

Assessment of genetic diversity among Siberian stem rust isolates using SSR markers

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The genetic diversity of the fungus *Puccinia graminis* is extremely high. Within the species, there are several special forms (f. sp) virulent to different cereals, and there is a differentiation of *P. graminis* f. sp. *tritici* (Pgt) determined by the resistance of wheat varieties. The objective of this study was to develop the panel of SSR markers to estimate the level of genetic diversity among the Siberian stem rust isolates. The effectiveness of 20 SSR markers used in the international rust laboratories for Pgt differentiation (Zhong 2009, Berlin 2012, 2017) was tested on a sample of 14 plants infected with stem rust: wheat varieties and wild grasses with urediniospores from Omsk, Novosibirsk, and Altay regions, together with the sexual progeny on barberry leaves (aeciospores) in Novosibirsk. Thirteen markers were polymorphic and only five of them gave amplicons with the sizes expected from published data: 227AAGR/F, 24R/F, CAA53F1/R1, PgCAA8F1/R, CAA49F1/R1. Therefore, this suggests the large genetic distance between Western Siberian and European populations of stem rust. Pgt samples from the same wheat variety – Chernyava 13, collected in Omsk and Novosibirsk regions, showed differentiation on the SSR-profiles of five markers: 109AGGF/R, 227AAGR/F, 293F/R, PgCAA8F1/R1, CAA49F1/R1. These results indicate that two distant Pgt populations exist in these regions of Western Siberia. Four SSR markers (109AGGF/R, CAA98F1/R1, CAA53F1/R1, CAA49F1/R1) were able to differentiate the single pustule isolates obtained from the Novosibirsk population. This set of markers may be useful to inspect the extended sample of Pgt isolates. Most of the tested markers gave the same SSR-profiles for samples of aeciospores and urediniospores from wild grasses, but not from wheat. These results tell us that another special form, not Pgt, could be segregated in sexual progeny on barberries in Novosibirsk.

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