

Invitation à la soutenance publique de thèse

Pour l'obtention du grade de Docteur en Sciences

Monsieur Yordan MUHOVSKI

Maître ès Sciences

Molecular and genetic characterization of resistance to Fusarium head blight in winter wheat "Centenaire"

Fusarium head blight (FHB) is a devastating disease of wheat (*Triticum aestivum* L.) with worldwide economic and health impact. The disease is caused by a group of trichothecenes producing *Fusarium* species with *Fusarium graminearum* being the most prevalent. FHB can not only cause yield loss, more seriously is that it can deteriorate seed quality by contaminating the infected grains with trichothecenes mycotoxins harmful to humans and animals. Breeding wheat resistant to FHB is one of the best strategies to minimize crop and grain quality losses due to the pathogen. However, the numbers of reported FHB resistance sources are limited including mostly spring genotypes and as well the molecular events leading to FHB resistance are still poorly understood.

In the present work, we initiated a study on molecular and genetic characterization of FHB-resistant winter wheat genotype Centenaire exhibiting Type II resistance. The molecular aspect of this thesis included identification and characterization of putatively candidate defense genes expressed in Centenaire during *F. graminearum* infection using suppression subtractive hybridization. Time-course expression study confirmed that some of the newly identified transcripts were differentially expressed between resistant and susceptible wheat accessions and they were related to metabolic pathways with potential defense role.

Here we also presented the identification of five new full-size ATP-binding cassette transporters G (ABCG) subfamily differentially expressed in wheat genotypes with contrasting resistance to head blight. The obtained results emphasize the potential involvement of ABCG transporters in wheat resistance to FHB, at least in part through the detoxification of the pathogen-produced mycotoxin deoxynivalenol.

The genetic aspect of the present thesis was to identify molecular markers and quantitative trait loci involved in head blight resistance. Wheat population B360 issued from cross between Centenaire x Robigus was partially genotyped using microsatellites and each wheat line was evaluated for resistance to *F. graminearum*. Eight microsatellite markers on chromosome 1B, 2B, 3A, 4B, 5A and 6B were found linked to such loci. Using different mapping strategies we mapped several of the selected candidates to the corresponding wheat chromosome. Altogether our results enlighten some possible mechanism for resistance to this devastating disease and as well suggest wheat genotype Centenaire as a resistance source for wheat breeding programs.

Lundi 10 septembre 2012

à 16h00

Salle de Séminaire B059
Bâtiment Carnoy
Croix du Sud, 5
1348 Louvain-la-Neuve



Membres du jury :

Professeur Henri BATOKO, promoteur (UCL)
Docteur Jean-Marie JACQUEMIN, promoteur (CRAW-Gembloux)
Professeur Jacques FASTREZ, président (UCL)
Professeur Claude BRAGARD, secrétaire (UCL)
Professeur Marc BOUTRY (UCL)
Professeur Jean-Pierre BAUDOIN (ULg Gembloux Agro-Bio Tech)
Docteur Dominique MINGEOT (CRAW-Gembloux)