Resistance of European winter wheat cultivars to *Zymoseptoria tritici* isolate IPO92006

Czembor P.C., Radecka-Janusik M., Słowacki P.
Plant Breeding & Acclimatization Institute – National Research Institute,
Radzików, 05-870 Błonie, Poland

Objective

Septoria tritici blotch (STB) of wheat (*Triticum aestivum*), caused by the fungal pathogen *Mycosphaerella graminicola* (anamorph: *Zymoseptoria tritici*, syn. *Septoria tritici*), is present in most wheat-growing areas worldwide. Host resistance is the most economical and safest method of controlling the disease and information on resistance loci is crucial for effective breeding for resistance programs.

Methods

In the study we used a set of 83 wheat cultivars registered in the Descriptive List of Agricultural Plant Varieties (COBORU 2012), 110 cultivars from other European countries and 25 cultivars/lines with identified STB resistance loci. The wheat genotypes were tested on adult plant stage under polytunnel conditions with watering system. Fully expanded flag leaves were sprayed with spore suspension of IPO92006 *Z. tritici* isolate. After incubation period, the percentage leaf area covered by necrosis (NEC) and covered by pycnidia (PYC) were measured on flag leaf of each wheat cultivar/line that were used in agglomerative hierarchical clustering (AHC) analysis with UPGA algorithm (unweighted pair-group average).

Results

Three groups of wheat cultivars/lines were identified (Fig. 1) and the largest group comprised 170 resistant genotypes with NEC 12.4%–82.1% and PYC 1.1%–53.5%. Within this group, set of 43 highly resistant wheat cultivars were identified (NEC 1.1%–41.8%, PYC 1.1%–31.9%): TE9111, Capone, Lear, Intro, Bombus, Fermi, Heros, KWS Erasmus, Oxal, Tabasco, Elixer, Dacanto, RGT Kilimanjaro, Florett, Sukces, Reciproc, Frument, Desamo, Edgar, Colonia, RGT Djoko, Addict, Forum, Famulus, Pionier, Amifor, Mandub, Memory, Terroir, Julius, Joker, Solitar, Kranich, Grapeli, KWS Dacanto, Eron, Marcopolo and Celebration. (Fig. 2, Tab.) In addition in the same subgroup two genotypes with identified resistance loci were classified: Florett (QTL-3B, QTL-6D, *Stb6* and *Stb15*) and TE9111 (*Stb11*, *Stb6* and *Stb7*). This may suggest that resistance to STB in European cultivars is contributed mainly by quantitative loci and those with main effects. Presented work (phenotyping data) is a part of larger project aiming at identification of resistance genes to Septoria tritici blotch in winter wheat and will be used in near future in association mapping approach.

Acknowledgments

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Figure 1. Dendrogram based on AHC analysis.

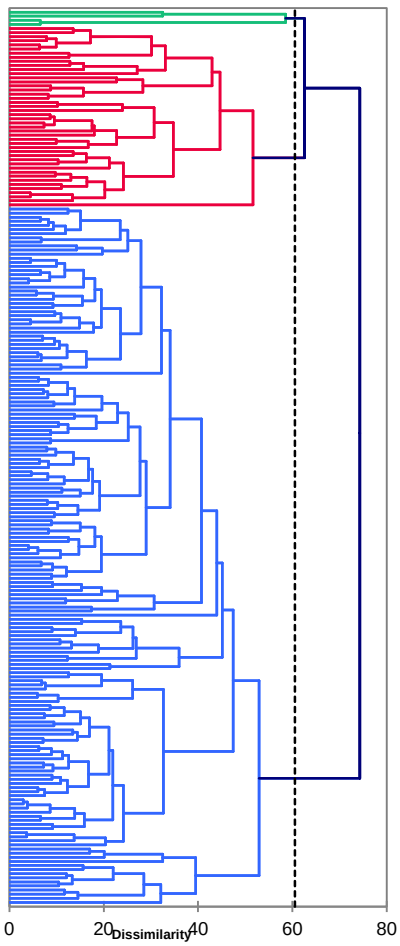

Table – Highly resistant wheat cultivars with respective percentage of necrosis and pycnidia coverage

Cultivar	NEC	PYC
TE9111	12,4	1,1
Capone	19	2,2
Lear	19	1,2
Intro	20,5	4,7
Bombus	21,5	8,7
Fermi	25	11,6
Heros	25,1	7,1
KWS Erasmus	27,1	15,1
Oxal	27,9	4,9
Tabasco	31,6	19,3
Elixer	31,7	7,9
Dacanto	31,7	13,5
RGT Kilimanjaro	32,8	7,7
Florett	33,3	10,3
Sukces	33,6	13,6
Reciproc	34	10,4
Frument	34,1	6,7
Desamo	35,6	10,1
Edgar	35,6	18,9
Colonia	35,8	15,5
RGT Djoko	36,2	21,4
Addict	36,2	19,3
Forum	36,2	17,4
Famulus	36,3	13,5
Pionier	36,7	13,8
Amifor	37,7	16,8
Mandub	38,2	17,9
Memory	38,3	15,4
Terroir	38,6	15
Julius	39,2	6,7
Joker	39,2	13,2
Solitar	39,5	13,2
Kranich	39,7	16,5
Grapeli	40,1	18,4
KWS Dacanto	40,5	23,3
Eron	40,7	31,9
Marcopolo	41,5	20
Celebration	41,8	22,5

Figure 2. Highly resistant wheat cultivars (fragment of the dendrogram in Fig. 1)