

Resistance to fusarium ear rot in maize: heritability and trait associations

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Maize is one of the most important crops, widely used not only for food and animal feed, but also as biofuel and bioproduct source. Poland, over the past decade, became fifth producing country in Europe, with total area planted over 1M ha (silage and grain combined). Ear rot caused by *Fusarium* spp. are most significant fungal disease, causing reduction in yield and affecting its quality. Changing environmental conditions, among conservations tillage techniques and maize/wheat dominated crop rotating systems influence the incidence of the disease. These factors may also affect the structure of the pathogen population, disease severity and associated mycotoxin contamination levels. In Poland an increase in the level of grain contamination by toxins produced by *Fusarium* has been observed in recent years. Among with appropriate agronomic practice, the use of highly resistant hybrids is an important part of the integrated plant protection method.

Because of this, the aim of this study was to determine heritability of resistance to ear rot and traits that are related to this disease resistance.

Forty-two inbred lines, which belong to flint (23) and dent (19) group and different KOB and SH gene pools, were crossed. Based on phenotypic ear rot assessment using scale 1 to 7 after inoculation with *F. graminearum* and under natural infection, they were divided into 3 groups: highly resistant (14 flint and 5 dent), moderately susceptible and susceptible (5 flint and 9 dent). For the next step of our study, parental lines from the first and last group and their F₁ hybrids were included (19 flint and 30 dent). As a control, hybrids which parental lines were included into moderate susceptible and highly resistant groups were evaluated. They were characterized under field condition taking into account such traits as: time of tassel anthesis and silk emergence, silk length and anthocyanin content, cob morphology, height. Ear rot resistance level of selected hybrids after inoculation has been confirmed by determining the content of DON. After cob harvest by hand their grain was ground and tested by RIDA QUICK SCAN immunochromatographic test reader. Heritability and correlations between disease severity, DON contamination and selected traits were determined.

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