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Fungal Diseases of Soybeans

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Annotation: The article provides information about the biological characteristics, distribution, development and reproduction of diseases root rot, stem rot, black rot and brown rot. It also emphasizes the negative impact of diseases on the quantity and quality of harvest.

Keywords: soybean, disease, fungus, root rot, stem rot, black rot, brown rot.

Introduction. Soybeans are an important food crop in the modern world. The fact that the grain contains up to 50% protein and 20-23% oil further increases interest in it. The crop has many useful properties, and its amino acids are not found in other plants. Therefore, soybeans are considered a promising crop for human nutrition. Irrigation conditions not only create favorable conditions for growing soybeans, but also create favorable conditions for the spread and development of harmful organisms. This has a negative impact on the quantity and quality of the harvest [1,2, 3,4].

Objectives and methods of the study. The main objective of the research is to study the species composition of common putrefactive diseases of soybeans in the conditions of the Samarkand region and to develop effective methods for combating them based on their morphological characteristics and identification. The main objective of the research is to analyze foreign and domestic sources of information on rotting diseases of plant organs and to study the occurrence of these diseases in soybean fields, the sources of their spread and methods of their detection.

Research results and their analysis. Soybean plants are susceptible to a number of diseases caused by fungi, bacteria and viruses. These kill the plant, cause spots on the leaves and cause pod, seed and stem rot.

Among the many diseases of soybeans, the most common and harmful are rots caused by fungi.

Root rot. Root rot causes serious damage to soybean fields, killing the sprouted lawns. The disease affects the sprouts and young plants that have come to the surface of the soil. The grass roots, stems and seed pods rot. The appearance of the main root and stem bark is reddish-brown. Most of the secondary roots die. The plant dries up and dies. Deep, round, brown spots appear on the tips and underside of the pods. In some cases, the growing point of the plant turns black, and the appearance of the damaged plant resembles an extinguished candle. In most cases, the causative agent of soybean root rot is fungi of the genera *Fusarium* and *Rhizoctonia*, in some cases the causative agent may also be fungi *Puthium* and *Thielaviopsis* [5]. Fusarium wilt causes the formation of light pink pads on the leaves, consisting of 4-5 transversely segmented sickle-shaped conidia [6].

Rhizoctonia lesions produce a white, felty powder, while *Thielaviopsis* lesions produce a similar brown powder. The dust consists of black mycelium, conidiophores, and barrel-shaped brown macroconidia that are arranged in chains. They persist in the soil for several years and are considered the primary pathogen. *Thielaviopsis* microconidia also cause secondary leaf damage [7].

The *Puthium* fungus produces a weak, fine dust consisting of zoospores, which subsequently also produce oospores.

The disease can appear anywhere in the field during the period of grass seedling emergence under favorable weather conditions. Conditions such as increased soil moisture, mold, and lack of moisture during the plant growth period can aggravate the course of the disease. The causative agents of root rot persist in plant debris in the soil and are the main source of infection.

Southern sclerotial rot. It mainly affects the lower part of the stem, where the stem rots and becomes covered with silky white mycelium, on the surface of which round or elliptical sclerotia of the fungus appear. The sclerotia are small, 0.5-3 mm, easily separated, smooth, shiny, dense, pinkish, later dark yellow. Infected plants die prematurely, without having time to produce seeds [2].

White stem rot. The causative agent of this disease is the marsupial fungus *Sclerotinia sclerotiotiorum (sci. Libertiana)*, which in most cases causes a wet brown spot on the lower part of the stem. The spot is covered with dense paga-paga or fluffy dust. Large (up to 1 cm) slimy white sclerotia are formed in the pods. Over time, the stem of the plant becomes fibrous, the leaves droop and dry out. The fungus also damages the pods and seeds [3].

Black rot. The causative agent of the disease is the immature fungus *Macrophomina phaseoli*. It damages the roots and main stem of the soybean plant. This disease differs from other putrefactive diseases in that its sclerotia are located under the damaged bark of the plant. The sclerotia are so small and numerous that the tissues under the bark of the plant acquire a grayish-black color. In some cases, pycnidia in the form of black dots appear on the damaged parts of the stem [4].

Brown stem rot. The causative agent of the disease is the immature fungus *Cephalosporium gregetum*. The fungus mainly damages the inner part of the stem. There are no external signs of the disease, if you look at the inner part of the damaged stem, you can see that its lower part has turned black. Over time, the entire stem of the plant turns completely black. As a result, the leaves dry out, and the leaves look as if they have been struck by a cold. Most plants fall over in shaded areas [3].

In the system of measures against soybean root rot diseases, it is important to create favorable conditions for seed germination. In this case, soil moisture control, regular watering, removing soil turbidity with a harrow, timely sowing of seeds and other measures will promptly prevent the disease. In addition, it is recommended to plant soybean varieties that are relatively resistant to diseases. To eliminate infections on soybean seeds, treatment with various fungicides before planting gives good results.

Conclusion. Soybean is a valuable food crop, but during its growth and development it is affected by fungal diseases such as root rot, white stem rot, black rot and brown rot. Root rot is especially common in shaded areas. Studying the biological and morphological characteristics of diseases is important for developing effective means of combating them.

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