9th International Wheat Conference

20–25 September 2015 | Four Seasons Hotel | Sydney, Australia

Program and Abstracts

PO77	TH6	REVISED MAP LOCATIONS FOR THE STB2 AND STB3 GENES FOR RESISTANCE TO SEPTORIA TRITICI BLOTCH IN WHEAT **Stephen Goodwin**
PO78	TH6	SURVEILLANCE OF WHEAT LEAF RUST RACES IN CZECH REPUBLIC IN THE YEARS 1966-2011 **Alena Hanzalová**
PO79	TH6	RESISTANCE VARIETIES TO POWDERY MILDEW THROUGH THREE WHEAT BREEDING CYCLES **Radivoje Jevtic**
PO80	TH6	THE FUTURE OF LR34 IN MODERN, HIGH INPUT, BREEDING PROGRAMS **Paul Johnston**
PO81	TH6	THE POSSIBILITY OF CULTIVATION OF CIMMYT BREAD WHEAT LINES IN HOT AND HUMID REGIONS OF NORTHERN IRAN **Manoochehr Khodarahmi**
PO82	TH6	PYRAMIDING RESISTANCE TO WHEAT STREAK MOSAIC VIRUS **Philip Larkin**
PO83	TH6	RESISTANCE TO STRIPE RUST OF WHEAT YR GENES AND MAJOR COMMERCIAL CULTIVARS OR RESISTANCE SOURCES OF CHINA IN YUNNAN PROVINCE **Mingju Li**
PO84	TH6	EVALUATION OF WHEAT LINES CONTAINING DIFFERENT COMBINATIONS OF STEM, LEAF OR STRIPE RUST RESISTANCE GENES **Ansori Maré**
PO85	TH6	INTRODUCING SOURCES OF CROWN ROT RESISTANCE FROM BREAD WHEAT INTO DURUMS **Anke Martin**
PO86	TH6	CRE8-IVITY: INTEGRATING CLASSICAL AND CONTEMPORARY APPROACHES TO ISOLATE A RESISTANCE GENE FROM WHEAT **Diane Mather**
PO87	TH6	PROGRESS TOWARDS SEQUENCING THE LEAF RUST RESISTANCE GENE LR16 **Curt McCartney**
PO88	TH6	THE REACTIONS OF SOME GENOTYPES FROM CULTIVATED DURUM WHEAT CULTIVARS CROSSES WITH T. DICOCCOIDES TO RUST DISEASES **Zafer Mert**
PO89	TH6	THE REACTIONS OF RED WINTER BREAD WHEAT IN PRELIMINARY YIELD TRIAL TO STEM, LEAF AND STRIPE RUSTS **Zafer Mert**
PO90	TH6	REACTIONS OF BREAD WHEAT GENOTYPES IN FACULTATIVE WINTER WHEAT NURSEY TO STEM, LEAF AND STRIPE RUST IN TURKEY **Zafer Mert**
PO91	TH6	DETERMINATION OF THE REACTIONS OF WINTER BREAD WHEAT -BUNT RESISTANCE SOURCES TO BUNT, STRIPE, LEAF AND STEM RUSTS IN 2014 **Zafer Mert**
PO92	TH6	THE REACTIONS OF GENOTYPES IN PRELIMINARY WINTER WHEAT YELLOW RUST RESISTANCE NURSERY TO RUSTS **Zafer Mert**
PO93	TH6	MULTIPLE PHENOTYPING OF WHEAT PATHOGENS AS A TOOL FOR INCREASING SELECTION INTENSITY IN RESISTANCE BREEDING **Thomas Miedaner**
PO94	TH6	VIRULENCE TRENDS OF STEM AND STRIPE RUSTS IN THE SOUTHERN HIGHLANDS OF TANZANIA FROM 2012 TO 2015 **Rose Mongi**
PO95	TH6	ADVANCED WHEAT BREEDING LINES COMBINING FHB1 AND SR2 RESISTANCE IN DIFFERENT GENETIC BACKGROUNDS **Alexey Morgunov**

cause considerable yield losses on wheat particularly in the eastern part of the country with warmer climate. Knowledge of virulence in the leaf rust population is important for resistance breeding.

In Czechoslovakia and later in the Czech Republic virulence in the rust population has been studied since the sixties of the last century, first on the standard differentials cultivars Malakoff (*Lr1*), Carina (*Lr2b*), Brevit (*Lr2c*), Webster (*Lr2a*), Loros (*Lr2c*), Mediterranean (*Lr3*), Hussar (*Lr11*), Democrat (*Lr3*) and on an additional differential Salzmünder Bartweizen (*Lr26*). Later a set of near isogenic lines (NILs) in cv. Thatcher background was also used for rust virulence studies.

In the sixties of the last century race 14 prevailed. Of the genes possessed by standard differentials it was virulent only to *Lr2c* (Brevit, Loros) and *Lr11* (Hussar), of the tested NILs also to *Lr16, Lr17, Lr23* and later to *Lr26*. It was stepwise replaced by race 77 virulent to all standard differentials (i.e. *Lr1, Lr2a, Lr2b, Lr2c, Lr3, Lr11*) of the tested NILs also to *Lr10, Lr3bg, Lr3ka, Lr10, Lr11, Lr15, Lr16, Lr17, Lr21, Lr23, Lr30* and later to *Lr26*, as well. Virulence to *Lr3* and to *Lr26* was found in Czechoslovakia already before cultivars possessing *Lr3* and/or *Lr26* started to be grown. Virulence to *Lr26* occurred in the rust population at least 10 years before the first cultivars possessing that gene were registered in Czechoslovakia. Another important race 61 was identified in 1977 for the first time. First it was avirulent, later virulent to *Lr26*. Its incidence had an increasing trend till 1991. Race 61 was virulent to *Lr2c, Lr3* and *Lr11* (from the standard differentials) and further to *Lr3bg, Lr3ka, Lr10, Lr11*, Lr16, *Lr17, Lr21, Lr23* and *Lr30*. The last important race appearing in the period 1987-1991 was race 53 virulent to *Lr26*. Race 53 was avirulent to all standard differentials except cv. Hussar (*Lr11*). However, it was no more found in the years 1994-2001. In that period race 2 particularly with virulence to *Lr26* appeared in several years. It was virulent only to standard differentials Mediterranean and Democrat (*Lr3*) as well as to cv. Hussar (*Lr11*). The most effective *Lr* genes in the period 2002-2011according to the average % of the virulent isolates were as follows: *Lr19* (0.3%), *Lr9* (0.7%), *Lr24* (7%), *Lr28* (15%).

In 2002–2011 only sporadic incidence of virulence was determined on NILs possessing *Lr9* and *Lr19*. On the average, relatively low virulence was found on NILs with *Lr2a, Lr2b, Lr24* and *Lr28*. The highest frequency of virulence was ascertained on NILs possessing *Lr3a, Lr10, Lr11, Lr13, Lr15, Lr17, Lr21, Lr23* and *Lr26*. Several changes in the virulence frequency in the leaf rust population appeared in the course of the period under investigation. The most significant one was increase of virulence frequency on *Lr1* from the average 8% in the years 2002-2004 to 85% in the years 2009-2011.

The presence of the genes for virulence in the leaf rust population was only partially influenced by resistance genes in the grown cultivars. More different genes for virulence were recorded in the rust population than only those corresponding to the resistance genes in the grown cultivars. In most years, cultivars without genes for resistance were predominant among the grown cultivars.

Acknowledgements. Supported by Ministry of Agriculture of the Czech Republic Projects No. MZE 0002700604 and No. QJ1210189.

PO79

Resistance varieties to powdery mildew through three wheat breeding cycles

Radivoje Jevtic[1], Novica Mladenov[1], Nikola Hristov[1], Zoran Jerkovic[1], Mirjana Lalosevic[1]

[1] *Institute of Field and Vegetable Crops, Novi Sad, Serbia*

Twenty-four cultivars of winter wheat, representing most of the cultivars released in Serbia from 1955 to 2006, were used in the study. Wheat breeding was carried out through three cycles: first 1955-1962 (Banatka, Bankut 1205, San Pastore, Bezostaja 1, Libellula), second 1970-1990 (Zlatna dolina, Sava, Partizanka, Novosadska rana 2, Kragujevacka 56, Balkan, Yugoslavia, Skopljanka, Lasta, Evropa 90, Pobeda) and third 1992-2006 (Novosadska rana 5, Renesansa, Pesma, Ljiljana, Cipovka, Dragana, Simonida, NS 40S). The study was carried out at the experimental field of the Institute of Field and Vegetable Crops, Novi Sad, Serbia (45°33'N, 19°85'E, 82 m altitude). The location is characterized by semiarid conditions, with dry, hot spring and summer, neutral autumn and moderately cold winter. The wheat cultivars were planted in a randomized complete block design in three replicates. The basic plot size was 5m^2. Disease severity (%) was evaluated according to modified Cobb's scale from 0 to 100%, in a three-year period (2011-2013). Due to distributional nature of the data, non-parametric Kruskal—Wallis test was used. In addition, a non-parametric multiple comparison test was used to test the differences among the wheat breeding cycles.

The results of a Kruskal–Wallis test were highly significant ($P < 0.01$) for *Blumeria graminis* f.sp. *tritici* in two years and significant ($P < 0.05$) in 2011 indicating that mean ranks of the intensity of infection per breeding cycles are different among the three years. For *B. g.tritici*, intensity of infection, there are significant differences among the second and third cycle in 2012 and first and second cycle in 2008. In addition, there is highly significant difference ($P < 0.01$) between second and third cycle in 2013.

Notwithstanding the difference between the breeding cycles, in each of the test cycle, may be significant sources of resistance to *B.g. tritici*.