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Abstract of doctoral thesis.:

Assessment of the accumulation of mycotoxins and bioactive components in the grain of winter wheat varieties as a reaction to stress caused by infection with *Fusarium*.

Słowa kluczowe: *Fusarium*, mycotoxins, polifenols, winter wheat, technological value of wheat grain

Fungal diseases, including those caused by fungi of the *Fusarium* genus, are a factor that significantly affects the level and quality of cereal grain yield. The presence of mycotoxins produced by *Fusarium* often caused defense reactions in the plant in the form of the production of phenolic compounds. The presence of these toxins in the grain causes changes in its composition.

The aim of the research is to determine the impact of the variety on the amount of bioactive compounds, *Fusarium* mycotoxins, yield level and baking value of wheat as a reaction to stress caused by infection with *Fusarium* .

Research on determining the content of *Fusarium* mycotoxins and bioactive components in winter wheat grain as a reaction to stress caused by infection with *Fusarium culmorum* and *Fusarium graminearum* was carried out on experimental plots belonging to IUNG-PIB in Puławy in 2016-2017. However, a field experiment on the impact *of Fusarium culmorum* on the yield level and technological value of wheat varieties was conducted in 2018-2020 at the Experimental Station in Osiny.

The research determined the level of infection of wheat ears by *Fusarium culmorum* and *Fusarium graminearum*, as well as grain yield and thousand-grain weight. Additionally, using the DUALEX $^{+TM}$ apparatus, the chlorophyll content and indexes of flavonols and anthocyanins content in leaves after inoculation with the fungus were determined. The content of phenolic acids in wheat leaves was determined. In order to describe the technological value of the grain, the protein content, gluten amount and Zeleny sedimentation index were determined. The rheological properties of the dough were assessed, including the assessment of the properties of the protein-starch complex, using the mixolab apparatus.

The research results confirmed that grain infection with *Fusarium* significantly reduces the yield and thousand-grain weight of wheat. Inoculation plant with *Fusarium* caused stress in plants in the form of an increase in the flavonol index and a decrease in the anthocyanin index. Differences were found in the amount of mycotoxin production by the *Fusarium* species used, as well as varietal differences in the accumulation of mycotoxins. Inoculation with *Fusarium culmorum* influenced the technological value of grain, the properties of starch and the protein complex, which resulted in changes in the rheological characteristics of flour and dough properties. The observed interaction of inoculation with the variety in composition qualitative characteristics and rheological characteristics of flour indicates that the group of wheat varieties includes genotypes that are less susceptible and do not show changes as a result of infection with a fungus of the *Fusarium* genus

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