Proceedings of the 58th Italian Society of Agricultural Genetics Annual Congress
Alghero, Italy – 15/18 September, 2014
ISBN **978-88-904570-4-3**

Poster Communication Abstract – 5.25

PYRAMIDING THE GLYCOSIDASE INHIBITORS PVPGIP2 AND ACPMEI OR PvPGIP2 AND TAXI-III TO IMPROVE RESISTANCE AGAINST FUNGAL DISEASES IN WHEAT

TUNDO S.*, KALUNKE R.*, JANNI M.*,***, VOLPI C.*,****, FAVARON F.**, D'OVIDIO R*

*) Dipartimento di Scienze e tecnologie per l'Agricoltura, le Foreste, la Natura e l'Energia (DAFNE), Università della Tuscia, Via S. Camillo de Lellis snc, 01100 Viterbo (Italy)
**) Dipartimento TeSAF, Università degli studi di Padova, Viale dell'Università 16, 35020 Legnaro (Italy)
***) CNR Istituto di Genetica Vegetale, Bari (Italy)
****) Enza Zaden Italia Research SRL, S.S. Aurelia km 96.710, 01016 Tarquinia (Italy)

glycosidase inhibitors, wheat defence, transgene pyramiding, cell wall

Many pathogens produce a wide range of cell wall degrading enzymes (CWDE) and among them polygalacturonase (PG) is one of the first enzyme produced during the infection process. PG activity is limited by PGIP and by high levels of pectin methyl esterification which is controlled by the activity of the pectin methyl esterase (PME) and its inhibitor (PMEI). In wheat, high accumulation of a bean PGIP (PvPGIP2) or an increased level of pectin methyl esterification, obtained by expressing a kiwi PMEI (AcPMEI), reduced Fusarium Head Blight (FHB) and leaf blotch symptoms caused by the fungal pathogens *F. graminearum* and *Bipolaris sorokiniana*, respectively. In the present work we pyramided PGIP and PMEI with the aim to verify whether the combined presence of PG inhibitor and high level of pectin methyl esterification could enhance further wheat resistance against fungal pathogens, We used traditional breeding to cross the transgenic wheat plants expressing PvPGIP2 and AcPMEI. Analyses of F1 and subsequent progenies (up to F6) demonstrated the feasibility to combine the expression of both transgenes and the occurrence of both PvPGIP2 activity and high level of methyl esterification of cell wall pectin. Plants expressing both inhibitors showed a significant reduction of disease symptom against both *F. graminearum* and *B. sorokiniana*, although the level of protection was similar to that observed with the parental lines carrying the individual genes. On the contrary, preliminary experiments on durum wheat plants carrying the transgenes encoding PvPGIP2 and the xylanase inhibitor TAXI-III showed a reduced FHB symptoms compared to the parental line PvPGIP2.