IDENTIFICATION OF FUNGI OF THE GENUS *FUSARIUM*

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Abstract: *Fungi of the genus Fusarium are an important group of microscopic fungi that play a significant role as plant pathogens and sources of toxins hazardous to human and animal health. These fungi are widespread in soil and plant debris, causing diseases of various agricultural crops, such as fusarium, and causing food spoilage. Some Fusarium species can produce dangerous mycotoxins such as fumonisins and trichothecenes, making them important targets for study in the field of food safety.*

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Identification of Fusarium fungi is of key importance for plant disease diagnosis and food and feed contamination monitoring.

Key words: *Fusarium, identification, fungi, mycotoxins, fusarium, phytopathogen, morphological method, molecular methods, PCR, DNA sequencing, microscopy, plant pathogens, food safety, fusarium diseases, fumonisins.*

Introduction: In 1809, the German scientist H.F. Link first united many different species of fungi into the genus *Fusarium.* At the first stages, the classification of this genus was carried out only on the basis of superficial observations, while the cultural characteristics of the studied samples were practically not taken into account. Based only on such observations, more than 1,000 species, varieties and forms of *Fusarium* were classified. Most species of the

genus *Fusarium* are primarily plant pathogens that cause wilt, developing in the vascular system of plants; damage to the ear, fruit and seeds; rot of vegetative and generative parts of plants; root rot. *Fusariums* damage various important agricultural crops: cereals (especially wheat, barley, corn), fruits, vegetables, ornamental crops and others [2].

Fungi of the genus *Fusarium* can remain in the soil for a long time, feed on organic matter in the soil and plant residues, and after a certain period penetrate healthy plants. In addition, they have the ability to infect plants belonging to different families, but growing in the same conditions [3].

Fungi of the genus *Fusarium* in the conditions of the Tashkent region affect annual, biennial, perennial, herbaceous, woody, cultivated and wild plants, a total of 70 species belonging to 20 families. Pathogenic species of the genus *Fusarium* affect the above-ground and underground parts of plants, and lead to rotting of stems, wilting of leaves, rotting of seeds, root crops, tubers, fruits [3].

Diseases of agricultural plants caused by fungi cause significant damage to crops and lead to economic losses. For the timely application of plant protection products against diseases and control of grain contamination by phytopathogenic fungi at different stages of its production and processing, their detection and accurate identification are necessary [4].

Fungi of the genus *Fusarium* are capable of infecting plants and producing mycotoxins in a wide range of temperatures. One of the leading factors in the development of the disease is excess humidity of more than 71%, especially during the flowering period. The negative impact of fusarium on plants is expressed in the suppression of photosynthesis, immunity, enzymes, which leads to the death of the plant. [5].

Research methods: The danger posed by fungi of the genus *Fusarium* and the mycotoxins they produce makes it necessary to develop methods for rapid and reliable determination of the species affiliation of strains, which will make it possible to determine the spectrum of compounds accumulating in a crop or batch

of grain. Today, methods based on DNA polymorphism analysis play an important role in taxonomic studies of the genus *Fusarium* and identification of its representatives. The use of a molecular genetic approach has made it possible to more clearly establish standards and boundaries of species, as well as to characterize a number of new taxa. In addition, the study of inter- and intraspecific DNA polymorphism has made it possible to develop a number of highly specific systems for the diagnosis and identification of the main pathogens of *fusarium*, primarily based on PCR and its modifications. The use of modern molecular biological and bioinformatics methods, including whole-genome sequencing, has significantly accelerated the study of the genetic diversity of the genus *Fusarium* and the functional characterization of genomic elements, but the search for effective methods of molecular labeling and informative DNA barcodes remains relevant [1].

Conclusion: The combination of morphological, molecular and biochemical methods enables accurate identification of *Fusarium* fungi, which is important for understanding their ecology, role in plant diseases and food safety. In-depth studies will help improve pathogen control, reduce mycotoxin risks and increase agricultural productivity.

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