% of fungicides against alternations in okra crops. -2.5 kg/ha and Previkur extra TGB 72.2% k.s. - 1.5 l/ha was used. In the treated variants, the degree of damage by the disease on the 10-15th day was equal to 0.31-0.22 points, and compared to the control, 93.3-94.2% efficiency was achieved, and on the 20th day, the efficiency was 72.5-75.0%. the decrease was observed. (Table 2)

**Table 2. Fungicides for *Alternaria* disease in okra biological efficiency**  
(*field experience, working fluid consumption 600 l/ha,*)

№	Options	Consumption rate of drugs l/kg/ha	The average level of damage before spraying the drug, points	Average damage after treatment, score			
				5-day	10-day	15-day	20-day
1.	Control	-	2,1	2,5	3,0	3,5	4,0
2.	From there 73.1% n.kuk.	2,5	2,0	0,31	0,2	0,2	1,1
3.	Previkur extraTGB72.2% s.c.	1,5	2,1	0,32	0,22	0,22	1.0
4	KurzatR n.kuk.(E)	2,5	2,1	0,35	0,3	0,4	1,4

Efficiency compared to control, %							
1.	Control	-	2,1	0	0	0	0
2.	From there 73.1% n.kuk.	2,5	2,0	87,6	93,3	94,2	72,5
3	Previkur extraTGB72.2% k.s.	1,5	2,1	87,2	93,3	93,7	75,0
4.	KurzatR n.kuk. (E)	2,5	2,1	86,0	90,0	88,0	65,0

Kurzat R n.kuk, which was used as a model - in the variant used in the consumption amount of 2.5 kg/ha, the degree of damage to the alternating disease in 10-15 days of calculation was equal to 0.3-0.4 points and 90.0-88 compared to the control. .0% efficiency achieved.

### Conclusion

Okra seeds fungicides Maxim 2.5% s.k -0.4l/t; Root rot when planted treated with Seles-top 31.5% d.c.-0.6l/t. (Rhizoctonia solani), fusarium wilt (Fusarium spp) disease development and damage up to 30-40 days, as well as up to 2 times of chemical treatment compared to the control was prevented, and quality harvest was achieved.

In production conditions, fields planted with okra were treated with prophylactic fungicides during the onset of alternaria disease, 73.1% n.kuk. -2.5 kg/ha or Previkur extra TGB 72.2% k.s. - High efficiency is achieved when used in the amount of 1.5 l/ha.

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