

PREVALENCE OF FUSARIUM DISEASE IN BRASSICACEAE VEGETABLE CROPS IN THE CONDITION OF TASHKENT REGION

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The article presents the data on the prevalence of Fusarium disease among the diseases found in Brassicaceae vegetable crops in Tashkent region. Fusarium-infected plants were observed to lose their green color and gradually turn yellow and were stunted in growth and development. When comparing the prevalence of Fusarium disease by farms, the indicator on this regard was relatively more (10.0-23.5%) in Rahmatkhujayev Toir farm in Tashkent region, while in the farm of "Fresh Rose" LLC in Urta Chirchik district, the spread rate was 7.1-21.3%, and in Yahyokhon Ziyonur farm of Tashkent district, it was equal to 7.2%-19.4%.

Key words: disease, prevalence, *Fusarium. oxysporum. f.conglutinans*, species.

Introduction

Brassicaceae vegetables have a special place among vegetable crops, this group includes white cabbage, red cabbage, broccoli, savoy, brussels, Chinese cabbage, bok choy cabbage, kohlrabi cabbage, cauliflower and others belonging to the *Brassicaceae* family. Brassicaceae vegetables products are consumed throughout the year in fresh form or processed in the form of boiled, fried, prepared as a salad, marinated, canned and dried forms. They contain an average of 8.5% dry matter, including 4.2% sugar, 1.44% protein, 1.6% connective tissue, 0.2% fat, 0.64% ash. Brassicaceae vegetables are rich in vitamins necessary for human body. They contain an average of 31.9% mg of vitamin C, 2% mg of carotene, 4% mg of K, 2.7% mg of PP, 1% mg of B₃, and 0.6% mg of B₂. Brassicaceae vegetables have healing properties and are used to treat heart diseases, gastrointestinal diseases, diabetes, obesity and other diseases.

Globally, the cultivated area of Brassicaceae vegetables crops is about 2.5 million hectares, and the amount of cultivated cabbage and Brassicaceae vegetables is 71.45 million tons.

Cultivation of Brassicaceae vegetables in the Republic of Uzbekistan has been increasing year by year, reaching 900 000 tons in 2017 (FAOstat, 2017³).

Like other agricultural crops, Brassicaceae vegetables are damaged by a number of viruses, bacteria and fungi during their growth, development and storage. These diseases not only reduce the productivity of cabbage vegetable crops, but also cause a decrease in their quality.

Fusarium disease of Brassicaceae crops was observed at all stages of their development (Alimbekova, 1940; Vladimirovskaya, 1941; Osnitskaya, 1950; Teterevnikova-Babayana, 1959; Kuziev, 1992).

It was noted in our research that Fusarium disease of Brassicaceae vegetables has been observed in all cabbage-sown fields of Tashkent region. It was observed that Fusarium disease is widespread in cabbage crops grown in the open field, starting from the seedlings that formed seed leaves.

Brassicaceae vegetable crops are affected by a number of viral diseases (*Cauliflower mosaic virus*, *Turnip mosaic virus*), bacterial diseases (*Pseudomonas syringae. pv. maculicola*, *Erwinia spp*, *Xanthomonas campestris pv. campestris*) and fungal diseases (*Alternaria brassicae*, *Phoma lingam*, *Fusarium oxysporum f. sp. conglutinans*, *Verticillium dahliae*, *Sclerotinia sclerotiorum*, *Mycosphaerella brassicicola*,

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³FAOstat, 2017. <http://www.fao.org/faostat/en/#data/QC>

Peronospora parasitica, *Plasmodiophora brassicae*, *Pythium spp.*, *Fusarium spp.*, *Rhizoctonia solani*) at their growth, development and shelf life periods (Khasanov, Ochilov, Gulmurodov, 2009; Allayarov, Abdurakhmanova, Khakimov, 2019).

A number of scientists reported the emergence of resistance of pathogens to synthetic fungicides (Korolev, Mamiev, and Elad, 2010; Mamiev et al., 2013; Zuparov et al., 2020; Mamiev et al., 2020), in its turn, it encourages the use of biofungicides against disease-causing fungi.

Research objects and methodology

Experiments on the study of the prevalence of diseases of Brassicaceae vegetable crops in 2017-2019 were conducted in the farms Yahyokhon Ziyo Nur, Rahmatkhujaev Toir in the Tashkent region, in the fields of the vegetable farm of "Fresh Rose" Limited Liability Company, and laboratory experiments on the identification of pathogens of Brassicaceae vegetables crops were carried out in Tashkent State Agrarian University at the department of agricultural phytopathology and agrobiotechnology.

Solid nutrient media and a moisture chamber were used to isolate pure cultures of disease-causing fungal species from infected samples of Brassicaceae vegetables crops.

Determinants by N.M. Pidoplichko(1977), V.I. Bilay (1977) and other determinants were used to identify the types of fungi. Statistical analysis of research results was carried out by the method of B.A. Dospekhov.

Research results and their discussion

The symptoms of *Fusarium* disease in seedlings of Brassicaceae vegetables crops are similar to black rot. The roots of seedlings affected by the disease first turned yellow and then turned brown, and some seedlings died without developing seed leaves. Due to the disease, the root neck of the older seedlings turned brown and thinned. It was observed that the part of the stem attached to the root was thickened. Such seedlings were stunted and some turned yellow and died.

Fusarium-infected plants were observed to lose their green color and gradually turn yellow and were stunted in growth and development. The leaves on the head cores of the diseased plants were not completely closed and had a porous appearance, and some did not form cores at all, and it was observed that the upper leaves were wilting. Such plants were easily pulled out of the soil.

Fungi species isolated from infected samples of Brassicaceae vegetables was found to be *Fusarium. oxysporum* Schlecht. *f.conglutinans* Wr.

Table 3.4 provides information on the spread of *Fusarium* disease of Brassicaceae vegetables crops in farms of the Tashkent region. As a result of the research, the highest prevalence rate of *Fusarium* disease was observed in white cabbage crop. It was observed that 10.8% to 23.5% of this crop was affected by the disease. Kohlrabi was the least affected by the disease, its damage was equal to 7.1%-10.0%.

Prevalence of *Fusarium* disease was noted in other Brassicaceae vegetables, and this indicator was 9.4%-22.1% in Chinese cabbage, while in cauliflower 8.8%- 20.7%, in leafy cabbage 8,0%-19,8%, in broccoli 7,2%-15,3%, and in red cabbage 7.7%-11.0%.

Table-1

Prevalence of *Fusarium* disease in Brassicaceae vegetable crops grown in the farms of Tashkent district

№	Farms	Prevalence of <i>Fusarium</i> disease, %		
		By years		
		2017	2018	2019
1	2	3	4	5
White cabbage				
1	"Yahyokhon Ziyo Nur" farm, Tashkent district	13,9	19,4	10,8
2	"Rahmatkhujaev Toir" farm, Tashkent district	18,6	23,5	14,1
3	"Fresh Rose" LLC Urta Chirchik district	15,2	21,3	11,7
Cauliflower				
1	"Yahyokhon Ziyo Nur" farm, Tashkent district	10,3	15,1	8,8

2	"Rahmatkhujayev Toir" farm, Tashkent district	14,2	20,7	10,5
3	"Fresh Rose" LLC Urta Chirchik district	11,9	19,6	9,0
Red cabbage				
1	"Yahyokhon Ziyon Nur" farm, Tashkent district	8,5	11,0	7,7
Chinese cabbage				
1	"Yahyokhon Ziyon Nur" farm, Tashkent district	11,5	16,9	9,4
2	"Rahmatkhujayev Toir" farm, Tashkent district	16,8	22,1	12,3
3	"Fresh Rose" LLC Urta Chirchik district	13,2	20,0	9,7
Broccoli				
1	"Yahyokhon Ziyon Nur" farm, Tashkent district	8,2	10,4	7,2
2	"Fresh Rose" LLC Urta Chirchik district	9,1	15,3	8,0
Leaf cabbage				
1	"Yahyokhon Ziyon Nur" farm, Tashkent district	9,7	13,2	8,0
2	"Rahmatkhujayev Toir" farm, Tashkent district	12,9	19,8	10,0
3	"Fresh Rose" LLC Urta Chirchik district	11,1	17,5	8,3
Kohlrabi				
1	"Fresh Rose" LLC Urta Chirchik district	8,3	10,0	7,1

Analyzing the spread of Fusarium disease by years, the disease prevalence relatively more in 2017, i.e. 10.0%-23.5%, while in 2016 it was slightly less 8.3%-18.6%, in 2018 the spread of the disease was 7.1% to 14.1%. When comparing the prevalence of Fusarium disease by farms, relatively more rate was observed in Rahmatkhujayev Toir farm of Tashkent region and its indicator was 10.0-23.5%, while in "Fresh Rose" LLC farm in Urta Chirchik district its prevalence was 7.1-21.3 %, and in Yahyokhon Ziyon Nur farm of Tashkent district it was equal to 7.2%-19.4%.

In our opinion, such a difference in the spread of Fusarium disease in Brassicaceae vegetable crops is probably due to the fact that the pathogen is more adapted to the previously cultivated crops.

The difference in the prevalence of the disease by year may be the effect of weather conditions. The difference in the prevalence of Fusarium disease by farms can be attributed to the agrotechnical measures and the work done against the disease.

Such a difference, in our opinion, in the prevalence and development of the Fusarium disease in Brassicaceae vegetable crops and in the loss of the crop can be considered to be due to the quality of agrotechnical measures and practices for planting of new crop types for the conditions of the Republic at different levels in the farms.

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