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CUCUMBER FUSARIOUS DISEASE AND MEASURES TO COMBAT IT

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Abstract: This article provides information on the origin, distribution, pathogenesis and damage caused to the plant by *Fusarium oxysporum* f. sp. *cucumerinum*, a common disease of cucumber plants. It also describes the diagnosis of the disease, preventive measures and integrated protection methods. Based on research and scientific literature, the importance of *Fusarium* in agriculture and prevention strategies are highlighted.

Keywords: cucumber, fusarium, wilt, disease, chlamydospore, cucumber seed, spread, damage, pathogen, control, preventive.

Cucumber (*Cucumis sativus* L.) is a widely cultivated vegetable crop in both greenhouse and open-field conditions in Uzbekistan. Its high productivity is closely related to the proper implementation of agrotechnical practices and effective disease management. One of the most dangerous diseases affecting cucumber is *Fusarium* wilt, caused by the hyphomycete fungus *Fusarium oxysporum* f. sp. *cucumerinum* [1]. This pathogen belongs to a harmful group of soil-borne fungi. Its widespread occurrence and rapid development under warm and humid conditions make *Fusarium* wilt one of the most pressing problems in vegetable production.

The primary source of disease spread is soil. *Fusarium* fungi are capable of surviving in soil in the form of chlamydospores for up to 5–10 years [3]. In addition, the disease can spread from one field to another through infected seeds, plant residues, irrigation water, and agricultural machinery [4]. Favorable conditions for the development of *Fusarium* wilt include temperatures of 25–30 °C, high soil moisture, continuous cultivation of cucurbit crops in the same field, and heavy-textured soils [5].

Fusarium wilt often progresses latently. The pathogen infects cucumber and melon seeds sown in the soil, germinating seedlings, and young plants emerging above the soil surface. It poses a particularly high risk during the first 3–4 weeks after transplanting. Infected cotyledons turn yellow and rot, resulting in sparse plant stands. In plants with true leaves, the roots and root collar become dark brown, the cortex decays, growth is retarded, and individual vines—and eventually the entire plant—wilt and dry out.

In mature plants, the main symptom of the disease is the wilting of one or several lower leaves, followed gradually by upper leaves, ultimately leading to the wilting of the entire plant. The vascular tissues of the stem, especially at the root collar, become clearly visible as silvery-white filamentous structures. When the root or root collar is cut longitudinally, dark yellow or reddish-brown discoloration can be observed in the xylem vessels. Later, a loose white mycelium develops on the stem. After plant death, the mycelium gradually turns pale pink and then red. In

some cases, plants that appear healthy externally may wilt suddenly overnight. As a result of Fusarium wilt, yield losses may reach 30–70% [3].

Accurate diagnosis of Fusarium wilt requires laboratory-based phytopathological analysis. In this process, samples taken from infected tissues are cultured on nutrient media, and the morphological characteristics of fungal colonies are examined [4]. Under microscopic observation, macroconidia and microconidia characteristic of Fusarium species are identified [1].

Several methods can be employed to control Fusarium wilt. These include agrotechnical measures such as crop rotation, avoiding the cultivation of cucurbit crops (pumpkin, melon, watermelon) on the same field for at least 3–4 years, using healthy seeds and seedlings, thorough soil preparation before planting, deep plowing, removal of plant residues from fields, seasonal replacement or disinfection of greenhouse soil, and avoiding excessive irrigation to prevent water stagnation in the soil [2]. Irrigation should be carried out in the early morning or evening. When Fusarium symptoms such as wilting or stem discoloration appear, infected plants should be immediately removed along with their roots and taken out of the field. The selection of Fusarium-resistant cucumber varieties and hybrids is also essential. Additional control measures include chemical soil treatment, seed disinfection with fungicides, the use of antagonist microorganisms, and the application of biological preparations.

Conclusion

Fusarium wilt of cucumber is one of the most dangerous diseases that significantly reduces crop yield. The long-term survival of the pathogen in soil, its rapid penetration into the plant, and its latent development complicate effective control. Therefore, preventive measures, the use of healthy planting material, proper crop rotation, and strict greenhouse hygiene play a crucial role in preventing Fusarium wilt. Integrated disease management strategies reduce the spread of the disease and contribute to stable and sustainable yields.

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