



FUNGAL DISEASES OF GREEN VEGETABLE CROPS (DILL, PARSLEY, ELDERBERRY) AND THEIR CONTROL MEASURES

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INTRODUCTION

The main part of agricultural crops in Uzbekistan is vegetable crops. Currently, the gross harvest of vegetables is 560-570 mln. tons, each person's consumption of vegetables corresponds to 100 kilograms during the year. *Aphanomyces*, which causes disease in vegetable crops in many countries *cladogamus* Drechler; *Pythium debaruanum* Hesse, *Fusarium oxysporum* (Schlecht.) Snyder et Hans., *F. solani* (Mart.) App. et Wr., *Alternaria radicina* Meter, Drechs et Eddy, *Alternaria tenuis* Nesselr., *Phoma anethi* Sacc., *Rhizoctonia solani* JG Kuhn. fungi cause significant damage. Due to the damage caused by the diseases caused by fungi, it leads to a decrease in the quantity of the crop and a deterioration in its quality. Taking this into account, it is of strategic importance to continue scientific research on the implementation of measures to combat disease-causing fungi. Dill (*Anethum graveolens* L.) is one of the oldest annual plants of the Apiaceae family. Its leaves and seeds have been used as a spice in Southeast Europe and Asia since ancient times. Wild dill species grow in North Africa, Asia Minor, Iran and India. Dill is grown all year round, in open and closed ground, and in winter and early spring, using different methods of cultivation.

Celery (*Apium graveolens* L.) is one of the oldest plants of the Apiaceae family. It was well known and considered a medicinal plant in ancient Egypt, Ancient Greece and Ancient Rome. Celery was cultivated as a vegetable crop in Europe in the 16th century and in Russia at the end of the 17th century. According to N.V. Vavilov, the homeland of celery is the eastern part of the Mediterranean Sea. Wild species of celery are found in temperate regions in Europe and Asia, and about 14 species of the genus *Apium* are distributed worldwide, from Australia and New Zealand to South America and the Mediterranean. *A. graveolens* is the only cultivated plant of the *Apium* species. There are three cultivated types of celery: root celery (*Apium graveolens* L. var. *Rapaceum* (Mill.) Gaud.), root celery (*Apium graveolens* var. *Secalinum* (Mill.) DC.) and leaf celery (*Apium graveolens* var. *dulce* (Mill.) DC.) species [4].

RESEARCH METHODS

First of all, it is necessary to correctly diagnose the disease and correctly identify the type of fungus that causes it. It is certainly not possible to determine a diseased plant at a glance. Because in some cases, diseases with the same appearance can be caused by microorganisms belonging to different groups. Therefore, they can be detected only in laboratory conditions using a microscope or by planting in artificial nutrient media. Herbarium specimens were collected from diseased plants for proper diagnosis of plant disease and correct identification of causative species. During the herbarium collection, not only the leaves of the diseased plant, but also other organs were taken as much as possible. The root part of the withered plants was also taken. More than 500 herbarium specimens of plants were collected during scientific work [5].

After collecting the herbariums and bringing them to the laboratory, the papers containing the plant herbarium were placed between 2 thick sheets of paper, the leaves and twisted parts were straightened, placed in a shady place, and pressed with a heavy object. Herbarium papers were changed daily at first, and then once every 2-3 days after the plants had dried a little. At the time of taking the samples, where they were taken, day, year, type and variety of the plant were indicated, written on a label and placed in the herbarium paper. After the herbariums were well dried, they were placed in the herbarium folder.



ISOLATION OF FUNGAL SPECIES FROM SEEDS OF GREEN VEGETABLE CROPS

As a result of the analysis of literature data, it was found that most of the disease-causing fungi species were isolated from the seeds of green vegetable crops. Therefore, we also paid special attention to the separation of fungal species from their seeds.

Solid nutrient media and water to form a wet chamber were used to isolate pure cultures of fungal species from disease-infected samples of green vegetable crops. Culture media and water were sterilized in an autoclave at 1 atmosphere for 1 hour. Sterilized nutrient media were placed in Petri dishes and test tubes without cooling. Nutrient media in Petri dishes were kept for solidification for a certain period of time. Fungal mycelia grown from plant tissue placed in a moist chamber in Petri dishes or planted in artificial nutrient media were inoculated into test tubes containing nutrient medium with a sterilized microbiological loop in front of an alcohol lamp flame. After they grew well, the clean ones were selected and taken away for storage and their types were determined.

RESEARCH RESULTS

According to the results of our observations, it was found that diseases caused by several types of fungi are spread in green vegetable crops. The main types of diseases in dill, parsley and celery: fusarium root rot and black, fusarium wilt, powdery mildew, false powdery mildew, cercosporosis, alternariosis and other spots were noted. Information on the spread of diseases in green vegetable crops was presented in Tashkent region. In particular, the prevalence of black rot in dill from 23.5% to 26.4%, parsley from 26.2% to 30.2%, and celery from 22.5% to 27.5% was recorded. It was observed that the disease leads to the death of the plant as a result of damage to the root and root neck. The spread of powdery mildew disease in dill from 19.0% to 21.8%, parsley from 7.8% to 9.6%, and celery from 9.3% to 9.8% was noted. It was observed that the disease damages the leaf, band and canopy of the plant. Alternaria disease spread from 15.2% to 17.4% in dill, from 10.8% to 12.3% in parsley, and from 9.3% to 9.8% in celery. It was observed that the disease damages the leaf, band and canopy of the plant.

When the spread and development of the disease was studied in the parsley plant, the lowest spread of the disease was found in the "Nilufar" of parsley planted in the fields of the "Farodis xirmoni" farm in the Tashkent region. In the variety up to 27.9%, and the development of the disease was 17.8%. The highest spread of the disease was found in the variety "Obyknovennaya listovaya" (35.1%) grown in the "Farodis xirmoni" in the Tashkent region. In this greenhouse, disease development up to 16.2% was observed. Disease was detected in 102 out of 364 plants (28.0%) of the "Gigant" variety of parsley grown in the greenhouses of the farm "Akhmad polvon Talab polvon" in Tashkent region, and the development of the disease was observed up to 23.6%.

According to the results of our observations on celery, it was observed that the prevalence of the disease in all fields was the same, 22.4-24.8%. In particular, "Serbarg" of celery planted in the fields of "Farodis xirmoni" farm in Tashkent region 361 (28.7%) of 1251 plants observed in the cultivar were found to be infected and the disease development was 18.2%. In celery, the most development of black was observed in "Nezhny" variety of celery grown in the greenhouses of "Akhmad polvon Talab polvon" farm in Ortachirchik district, 20.8%, and in "Bodrost" variety, planted in "Farodis xirmoni" in Tashkent region, 20.6%. The disease index was 5.2-6.1%, respectively. When we compared the prevalence of black blight in green vegetable crops by year, the disease was observed the most in 2019. In particular, up to 26.4% in dill, up to 30.2% in parsley and up to 27.5% in celery. The lowest spread of the disease was observed in 2020. It was around 23.5% in dill, 27.4% in parsley and 22.5% in celery. We believe that this is due to the wet weather and high relative humidity in the spring of 2019.

The highest yield loss (13.3%) was observed in the "Gigant" variety of parsley. 6.56 kg of healthy plant and 5.69 kg of diseased plant were obtained. That is, 0.87 kg or 13.3% yield loss was observed compared to the healthy one. It was found that the most resistant variety of parsley is "Obyknovennaya listovaya". The yield of a healthy plant was 4.65 kg, and the yield of a diseased plant was 4.15 kg. That is, 10.8% yield loss was observed compared to the healthy one. In "Nilufar" and "Novas" varieties, the same 11.2% yield loss was observed compared to healthy ones. The highest yield loss (17.0%) was observed in "Samurai" variety of celery. 4.94 kg of healthy plant and 4.91 kg of diseased plant were obtained. That is, 0.84 kg or 17.0% yield loss was observed compared to the healthy one. "Bodrost" variety of celery was found to be the most resistant variety to the disease. Although this variety was 29.0% affected by black blight, 8.7% yield was lost due to the disease. 9.1-13.8% yield loss was observed in "Serbarg" and "Nejny" varieties, respectively.

The effect of black blight on the yield of green vegetable crops by year, 18.2% of dill, 14.4% of parsley and 17.1% of celery were lost due to the disease in 2019. In 2020, slightly less crop loss was observed in dill, 13.8% in parsley, and 15.8% in celery due to disease. In 2021, the effect of black rot disease on productivity was observed most in celery (16.8%). 15.5% and 13.2% respectively in dill and parsley.



We explained that the greatest impact of the disease on productivity was observed in 2019, which is related to the widespread and strong development of the black rot disease in this year.

Dill It was found that the variety "Uzbekistan-243" is the most resistant to alternariosis. 2.32 kg of healthy plant and 2.10 kg of diseased plant were obtained. That is, 9.5% yield loss was observed compared to the healthy one. In "Orom" and "Kharkovskaya-85" varieties, 12.9% and 10.5% yield loss was observed, respectively, compared to a healthy plant.

The highest yield loss was observed in the "Novas" variety of parsley. 5.64 kg of healthy plant and 4.92 kg of diseased plant were obtained. That is, 0.72 kg or 12.8% yield loss was observed compared to the healthy one. It was found that the most resistant variety of parsley to Alternaria disease is "Nilufar" variety. The yield of a healthy plant was 6.25 kg, and the yield of a diseased plant was 5.65 kg. That is, 9.6% yield loss was observed compared to the healthy one. In "Obyknovennaya listovaya" and "Gigant" varieties, 11.0% and 10.5% yield loss was observed, respectively, compared to healthy ones.

It was observed that Alternaria disease affects the yield of celery more than green vegetable crops. Celery "Nejnyy" variety had the highest yield loss. 4.95 kg of healthy plant and 4.10 kg of diseased plant were obtained. That is, 0.85 kg or 17.0% yield loss was observed compared to the healthy one. "Serbarg" variety was found to be the most resistant to Alternaria. Although this variety was 15.8% affected by the disease, 10.5% yield was lost due to the disease. 15.0% and 15.4% yield loss was observed in "Bodrost" and "Samurai" varieties, respectively.

CONCLUSIONS

1. Herbarium samples collected from diseased green vegetable crops, 20 species of pathogenic fungi were isolated.
2. When the fungi isolated from green vegetable crops were analyzed by plant organs, it was found that plant seeds are most affected by fungi.
3. 28 species of fungi were isolated from the seeds of green vegetable crops. Some types of fungi have been found to damage several parts of the plant.

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