

FIELD COLLECTIONS OF FRUIT SPECIES AND DESCRIPTION OF ORIGINAL CZECH CULTIVARS

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ABSTRACT

At the Research and Breeding Institute of Pomology, Holovousy Ltd., 2222 cultivars of fruit species are maintained in field collections. At least three trees of each cultivar are planted in the orchards. Within species the cultivars are planted according to their time of ripening. Important agronomic characters are evaluated in the orchards. PC databases are continuously updated with evaluation and characterization data. Further, we are involved in identification and collection of important landraces on the territory of the Czech Republic and neighboring countries. Important accessions are introduced into germplasm orchards. Besides, we also register and map interesting valuable accessions in the country for in situ conservation. We establish on farm plantations of local landraces in cooperation with national parks and protected landscape areas.

INTRODUCTION

In the Czech Republic, the collections of fruit species are maintained in two places. Species, which require warm growing conditions (apricots, peaches, almonds) and underutilized fruit species (chestnut, *Lonicera* sp. etc.) are maintained at Mendel University of Agriculture and Forestry in Brno and Lednice na Morave. Other collections are maintained in Research and Breeding Institute of Pomology Holovousy Ltd.

A wide range of fruit cultivars have been cultivated on the territory of the Czech Republic since the medieval times. Many land races grown here at the beginning of the last century provide the evidence for it. The evolution of cultivars was a spontaneous process, which resulted mainly from a large

area density of fruit plants and growing traditions. We do not know the origin of these land races. As occasional seedlings, they spread widely due to their good properties. These land races are adapted to edaphic and climatic conditions of the region (Paprstein, Kloutvor, 1999, 2001, Paprstein, Kloutvor, Holubec, 2002).

MATERIALS AND METHODS

The dense spacing of trees and dwarfed rootstocks are used in field collections in order to reduce costs. Rootstocks and spacing used are stated in table 1. At least 3 trees of one variety are planted. The disposition of field collections enables using of statistical methods for evaluation of agronomic characters. Maximal information on a variety is thus obtained. A method of scattering of standard cultivar throughout plantation in chessboard arrangement proved good. If it is possible, cultivars are placed in rows according to their time of ripening. This placement makes chemical protection and evaluation in harvest time easier. Low-cost tree training and orchard management follow standard practices. Weed-free strips are maintained under the trees with herbicide applications. Regularly cut grass between the rows enables using agricultural machinery regardless of climatic conditions.

In the years 1994–2003, expeditions were undertaken on the territory of the Czech Republic. Each expedition was prepared jointly with local NP and PLR experts, who provided floristic data and local maps with fruit occurrence. The land races and cultivars were determined, evaluated from the point of health status and growth. The most valuable items were marked and grafts were collected. All sites were localized by GPS and mapped in the Map of the Czech Republic 1:100,000.

Table 1. Spacing, rootstocks and year of plantation of collections of fruit species

Species	Rootstock	Spacing (m)	Year of planting
Apple	M 9	4 x 2	1986
Pear	seedling	5 x 3	1982
Plum	myrobalan	6 x 5	1982
Sweet cherry	P-TU-2	6 x 6	1990
Sour cherry	P-TU-2	5 x 4	1990
Hazelnut	turkish hazel	6 x 5	1992
Walnut	seedling	10 x 10	1989
Rowan	Sorbus aucuparia	8 x 5	1992
Strawberry	–	containers	1995
Raspberry	–	containers	1996
Blackberry	–	containers	1997
Gooseberry	flowering currant	3 x 0,8	1997
Red currant	–	3 x 1,5	1997
Black currant	–	3 x 1,5	1997
White currant	–	3 x 1,5	1997
Highbush blueberry	–	3 x 1,5	1996
Cranberry	–	containers	1997

RESULTS AND DISCUSSION

Field collections in RBIP Holovousy Ltd

At the Research and Breeding Institute of Pomology (RBIP), Holovousy Ltd., 2222 cultivars of fruit species are maintained in field collections (table 2). The collection of apple cultivars (*Malus domestica* BORKH.) is the largest (1053 cultivars), followed by sweet cherry (*Cerasus avium* L., 337), plum (*Prunus domestica* L., 257), pear (*Pyrus communis*., 137) and sour cherry (*Cerasus vulgaris* P. MILLER, 108). Gooseberry (*Grossularia uva-crispa* (L.)MILL.), strawberry (*Fragaria* L.), rowan (*Sorbus aucuparia* L.), highbush blueberry (*Vaccinium* L. (American cvs.)), cranberry (*Oxycoccus* HILL), hazelnut (*Corylus avelana* L.), raspberry (*Rubus idaeus* L.), blackberry (*Rubus fruticosus* agg.), currant (*Ribes* L.), and walnut (*Juglans regia* L.) represent smaller collections. Important agronomic properties are evaluated in the orchards. PC databases (ISGOD) are continuously updated with evaluation and characterization data.

Collecting important landraces

The distribution of fruit woody plants was found to be larger in the lower altitudes of Sumava Mts. In the vicinity of former or existing villages and along melioration gullies, mainly along the Svarcenberk Channel. Solitary trees and former alleys predominated. In the most cases we found wild forms of cherries, apple and pear trees. In Krkonose the collecting was mainly oriented to interesting frost-resistant individuals. Altogether 39 items were chosen for in situ conservation. Bird cherries (*Prunus avium*) from the altitudes of 800 to 1,000 m formed the major part. They were characterized by good health, they were not significantly damaged by frost and their age ranged between 100 and 200 years. From the pomological point of view the region of Orlicke Mts. is poor for original landraces. Nearly all-old fruit trees were cut down over the last 45 years. Nevertheless, we succeeded in discovering several original landraces ('Vinne', 'Kralicke', 'Studnicne', 'Medove' and 'Louzne'). The western part of Krusne Mts. is relatively rich in

Table 2. Field collections of fruit species in RBIP Holovousy Ltd.

Fruit species	Number of accessions in collection
Gooseberry	46
Pear	137
Apple	1053
Strawberry	75
Rowan	20
Highbush blueberry	29
Cranberry	4
Hazelnut	17
Raspberry	54
Blackberry	2
White currant	11
Black currant	36
Red currant	18
Plum	257
Sweet cherry	337
Sour cherry	108
Walnut	18
Total	2222

fruit trees, especially in apple and pear trees. The regional cultivar variety includes cultivars planted after 1st World War. Surprisingly, apple trees appear very often and so do pear seedlings which was not noticed on other localities. Two seedlings of pears with red fruits and good economic traits were found. Jeseníky Mts. was rich in fruit trees in the past, but a lot of plantations were recently cut down. Several old landraces could still be found: 'Mostove', 'Krasokvet zlutý', 'Libinske', 'Pasecke vinne', 'Halberstadske paneneske'.

Farm plantations of selected apple and pear cultivars (including wild forms) were established in the territory of Krkonose National Park in Vrchlabí.

Description of original Czech cultivars

Sweet cherries:

Belice – Czech land race from Horice region. Guigne ripening in the 3rd cherry week. Fruits

are medium large, yellow with apparent cinnamon marking. The flesh is very soft, flavor sweet-subacid, very good.

Karesova – Czech cultivar, which was found in Ostromer, Podkrkonosi in the end of 19th century. Dark guigne with big fruits, which ripens in the 2nd cherry week, in the same time as 'Early Rivers'. This land race is presently used in commercial plantations. It is more suitable for our conditions than the cultivar 'Burlat'.

Ladeho pozdni – Red bigarreau of unknown origin, ripening in the 2nd half of August. It is the latest ripening cherry cultivar kept in germplasm collection. Fruits are medium large to small, of an average taste.

Troprichterova – Czech cultivar ripening in the 4th cherry week. It belongs to semi-bigarreau. Fruit is dark red, large, acidic-sweet and very good.

Sour cherries:

Vackova – Czech cultivar bred by Czech pomologist Jan Riha in the end of 19th century. Outcrossing morello, ripening between 3rd and 4th cherry week. Dark red fruits, large and excellent, sweet acidic taste. Suitable preferably for direct consumption.

Plums:

Chrudimska – Plum with medium fruits (25g). Flesh is greenish yellow, firm, aromatic, sweet-subacid, very good. Stone is free when fully ripe. It ripens in the 3rd decade of August. Trees are moderately vigorous. Canopies are spreading. Tolerant to PPV

Apples:

Misenske – Very old cultivar. Origin unknown. This cultivar was grown in Bohemia as early as in 15th century. Flesh is whitish, firm, sweet-subacid, good. It ripens in November, keeps well until April. Canopies are dense and globous. Trees are vigorous.

Malinove holovouske – A local cultivar, which was found by lord František Josef from Leveneu and Grünwall in Holovousy in the late eighteen century. This cultivar won first award in imperial exhibition in Vienna in 1888. Historical records states that even Emperor Francis Joseph II honored the excellent taste of this cultivar. Thanks to that, the cultivar gained

good reputation and expanded in former Austrian Monarchy. Even in the last century, this cultivar was abundantly grown especially in the Horice region and in the foothills of Giant Mountains. This cultivar is suitable for extensive plantations. Trees are vigorous and the canopies are highly globular. Prime quality October-November.

Pears:

Jakubka ceska – One of the earliest summer pears, ripening in late July. This cultivar is grown in Bohemia since the beginning of the 18th century. Trees are vigorous and healthy. Canopies are pyramidal.

Koporecka – A very old Czech pear cultivar abundantly grown mainly in northern Bohemia. Fruits are tasty. Prime quality November-January. Excellent at Christmas. Canopies are highly globular. Trees are moderately vigorous.

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