UDC: 633.11:632.4:581.19 DOI: https://doi.org/10.53040/ppap2026.03

INFLUENCE OF SOME FUSARIUM SPP. STRAINS ON COMMON WHEAT PLANTS: MORPHO-BIOLOGICAL RESPONSES

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The fungal species *Fusarium solani* (F.s.) and *F. verticillioides* (F.v.) are filamentous, predominantly necrotrophic micromycetes that colonize plants, infecting them via roots and seeds and systemically invading plant tissues. This leads to reduced germination, inhibited plant growth, and the development of necrosis in various organs. Strains of both species secrete a range of extracellular metabolites – toxins, hydrolytic enzymes, and bioactive compounds – into the culture medium, exerting diverse effects on plants. These characteristics make culture filtrates (CFs) a valuable biological tool for studying plant-pathogen interactions.

Purpose. The aim of the research was to determine the morphobiological responses of common wheat to grain treatment with culture filtrates (CF) from two strains of F.s. and F.v. with different toxigenic profiles.

Materials and methods. The study utilized grains from five genotypes and six F_3 hybrids of common winter wheat, along with culture filtrates (CF) from two strains of F.s. and F.v. The CFs were prepared using Czapek liquid nutrient medium. The grains were soaked for 18 hours in the CFs and in distilled water (control), after which they were rinsed with distilled water and placed in Petri dishes on moistened filter paper. Morphometric analyses – germination, embryonic radicle length, and shoot length – were performed on day 5. Plant dry mass was determined by air-drying the plants for 7 days. Data were statistically processed using the STATISTICA 7 software package.

Results and discussion. It was determined that the F.s. strain stimulated shoot growth (34.5%), whereas the F.v. strain inhibited germination (10.2%) and embryonic radicle growth (31.1%). However, both strains had a virtually similar effect in inhibiting dry biomass accumulation: 16.7% and 17.1% for F.s. and F.v., respectively ($p<0.05$).

The data obtained demonstrate that FC F.s. strongly stimulated cell division – likely due to the high auxin or gibberellin content in the FC– but this phenomenon was not accompanied by biomass accumulation. During the initial stages of germination, growth relies primarily on endosperm reserves. F.s. utilized these reserves for cell division; however, while the shoot elongated, it did not accumulate additional structural material.

The metabolites of both fungi likely affected photosynthetic and respiratory activity, as well as the utilization of carbon stored as reserves in the grain, resulting in a similar inhibition of biomass accumulation.

Conclusions. Given the fact that F.v. specifically produces fumonisins, moniliformin, and fusarin C, while F.s. produces a different spectrum of metabolites – fusaric acid and naphthazarins– it can be assumed that fungal strains belonging to species with distinct toxigenic profiles affected the plants through different physiological mechanisms; however, these mechanisms led to a similar outcome: the inhibition of biomass accumulation during the wheat–pathogen interaction.

Keywords: wheat, *Fusarium* spp., interactions, effects.

Acknowledgments: The research was carried out within the framework of the Subprogramme 011102 "Extension and conservation of genetic diversity, improvement of gene pools of agricultural crops in the context of climate change" financed by the Ministry of Education and Research of Republic of Moldova.