

Tradition of Fruit and Vegetable Species Breeding and Propagation in Bohemia and Moravia

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We are now standing on the verge of the 21st century, which is a good opportunity for looking back into the history of our activities, and appraise the good or bad things that happened. The aim of this brief paper is to inform about the various happenings in Czech and Moravian fruit and vegetable farming. To know the history and the results of the past is a necessary prerequisite for further successful development of these activities. As the classics used to say: HISTORIA MAGISTRA VITAE, which means „History is the teacher of life“.

Fruit trees and shrubs have been the inherent part of Bohemia and Moravia from the pre-historic times. This fact can be documented by numerous relics of some fruit species from the Great Moravian period - between the 8th - 10th century, which were found at the uncovered fort by Mikulcice, in the lower part of the Morava river basin. There are also written records from the 10th and 11th centuries, especially from the time of reign of the Roman emperor and Czech king CHARLES IV. (1316-1378). The development of fruit farming increased during the following centuries, even though it was significantly disrupted twice - in between 1419 and 1437 (the Hussite wars), and later between 1618 and 1648 (the Thirty Years' War).

The advanced state of the fruit farming knowledge, as well as the practical results of this activity are documented by a Czech exile, forced to leave the coun-

try during the anti-reformation era, Jiri Holik (in Latin known as: Georgius HOLYK, Bohemus exul.) (1643-1710). He wrote a book, in his time a very innovative one, on horticulture, especially pomology, which was called „GARTEN BAU“. It was printed in the Latvian town of Riga (at that time under the Swedish supremacy) in 1684, and in the following hundred years, it was reprinted in amazing 21 editions. Other practical results of Czech and Moravian fruit farming were numerous varieties of fruit species, especially apples, which were taken by Czech emigrants to exile, where they were successfully planted and propagated, unfortunately often under other than their original names. In the 18th century, thanks to the physiocratic efforts of the forward-looking Austrian Empress and Czech Queen MARIE THERESE (1717-1780), the development of agriculture and horticulture was widely supported. Great attention was paid to fruit farming, too. These efforts were successful in both Bohemia and Moravia. The enthusiastic fruit farmers of that period were very well aware of the necessity for a systematic study of variety and species ranges of fruit plants. By comparing them, they carried out selections and aimed for a systematic improvement of the variety range in the given areas. These were the origins, although somewhat primitive, of selecting and breeding methods. The establishment of such collections and also related educational activities in Moravia were the work of a friar priest and doctor Adam BOCCIUS (1731-1806) from Valtice (called Feldsberg at that time), who made himself known also as an excellent botanist and popularizer of horticulture. In Bohemia, this role was taken up by another priest, Matej RÖSSLER (1754-1822), a dean in Pödebrady. At that time, the works of the Tübingen professor Rudolph Jakob KAMERER (R.J. CAMERARIUS) (1665-1721) on plant sexes and the possibilities of cross-bree-

ding (hybridisation) were already known as well. A Czech pomologist, Josef Eduard PROCHE (1822-1908), dwelling and working in Sloupno by Novy Bydov (close to Hradec Kralove), issued from the work of RÖSSLER and his collections of fruit varieties, and also frequently used various methods of cross-breeding for further improvement of fruit varieties. He even left written records of his findings and experience. An interesting and less-known historic fact is that in 1883, he met with J. G. MENDEL at a horticultural exhibition in Brno. At that time, Mendel was also a keen fruit grower interested in breeding fruit species. PROCHE is said to be the „Father of Czech fruit breeding“.

In the 18th century, thanks to the effort of pomology enthusiasts and „folk“ breeders, numerous regional varieties of fruit were bred, which became popular and famous also in the neighbouring countries. An example of such variety were for instance the 'Brno Prunes', which were popular at the Viennese court of the Emperor FRANZ (1768-1835), or the 'Solanka' pears from the Libochovice region of Bohemia, which were massively exported to Dresden. At Christmas time, the Imperial court and the families of the Viennese patricians couldn't do without apples from the East-Bohemian village of Holovousy - 'Himbeerapfel von Holovousy' (Malinovo Holovouske). And there could be many more of such examples.



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The rediscovery of the „Mendel’s Principles“ in 1900 ignited an intensive research and breeding activities in many fields of agriculture, and also in fruit farming. A truly significant asset for all the breeding practice in our lands was the establishment of the first research and breeding institute in the Austrian-Hungarian monarchy, which in fact represented the whole of Central Europe back then. It was the Fürst Johann von Liechtenstein-Pflanzenzüchtung-Institut, later shortened as Mendel-Institut - or Mendeleum, which was founded between 1912 and 1913 in the Moravian town of Lednice (Eisgrub). One of the initiators and the first directors of this institute was the re-discoverer of the Mendel’s principles, Viennese professor Dr. Erich TSCHERMAK-SEYSENEGG. After 1918 the director’s position was held by Prof. Dr. F. FRIMMEL-TRAISENAU (1888-1957). One of the tasks of his wide-reaching breeding and genetic research activities was also the breeding of fruit plants. After 1918, in the period after the First World War (1914 - 1918), various political and regional changes took place, and one of them was the establishment of the former Czechoslovak Republic. The successive internal political changes brought also substantial changes in the programme of agricultural fields and their activities. Within the newly established research institutes in Prague, Brno, and Bratislava, sections and departments were founded to be aimed at horticulture, and thus also at pomology. This is how the State Institute of Horticultural Research in Pruhonice gradually came to existence. Brno, as well, had its pomological and enological departments and detached workplaces. Other breeding stations were founded as well, driven by the efforts of growers, for example in Prerov, where a fruit breeding and nursery centre was established in Horní Mostenice.



Apart from the mentioned state, land, and collective (cooperative or joint-stock) companies, breeding was pursued also by enthusiast gardeners and fruit farmers. One of them was for instance the famous breeder Vaclav BLAHA (1899-1975), who achieved extraordinary breeding results with his varieties, and remained a private gardener and breeder in the latter totalitarian era (between 1948 and 1989). Despite the fact that he was often discredited as a layman, the state and political representatives had to, although not willingly, respect his fruit breeding genius.

A special chapter in the history of pomological research and breeding is represented by the controversial period after the Second World War (1939-1945). On one hand, the personal initiatives were restrained, contacts with the „Western“ foreign countries restricted, modern laboratory equipment, technologies, and specialised literature were hard to reach, and the state directive had an incredibly strengthened position. On the other hand, many breeding and research centres were established, domestic breeding was supported, as well as was the development of propagation and nursery farming, and horticultural education too. Thus, despite the numerous directive regulations and restrictions of the contact with non-social foreign countries, many positive goals were achieved. Thanks to the numerous, at that time non-official, contacts with the states of Western Europe, our horticultural science could learn about new findings and trends in breeding and propagation of horticultural plants, therefore also the fruit and vegetables. Due to this almost illegal activities, we were able to achieve many successes in breeding, propagation, and research. An important role in the higher education of breeders and propagators of vegetable and fruit plants was played by the then newly established Horticultural College (later the Faculty of Horticulture) in Lednice. It was a part of the Agricultural University in Brno, which is now called Mendel University of Agriculture and Forestry, where breeding (applied genetics) and propagation (including nursery farming) was taught as part of profile subjects. The fact that some of the university lecturers were the members of renowned international organisations, such as ISHS, EU-

CARPIA, and others, supported the successful running of the research work.

Recently, that is after the revolutionary year 1989, when democracy was re-established here along with free contacts with the whole world, we can boldly state that the current trend in fruit breeding in our country is in concurrence with the development in the world, especially in the field of stone fruit and termophilic kernel fruit (apricots). These positive achievements were reached by the research centre in Holovousy (where the famous raspberry apples came from), breeding station in Techobuzice and Strizovice by Liberec (run by the Czech Institute of Sciences), and also by the Faculty of Horticulture in Lednice (apricots). The perspective varieties of apples, which are resistant especially against apple scab, are often patented and successfully grown abroad as well. Widely used in the whole world are also the dwarf vegetative cherry rootstocks from the research institute in Holovousy, as well as the cherry variety called Kordia’.

Excellent standards in quality, yield, and health are achieved by many of the breed varieties. From apples, these include: ‘Rubin’, ‘Topaz’, ‘Bohemia’, ‘Delor’, and others. Pears: ‘Radana’, ‘Elektra’, ‘Bohemica’, ‘Erica’. Cherries: ‘Kordia’, ‘Karesova’, ‘Techlovan’, and others. Apricots: ‘Leskora’ and other varieties. From the varieties of currants, ‘Losan’



is very successful, which is suitable for mechanised harvesting. Good quality of Bohemian and Moravian fruit varieties is documented also by the fact that in the cultivated and widely demanded range, domestic varieties and rootstocks dominate. They are not just effective and of good quality, but also adaptable to the specific conditions in various growing regions of our country.

Many facts from the described history of cultivation, breeding, and propagation of fruit plants apply also to vegetable species. Vegetables have always been grown here from the ancient times. In 1946, a prehistoric vessel with the remains of bulbs was found close to the Moravian town of Kyjov - its origin is estimated to approximately 2000 BC. Numerous findings included relics of various vegetable species in Mikulcice - place in the lower part of the Morava river course. These came from the Great Moravian period between the 8th and 10th century AD. Horseradish cultivation in Bohemia is documented back to the 12th century. Vegetables have always played an important role in human nutrition. It was not just some auxiliary food, but very often vegetables represented the main course, and especially for the poorer groups of folk, vegetables formed a significant part of diet. Although cultivation and consumption of vegetables have been pursued here from the very ancient times, the species range and to a certain extent also the cultivation technology were influenced by the Benedictine monasteries from the 10th century AD. The Benedictines first came to our lands in 993, and set up their first monastery in Brevnov, today a part of Prague. They were a strict order, whose task, apart from spiritual activities, was education and improvement of agriculture. And it was the Benedictines, who prompted the great and mighty emperor KARL I. The Great (742 - 814) to issue an important document, which also served as a regulation: „Capitulare Carovi Magni de villis vel curtis imperialibus“, which represented the effort of the King of Frankonia and Roman Emperor to uplift the quality of agriculture, and thus also of horticulture. The text of the document was prepared by a scholarly Abbot of one

Benedictine monastery from France, whose name was Francis ANSEGNIS. As with fruit farming, vegetable farming had its peak and downfall periods. The fact is, that the tradition of vegetable cultivation and the origins of somewhat primitive, or „family“ vegetable breeding date back to the 18th century, although there are also some older records documenting this. For example in Prague - Smichov, in the horticulturist family of DVORSKY, kohlrabi was bred with a long tradition. One of the varieties called 'Dvorskeho prazska rana' (Dvorsky Prague Early) played a key part in the breeding of the then famous Swiss kohlrabis, known as Roggli-s Kohlrabi', which were resistant to premature sprouting in cool spring weather. In the Polabi region near Vsetaty, regional variety of onion was bred, called 'Vsetatska', which was the achievement of the FABIAN, and later the NOVAK families. This variety was widely used by foreign breeders as a family component for further breeding of onions. Also in Dobra Voda near Hradec Kralove, breeding of cabbage (and also of other vegetable species) was the domain of the famous POUR family, who were active in breeding from the 18th century. The variety of cabbage called 'Dobrovodske Zeli' (originally 'Pourovo') was the most frequently cultivated variety in Czech lands, and in Slovakia too. It was also popular for its quality and high yields elsewhere in Europe, for example in Ukraine, Russia, Poland, and Austria. Similarly famous was the salad cucumber of 'Mladoboleslavska' variety, which was used by some breeders in European seed companies as a resistance to *Cladosporium* (*Cladosporium cucumerinum* Ell. et Arth.) in the mid 20th century. Excellent were also the regional 'Hajnavky' cucumbers from the Vsetaty region, which didn't suffer from „bitterness“. Good quality was typical also for the regional cucumber varieties from Bzenec or Znojmo regions, which established the tradition of highly popular pickled 'Znojemske' gherkins (company name Znojmia). As already mentioned in the case of fruit plants, important role in the development of vegetable breeding was played by the research and breeding institute in Led-

nice, called „MENDELEUM“, along with the personality of professor Dr. Franz FRIMMEL-TRAISENAU, who invented many breeding methods, and also bred numerous varieties himself (tomatoes, peppers, cucumbers, melons, pumpkins, etc.). He was the very first person in Europe to introduce the first F₁ tomato hybrids and spinach to the practice. In Bohemia and Moravia, there were numerous other plant breeders, who gradually developed the domestic range of vegetables, many varieties from which became widely used in foreign practice as well (for example VYSKOCIL, POUR, DVORSKY, KOZMAN). Significant role in the development of vegetable breeding and propagation in the 1920's to 1940's was the one of a university professor Dr. Frantisek LANDOVSKY from Prague, who worked as a director of the Horticultural Research Institute in Pruhonicе for some time.

Despite the fact that the post-war era after the Second World War, and after 1948, was deeply affected by the totalitarian and corrective regime, there were also many positive achievements, just as mentioned with the fruit species breeding. Important role in the conception work at that time was played by the Research and Vegetable Breeding Institute in Olomouc, as well as the horticultural department of the Research Institute of Plant Production in Prague - Ruzyně. Its activities were complemented by the work of a wide and complicated network of breeding stations and other work-



places. These were situated in areas of intensive vegetable production, and their number varied between 10 to 14. Especially successful was the breeding of stalk vegetables, especially cabbage and kohlrabi, bulbous vegetables, tomatoes, peppers, and cucumbers. Very good, and acceptable for international appraisal was also the breeding of leguminous, root, and leaf vegetables. Apart from conventional methods, hybrid breeding (F_1) was applied as well, mainly for tomatoes, peppers, and cucumbers. Partial positive results were also with the polyploidic breeding of radishes. Although at that time the state and political bodies preferred quantity and large-scale production technologies to quality, breeders prudently specialised in quality, which was often seen as contra-productive. They applied organoleptic assessments, various physical methods of assessing inner quality and state of ripeness. The fact that the quality of our varieties was really good, is documented by the export of seeds of these varieties to foreign countries (especially cabbage, kohlrabi, keel, radishes, and some others).

A great deal of the professional skill of breeders and propagators of vegetables was provided by the Horticultural College (later Faculty of Horticulture) in Lednice, where breeding and propagation of horticultural plants represented one of the key disciplines.

A new era in the history of breeding and propagation of vegetables began after 1989 - 1990, when a large part of Cen-

tral and Eastern Europe experienced the fall of the „iron curtain“. The newly gained freedom put domestic breeders and propagators, as well as the whole community of practical growers in a position facing immense invasion of foreign varieties, many of which were inappropriately and massively promoted. That was a tempting lure for numerous less-experienced growers seeking huge profits. Unfortunately, the advertisements were not always true. This situation opened the door to a large number of foreign seed production companies, and obviously led to the decrease of breeding practice in our country. Recently, vegetable breeding in the Czech Republic is pursued by the following companies: MORAVOSEED Mikulov and Svijansky Ujezd, SEMO Smržice by Prostějov, SEMPRA - Veleliby by Nymburk (in-

cluding all their detached stations), SEVA-FLORA Valtice by Mikulov, company KRIVSKY Klesice near Chrudim, LIBERA Vrbka u Ostravy, company HOLMAN Bzenec by Hodonin, and CEZEA Cejc.

Despite the fact that the Research and Breeding Institute in Olomouc was closed down, as well as many breeding stations, the above mentioned breeding centres and companies put a great effort in maintaining the good reputation and the traditional quality of Czech breeding and seed production. The old fact is being confirmed, that in our growing conditions, the best results are achieved with domestic breeding and domestic-produced seed. They are reliable, and tolerate the specialities and differences in local climate and soil quality.

