

# Present situation in plant breeding in Slovakia

F. DEBRE and G. ZALABAI

## Introduction

The State of Food Insecurity in the World (SOFI 2003) estimates 842 million people suffer from chronic hunger.

„The Rome Declaration calls upon us to reduce by half the number of chronically undernourished people on the Earth by the year 2015.... If each of us gives his or her best I believe that we can meet and even exceed the target we have set for ourselves.“

H.E. Romano PRODI, President of the Council of Ministers of the Italian Republic and Chairman of the World Food Summit.

„We have the possibility to do it. We have the knowledge. We have the resources. And with the Rome Declaration and the Plan of Action, we've shown that we have the will.“

Dr. Jacques DIOUF, Director-General of FAO [2]

Researchers, breeders, seed producers and seed merchants share a great responsibility for food sufficiency in the world.

## Agriculture in Slovakia

Slovakia has 2.441 million ha of agricultural land from the total area of 4.904 million ha (49,9 %), arable lands and permanent crops 1.45 million ha of which 0.2 million ha are irrigated; grasslands 0.865 million ha; forests 1.921 million ha. Main crops include wheat (0.405 million ha), barley (0.199 million ha), maize (0.145 million ha), oil crops (0.160 million ha) and also potatoes, sugar beet, vineyards and fruit trees. Agricultural land per capita represents 0,46 ha. [1]

Hectare yield trend of the most important crops grown in Slovakia from year 1938 to 1990. After the year 1990 there was recorded the yield decrease for the main reasons - fertiliser deficit, insufficient plant protection by pesticide, non-certified seed, lack of technology used, and old machinery, human factor. [4]

The privatisation of agriculture has been applied in all sectors - land, agri-food

market, agro-industries, etc. and was fully completed in 1997. Small private farms and business entities have been created from previous big state ones.

## Short History

The first steps were done in accordance with the recommendations made by the Slovak revivalists (FÁNDLI, LICHARD) in the 18<sup>th</sup> and the 19<sup>th</sup> centuries concerning the selection and hybridization work. This is followed by a reference on the first practical attempts at breeding in Slovakia towards the year 1870. These initial experiments were made with wheat in Sládkovicovo and in Radvan (Szilvai); J. Agnelli did more significant trials with improvement of the potatoes in Cárý. Thence numerous attempts follow at breeding work with different crop plants, namely with the improvement of barley (in 1899-1908) in Bohunice, with wheat, rye and barley in Radošina (1900-1918), with wheat in Palárikovo since 1906, with barley again at Sládkovicovo since 1909, etc. All these initial attempts in breeding lasted only for a period of some years; they did not get through and ceased. The method used was mass selection; J. Agnelli crossed potatoes and obtained new varieties.

The conditions for the development and stabilization of plant breeding in Slovakia were improved during the period of the first Czechoslovakian Republic, i.e. since 1918. The first Act safeguarding of plant breeding and production of certified crop seed was issued in 1921 (No. 128, Order in Council No. 208).

During the years 1918 - 1938, eighteen working places were engaged in plant breeding in Slovakia. 92 crop varieties were developed, maintained and approved for release in Slovakia during the years 1920 - 1948.

After the World War Two, 18 breeding subjects that resided at estates and farms applied for breeding and seed production (maintenance breeding - multiplication). In 1947 a co-operative Slovosivo

(Slovakian Seed Co-op.) was established to regulate, organize and support plant breeding and seed production. After the nationalization of the breeding enterprises that function was taken over by the Czechoslovak state farm.

Plant breeding, seed production and its distribution have been settled by the plant production improvement act No. 188 since 1950. This act entrusted both the state and the cooperative farms with the breeding work.

During the 20 years period (1949-1969) a total of 418 varieties - 129 cereal varieties, 34 pulse crop var., 28 oil plant var., 41 varieties and hybrids of maize, 10 sugar beet var., 58 potato var., 1 hemp var., 25 grass var., 9 tobacco var., 32 vegetable var., 10 fruit tree var. etc. were developed. In accordance with the improvement policy in breeding, since 1960 the breeding stations have been specialized for particular groups of crops, e.g.: cereals, pulses, maize, grasses, vegetable crops, fruit culture, and viticulture. [3]

The act No. 188 which had carried forward the standards for plant breeding and seed production was replaced by a new version in 1964 - Act no. 61. According to it the released varieties had to be maintained by maintaining breeding. The above Act was amended by the Czechoslovak Standard (CSN) for the recognition of seeds and seedlings, and by instructions for testing and for the recognition of seeds and seedlings, and by instructions for testing and for the approval of new varieties. In 1990 the number of breeding subjects was higher than 20.

## Present situation

Plant breeding activity that previously took place at various state Plant Breeding Stations, still continues, but the stations are all privatised. Only the Research Institute of Plant Production in Piešťany, where also the National Gene Bank is situated, remains as the state. Some institutions were terminated. At selected

**Autoren:** PhD. František DEBRE, Gyula ZALABAI, Slovak Association of Seed Traders and Breeders, Pod Rovnicami 7, 871 05 BRATISLAVA 4, Slovakia, E-mail: sssa@stonline.sk



private stations the breeding activity continues with the same intensity and is enlarged in some cases. In Slovakia breeding activities have decreasing tendency en bloc (Table 1).

Plant breeding is focused on cereals, maize, legumes, potatoes, grasses, grapevine and some species of vegetable and fruit plants. Winter wheat is the most important crop that is grown in Slovakia and contributes also to global food security. The subjects, having permanent residence in Slovakia, bred nearly 50 % of the wheat varieties (Table 2). Slovakia has not own variety of rye, oilseed rape, sunflower and soybean.

The Central Controlling and Testing Institute in Agriculture of the Slovak Republic, which has different branches in the regions, perform the variety evaluation, registration and release. The domestic and foreign varieties are tested in official field trials for 2-3 years and on the basis of their results they are analysed by special commissions, which recommend them to the Ministry of Agriculture.

The new varieties are registered in the official catalogues, which are published every year. Only the varieties of economically important species must be registered, what is the case of major field crops, a large number of vegetable species, fruit trees and root shaped plants. They are registered in a Special List of species and seeds. Slovakia is admitted by OECD to register cultivars.

Private companies cover seed production. At present there are 8 important seed producers that work in Slovakia. There are important also the trade agencies and multinational companies oriented in import of the seed.

Seed producers must be authorised to exercise their activity. Mainly private seed companies that organise the multiplication in different farms produce the seed. The breeding stations in general produce only the higher generations, whereas the multiplication is performed in specialised farms. Lower prices favour seed production for export, which is directed toward the European countries.

The presence of 'informal' seed sector is related to the production for own use.

Slovak Association of Seed Traders and Breeders (SASTAB) was established on 25 May 1993 in accordance with the § 20f of Slovak Civil Code in purpose of unification, supporting and putting through the interests of plant breeders and seed producers. In May 1995 SASTAB was accepted as a member of FIS and ASSINSEL. The General Assemblies both of these organizations adopted the motion in Rome on 25 May, 2000 for the merger of the two associations. The name of the new association will be the „International Seed Federation (ISF)“.

In October 2004 SASTAB was accepted as a member of ESA (European Seeds Federation). SASTAB is the non profit and voluntary union of legal entities with residence in Slovakia dealing with plant breeding, seed growing, seed trading and providing services in the area of plant breeding and seed activities. SASTAB members work in two chambers - Chamber of breeders and Chamber of seed tra-

**Table 1: List of organizations participating in breeding activities in the Slovak Republic - present situation**

Nr.	Organization	Breeding activities/plant species	Note concerning breeding activities
1	Research Institute of Plant Production Piešťany	wheat, barley, oat, alfalfa, red clover, birdsfoot trefoil, poppy	increasing by selected species
2	SELEKT, Research and Breeding Institute JSC, Bucany	wheat, sugar beet, fodder beet, pea, white clover	limited
3	ISTROPOL Solary JSC, Horné Mýto	wheat, triticale, barley, Sudan grass, capsicum - red pepper, melon, watermelon	increasing by selected species
4	Hordeum Ltd, Sládkovicovo	wheat, barley, millet	increasing by selected species
5	Breeding Station JSC, Horná Streda	pea, field pea, vetch, hairy vetch, faba bean, dry bean, French bean	in conversion
6	SEMPOL Holding JSC, Trnava	maize	limited
7	Research and Breeding Institute of Potatoes JSC, Veľká Lomnica	potatoes	limited
8	WOOD Breeding Station Ltd, Radošina	wheat, triticale, barley	in conversion
9	Zelseed Ltd, Horná Pôton	vegetables, maize	increasing by selected species
10	Lestra & Co Ltd, Nesvady	vegetables	increasing by selected species
11	Research Institute of Vegetable Ltd, Nové Zámky	vegetables	limited
12	Research Institute of Fruit and Decorative Trees JSC, Bojnica	fruits, small fruits, root stocks	limited
13	Plantex Ltd., Veselé pri Piešťanoch	fruits, rootstocks	increasing by selected species
14	HERBATON Ltd, Klcov	fruits, rootstock, medical and tonic herbs	declining
15	Research and Breeding Station Ltd, Veselé pri Piešťanoch	fruits, root stocks	in conversion
16	Research Institute for Viticulture and Oenology, Bratislava	grape-vine	in conversion
17	Breeding Station Koronc Ltd, Trebišov	wheat, barley, lentil	stopped activities
18	Breeding Station Ltd, Vrbové	ornamental plants	stopped activities

Table 2: Slovak Plant varieties Maintainers - National List 2004 (selected species)

Nr.	Latin	English	Total sum Varieties	Slovak maintainers	% of Slovak maintainers
1	Triticum aestivum L. emend. Fiori and Paulo	Wheat	55	26	47
2	Triticum durum Desf.	Durum wheat	6	3	50
3	Hordeum vulgare L.	Barley	43	17	40
4	Zea mays L.	Maize-corn	203	13	6
5	Zea mays L.	Maize-silage	78	21	27
6	Beta vulgaris L.	Sugar beet	38	1	3
7	Pisum sativum (partim)	Pea	39	15,5	40
8	Brassica napus L. (partim)	Oilseed rape	32	1	3
9	Malus Mill	Apple tree	57	50,5	89
10	Capsicum annuum L.	Capsicum pepper	169	37,5	22

ders. Four working commissions are dealing with specific problems in seed trading and plant breeding activities (economical, legislative, for elimination of illegal seed trade and control commission). At the present time SASTAB has 28 regular members.

SASTAB is an ordinary member of the Agrarian Chamber, building working contacts with several home and foreign growers unions and associations.

Main Actors of the Seed Sector are:

Governmental Sector - Ministry of Agriculture and its Institutions, Ministry of Environment (GMO).

Private Sector - Seed Enterprises (national and from abroad); Plant Breeding Enterprises (national and from abroad); Research Institutes Ltd.; Unions and associations (SASTAB, Slovak Agricultural Chamber, and others).

Central Controlling and Testing Institute in Agriculture of the Slovak Republic - Variety Registration; Plant Variety Protection; Seed Certification; Variety Recommendation; State Phytosanitary Service.

Until 1990 there were 2 State companies dealing with seed production activities. In 2004, 400 subjects including the National companies based on the former State ones (their regional centres).

National companies were founded as the new ones.

## Legislation

Breeding and seed production are regulated by two basic acts. The first act No. 132/1989 Statute (St.) on protection of the rights for new varieties of the crops and animal races was last amended by act 435/2001 St. on patents, additional mark certification and the second act No. 291/1996 St. about varieties and seed material.

Seed Legislation is based on the EU principles (new Seed Act since 2003). Plant Variety Protection - UPOV 1978 Act, Varieties Registration must accept DUS & VCU - no remarkable barriers for abroad co-operation. Seed Certification obligatory in a case of the main crops using seed standards based on the EU requirements. Accreditation of Company seed laboratories are being developed.

Protection of plant breeder's rights - basic condition for returning of investments. Legislative system is at the same level as in EU (Act No. 132/89 in the notion of Act No. 22/1996 Z.z.).

Regulation Nr.345/1997 Z.z introduced remuneration. Reaction on this was, that six SASTAB members founded Cooperative of Variety Owners - Remuna in 2004. The basic activities are - monitoring of Farm Saved Seed (FSS) usage; administration and collection of FSS remuneration in favour of its members (rem. = 50 % of royalty); in near future it will prepare the collection of royalties. Probably since next year Remuna will be an ordinary member of SASTAB.

Despite of good legality, there have been done not enough in the sphere of monitoring and in adherence of mentioned rights not only in primary production but also even in connection with seed trade organizations.

At present in Slovakia there are running high intensive legislative works especially concerning the adjustment of EU regulations in the sphere of variety registration and seed trade. These work result in adoption of 12 governmental orders and 4 regulations of Ministry of Agriculture.

Plant Variety Protection (PVP) legislation. The Act 132/1989 (in Act 22/1996) - based on UPOV 1991. FSS of a pro-

tected variety is possible only in harmony with Law. Farmers are obliged to give the information on a request of the breeder and to pay an appropriate remuneration. Penalties must be according to the law. Slovakia also adapted its legislative in harmony with EU legislation.

## Conclusion

Slovak breeders strive to keep mutual advantageous contacts and cooperation with foreign breeders as the exchange information, acquaintance with breeding methods and problems and their solution, study of the breeding material, crop varieties and the exchange of varieties. Plant breeding activities in the Slovakian geographical area belongs to the European cultural sphere for many years. We hope, that we improve the new possibility for cooperation in joint Europe for searching fruitful results contributing to reduce the number of chronically undernourished people on the Earth.

## Literature

1. AgroWeb Slovak Republic. This site is created, maintained and hosted by ÚVTIP, Nitra, Slovakia in co-operation with Working Group and FAO SEUR. Available on <http://www.uvtip.sk/english/awsk/show.php?page=country>.
2. FAO: The State of Food Insecurity in the World. Available on <http://www.fao.org/-ag/cgrfa/itpgr.htm>
3. KLINOVSKÝ, Milan et al.: 100 rokov šľachtenia rastlín na Slovensku (100 Years of Breeding Work in Slovakia). I. Iss. Bratislava: Slovosivo 1970. 528pp.
4. MIŠTINA Timotej: Slovak Breeding, Seed Production and Conservation on Genetic Resources. In: Bulletin Eastern European Seed Network, 2<sup>nd</sup> Annual Meeting, 3-5 November 2002, Bratislava, Slovak Republic, p. 31-35.
5. Vestník Ministerstva pôdohospodárstva Slovenskej republiky: Listina registrovaných odrôd (National list), roc. XXXVI, čiastka 17, 16.6.2004. Available on [http://www.mpsr.sk/slovak/menu/vestniky\\_2004/vest17\\_2004.pdf](http://www.mpsr.sk/slovak/menu/vestniky_2004/vest17_2004.pdf)

