

Exploring and preserving old apple cultivars of the Carpathian basin

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Summary: In a few scattered orchards of the Carpathian basin one can still find our most common historical apple cultivars and certain traces of traditional cultivation. We consider it an important part of the Department's breeding work to explore old apple cultivars which can be used as parent partners and sources of resistance, to identify them pomologically as well as to examine the production and marketing value of old cultivars recommended for cultivation in ecological production and in gardens. This paper documents the results of expedition and collecting work carried out in three regions of the Carpathian basin (foot of the Carpathian Mountains, Transylvania, Aggtelek karst area), and also the saving of old Hungarian apple cultivars preserved until present in the English National Fruit Collection. A total of more than 100 old apple cultivars and variations, as well as 13 valuable genotypes were collected during our explorations in the above mentioned four areas. A further aim of our work is to contribute to the protection of still savable archaic fruit production relictum areas and to the preservation of cultivars in the certain regions, and also to promote the recognition of the aesthetic landscape value of old apple trees and endemic orchards of old cultivars. Our good co-operating partners in this work are Aggtelek National Park, Farmer Club of Visk and the consultation centre of Hungarian horticulturist training beyond the border in Nyárádszereda.

Key words: *Malus x domestica*, old cultivars, scattered orchards, exploration, preservation, apple

Introduction

Old fruit cultivars preserved in their original habitat and half wild variations appearing in certain regions can be important gene sources for fruit breeding. The pomological and fruit breeding work-group of the Department of Fruit Science has paid special attention to preserve and improve gene bank population, which can be useful for breeding. Discovery and examination of promising gene sources are important parts of the Department's breeding program (Tóth et al., 2005/a), but we consider valuable not only those gene populations which can be used as parent partners. In connection with folk cultivation methods well reflecting natural and economic features of different regions, old cultivars and folk pomology are involved in examinations as well (Szani, 2001, Tóth & Szani, 2004).

New needs and possibilities have appeared in resistance breeding regarding gene sources, therefore, in the last decade we gave priority in the last decade to explore more utilizable gene sources and to examine their possible breeding values (Kása et al., 2004). During our work, the aim was to enrich the gene sources present in international literature with valuable cultivars of the Carpathian basin which have special importance in preserving biological diversity as well.

From the work done until present, we briefly introduce four expeditions in this paper, because genotypes (old and

local cultivars, valuable seedlings) collected in these areas are already in our gene bank, and the examination of their usability in resistance breeding has begun.

The four regions of our fruit gathering were:

- Scattered orchards near Huszt and Visk at the foot of the Carpathian Mountains;
- Transylvania, Székely land;
- 13 scattered orchards of the Aggtelek National Park;
- The English National Fruit Collection, Faversham, Kent.

Foot of the Carpathian Mountains

We started the exploring work at the foot of the Carpathian Mountains, in the Ukraine in 1997, when we became aware of the fact, that seeds of apple producing areas on the mountain regions of Técső and Huszt probably go back to the Middle Ages. Namely, according to Rapaics (1940), Sóvári apples originating from the upper Tisza region, were already known in the Middle Ages, and they reached national reputation in the 19th century after numerous pomological works were published about the cultivar.

Considerable plantings were carried out in the vicinity of Visk between the two world wars, and the cardinal species of the 1500 hectares orchard planted by the colfarm in 1946 was the apple. We estimated to explore 50–60 different apple cultivars near Visk, among which known world cultivars

(eg. Golden Delicious), unnamed old cultivars of the soviet states, as well as old cultivars from the upper Tisza region can be found.

The orchards became scattered as parks. Under the 10- to 100-year-old trees in large spacing orchards with large spacing a natural herbaceous vegetation can be observed with numerous protected species, such as anemone (*Anemone sylvestris*), dog's tooth grass (*Erythronium dens-canis*), primrose (*Primula vulgaris*), hepatica (*Hepatica nobilis*), scilla (*Scilla*) and orchid (*Orchis*) species. The area under the trees is used as a meadow or grazing-ground as well. In the last decade no chemicals were used on the trees. Owing to money troubles, there is no possibility to apply fertilizers and chemicals, therefore, the fruit is bio, free of residues. Because of extensive cultivation the yield is low, 4 tons per hectare. Susceptibility and resistance of certain cultivars against different pathogens and pests can be well observed in the orchard.

Using pomological knowledge of local growers as well (Krüzsély, 1998 personal communication), our observations were started in Visk in the Kistécs valley and in Grengyes in 1997 (Balikó, 2000), and were carried on later in further areas, and as a result, our gene bank population was enriched by 24 historical cultivars (Table 1).

After open field examinations on at the original habitat and fruit quality evaluations, we have chosen those cultivars worthy to examine as gene sources for breeding. After three years of examining resistance against fire blight (*Erwinia amylovora* (Burrill) Winslow) (BURRILL) WINSLOW in a greenhouse, we proved that cvs. 'Szemes alma', 'Pónyik' and 'Sikulai' – because of their outstanding shoot and fruit resistance – can be taken into consideration as resistance sources in breeding programs (Tóth et al., 2005/b).

Transylvania

Transylvania – even as a part of Romania – is a treasury of old apple cultivars. Its fruits are partly endemic, partly immigrants, or imported. According to Nagy (1873) and Nagy-Tóth (1998), native cultivars, but especially those of foreign origin, under the effect of natural conditions of Transylvania and owing to the careful work of the growers, moulded themselves to diverse geographical regions changing significantly and mixing with each other, and they have become specific even in their names. Transylvanian pomology flourished in the end of the 19th and in the first part of the 20th century (Nagy-Tóth, 1998, Rapaics, 1940, Szani, 2001).

Areas near the rivers Gagy and Nyikó are rich in historical cultivars. Owing to geographical features and factors of economic history, trees survived inside the villages, on farms near houses, in central places. There are approximately 60 cultivars in this region. 50% of the cultivars explored is present in more places, but we could find only one individual per cultivar from the other half. Selected clones of some regional cultivars were produced from the beginning of cultivar evaluation, from the end of the 19th century, these are rich in variations in their place of origin even nowadays. Last relictum

areas still preserving traces of archaic farming need to be protected, and folk pomology is worth mentioning as well.

Cultivar richness, several methods of utilization and appreciation of winter apples stored for long indicate the former importance of apple in folk nutrition and farming. The produced fruit played a significant role in the alimentation and income of families. Long storable cultivars have partly covered the winter needs of the family. Fruits of easily stored but not too tasty cultivars are not so popular nowadays (Tóth & Szani, 2004, Szani, 2001).

In Transylvania, Székely land (Háromszék, Nyárád and Kászon regions) we started to designate trees in local gardens. The success of our collecting work started in 1996 and lasted for several years was restricted by propagation difficulties and other problems. The outstanding pomological knowledge of local people was a great help in the exploration work. As a result of a further expedition in 2002, we were almost able to almost complete the Transylvanian part of our apple cultivar collection (Table 1).

Aggtelek karst area

The idea of our exploring work in scattered orchards of the Aggtelek National Park situated in the north-western part of Hungary came from the National Park's management in 2001. They plan to reserve traditional features of vineyards with the help of state resources, and this covers preservation of fruit trees in scattered orchards as well with their significant genetic and cultural historic value.

According to our experiences (Tóth & Geiszler, 2001), fruit production in mountains is carried out in a native, archaic way even nowadays. Practically, this is a kind of clearing cultivation, a traditional folk selection by axes. This means the good tree is left in place, the bad is cut down. The soil under the trees in orchards is covered by natural vegetation, so it served as a meadow or grazing-ground as well. The most important part of orchard cultivation is mowing, because the most important product of orchards was the hay for animals. Using words of local farmers, even the 'weed' could well be utilized in the past. The 'weed' means offsprings and seedlings of trees, which could be used as firing fuel in lime-burning. In most fenceless orchards there is no cutting, plant protection and soil management. The fruit is knocked down from the trees, broken branches are carried away for burning or burned in place. Fallen leaves and undergrowth are also burned, which frequently causes uncontrollable fires. Game damage was always significant on the vineyard, therefore no costly nursery material was planted. Seedlings started up in place were grafted by saddle grafting or shield-grafting in at diverse heights. The scion came from the neighbourhood or from village gardens. Better cultivars passed from one neighbour to the other. The age-long process of grafting and cutting formed the present species and cultivar composition of the mountains, which is a mixture of culture cultivars and wild forms. The value of certain fruit species and cultivars depended on their usability. Last representatives of some cultivars are old individuals of this combination even

Table 1 List of historical apple cultivars and other taxons saved in the gene bank

Foot of the Carpathian Mountains	Transylvania	Aggtelek National Park	Taxons from the National Fruit Collection, England
Batul	Arany kormos	Asztraháni piros	Angyal Dezső
Baumann renet	Arany párisi	Batul	Bánffy Pál
Beregi sóvári	Árpával érő	Baumann renet	Batul
Bőrkormos renet	Bamberge	Boiken	Bereczki Máté
Citromalma	Batul (white, yellow, green and red)	Boskoop-i szép	Beregi sóvári
Cserepánya	Blenheimi arany renet	Bőralma	Budai Ignác
Édes escoar	Boiken	Bőrkormos renet	Búzával érő alma
Galambka	Boldizsár alma	Champagne-i renet	Cigány alma
Kanadai renet	Boros alma	Citromalma	Csikos óriás halasi
Kisasszony	Bőralma	Entz rozmaring	Damjanich
London pippin	Budai Domokos	Galambka	Dániel féle renet
Magonc rózsza	Cigány alma	Jonathan	Daru sóvári
Nagy zöldalma	Dráva menti	Kanadai renet	Desseffy Arisztid
Sovári nobil	Édes alma	Királyi renet	Entz rozmaring
Papíróka	Farkaslaki téli alma	Lánycsősű	Fekete tányéralma
Rózsza alma	Fehér asztraháni	Magyar kormos renet	Gomba Károly
Sárga szépvirágú	Fehér Klár	Nyári fontos	Gyógyi piros
Sikulai	Fehér (Lóci) tányéralma	Nyári esíkos fűszeres	Hamvas alma
Szemes alma	Füstös alma	Páris alma	Harang alma
Tafota	Gegesi piros (=Piros tányéralma?)	Parker pepin	Hejőcsabai sárga
Törökbálint	Gegesi zöld (=Kálvil?)	Pónyik	Herceg Batthyányi alma
Vilmos renet	Gyógyi piros	Sárga szépvirágú	Hosszúfalusi
Zöld sóvári	Karmazsin	Simonffy piros	Ízletes zöld
1 local seedlings	Kék renet	Sóvári nobil	Jászvadóka
	Király alma	Téli aranyparmen	Jolánka
	Kisasszony	Téli piros pogácsa	Kéresi muskotály
	Lengyel alma	Törökbálint	Kis Ernő tábornok
	London pippin	7 local cultivars and seedlings	Marosszéki piros
	Lóci cirmos alma (=Szászalma?)		Máté Dénes
	Lóci édes almája (=Gravensteini?)		Miskolci kormos
	Magotlan alma		Nemes szeresika
	Masánszky		Orbai alma
	Mádai kormos		Pónyik
	Mosolygó alma		Pusztai sárga
	Narancs alma		Sikulai
	Nyári alma		Simonffy piros
	Nyári fűszeres		Sóvári nobil
	Nyári Klár		Szabadkai szeresika
	Orbai füzi alma		Szászpap alma
	Parker pepin		Széchenyi renet
	Piros édes		Tordai alma
	Pónyik		Tordai piros kálvil
	Poronyó		Tükör alma
	Sándor cár		Vajki alma
	Sárga szépvirágú		
	Selyem alma		
	Sólyom alma		
	Szászpap alma		
	Tartós Gusztáv		
	Tányér alma		
	Téli alma		
	Téli aranyparmen		
	Törökbálint		
	Wagner díjas		
	Zöldhátú		
	5 local cultivars		

now. It can be proved, that apple trees on wild rootstock in an uninhabited village (ruin) called Derenk in the area of Aggtelek National Park are at least 60 years old.

Pomological knowledge of local people was weak,

therefore cultivar identification was our task. In spring 2001, during flowering, trees thought of potential interest were selected. A self-prepared pomological test paper was filled in about selected trees several times during the vegetation period,

and digital photographs were taken about leaves, flowers, fruits and habit of each tree. The pomological test paper contained the following characteristics: vigour, habit, canopy density, type of fruit-bearing parts, thickness of shoots, state of stamina, flowering time, flowering vigour, fruiting vigour, leaf size, leaf form, base of leaf, leaf peak, hairiness of leaf back, susceptibility to fruit falling, susceptibility to diseases (scab, powdery mildew, cancer, fire blight). From selected trees shoot and fruit samples were collected, and with the help of pomological books and experts we tried to identify cultivars and to select valuable clones. Besides 13 plum, 8 pear, 1 cherry, 1 quince and 1 apricot cultivars, we identified 28 apple cultivars, and also observed and gave a detailed description of about 17 further remarkable local cultivars for the purpose of gene reservation and utilization as gene source of resistance. List of 35 taxa collected and successfully included into our gene bank can be seen in *Table 1*.

As a further result of our exploring and evaluating work, we suggested the development of tourism in the case of two areas (Jósvafő vineyard, Derenk village/ruin). In three cases, we proposed maintenance and gene reservation by Aggtelek National Park (Baradla front, Almástető, Tornakápolna vineyard), and in four additional vineyards (Szinpetri vineyard, Csömör hill, Szögliget Kútfej side, Bódvaszilás vines: Nyerges-hill and Pályi-valley) supporting farmers with propagation material is worth considering. We have found the further research of the remained four sparse orchards causeless pointless (Szín: along the road to Szélcepuszta, Szögliget Nyírjes, Kökényberki spring, Komjáti: Nagy-valley) (Tóth & Geiszler, 2001).

Cultivars stored in a gene bank collection can easily be destroyed by an epidemic, which gives special significance to this in situ gene reserving work. Furthermore, trees taken away from traditional habitat and cultivated in a different way do not necessarily show their recognizable original values.

Besides, with this work we became part of the first national experiment of a new fruit production trend, called 'fruit trees in the landscape' in Western Europe, and according to our observations, its significance increases rapidly. For example in Germany, Austria and England it is has been known for long, that old, uneconomical orchards of outdated cultivars represent an important aesthetic values for the landscape. Preserved old orchards can even provide economic profit sometimes by developing tourism, while they give pleasure also to native people. In some places, fruit juice and wine factories based on these orchards help the survival and maintenance of population.

In these kinds of programs, traditional cultivars explored in scattered orchards can play a role. It would be worthwhile to fulfil the needs of gourmards by so-called nostalgic cultivars in the future.

National Fruit Collection, England

A further important source of widening our gene bank population was the National Fruit Collection of England (Brogdale, Faversham, Kent). The institute's predecessor in title obtained the propagation material of most important

cultivars of the Carpathian basin from Mátyás Mohácsy, former head of our institution in 1948 (Morgan & Richards, 1993). During my first visit to the English National Fruit Collection in 1992, I recognized that valuable treasures of the Carpathian basin, which unfortunately disappeared from Hungarian cultivar collections, had been saved in England. Later in 1996 and in 2003 I had an opportunity to make pomological observations and take photographs of cultivars. I made preparations for importing propagation material of cultivars. I also observed the methods of gene bank data collection and registration.

Old cultivars kept in the English national gene bank fulfil even the needs of fruit cultivar patrons. Work and programs of Brogdale Horticultural Trust are exemplary in utilizing old cultivars. Organization of open days for promoting cultivar recognition and offers for the identification of unknown cultivars are especially remarkable.

The second import of cultivars preserved in England and their propagation in 2002 was successful, the 44 cultivars (see *Table 1*) kept in our gene bank in Soroksár, as possible gene sources of resistance to fire blight, gave examination material for evaluating the pathogen-host plant relationship (Tóth et al., 2005c).

Conclusions

One of the aims of our collecting work is to protect curiosities from final extinction, as their disappearance would be a loss from more aspects. Genetic material of endemic cultivars appeared in the Carpathian basin cannot be reproduced. The knowledge connected to old cultivars is to be forgotten by expiration passing of the last generation saving it.

Therefore, we need to continue to explore and secure scattered orchards in the future. Inside the European Union, it is needed to find a possibility to support the maintenance of gene bank collections, which serve breeding and biodiversity, and can be utilized in ecological farming and rural development as well.

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