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Sour Cherry Breeding and Production in Hungary

JÁNOS APOSTOL[1] AND AMY IEZZONI[2]

Abstract

Clonal selection and breeding of sour cherry (*Prunus cerasus* L.) began in Hungary in 1943 and 1950, respectively, at the Enterprise for Extension and Research in Fruit Growing and Ornamentals, Budapest. In the last 25 years, there has been a rapid expansion in production and a doubling of the sour cherry acreage in Hungary due to the introduction of new profitable cultivars from their programs. These new cultivars and numbered selections ripen over a 40 day period. The range in fruit weight, percent soluble solids and juice color is from 4 to 8 grams, 14% to 20%, and light red to dark purple, respectively.

Introduction

Hungary is one of the largest sour cherry producing countries with approximately 6400 ha in production and 80 to 90,000 tons of annual marketable yield. Approximately 99% of the production is of dark purple highly pigmented sour cherries. Only a small amount of Montmorency-type cherries (Pipacs type) are grown.

Hungarian sour cherry production in commercial orchards has dramatically increased over the last 25 years (Fig. 1). The rapid expansion and doubling of the sour cherry acreage in Hungary is due directly to the introduction of new profitable cultivars bred and/or selected at the Enterprise for Extension and Research in Fruit Growing and Ornamentals in Budapest. New hybrid cultivars were bred by János Apostol and the late Pál Maliga. Selection of local varieties is the responsibility of Ferenc Pethő, Tibor Szabó, Sándor Kovács and János Apostol. Clonal selection of the Pándy and Cigány groups is under the direction of Sandor Brózik, Ferenc Nyujtó, and Zoltán Éles.

The success of the Hungarian breeding and selection programs began only 40 years ago and the superiority of the new cultivars produced by these programs is a fruit breeding success story. The objective of this article is to recount the history of sour cherry breeding in Hungary and describe the current sour cherry cultivars and advanced selections.

History

When sour cherry breeding began in Hungary, there were 2 major landraces, Pándy (Syn: Köröser weichsel and Crisana) and Cigány. Pándy has excellent fresh-market fruit quality but it is self-sterile and was therefore planted with the self-fertile Cigány as a pollinator. Pándy types, comprise a whole range of local sour cherry selections which differ in tree size, blossoming time, and ripening time. Pándy clones all possess good fruit size, fruit color, and generally good fruit quality. Cigány clones differ in blossoming time, fertility, and crown size; however, the fruit of Cigány clones is always small and dark and ripens at the same time. The breeding program's initial objective was to select Pándy and Cigány clones with overlapping flowering time. Evaluations included approximately 82 different Pándy types and 17 Cigány clones. As a result of this selection work, 3 Pándy clones (P 48, P 279, and Bb 119) and 3 Cigány clones (C 7, C 59, and C 404) were identified, propagated, and now share approximately 12% of the commercial production acreage.

Local cultivars were also tested to identify those which would be self-

[1]Enterprise for Extension and Research in Fruit Growing and Ornamentals, Budapest, Hungary.
[2]Associate Professor, Department of Horticulture, Michigan State University, East Lansing, MI 48824.

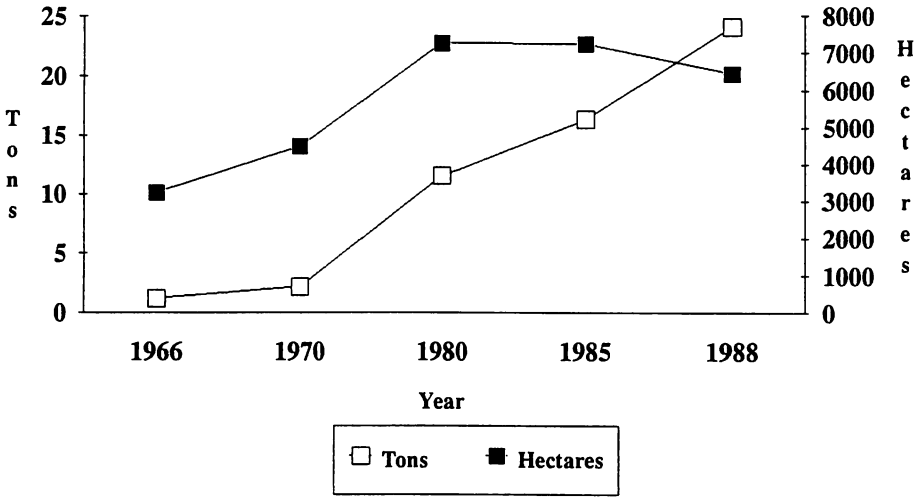

Figure 1. Commercial yield and hectares of sour cherry in Hungary between 1966 and 1988.

fertile with higher yields than Pándy and better fruit quality than 'Cigány.' Resulting from these selections were the self-fertile 'Ujfehértói Fürtös,' 'Debreceni Bőtermő,' 'Kántorjánosi,' and 'Csengődi' (Table 1). Among these, 'Ujfehértói Fürtös' is the most important representing 35% of the plantations.

The sour cherry selection program eventually grew into a larger program of hybridization to produce new productive self-fertile cultivars with fruit quality similar to Pándy. Fruit quality would suit both fresh consumption and processing and there would be a range of ripening dates. The breeders relied heavily on the use of Pándy as a maternal parent, yet, they were able to select self-fertile hybrids. Cultivars released from this program include

Table 1. Parentage and release date of Hungarian sour cherry cultivars and advanced selections.

Cultivar or advanced selection	Release date	Parentage
IV 3/48	-*	Érdi Bőtermő x Meteor Korai
Meteor Korai	1965	Pándy x Nagy Angol
Csengődi	1990	unknown
Érdi Jubileum	1980	Pándy 38 x Eugènia
Favorit	1980	Pándy x Montreuilli
Korai Pipacs	1979	Pándy x Csàszàr
Érdi Bőtermő	1970	Pándy 38 x Nagy Angol
M172	-*	Pándy x Eugènia
Ujfehértói Fürtös	1970	local selection
Debreceni Bőtermő	1986	local selection
Kántorjánosi	unknown	selection of Pándy

*Under test.

'Érdi Bőtermő,' 'Érdi Jubileum,' 'Favorit,' 'Meteor Korai' and selections IV 3/48 and M172 under test (Table 1). The most wide-spread of these hybrid cultivars is 'Érdi Bőtermő' which represents 35% of the recent plantations.

Selections

The new cultivars and advanced selections are reviewed in order of ripening time with additional detail in Table 2 and Fig. 2.

IV-3/48 ripens in Hungary as early as May 20-22. The fruit is dark red with a pleasantly flavored sour-sweet taste suited to the fresh market. The tree is of medium vigor with a dense crown.

'Meteor Korai' (Early Meteor) ripens in early June and has a pleasantly sourish-sweet taste. The juice is staining. The blossoming time is early to medium and the tree is consistently high yielding. The tree is vigorous, bearing mainly on 2-year-old spurs and therefore does not have bare wood. It is also resistant to San Jose scale (*Ouadraspidiotus perniciosus* Comstock).

'Csengődi' Ripens 3 to 5 days after Meteor Korai. The skin is dark purple-red, and the fruit very juicy and aromatic with a sourish-sweet taste. The blossoming time is medium and the variety is very heavy yielding. The tree is vigorous, late cropping and shows high field resistance to *Blumeriella jaapii* (Rehm.) Arx [syn. *Coccomyces hiemalis* (Higg.) Nannf.] and does not show symptoms of *Prunus* Necrotic Ringspot Virus.

'Favorit' ripens approximately June 12. The fruits are lighter red than the previous selections. The tree blossoms in the middle period. The growth is not very vigorous.

'Korai Pipacs' (Early Poppy) ripens between the 10th and 15th of June with light red fruit similar to Montmorency. Bloom time is medium, and the tree is medium vigorous and suitable for machine harvest. Fruit are used mainly for the baking industry.

'Érdi Jubileum' (Jubilee of Erd) is increasing in importance because although the fruit ripens on approximately June 12, it can be left on the tree for up to 20 days without deterioration. The fruit resembles sweet cherry, turning almost black when left on the tree and is frequently harvested with a refractive index of 18%. Additionally, the fruit is very aromatic. The tree is of medium vigor and the fruit is easy to shake since the pedicel separates from the fruit without tearing.

'Érdi Bőtermő' (Abundant of Erd) ripens approximately June 18 to 20, and fruit are used for both fresh consumption and processing. The tree is early blossoming and rather weak growing. Initial fruiting is on short spurs; however, older trees can have barren wood if the one-year-old fruiting wood is not removed. In Michigan, 'Érdi Bőtermő' blooms one or two days before and ripens approximately one week before 'Montmorency.'

'Cigány' (Gypsy) varieties ripen in the second half of June. The fruit is rather small and soft, tart, aromatic and dark juiced useful for canning. The trees are of medium vigor, heavy yielding and suitable for mechanical harvest. Individuals of these groups are important as pollinators for Pándy clones of corresponding blossoming time. Cigány 7 and 59 are good pollinators for Pándy 279, while the earlier blooming Cigány 7 is a good pollinator for Pándy 48.

Pándy group of selected clones ripen fruit the end of June to early July. The fruits are dark crimson and the tree is medium vigorous to vigorous; the flowers are self-sterile.

M 172 ripens about the 22 to 25 of June which is just before 'Montmorency.' The fruit is bright red when mature. The tree is spur-type and of low-vigor, not inclining to be barren. It is suitable for mechanical harvest.

'Ujfehértói Fürtös' (Bunched of Ujfehértó) ripens in early July with quite large fruit under ideal growing

Table 2. The characteristic features of the main sour cherries in Hungary.

Clone	Ripening period	Diameter (mm)	Fruit wt (gm)	Skin color	Juice color	Flesh firmness	Ref %	Acid %	Kernel[x] ratio	Use
IV 3/48	May 20-22	20-22	3.8-4.5	dark crimson	dark crimson	medium	13-15	1.5-1.5	5.0	early fresh market
Meteor Korai	June 3-5	20-22	4.4-5.5	dark crimson	dark crimson staining	medium	14-16	0.9-1.6	4.0-6.0	early fresh market juice
Csengődi	June 10-12	21-23	5.0-5.6	dark purple	dark very staining	medium	16-20	1.1-3.2	4.5-5.5	bio-organic food, highly pigmented
Érdi Jubileum	June 12-30	21-23	5.0-6.5	dark purple	dark very staining	frim	18-22	1.5-2.2	4.0-5.0	all purpose, highly pigmented
Favorit	June 12	23-25	6.8	light red	not staining	soft	13-15	0.9-1.6	5.5-6.7	fresh market
Korai Pipacs	June 12-15	21-22	5.0-6.4	light red	not staining	medium	15-17	0.7-1.0	4.0-5.0	confectionary
Érdi Bőtermő	June 18-20	22-24	5.6-7.5	dark red	red, little staining	medium	15-17	1.0-1.5	5.5-6.0	all purpose
Pándy clones	June 25-30	22-25	4.1-7.9	dark red	red, little staining	medium	12-15	0.8-1.5	6.5-8.0	all purpose
M 172	June 25-30	23-25	7.5-8.2	red	red, not staining	medium	14-19	1.0-1.7	8.0-9.0	fresh market
Cigány clones	June 18-23	14-20	2.4-4.2	dark red	dark red staining	medium	13-18	1.4-2.2	6.0-13.0	juice, some are suitable for canning
Ujfehértói Fürtös Debreceni Bőtermő Kántorjánosi	July 1-5	18-24	5.0-5.4	dark red	red, little staining	medium	12-17	0.7-2.2	10.0-13.0	all purpose

[x](kernel weight) x 100/total fruit weight.

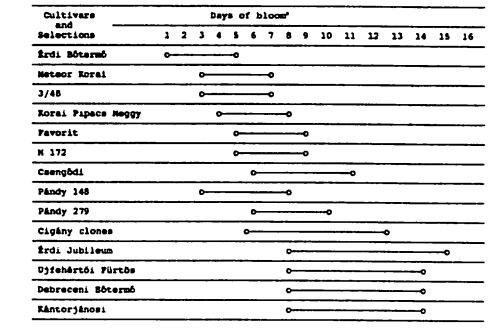

Figure 2. Bloom periods for sour cherry cultivars and numbered selections in Hungary.

conditions. Because of the floral bract on the stem it is difficult to pick the fruit with the stems attached; however, it is suitable for mechanical harvest. The tree is vigorous. In Michigan, 'Ujfehértói Fürtös' blooms 2 to 3 days after and ripens approximately one week after 'Montmorency.'

'Debreceni Bőtermő' (Fertile of Debrecen) and **'Kántorjánosi'** are very similar to 'Ujfehértói Fürtös.

Production

Many younger orchards are planted at 8 x 5 m or 7 x 5 m with trees grafted onto *P. mahaleb*. However at 13 to 14 years old, the tree canopy of the more vigorous selections must be pruned to permit the movement of orchard equipment. In those orchards planted with the self-sterile Pándy clones, the ration is 1:1 for Pándy:Cigány trees where Pándy and Cigány alternate every 2 rows.

The ripening season of cherry in commercial production in Hungary is from early June to July 5-10. Approximately, 30% of the total yield is harvested before June 20th, 40% between June 20 and 30, and 30% in July. 'Montmorency' ripens the end of June in Hungary.

Several of the Hungarian selections, most notably, 'Érdi Bőtermő,' and 'Favorit' may become infected with European brown rot (*Monilinia laxa* Aderh. & Ruhl.). However, this problem is controlled by a vigilant spray schedule consisting of copperoxichloride at bud burst and twice again until bloom. Other fungicides are used at full bloom and petal fall.

Conclusions

The sour cherry breeding program in Hungary initially began with the collection of the better strains of the local varieties and selection among these strains. As the breeding program developed, these local cultivars were crossed with other cultivars, usually foreign, and the first series of hybrids have been named, released and commercially accepted. Additional hybrids are now under test and will result in the release of even more promising cultivars. Certainly, the goals of self-fertility combined with good fruit quality and a 40 day ripening period have been realized.

Only 2 of the Hungarian selections, 'Érdi Bőtermő' and 'Ujfehértói Fürtös,' have fruited in the United States. Several of the other selections are in their eighth year at the National Plant Germplasm Quarantine Center, Glenn Dale, MD.

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I certify that the statements made by me above are correct and complete. R. M. Crassweller, Business Manager. August 19, 1991.