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Growing Balaton® - Horticultural Considerations

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The fruit industry in Michigan has generations of experience growing the tart cherry Montmorency, but very little experience growing the new Hungarian variety Balaton. These varieties differ in many horticultural traits. This article discusses several of the horticultural traits of Balaton that are based on 15 years of research in several Michigan locations. Tree growth and training are discussed in an accompanying article.

Site Selection and Cold Hardiness

Balaton is more susceptible to winter injury than Montmorency, and in fact, it behaves more like some sweet cherry varieties in this regard. Therefore, it is critical to select sites that would be good for sweet cherries or peaches. Take care to develop scaffolds limbs with wide crotch angles which acclimate more quickly in the fall as opposed to narrow crotch angles. Plan to paint trunks and lower scaffolds with white latex paint.

In addition, although Balaton tends to bloom a day or so later than Montmorency, the buds begin development earlier than Montmorency and therefore are more susceptible to cold temperatures in certain situations. For example, due to the very warm temperatures in late February and early March this past season, Balaton flowers were phenologically more advanced than Montmorency flowers when the freezing events occurred. As a result, Balaton and Montmorency had 56% versus 32% pistil/flower death, respectively, based on data from MSU's Clarksville Horticultural Experiment Station (CHES).

Plant Spacing

Balaton trees are more vigorous growing trees than Montmorency and ultimately grow to a larger size. Therefore, we suggest planting trees 1-2 feet further apart than Montmorency within and between rows.

Rootstocks

At this time Balaton appears to be higher yielding on mahaleb rootstock compared to MxM60 and MxM2 where soils are sufficiently well drained (Table 1). However, even with Montmorency it is characteristic for MxM60 and MxM2 to result in delayed productivity compared to mahaleb. In Europe, where Balaton has been widely planted, mahaleb is the rootstock of choice. However, Hungarian researchers have selected mahaleb seed sources that have not previously been grown in the U.S. These selected mahaleb rootstocks, most commonly CT 500 and CT 2753, are now being imported from Hungary and are currently being evaluated in plots planted in Michigan in 1998.

Table 1: Comparison of yields (1bs.) for the Balaton rootstock trial at CHES and the NW Station for 1999 and 2000[zy].

			1999			2000	
Location	Rootstock	No. of Trees	Total	Avg/tree	No. of Trees	Total	Avg/tree
CHES	MXM 2	9	228	25.4	9	391	43.4
	MXM 60	10	248	24.8	10	458	45.8
	Mahaleb	10	322	32.2	10	809	80.9
NW	MXM 2	10	85	8.5	10	106	10.6
	MXM 60	10	88	8.8	10	111	11.1
	Mahaleb	10	142	14.2	10	116	11.6

[z]Trees planted in 1995.
[y]Balaton trees grafted on CT 500, CT 2753, Erdi V, and Korponay were added to this plot in 1998.

Crop Management
Balaton appears to be able to carry a crop at a younger age while still putting on adequate growth when compared to Montmorency. In fact, some early crop may be desirable to help hold down scaffolds from becoming too upright. Much more is yet to be learned, but at this time it appears that gibberellic acid used at high rates for defruiting young trees is generally not recommended unless trees get off to a slow start and begin overcropping. In cases where gibberellic acid is used, allow trees to begin cropping 1 to 2 years sooner than with Montmorency. The more vigorously growing Balaton certainly appears to need gibberellic acid less during these early years than Montmorency.

Pollination/Fruit Set
Balaton does not appear to fruit as well as Montmorency during years when conditions are cool during bloom. Based on our observation and verbal recommendations from Hungarian colleagues (but with no proven research data) we suggest using two hives of bees per acre to facilitate good pollination.

Fruit Quality
Balaton fruit (Figure 1), with an average fruit weight of 5.8 grams and a diameter of 22 mm, is significantly larger than Montmorency (Table 2). The fruit is sweeter than Montmorency, generally reaching 16% soluble solids. In addition, Balaton is significantly firmer than Montmorency and therefore is less likely to be damaged by wind whip. This firmness is also noticeable in the pitted fruit that hold their round shape better than Montmorency. On first look however, it is Balaton's intense red, almost purple, color that sets it apart from Montmorency (Fig. 2). Unlike Montmorency that just has red pigment in the skin, Balaton has red pigment in the skin and throughout the flesh. The amount of red pigment is approximately three times higher in Balaton than Montmorency. These unique quality attributes make Balaton an interesting alternative to Montmorency for such products as yogurt, jam, juice and nutraceutical products.

Fig. 1. Balaton fruit at CHES

Table 2: Evaluation of Montmorency and Balaton at the CHES for 12 years (1988-2000).

	Montmorency	Balaton
Bloom date[x]	May 6	+1
Harvest date[y]	July 10	+8
Fruit weight (g)	4.9	5.8
Fruit length (mm)	17	19
Fruit width (mm)	20	22
Soluble solids (%)	14.2	16.0
Pigment[y]	0.92	2.22
Pit length (mm)	9.6	10.4
Pit length/Pit width	1.12	1.12
Pit wt./Fruit wt. (%)	6.2	6.4

[x]+/- Montmorency
[y]0 = clear, absorbance at 515 nm

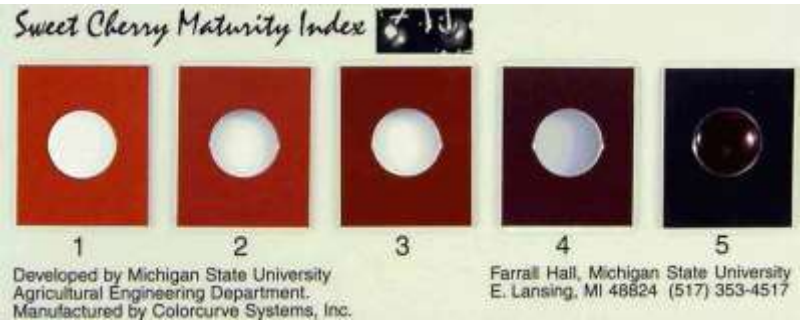

Fig. 2: Balaton fruit harvested on August 3 from CHES matches color number 5.

Determination of Optimal Harvest Time

In 1999, some of the Balaton fruit coming into the processing plants had uncharacteristically low soluble solids and red pigment levels. In addition, there was occasionally extensive fruit cracking and the fruit was not as freestone as usual. All these characteristics suggested that the fruit had been harvested before it had reached its optimum maturity. Therefore, this past season a study was conducted with the goal of determining optimum harvest parameters for Balaton. Balaton samples were collected 3 times at the Northwest Michigan Horticultural Research Station (NWMHRS) (July 10, 20, and 30) and every 2-4 days from CHES between July 5 and August 3. The following characters were measured: pull force, fruit weight, soluble solids, fruit color and fruit cracking. Pull force was determined to be the best indicator of fruit maturity and it is recommended that the fruit not be harvested until the pull force averages below 400. By this time, the fruit should have reached its characteristically high soluble solids and pigment levels and should be sufficiently freestone to pit well. Additionally, since Balaton fruit is very firm, it can easily hang well on the tree until this time and not be susceptible to wind whip.

Harvesting mature Balaton is especially important to reduce the % cracking when the fruit is transported in water. If fruit is harvested too immature, it will not have developed a good abscission layer between the fruit and the stem. However, when mature, the abscission layer is adequately formed so that the fruit removes with a dry stem scar. This abscission layer not only seals in the fruit juices, but also seals out the water. If harvested immature, water enters the cherry through the bleeding stem scar and may lead to cracking. For example, % cracking for Balaton fruit grown at CHES this year showed a reduction from 48% cracking on July 17 to 16% cracking when harvested on July 31. Although some cracking can be tolerated for certain products, there is some interest in exploring dry harvesting techniques.

Mechanical Harvesting

When trees are young the bark is more prone to slipping than with Montmorency. Use extreme caution when trees are small. As trees age, mechanical harvesting is no problem. We have mechanically harvested Balaton at the NWMHRS and CHES for many years with no ethephon. If trees are to be treated with ethephon, do not apply it too early in the season. Balaton gets much darker red than Montmorency, so ethephon applied at the same color as for Montmorency would be way too early. In this regard, make sure that if Balaton trees are planted next to Montmorency, that the Montmorency ethephon application does not drift over to the Balaton rows. If this were to occur, the Balaton fruit would begin to abscise before they are at a desirable harvest maturity.

The fruit generally matures 7-10 days after Montmorency, and possibly later for some markets. However, as fruit gets over ripe it is much more prone to drop than Montmorency. This is because Balaton develops a much drier, more complete abscission layer between the stem and fruit than does Montmorency.

Yields

The yield potential for Balaton looks good, however, it will be only after years of observations that we will have a better idea of its average yielding ability. As of today, the only comparative yield information is from two Montmorency versus Balaton yield trials (Figure 3) that were planted at CHES

and the NWMHRS in 1994. In both 1999 and 2000, Balaton did have higher yields that Montmorency however, the difference among individual tree yields was quite large (Table 3). The reduced yields of Montmorency and Balaton at the NWMHRS versus Montmorency are due to different environmental conditions, i.e. dryer lighter soils at the NWMHRS and more freeze damage in 2000.

Figure 3. Blooming Balaton and Montmorency at CHES. Balaton trees are in the two rows on the left and Montmorency trees are in the two rows on the right.

At both CHES and the NWMHRS, Balaton fruit was harvested, weighed, placed in water tanks and then measured with the volumetric probe to determine the weight to volume conversion. In the case of the fruit collected at CHES, the probe measurements used in the calculation were taken at the processing plant. This initial work indicates that the conversion factor used by the industry for Montmorency should accurately estimate Balaton weight as well (Table 4).

Table 3: Yield comparisons for Montmorency and Balaton in pounds at CHES and the NW Station for 1999 and 2000[z].

Location	Cultivar	1999				2000			
		#Trees	Total	Avg/tree	Range	#Trees	Total	Avg/tree	Range
CHES	Montmorency	20	1014	50.7	24-86	45	3776	83.9	22-174
	Balaton	25	1290	51.6	17-82	41	4001	97.6	36-153
NW	Montmorency	45	640	14.2	0-39	45	986	21.9	0-46
	Balaton	44	836	19.0	0-43	44	1058	24.1	1-45

[z]Trees planted Spring 1994.

Table 4: Comparison of actual yield in lbs. with volume using the Montmorency conversion factor for 5 tanks of Balaton harvested at CHES and one tank of Montmorency and one tank of Balaton harvested at the NW Station in July,2000.

Location	Cultivar/Tank	Cu.Ft.	Probe[z]	Actual lbs.	% Difference
CHES	Balaton tank 1	11.48	545	573	95
	Balaton tank 2	13.92	661	676	98
	Balaton tank 3	17.30	821	807	102
	Balaton tank 4	21.82	1035	1125	92

	Balaton tank	520.30	963	936	103
NW	Montmorency	19.76	938	986	95
	Balaton	21.75	1032	1058	98

[z]Values are multiplied by the Montmorency conversion factor = 47.45

Disease Management

Balaton appears to be slightly less susceptible to defoliation due to cherry leaf spot than Montmorency, but it is still susceptible enough to require a good fungicide program. In years with heavy leaf spot pressure, the fruit stem may become infected even without significant leaf symptoms (Fig. 4). It shows similar resistance as Montmorency to European brown rot.

Fig. 4. Fruit stems of Balaton infected with cherry leaf spot fungus.

These recommendations and other information on Balaton cherry are available at http://www.maes.msu.edu/nwmihort and http://www.hrt.msu.edu/Balaton.html .

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Please send any comments or suggestions regarding this site to:

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