11th World Congress on

# PLANT BIOTECHNOLOGY AND AGRICULTURE

March 05-07, 2018 | Paris, France

## The use of DNA markers in plant breeding for disease resistance: From PCR-based approaches to allele specific markers

**Ahu Altinkut Uncuoglu, Yıldız Aydin** and **Ezgi Çabuk Şahin**
Marmara University, Turkey

Marker-assisted breeding is defined as the application of molecular markers in combination with linkage maps and genomics, to alter and improve plant traits on the basis of genotypic assays. Yellow rust, caused by *Puccinia striiformis* f.sp. tritici, is one of the major devastating factors worldwide in common wheat (*Triticum aestivum* L.). It is vital to identify associated DNA markers for Yr genes that can be used for marker assisted selection in wheat breeding programs to develop new cultivars with higher resistance. Here we report on the identification of six polymerase chain reaction (PCR)-based DNA markers (*Xgwm382, Xgwm311, wmc658, PK54, BU099658, C6*) linked with yellow rust resistance. Another issue requiring marker-assisted breeding are resistance for *Plasmopara halstedii* responsible for downy mildew disease and *Orobanche cumana*, holoparasitic plant called as sunflower broomrape, lead to loss of yield discount up to 100%. Single nucleotide polymorphism (SNP) markers linked with $Pl_8$, $Pl_{13}$ and $Pl_{arg}$ resistance genes for downy mildew disease in combination with competitive allele specific PCR (KASP) assay which is a fluorescent tagged allele specific PCR method that is more efficient way to determine SNPs like insertions and deletions than other PCR techniques were identified. SNP markers (*NSA2220* and *NSA2251* for *Pl8* gene, *NSA0052* and *NSA0354* for *Pl13* gene, *NSA2867* and *NSA6138* for Plarg gene) were found discriminative among resistant and susceptible parents and their F2 populations. Also, evaluation of *O. cumana* races by KASP assay has been performed and SNP197 marker converted from the one SSR marker (*Ocum-197*), was found as a distinctive marker for *O. cumana* races. All these efforts mentioned above show the potential use and power of PCR-based and sequence-based DNA markers in plant breeding programs particularly for disease resistance in wheat and sunflower.

## Biography

Ahu Altinkut Uncuoğlu is currently working as Faculty of Engineering, Department of Bioengineering, Marmara University. She has completed her PhD at TUBITAK Marmara Research Center in 2001. Her research interest and specializations include biotic (plant diseases) and abiotic (drought and salt stresses) stress tolerance in crops at molecular level, molecular breeding, Marker Assisted Selection (MAS) studies in plant breeding, plant tissue culture and haploid plant production, association mapping and DNA barcoding studies in plants, understanding plant biodiversity at molecular level, technology transfer and university-industry relations in biotechnology area.

ahu.uncuoglu@marmara.edu.tr

**Notes:**

Advances in Crop Science and Technology
ISSN: 2329-8863

Agri World 2018
March 05-07, 2018

Volume 6

Page 42