SUSTAINABLE UTILISATION OF PLANT GENETIC RESOURCES FOR AGRICULTURE AND FOOD

BOOK OF ABSTRACTS

International scientific conference
18 – 20 October 2016
Piešťany
Slovak Republic










NATIONAL AGRICULTURAL AND FOOD CENTRE
RESEARCH INSTITUTE OF PLANT PRODUCTION

National Agricultural and Foond Centre - Research Institute of Plant Production

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UTILISATION OF PLANT GENETIC RESOURCES FOR FOOD AND FEED: CASE STUDIES OF SPELT WHEAT AND BARLEY

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Plant genetic resources stored in *ex situ* collections can help to face today's challenges of food and feed security and safety. On the one hand, climate change impacts both crop and livestock production, on the other hand, food allergies and intolerances are on the rise, especially in the West.

To cope with the negative effect of drought on pasture quantity and quality and the globally increasing demand for meat, forage production has to become more effective. Barley is a crop of high adaptability and a valuable feedstuff as grain, hay or silage. To use barley efficiently for hay and silage production mutant genetic stocks offer some potential. Awnless, hooded and orange lemma mutants are the most promising sources. Awnless and hooded barley can be feed after heading when the crop is highly productive as the absence of awns poses no risk for livestock. Orange lemma mutants increase the digestibility of fodder due to reduced lignin content of grains and straw.

The number of people who suffer from allergic reactions after eating common wheat is increasing. Often these people do not react to spelt wheat as long as they aren't afflicted with coeliac disease or gluten intolerance. Consequently, acreage and research activities of spelt wheat increased significantly in recent years. However, several spelt wheat programs in the second half of the 20th century crossed spelt with common wheat to introgress the genetics for high baking quality, high productivity and the semi-dwarf character to improve lodging tolerance. In the face of consumerism, modern spelt wheat varieties with common wheat hybridization are refused by some manufacturers to avoid unsettledness of consumers.

Results from two ongoing projects on the use of barley and spelt wheat *ex situ* collections to improve fodder and food quality of barley and spelt wheat, respectively, are presented.

Key words: Feed, food safety, forage, *Hordeum vulgare*, *Triticum spelta*

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AEGILOPS DISTRIBUTION REVISION IN THE CZECH AND SLOVAK REPUBLICS, COLLECTION AND PHENOTYPING

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Aegilops distribution was revised on localities in the territory of the Czech Republic and the former Czechoslovakia, based on herbarium data, literature and floristic databases. The only species *Ae. cylindrica* reaches the target territory forming the northern limit of distribution in the Danube basin, in the foothills of Burda (Kováčovské hills). The other sites are considered secondary and both permanent and temporary sites were revised. Two sites in the Czech Republic and three sites in Slovakia seem to be stabilized. *In situ* conservation was proposed for 2 Czech sites where *Aegilops* cylindrical became naturalized in local vegetation. *Ex situ* gene bank collection has been maintained in the Gene Bank Prague since 1985 and includes 21 species and 1,100 accessions. The collection was phenotyped and evaluated on resistance to biotic stresses: resistance to leaf diseases, cereal aphids, viral diseases and qualitative parameters. Recently the collection was retested for the present races of leaf and stem rust including new introductions from Kazakhstan. Six different leaf rust races and five different stem rust races collected from the Czech Republic were applied in the older tests, and three races from each rust species in the recent tests. The highest number of accessions resistant both to wheat leaf rust and wheat stem rust and powdery mildew was found in *Ae. speltoides* (90%). Spontaneous hybridization of *Aegilops* accessions occurred with wheat cultivar as isolation. The resulting hybrids were phenotyped and compared with parents.

Goatgrass occurs in 6 localities in Slovakia (Dunajská Streda, Sereď, Chľaba, Kamenica nad Hronom, Čierna nad Tisou, Dobrá). This localities were localized by geographical position system and accessions were collected and evaluated by descriptors for wheat and *Aegilops*. There are maintained in the Gene bank Slovak Republic. These accessions were analysed to storage protein and we revealed polymorphism in the number of gliadin bands. Collected accessions of *Aegilops* species are interesting for improvement programme.

Key words: *Aegilops*, distribution, *ex situ*, phenotyping, evaluation, *in situ*, conservation

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