INFLUENCE OF THE PATHOGENIC CHARACTERISTICS OF FUNGI BELONGING TO THE FUSARIUM GENUS ON THE FERTILITY AND GROWTH OF WHEAT

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Abstract. *In this article, the pathogenicity of F.culmorum, F.incarnatum, F.equiseti, F. graminearum, F.avenaceum, F.javanicum fungi belonging to the Fusarium family isolated from the soil of wheat fields was studied. In this case, an artificial infection background was created to infect wheat seeds and the seeds were planted. Research lasted 21 days. Symptoms of the disease began to appear from 15 days after germination of infected seeds. Artificially planted seeds turned yellow and began to wither. The length of the root and stem of diseased and healthy plants was measured, and when the weight was measured, it was found that the weight of the healthy plant decreased sharply. Based on the data obtained as a result of the research, the article is enriched with tables and pictures.*

Keywords: *wheat, soil, fungus, disease, pathogen, Fusarium, F.culmorum, F.incarnatum, F.equiseti, F.graminearum, F.avenaceum, F.javanicum.*

Introduction

Crop rotation, plowing, tillage, the amount of mineral and organic fertilizers used, the composition of intermediate crops and weed species play a key role in the formation of the community of fungi found in the soil in the existing wheat agrocenosis in the republic. The agrotechnical measures carried out in the fields affect not only the development of the growth of crops, the quantity of the obtained harvest and the quality of the product, but also the interaction of the plant with the microorganisms in the soil, causing the accumulation of metabolites formed by them in the soil.

A comprehensive study of metabolites of fungi allows to correctly determine the causes of the disease, to determine what substance is associated with the appearance of symptoms.

Research methodology:

To infect plants artificially, Fusarium species are grown in sterile conditions in a specially prepared nutrient medium. Depending on the type of plants, it is possible to create an infection background or damage the plant artificially. In order to correctly determine the degree of morbidity of damaged plants, it is desirable to fully achieve the formation of morphological structures (large conidia, small conidia, chlamydospores) necessary for the correct determination of the amount of infection. To do this, the method of growing them in oats was used to use the Fusarium fungus infection isolated from the soil to destroy the soil. For this, 10 kg of oats were boiled in 10 l of water for 1 hour over low heat. Since oat grains were fully cooked during this period, 300 grams of them were placed in hot 1 l glass jars, and the mouths of the jars were closed with metal lids. The jars cooled with oats were sterilized for 1 hour under a pressure of 1 atm. After cooling, the flasks were inoculated in Petri dishes on agar medium for Fusarium infection. The broth was stirred every 3 days to ensure the growth of Fusarium infection in the oat growing in the jar. An infectious

background was created by mixing the prepared fungal mycelium with sterilized soil in the wells. 10 wheat seeds were sown on this infectious background.

The reduction in the yield of artificially infected plants compared to a healthy plant due to the disease was calculated using the following formula. (a-в).100

$$B = \frac{(a-в).100}{a}$$

Here: B – disease damage, decrease in yield (%),

a is the yield of a healthy plant.

B – amount of infected plant yield.

The average yield of one plant was calculated from 10 plants taken for control and used in the experiment (Dementeva, 1977). Khokhryakov, 1969; Kiray et al., 1974)

Research results:

In the course of research, an artificial infectious background was prepared to determine the pathogenicity of fungi belonging to the genus Fusarium isolated from the soil layers of wheat fields. Wheat seeds were sown in the resulting artificial infection background and, in the control option, seeds were sown in mycelium-free, sterilized soil. Experiments were followed up to 21 days.

Results of artificial inoculation of wheat with mycelium of Fusarium fungi

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<tr><td>Disease of the plant as a result of artificial infection with F.incarnatum fungi belonging to the Fusarium genus</td><td>Disease of the plant as a result of artificial infection with F.graminearum fungi belonging to the genus Fusarium</td></tr>
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Disease of the plant as a result of artificial infection with F.culmorum fungi belonging to the genus Fusarium	Disease of the plant as a result of artificial infection with F.equiseti, a fungus belonging to the genus Fusarium
	
Disease of the plant as a result of artificial infection with F.javanicum fungi belonging to the genus Fusarium	F. avenaceum, belonging to the genus Fusarium, is a case of plant disease as a result of artificial infection with fungi

The degree of plant disease was studied as a result of artificial infection with F. graminearum, F. incarnatum, F. javanicum, F. avenaceum, F. culmorum, F. equiseti fungi belonging to the Fusarium family. Artificially infested plants showed slower growth compared to control and after 15 days yellowing of leaves started to show disease symptoms. The height, root, and plant weight of the plants grown on the artificial infection background were compared to the control.

Growth and development of Ghazgon wheat grain infected with mycelia of Fusarium fungi
(Plant Quarantine and Protection at the Experimental Site of SRI)

№	Types	The number of damaged seeds, pcs	The number of germinated seeds, pcs	Stem length, cm	Root length, cm	Plant weight, gr
1	Control	10	10	43,2	19,6	2620
2	F.culmorum	10	7	37,4	13	990
3	F.incarnatum	10	8	39,3	12,4	1180
4	F.equiseti	10	8	38,4	13	1060
5	F.graminearum	10	9	36,8	14,4	980
6	F.javanicum	10	9	40,1	13,7	1020
7	F.avenaceum	10	7	37,8	17	1280

We can see from this table that 7 seeds germinated out of 10 seeds planted infected with F.culmorum fungus, root length of 7 plants was 13 cm on average, stem length was 37.4 cm on average, plant weight was 990 g on average. Out of 10 seeds infected with F. incarnatum, 8 seeds germinated, the length of the root was 12.4 cm, the length of the stem was 39.3 cm, and the average plant weight was 1180 g. We can see that 8 out of 10 seeds germinated in the seeds infected with

F.equiseti fungus, and the average root length was 13 cm, the stem length was 38.4 cm, and the average plant weight was 1060 g. 9 out of 10 seeds planted in seeds infected with F. graminearum fungus, the root length of the infected plants was 14.4 cm, the average stem length was 36.8 cm, and the average plant weight was 980 g. When planted with F.javanicum fungus, 9 out of 10 seeds germinated, root length was 13.7 cm, stem length was 40.1 cm, and plant weight was 1020 g on average. 7 seeds germinated from 10 seeds infected with F. avenaceum fungus, root length of 7 plants was 17 cm on average, stem length was 37.8 cm on average, plant weight was 1280 g on average. In the control version of the study, the growth of the plant was good, 10 plants sprouted from 10 seeds, the average root length of the plant was 19.6 cm, the plant height was 43.6 cm, and the average weight of 10 plants was 2620 g. In these studies, due to the damage caused by fusarium disease, plants infected with fusarium wilt turn yellow during the growing season, the plant lags behind in growth, does not produce lateral roots and stems, and the weight of the plant decreases due to the the fact that the infected plant dries up and dies from the inside.

In conclusion, not all fungi belonging to the genus Fusarium isolated from the soil are pathogenic in wheat. Because in the research, a total of 11 types of fungi were isolated from the soil of wheat fields, and 6 types of *F.culmorum, F.incarnatum, F.equiseti, F.graminearum, F.avenaceum, F.javanicum* were found to damage wheat. These pathogenic fungi persist in the soil, plant debris and seeds, and begin to infect plants as soon as the plant germinates when the next year's seed is planted. In preventing the spread of Fusarium wilt of wheat and in combating the disease, it is recommended to treat with effective seed fertilizers.

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