Introduction

In Romania, the wheat plays a big role in food and national economy, being grown on about 2 million hectares and its production was 7.4 million tons in 2013 (www.insse.ro). Leaf rust (Puccinia triticina) became in the last years the most important rust disease in Romania bread wheat, causing significant yield losses.

In the fight of wheat against Puccinia triticina and the fight of breeders for obtaining resistant cultivars, host resistance genes play a major role. Therefore, the identification of resistance genes in modern wheat cultivars and breeding lines, and then selection of the best resistance genes combination(s) are the first steps for a successful breeding. At present, among the known genes with slow rusting effect the most common are the genes: Lr34 (Dyck, 1977), Lr46 (Singh et al., 1998), Lr67 (Hiebert et al., 2010 and Herrera Foessel et al., 2011) and Lr68 (Herrera Foessel et al., 2012). Today, there are molecular markers that enable early detection of these genes and the markers assisted selection (MAS) allows a significant improvement of breeders’ efforts.

The aim of this study was to evaluate the presence of designated slow rusting resistance genes to leaf rust, Lr34 and Lr68, in Romanian wheat germplasm, using molecular markers.

Molecular assessment of Lr34 allele status, using cssfr5 marker

- Biologic material - 190 wheat cultivars and breeding lines.
- DNA isolation – seeds (10-15); using CTAB 2% buffer.
- PCR – multiplex –cssfr5 (Lagudah et al., 2009).
- Electrophoresis - agarose gel- 1.5%.

An overall screening of 190 winter bread wheat cultivars and lines with functional marker, cssfr5, has showed presence of Lr34 haplotype resistance in proportion of 59% (homozygous genotypes 49% and heterozygous genotypes 10%). We have observed that the percentage of Lr34 gene is very low (10%) in genotypes obtained before 1989 and very high at genotypes obtained after 1990 (98%).

Molecular detection of Lr68 gene, using molecular markers

- Biologic material - 64 wheat cultivars and breeding lines.
- PCR -STS-csGS and CAPS-cs7BNLLRR markers (http://maswheat.ucdavis.edu/protocols/Lr68/index.htm)
- Electrophoresis - agarose gel- 1.5%.

Among 64 Romanian winter wheat genotypes, the presence of leaf rust resistance genes, Lr68 (homozygous status), has been found, only, in five genotypes. In this case the frequency of this gene in our winter wheat is about 8%. Based on molecular markers assays, only two Romanian wheat genotypes carry the both genes Lr34 and Lr68 (Aniversar cultivar and F132- DH line).

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References