

**Memorandum of the participants of the seminar
“New knowledge in plant biology and its use in solving
the needs of plant breeding”,
organised in response to the European biotechnology platform
“Plants for the Future”**

In June 2004 a new European biotechnological platform “Plants for the Future” was announced by EPSO (European Plant Science Organization) with the support of Commissioner Dr. BUSQUIN. Formulations of its aims were presented as an action plan up to the year 2010 with a strategic vision up to 2025. These mirror the awareness of the new importance which plants have acquired at the beginning of the 21st century. Europe is in need of improved crops and novel plants to meet the demands of novel markets; these include new foods, the increasing importance of biomaterials, renewable energy resources and materials for the pharmaceutical industries. At the same time agroindustries need to stabilise and/or increase the yields, decrease the use of agrochemicals and energy, preserve and engage with biodiversity, and care for the landscape and its esthetic values. European help to the developing countries is envisaged as well. This should be connected first of all with offering technical help and know-how. The routes for reaching the above-mentioned aims are: (i) use of knowledge gained in basic and applied research in plant breeding; (ii) development of new technologies and new scientific knowledge for totally new plant-based products; (iii) deepening of the knowledge of metabolism and metabolites for integrating with breeding and agronomic practices aimed at new and developing needs of human nutrition and health; (iv) advance of research for stabilisation of yields in the expectation of extreme climatic changes; (v) changes in technologies of growing plants and in systems of management for minimising negative impacts of agriculture; (vi) study and selection of suitable genetic resources and development of new lines for novel use. The big importance of collaboration in the pursuit of research and plant breeding was recognised and in response to the activities of the European platform, with which Czech researchers and breeders are in agreement and in which they want to participate, this first meeting was organised in order to formulate priorities and offer research potential.

Plant breeding is increasingly an essential tool to further increase crop productivity, to stabilise and improve the quality of agricultural production, to increase resistance of plants to stress conditions and to further improve economically important traits. The breeding opportunities accelerated significantly in the last decade with the rapid development in biological sciences, especially biotechnologies. Also with regard to the environment, there is a need to reduce use of herbicides, pesticides and fertilisers, making use of breeding which appears to be the only true alternative to meet these future demands. A similar statement can be made for the adaptation of crops to climatic changes. As concerns plant productivity, it is still far from reaching its full potential. Genetic improvement of crops is highly cost-effective and new varieties themselves are products with high added value.

Breeders and researchers who participated in this seminar are aware that European-wide collaboration of plant research and breeding is of high importance for the future effectiveness and competitiveness of both science and breeding. With this in mind participants of the seminar recommend to the responsible organs of government:

(1) That there will be greater investment and support for plant research, specifically in the fields of biodiversity, biotechnologies, innovation of breeding methods and techniques, plant resistance to stresses, improved product quality and healthiness without compromising food and biological safety.

(2) That interactions and cooperation of research and breeding is supported, including creating a new legislative framework for joint activities.

(3) That the following items are included among research priorities:

- Study of genetic diversity in gene pool collections, selection and characterisation of donors of important traits for plant breeding;
- Use of neglected and new species in agriculture and the breeding of plants for new or alternative uses, including non-food uses in energy production and the industrial processing and as a source for degradable materials etc.;
- Use of markers for studies of genetic diversity and variety characterisation in gene pools;
- Design and use of suitable markers for assisted selection in agricultural and horticultural crops bred in the Czech Republic;
- Study and monitoring of important pathogens;
- Methods and materials for breeding for stress resistance;
- Use of transgenesis in breeding for specific targets in selected plant species;
- Innovation of breeding procedures using new methods and technologies, especially from the field of molecular biology;
- Research and development of methods and materials for breeding for high specific quality of final products;
- Research and development of materials and methods for breeding crops for alternative uses and different input levels.

The possibility of attracting students (both undergraduate and graduate) for research needed for breeders was discussed. This discussion led to the conclusion that in the program of studies, both at Faculties of Science and Agriculture, it is desirable to include blocks of lectures on the contemporary status, opportunities and needs of crop breeding.

Conclusion: These given recommendations represent the first attempt to set Czech national needs and aims in the response to the European biotechnological platform (EPSO). At the moment only crop breeding has been considered, but the recommendations of other sectors of plant biology will be elaborated and extended in the near future.

Participants of the workshop held at the Research Institute of Crop Production, Prague- Ruzyně, June 20, 2005