PP-61 Genetic resources for maize breeding programmes to improve ear rot resistance in Poland

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In Poland, during the last years the maize growing area has significantly increased because of the high demand from fodder industry - total area is about 1200K ha. Maize grain, being similar feed value to wheat, is much cheaper. Red and pink ear rots caused by *Fusarium* spp. are important factors affecting the yield and it's quality, mainly because of it's contamination with mycotoxins produced by fungi. It was observed, that during the last years contamination of these toxins increase also in Poland.

Based on our study conducted in 2015 and 2016, when 102 samples of commercially grown maize cultivars were collected in 14 localities throughout Poland, it was possible to determine that *F. verticillioides* was the most abundant species, followed by *F. proliferatum* and *F. graminearum* (60%, 11% and 12% of all *Fusarium* isolates, respectively). A number of minor species were also present: *F. temperatum*(5,0%), *F. poae*(2%), *F. subglutinans*(8%), *F. sporotrichioides*(1,0%). DON contamination in 22% of evaluated grain samples exceeds 1750 µg/kg, FUM in 5% of evaluated grain samples exceeds 1000 µg/kg and ZEA contamination in 7% samples was higher than 350 µg/kg. Differences between localities and varieties were significant.

Because of this, the major objective of this study was to determine effectiveness of the recurrent selection to develop maize flint and dent genotypes resistant to the ear rot based on genetic resources used in Polish breeding programmes. Two separate gene pools were evaluated: SH and KOB. The earliest flowering $S_{0:1}$ were self-pollinated and kernel inoculated with *F. gramninearum*. Disease development was visually assessed at harvesting time using 1-7 scale. Next, all genotypes scored within the range 2-3 were selected to continue the selfing procedure to obtain $S_{1:2}$, $S_{2:3}$ and $S_{3:4}$ lines. Additionally, anthocyanin content in corncobs, silks and pollen was described. Selection effectiveness was much higher within the gene pool SH ($S_{1:2}$: 51%, $S_{2:3}$: 58,9%, $S_{3:4}$: 87,2%) than within KOB pool ($S_{1:2}$: 56%, $S_{2:3}$: 57,9%, $S_{3:4}$: 59,6%). Ear rot resistance of selected S_4 lines was confirmed under field conditions after inoculation and based on DON contamination determined by RIDA QUICK SCAN. It was possible to conclude that DON content positive correlate with ear rot. Disease severity and DON contamination, negatively correlated with anthocyanin content in silks.

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PP-62 *Fusarium* head blight in German oats - genetic, toxigenic and phenotypic diversity of *Fusarium langsethiae, F. sporotrichioides* and *F. poae*

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Information on *Fusarium* head blight in German oats is still scarce regarding symptom development, the predominant causal agents, and mycotoxin contamination Therefore, we analysed the occurrence and diversity of *Fusarium* spp. and its mycotoxins in oat kernels from different locations in Germany in a 3-year monitoring. *Fusarium* species were identified based on spore morphology and the analysis of the elongation factor alpha region after sequencing. Sequences were further used to analyse phylogenetic relation among the obtained species. Mycotoxins in oat kernels were determined with HPLC-MS/MS. Although the frequency of *Fusarium* spp. varied between years, the predominant species was always *F. poae*, followed by *F. sporotrichioides,* and *F. langsethiae*. Further, we found that nivalenol (NIV) and T-2/HT-2 were among the most dominant mycotoxins in oat kernels. In greenhouse trials we tested the aggressiveness and mycotoxin production of the 3 predominant *Fusarium* species. According to our data, *F. sporotrichioides* was more aggressive than *F. langsethiae* under greenhouse and field conditions, which suggests that *F. sporotrichioides* is the main producer of T-2/HT-2 in German oats. Further, the results of this study indicate that *F. poae* might be responsible for high NIV levels in German oats. Over 40% of the analysed oat kernels were colonized with *F. poae* leading to frequently high levels of NIV with more than 900 µg/kg. Interestingly, the mycotoxin content was reduced by up to 90% when kernels were dehulled. However, the results of this study highlight that *Fusarium* head blight in oats is a problem of significant importance in Germany, which needs more attention in future research.