In situ Conservation of Fruit Landraces

F. PAPRŠTEIN[1], J. SEDLÁK[1] and V. HOLUBEC[2]

[1]Research and Breeding Institute of Pomology Holovousy, Ltd., Holovousy, 508 01 Hořice v Podkrkonoší, Czech Republic; [2]Department of Gene Bank, Crop Research Institute, 161 06 Prague-Ruzyně, e-mail: fp@vsuo.cz

Abstract: *In situ* conservation is considered as conservation of wild biota in the natural habitat (locality). The authors extend the term to cultivated fruit species naturalised in the landscape, such as occasional spontaneous seedlings, and planted material such as old solitary trees among fields, old groves, avenues (country lanes), wind-breaks, and abandoned remnants of orchards. *In situ* conservation is also used to mark unique materials during collecting expeditions, before they will be taken as *ex situ* or proclaimed as permanent *in situ*. Important landraces found within 12 regions of the Czech Republic were registered, evaluated, and *in situ* localised by Global Positioning System (GPS). The following accessions were marked for in-situ conservation: apple (401), sweet cherry (263), pear (91), plum (42), sour cherry (27), and berry fruits (18).

Keywords: conservation; fruits; genetic resources; *in situ*

Central Europe is the birthplace of many fruit cultivars. A considerable number of fruit landraces were cultivated there until the beginning of the 20th century. They often developed naturally, due to the high density of plantations and growing traditions. The origins of the older cultivars is often unknown. These landraces are well adapted to the soil-climatic conditions of a particular region (Paprštein & Kloutvor 1999, 2001; Paprštein *et al*. 2002).

In situ conservation is the conservation of biota in the natural habitat (locality). The term is mostly used for wild species. In the case of fruit species, it is associated with wild fruit species and occasional spontaneous seedlings of cultivated material growing in the natural vegetation. We intend to also use this term for the conservation of materials cultivated and planted in the past, such as old solitary trees among fields, old groves, country lanes, wind-breaks, and abandoned remnants of orchards. If these materials become an integrated functional part of the landscape (and some of them have unique properties worth conservation), they should get the status of *in situ* conserved materials.

This is considered to be the least expensive method. However, this method lacks sufficient security for the long-term maintenance of genetic resources, and additionally it is always temporary (associated with the lifespan of a tree). This method is also used to mark unique materials during collecting expeditions, before they are taken for *ex situ* or proclaimed as permanent *in situ*.

Since the second half of the last century, there has been a serious threat of the extinction of landraces in the territory of the Czech Republic, due to the continuing destruction of old plantations and county lanes. This destruction has been connected with changes in property ownership since the end of the Second World War, as well as changes in the priorities of agricultural production. The industrialisation of agriculture during the Socialist period replaced the small subsistence farms (and their associated diversity of fruit production) with large monoculture fields, containing small numbers of high-yield cultivars.

Because of the possible extinction of these indigenous landraces, the program for the collection and long term conservation of fruit landraces in the territory of the Czech Republic was started.

MATERIAL AND METHODS

Since 1994, collecting expeditions have been conducted. Those areas not affected by intensive agricultural production and recreational activities (national parks, protected landscape areas, and deserted military areas) were preferred. These expeditions were prepared in cooperation with the administrators of the national parks and protected landscape areas, who provided maps showing the occurrences of fruit species. The Beskydy Mts, Český les, Český ráj, Doupovské Mts, Jeseníky Mts, Konopiště, Krkonoše Mts, Krušné Mts, Orlické Mts, Podyjí, Šumava Mts, and Tachovsko areas were the areas surveyed.

The expeditions were organised at the time of fruit ripening. Determinations of the cultivars were carried out together with a description of their health status and a short characterisation. Important accessions were localised by Global Positioning System (GPS) and registered *in situ*. Grafts were taken from important genotypes, and these accessions were transferred to the germplasm collections of the Research and Breeding Institute of Pomology (RBIP), Holovousy, Ltd.

RESULTS AND DISCUSSION

Important landraces found were registered and localised *in situ*. The numbers of accessions of selected fruit species are summarised in Table 1. Apple accessions (401) were localised and registered *in situ* most frequently. Sweet cherry (263), pear (91), plum (42), sour cherry (27), and berry fruit (18) followed apple.

The distribution of woody fruit plants were found to be greater at the lower altitudes of the Šumava Mts. This was in the vicinity of former or existing villages, and along melioration gullies (predominantly along the Schwarzenberg Channel). Solitary trees and along former country lanes predominated. In most cases, we found wild forms of cherries, apple, and pear trees.

In the Krkonoše Mts, collecting was mainly oriented toward interesting frost-resistant individuals. Overall, 39 items were chosen for *in situ* conservation. Bird cherries (*Prunus avium*), from an altitude of 800 to 1000 m, formed the major portion. They were characterised by good

Table 1. Number of apple accessions included in *in situ* conservation

Locality	No. of trees					
	apples	pears	sweet cherries	sour cherries	plums	berry fruits
Beskydy Mts	10	4	2	0	3	0
Český les	4	1	73	9	1	2
Český ráj	24	2	31	1	0	0
Doupovské Mts	4	2	44	1	1	0
Jeseníky Mts	46	8	2	0	5	1
Konopiště	0	0	7	0	0	1
Krkonoše Mts	73	17	15	9	10	1
Krušné Mts	26	10	0	0	0	0
Orlické Mts	47	9	31	1	13	3
Podyjí	31	4	9	1	4	9
Šumava Mts	32	13	30	2	3	1
Tachovsko	104	21	19	3	2	0
Total	401	91	263	27	42	18

health. They were not significantly damaged by frost. The age of these sweet cherry trees varied from 80 to 140 years.

From the pomological point of view, the region of the Orlicke Mts is poor in original landraces. Nearly all of the old fruit trees were cut down during the last 45 years. Despite this, we succeeded in discovering several original landraces (Vinné, Kralické, Studničné, Medové, and Loužné).

The western part of the Krušné Mts is relatively rich in fruit trees, especially in apple and pear trees. The regional cultivar diversity includes cultivars mostly planted after the First World War. Surprisingly, apple and especially pear seedlings (which were not noticed in other localities) frequently occurred in the region of the Krušné Mts. Two seedlings of pears with red fruits and good economic characteristics were found.

The Jeseniky Mts were rich in fruit trees in the past, but many of the original plantations were recently cut down. However, several traditional old landraces were found: Moštové, Krasokvět žlutý, Libínské, Pasecké vinné, and Halberštadské panenské.

One of the examples of interesting genotypes found *in situ* is represented by the traditional pear cultivar Krvavka moravská. This very old cultivar was grown principally in Moravia. The fruit is small (50 g) and the flesh has a dark pink to light red colour. Fruits ripen in the first ten days of August. Fruits have low storability. The trees are vigorous and very large. Trees of this cultivar are resistant to frost damage in the wood. Fruits of interesting *in situ* localized and conserved genotypes have been presented at exhibitions of fruit in the Czech Republic and abroad.

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