

## Molecular screening of wheat entries for resistance to tan spot toxins Ptr ToxA and Ptr ToxB *Pyrenophora tritici-repentis*

Kokhmetova A.M.<sup>1\*</sup>, Ali S.<sup>2</sup>, Atishova M.N.<sup>1</sup>

<sup>1</sup> *Institute of Plant Biology and Biotechnology, Almaty, Kazakhstan*

<sup>2</sup> *South Dakota State University, Brookings, USA*

\* e-mail: [gen\\_kalma@mail.ru](mailto:gen_kalma@mail.ru)

Tan spot, caused by *Pyrenophora tritici-repentis*, is a serious foliar disease of wheat in Kazakhstan. The aim of this study was the identification of wheat genotypes resistant to *P. tritici-repentis* against Ptr race 1 and race 5 and their host-selective effectors Ptr ToxA and Ptr ToxB. The common wheat collection of 41 accessions were characterized using the molecular markers Xfcp623 and XBE4444541, diagnostic for the Tsn1 and Tsc2 genes conferring the sensitivity to fungal toxins. The accuracy of marker XBE4444541 with race 5 was 92.11 %, and to Ptr ToxB – 97.37 %. Genotyping results using the Xfcp623 marker confirmed the expected response to Ptr ToxA; the presence/absence of the Xfcp623 marker completely (100 %) coincided with the sensitivity/resistance to race 1 and Ptr ToxA. It demonstrates the reliability of a diagnostic marker of Xfcp623 for identifying wheat genotypes with resistance the fungus and insensitivity to toxin Ptr ToxA. The study of the reaction of wheat germplasm to the fungal inoculation and toxins infiltration showed that out of 38 analyzed 30 genotypes (78 %) exhibited resistance to both race 1 and race 5, and insensitivity to toxins Ptr ToxA and ToxB. Of the most significant interest are eight wheat genotypes that showed resistance/insensitivity both to the two races and two toxins. The results of phenotyping were reconfirmed by the molecular markers used in this study. Sensitivity to Ptr ToxB is not always correlated with susceptibility to race 5 and is dependent on host's the genetic background of the wheat genotype, i. e. from a specific wheat genotype. The results of the study are of interest for increasing the efficiency of breeding based on the elimination of the genotypes with dominant alleles Tsn1 and Tsc2, sensitive to the toxins Ptr ToxA and ToxB.