Session F: Plant breeding and plant analytics

FPL 1: Medicinal plant breeding in Poland: history and nowadays

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Abstract

Introducing of medicinal plants into cultivation and growing demands of phytopharma-ceutical producers have the influence on starting breeding research in Poland. In the Research Institute of Medicinal Plants of Poznan the breeding programs have been conducted from over fifty years. During these years 22 cultivars of medicinal plants were bred and successfully introduced into practice.

In Poland, medicinal plants were used from ages not only as a folk remedy but also as a drug in pharmacy. In the past, collecting in the wild was the main source of medicinal plant raw materials. Now, about 70 different species of medicinal plants are cultivated on app. 20 000 ha and Poland is recognized as the country of growing potential for the high quality raw material production, based on farmers long lasting experience and knowledge, but also based on the achievement of Polish medicinal plant breeding. The medicinal plant raw material, produced in Poland, mainly come from cultivation (10 000 - 20 000 t), but also from collection in the wild (3 000 - 5 000 t) (JAMBOR, 2001).

Chamomile (*Chamomilla recutita* (L.) Rausch.), thyme (*Thymus vulgare* L.), milk thistle (*Silybum marianum* (L.) Gaertn.), valerian (*Valeriana officinalis* L.), peppermint (*Mentha x piperita*), caraway (*Carum carvi* L.), lovage (*Levisticum officinale* Koch.), savory (*Satureja hortensis* L.), lemon balm (*Melissa officinalis* L.), sage (*Salvia officinalis* L.), evening primrose (*Oenothera paradoxa* Hudziok) and St.John's Wort (*Hypericum perforatum* L.) are the most commonly cultivated species in Poland . Different origin of raw materials and existence of medicinal plant chemotypes which are different in active substance content affect heterogeneous of raw material lots, what causes a lot of problems for producers. Following GMP demands, the drug production needs large, uniform consignment of the high quality raw material. The controlled cultivation of the medicinal plant cultivars provides the high yield of the raw materials, which contains a lot of active substances.

Establishing the Research Institute of Medicinal Plants in 1947 sped up the development of the breeding research in Poland. Prof. Waclaw Strazewicz, who gave rise to Institute, was the first medicinal plant breeder in Poland. He strongly pointed out the importance of medicinal plant breeding and he claimed that: "offering the high quality raw materials of medicinal plants from cultivation and developing breeding research is the only way for Poland to obtain the important position on the international market of medicinal plant raw materials" (STRAZEWICZ, 1948). Breeding research was also done in others Polish institutions as: University of Agriculture (SGGW-AR) in Warsaw (cultivars of chamomile and coriander), University of Agriculture in Wroclaw (evening primrose breeding) and some farmers (2 cultivars of valerian and mint).

The main directions of the medicinal plants breeding programs in the Institute are:

- Content of active substances
- Yield and its structure
- Adaptation to mechanical harvest
- Adaptation to abiotic (drought, winter hardiness) and biotic stress.

Medicinal plant breeders encounter considerable difficulties with:

1. Low income, because medicinal plants are cultivated on a small area

2. A large number of medicinal plant species (app. 170). Breeding programs usually cover species which are cultivated on large areas or are important for drug or food industries.

3. Most of medicinal plant species are perennial, so breeding programs are prolonged.

At the present time in the Institute, only the breeding program of lemon balm (*Melissa officinalis* L.) is performed to obtain the new, valuable cultivar.

In the Institute of Natural Fibres and Medicinal Plants 22 cultivars of medicinal plants were bred and introduced into cultivation:

- caraway (*Carum carvi* L.)	cvar. 'Kończewicki'
- caraway (*Carum carvi* L.)	cvar. 'Plewiski'
- chamomile (*Chamomilla recutita* (L.) Rausch.)	cvar. 'Zloty Lan'
- chamomile (*Chamomilla recutita* (L.) Rausch.)	cvar. 'Promyk'
- chamomile (*Chamomilla recutita* (L.) Rausch.)	cvar. 'Dukat'
- chamomile (*Chamomilla recutita* (L.) Rausch.)	cvar. 'Mastar'
- foxglove (*Digitalis lanata* Ehrh.)	cvar. 'Victoria'
- greater celandine (*Chelidonium maius* L.)	cvar. 'Cynober'
- hollyhock (*Althea rosea* Cav. var.nigra hort.)	cvar. 'Czarna Mańka'
- Jimsonweed (*Datura innoxia* Mill.)	cvar. 'Indianka'
- lovage (*Levisticum officinale* Koch.)	cvar. 'Amor'
- marjoram (*Origanum majorana* L.)	cvar. 'Miraz'
- milk thistle (*Silybum marianum* (L.) Gaertn.)	cvar. 'Silma'
- purple coneflower (*Echinacea purpurea* Moench.)	cvar. 'Ida'
- red pepper (*Capsicum annuum* L.)	cvar. 'Wulkan'
- sage (*Salvia officinalis* L.)	cvar. 'Bona'
- savory (*Satureja hortensis* L.)	cvar. 'Saturn'
- sweet basil (*Ocimum basilicum* L.)	cvar. 'Kasia'
- sweet basil (*Ocimum basilicum* L.)	cvar. 'Wala'
- St. John's Wort (*Hypericum perforatum* L.)	cvar. 'Topaz'
- thyme (*Thymus vulgaris* L.)	cvar. 'Sloneczko'
- valerian (*Valeriana officinalis* L.)	cvar. 'Polka'.

In the Breeding Laboratory of the Institute, the detailed rules of these cultivars maintenance breeding were elaborated and introduced into practice. Therefore, the basic seeds of cultivars are produced, then seeds for medicinal plant raw material producers (SEIDLER-LOZYKOWSKA , 2009).

References

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