

Biotechnology in Legume Breeding

International Workshop organised on the occasion of the 70th anniversary of agrobiological research and plant breeding at Šumperk

The “Kaiser Wilhelm Institut für Bastfaserforschung”, founded at Sorau in Silesia in 1938 as one of the research institutes of the “Kaiser Wilhelm Gesellschaft”, moved in 1942 to Šumperk (Mährisch Schönberg). It is located in a region with long-term history and optimum climatic conditions for flax production and processing in the Jeseníky Mountains (Altvatergebirge). The original research projects of the institute were ambitious and complex, and included flax growing, breeding, maintenance of genetic resources, protection against harmful organisms, and harvesting technologies. Additionally industrial processing like water retting, stem processing, spinning, weaving, yarn dyeing and textile adjustments were studied (HOCHMAN & GRIGA 2008).

After World War II, the research areas of the institute continued but the name of the institute changed many times as well as its organizational subordination to the Ministry of Agriculture or the Czech Academy of Agricultural Sciences. The spectrum of investigated crop species widened gradually. Three important milestones can be highlighted in the period after World War II. In 1961, the original focus on fibre crops was extended to grain legumes (by transferring legume research from the Cereal Research Institute at Kroměříž) which dominated the institute activities in the sixties. In 1977, the crop research institutes and breeding stations in Czechoslovakia were integrated into the State Breeding Enterprise OSEVA Prague, a.s. with the aim to join plant genetic research, practical plant breeding and seed production into one organization. At that time (1977–1993) seven breeding/research stations in Bohemia and Moravia belonged to the Institute and a number of pea, faba bean, soybean, winter rape and flax varieties were bred and released. However, the most important change happened in 1993, when, based on political decision of the Czech government, research institutes specialized in particular crops were transformed to limited liability companies (Ltd.) with the obligation to maintain their original activities, i.e. agrobiological research and plant breeding. Our Institute was thus transformed to “AGRITEC, Research, Breeding and Services Ltd.” and officially registered in September 1993. In 2002, AGRITEC, Plant Research, Ltd. was established as a private non-profit institution whose all potential profit must be completely reinvested to research.

Since the beginning of 1980s, the plant biotechnology research and its application in flax/linseed and legume breeding were initiated. At that time, we began to develop regeneration protocols *in vitro* for both crops, later on these protocols were used for clonal propagation on the one side and generation of somaclonal variation and selection *in vitro* on the other side. Our team contributed substantially to development of somatic embryogenesis induction in faba bean (first lab in the world) as well as in pea (third lab in the world). Anther/microspore culture and doubled haploid production in flax/linseed and winter rape is recently a routine supplement of conventional breeding in our institute. In the case of caraway, we reported first reliable protocol of anther culture for this spice crop. Later on, we started to develop methods of protein and DNA analyses both for cultivar identification and for marker-assisted selection. Finally, we used previously developed regeneration protocols for genetic transformation of flax and pea which resulted in the official release of transgenic flax (heavy metal tolerance and accumulation) and pea (virus resistance) into environment as the first institution in the EU. Thus, we can say that we celebrate not only 70 years of agrobiological research, but also 30 years of plant biotechnology of fibre crops and legumes. In addition, a 190 anniversary of J.G. Mendel was celebrated in 2012, whose experimental model – pea – represented a building stone for later formulations of the key laws of modern biology (see contributions of Schwarzbach et al. and Smýkal in this issue).

The Workshop was devoted to grain legumes biotechnology/breeding – we welcomed the people who have collaborated with AGRITEC for many years both informally in the framework of the former AEP (Eu-

ropean Association of Grain Legume Research), IAPB (International Association of Plant Biotechnology), COST Actions 822, 837, 843, 859, FA0905, and officially in a number of national (NAAR, CSF, Ministry of Education, TACR) and European Union Framework 4th to 7th projects (CABINET, Direct SE, EUFABA, ABSTRESS) to Barrande or EUROSTARS, and of course all dealing with legume biotechnology and breeding. The scientific program offered a wide range of interesting topics from classical tissue culture approaches, through genetic engineering to highly advanced molecular biology techniques presented by participants from nine European countries and USA (80 participants in total). The programme was well balanced between fundamental research, through applied research and methodological approaches to practical legume breeding.

MIROSLAV GRIGA
Chair of the Organising Committee

HOCHMAN M., GRIGA M. (2008): AGRITEC Research, Breeding & Services Ltd. – 65 years of research and breeding of technical crops and legumes at Šumperk (1942–2007). *Czech Journal of Genetics and Plant Breeding*, **44**: 37–39.