Five Most Important Attributes of Sweet Cherries and the Varieties that Fill These Needs

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The U.S. Pacific Northwest is the most important sweet cherry production region in North America, however, as recently as the early 1990's fresh cherry production consisted primarily of one variety, 'Bing'. In recent years there has been increased interest in new varieties, primarily, but not limited to, new releases from the Pacific Agri-Food Research Centre breeding program in Summerland, British Columbia, Canada.

New varieties and selections are currently being tested by Oregon State University at a variety trial located in The Dalles, Oregon. Fifty-three different varieties are being evaluated for five important attributes: harvest timing, fruit size, fruit firmness, productivity and rain crack resistance. Some of the more promising varieties will be reviewed in this paper.

Important attributes

1. Harvest Timing

There are a number of advantages to a longer harvest season including fewer demands on labor resources, reduced risk of rain-induced cracking and higher monetary returns. By spreading the harvest fewer pickers are needed, but those employed will be able to work for a longer period of time. Because fruit susceptibility to rain cracking is greatest near harvest maturity, the risk of rain cracking is reduced when the season is extended, as cherries are in various stages of susceptibility, potentially increasing grower returns. Avoiding the mid-season surplus of cherries and associated price slump connected with 'Bing' harvest can also increase monetary returns. In fact, in 2003 growers in Wasco County, Oregon, received less money for 'Bing' than for every other variety except 'Lambert' (Seavert, 2003). New varieties expand the harvest window to 1½ months at the same site (Figure 1 and Table 1).

2. Fruit Size

Cherry breeding programs around the world are consistently choosing new selections with large fruit size. For this reason, most varieties released in recent years are significantly larger than 'Bing'. Figure 2 shows the percentage of cherries of several varieties grown in The Dalles, Oregon that are 9 row (29.76mm) and larger. Notably, 'Bing' is significantly smaller than other cherries. Specific standouts for fruit size include 'Sandra Rose', 'Sonata' and 'Staccato' ('Splendid'). Figure 3 illustrates the results of a Washington State University trial conducted in Prosser, Washington showing fruit size of several new WSU varieties as a percentage of 10.5 row (25.4mm) and larger (M. Whiting, personal communication). 'Chelan' is a relatively small cherry, while nearly 100% of 'Tieton' and 'Selah' are 10.5 row and larger.

3. Fruit Firmness
Severe handling during the harvest, processing and shipping stages, with cherries often in transit for over three weeks, means that cherries need to be firm at the time of harvest. Pacific Northwest packinghouses typically measure cherry firmness with a Firmtech 2 (Bioworks Inc.) instrument. Firmness readings above 250 g/mm are generally considered acceptable by the industry. 'Bing', grown at the test plot in The Dalles averaged 275 g/mm over three years. 'Lapins', 'Sweetheart' and 'Staccato' stood out with readings of 360, 360 and 348 g/mm, respectively (Fig 4 and Table 1).

4. Productivity
Productivity varies tremendously among varieties. Generally speaking, self-fertile varieties such as 'Lapins' and 'Sweetheart' are very productive and may be difficult to control fruit set when grown on productive rootstocks such as Gisela 5 or 6. To help maintain fruit size, these self-fertile variety/Gisela combination trees should have 1/3 of all new growth tipped each year combined with some cuts into older wood so that spurs are no older than 5 years old. The contrast to productive varieties are varieties such as 'Tieton' and 'Regina' with low fruit set. Low productivity can be overcome in part by growing these varieties on a productive rootstock and training trees to a central leader system. Complicating this picture are reports from cherry production areas in other parts of the world where fruit set levels are different than in the Pacific Northwest. For example, reports out of France indicate that 'Regina' is so productive that combining it with a productive rootstock is not recommended. In addition, 'Kordia' ('Attika') has shown moderately high productivity in the Northwest, but has had fruit set problems in Chile and Australia. (See Table 1).

5. Rain Crack Resistance
Production of 'Bing' is limited around the world due to its rain cracking susceptibility. Low precipitation levels ranging from 200 to 300 mm in the main cherry production regions of the Northwest make it possible for 'Bing' to be successfully grown in this region of the world. Most of the new varieties being considered by growers in the Northwest are naturally more resistant to rain cracking than 'Bing'. Notable here are 'Regina' and 'Attika', with some cracking resistance shown by 'Chelan', 'Benton', 'Lapins', 'Skeena' and 'Sweetheart'. (See Table 1).

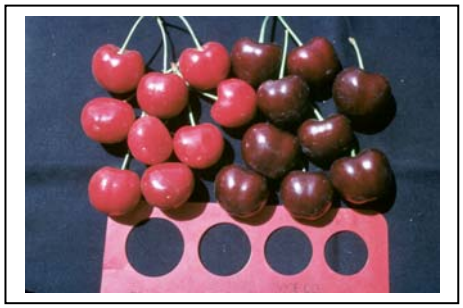
Varieties that fulfill one or more important attributes

'Chelan'

Greg Lang photo

'Chelan' is the earliest of the fresh sweet cherries grown in the Pacific Northwest ripening 10-12 days before 'Bing' or 'Van'. Although it is not a large cherry it has been well accepted in the market place. Fruit size is similar to 'Bing', or slightly smaller. 'Chelan' has a very mild flavor but the flavor seems to be acceptable for an early cherry. 'Bing is the most common pollinizer but 'Van', 'Lapins' or 'Sweetheart' can also be used. Productivity is high, so most growers prefer mazzard rootstock. However, on fertile soils Gisela 6 can be used, although severe annual pruning will be necessary to reduce crop load. 'Chelan' is incompatible on Mahaleb rootstock.

‘Tieton’



‘Tieton’, on right, ripens 6-9 days before ‘Bing’
Photo by Greg Lang

‘Tieton’ produces a very large cherry that has a beautiful luster to the skin. Along with ‘Chelan’ this is another early cherry out of the Washington State University breeding program, ripening just after ‘Chelan’. Bloom time is just before ‘Bing’, but ‘Bing’, ‘Van’ and ‘Rainier’ will all serve as pollinizers. Due to low productivity a Gisela rootstock is recommended with a central leader training system in order to increase productivity. On fertile soils, Gisela 5 is the preferred rootstock. There have been reports of high mortality with Mahaleb rootstock. Like ‘Chelan’, the flavor is very mild. Rain cracking susceptibility is high.

‘Benton’

Photo by Matthew Whiting

‘Benton’ ripens just ahead of ‘Bing’ so it needs to have several favorable attributes to help it compete. Fruit size is somewhat larger than ‘Bing’ and the flesh is very firm with excellent flavor. This is a self-fertile cherry with a late bloom occurring 4 to 5 days after ‘Bing’ or ‘Van’. Productivity is high, but it can be grown on a productive rootstock such as Gisela 6 if it is pruned severely each year. ‘Benton’ affords some rain crack resistance as compared to ‘Bing’.

‘Selah’

Photo by Matthew Whiting

‘Selah’ ripens in the very important harvest window between ‘Bing’ and ‘Lapins’. This is a very large cherry with firm flesh and good flavor. ‘Selah’ is self-fertile but produces cherries in loose clusters as opposed to the dense clusters of some other self-fertile varieties. Cropping is heavy but it is possible to raise this cherry on Gisela 6 rootstock if the tree is managed properly with heavy annual pruning. The tree habit is moderately spreading. Rain cracking incidence is similar to ‘Bing’.

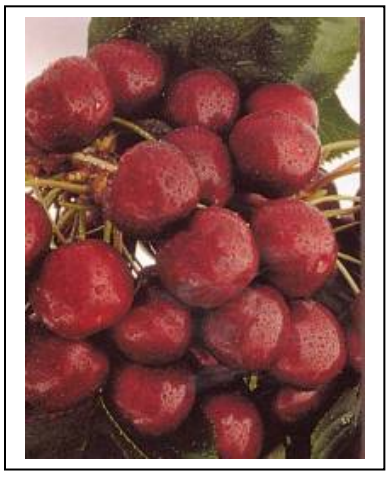
‘Attika’

‘Attika’ (‘Kordia’) is another cherry that ripens between ‘Bing’ and ‘Lapins’. It is widely grown in some of the later production areas of Europe such as Germany and northern Italy. ‘Attika’ is a moderately large cherry with firm flesh and excellent flavor. It blooms late, 4-5 days after ‘Bing’ or ‘Van’, but it is sensitive to frost even in the bud stage, so it should not be grown in frosty areas. ‘Regina’, ‘Schneiders’ and ‘Benton’ can serve as pollinizers. ‘Attika’ has shown good resistance to rain cracking.

‘Lapins’

‘Lapins’ is a late season cherry ripening as late as two weeks after ‘Bing’ or ‘Van’. The proper ripening time is sometimes difficult to determine as it turns a mahogany red well before it is ready to pick. A more accurate ripening indicator is to wait until the vascular tissue within the fruit is no longer visible. Fruit is produced in tight clusters. By removing 1/3 of the new growth each year the crop load and clustering potential can be reduced. Due to its high productivity it is generally recommended with a non-productive rootstock such as mazzard, but it can be grown on Gisela 6 if severe pruning and possibly or flower thinning is performed. ‘Lapins’ is self-fertile.

‘Skeena’



‘Skeena’ ripens just after ‘Lapins’ with similar fruit size. Fruit is produced in looser clusters than ‘Lapins’. The tree habit is more open than ‘Lapins’ and is therefore easier to train. ‘Skeena’ is self-fertile. Although the fruit is very firm, temperatures consistently over 37 C (100 F) for several days can cause a softening of the shoulders leading to post-harvest problems. For this reason ‘Skeena’ should preferably not be grown on a central leader style tree where fruit is continually exposed to direct sunlight. Fruit flavor is strong and good with a pleasant sweet/acid balance. ‘Skeena’ can be grown on Gisela 6 rootstock with severe pruning each year or on a full size rootstock.

‘Regina’

Along with ‘Skeena’ ‘Regina’ ripens just after ‘Lapins’. Fruit size is large and fruit are very firm. Fruit show excellent rain cracking resistance. ‘Regina blooms late, often a full seven days after ‘Bing’ or ‘Van’. Because of this and because productivity is low it is hard to find a good pollinizer for ‘Regina’. ‘Hedelfingen’, ‘Schneiders’, ‘Sam’, and ‘Attika’ can serve as pollinizers. More than one pollinizer is recommended in a block. Due to low productivity ‘Regina’ should be grown on a productive rootstock such as Gisela 5, 6 or 12. A central leader style tree will also help to increase productivity.

‘Sweetheart’

‘Sweetheart’ ripens after ‘Regina’ and up to three weeks after ‘Bing’ or ‘Van’. Fruit size is moderately large and cherries are very firm. The tree habit is open and branching occurs readily. ‘Sweetheart’ is very precocious and productive. For this reason new branches on mature trees should be tipped as described above in the ‘Lapins’ section in order to reduce fruit clustering. ‘Sweetheart’ is easiest to grow on non-productive rootstocks such as mazzard, but it can be grown on Gisela 6 if severe pruning and possibly fruit or flower thinning is performed. ‘Sweetheart’ is self-fertile.

‘Staccato’ (‘Splendid’)

‘Staccato’ was released from the Pacific Agri-Food Research Centre in Summerland, British Columbia, Canada. Production of ‘Staccato’ has been limited in the United States and Europe to reduce potential competition with Canadian growers. ‘Staccato’ ripens a full month after ‘Bing’ or ‘Van’ and produces a very large and firm cherry. Powdery mildew sensitivity can be a problem with this cherry, as the long growing season requires multiple applications of fungicide. Reports from Canada indicate that ‘Staccato’ may be sensitive to heat. ‘Staccato’ is self-fertile.

Photo by Frank Kappel

Summary

New cherry varieties are expanding the potential for increased grower returns through larger fruit size, more resistance to rain cracking and an extended harvest season. All of the varieties reviewed in this article have advantages over ‘Bing’ in one or more attributes, however, in the final analysis, the success of a given variety is dependent on consumer acceptance.

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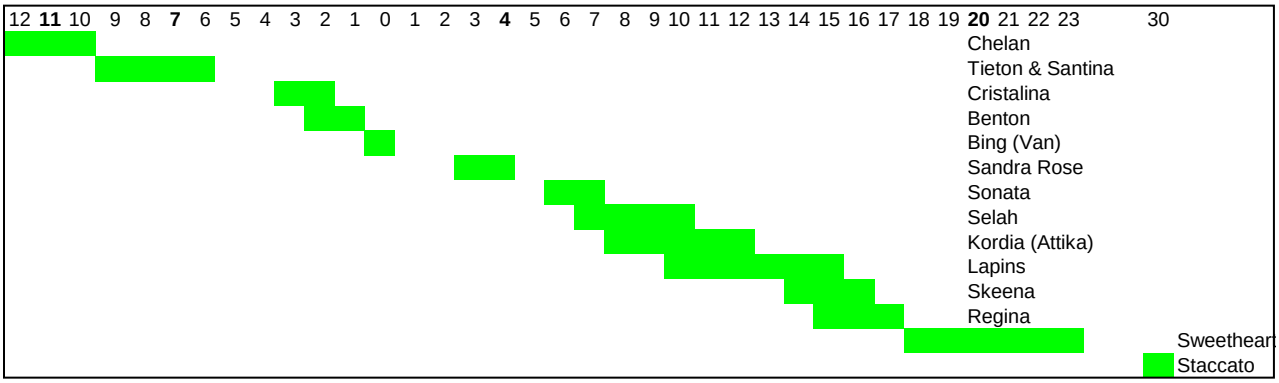

Figure 1. Harvest timing of several sweet cherry varieties as related to ‘Bing’ in days before or after ‘Bing’ harvest.

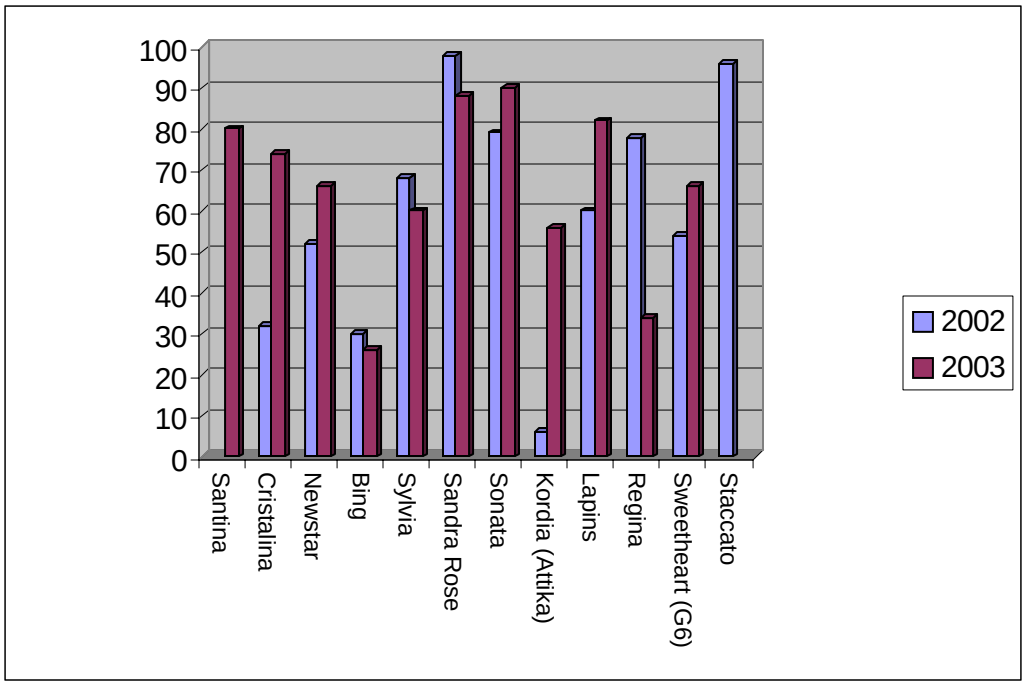

Figure 2. Fruit size of several cherry varieties grown in The Dalles, Oregon on mazzard and Gisela 6 rootstock as a percentage of 9 row (29.76 mm).

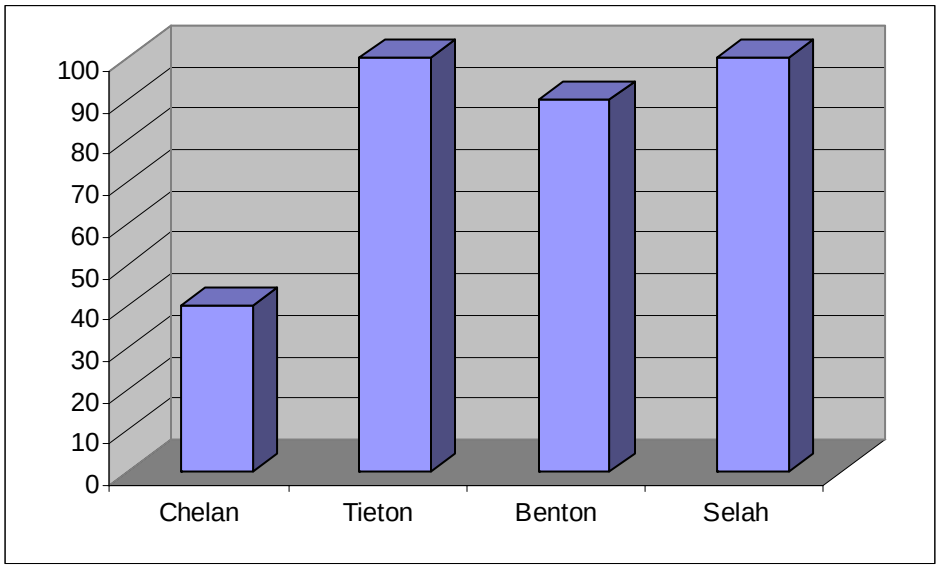

Figure 3. Fruit size of several cherry varieties grown in Prosser, Washington on Gisela 6 rootstock as a percentage of 10.5 row (25.4 mm).

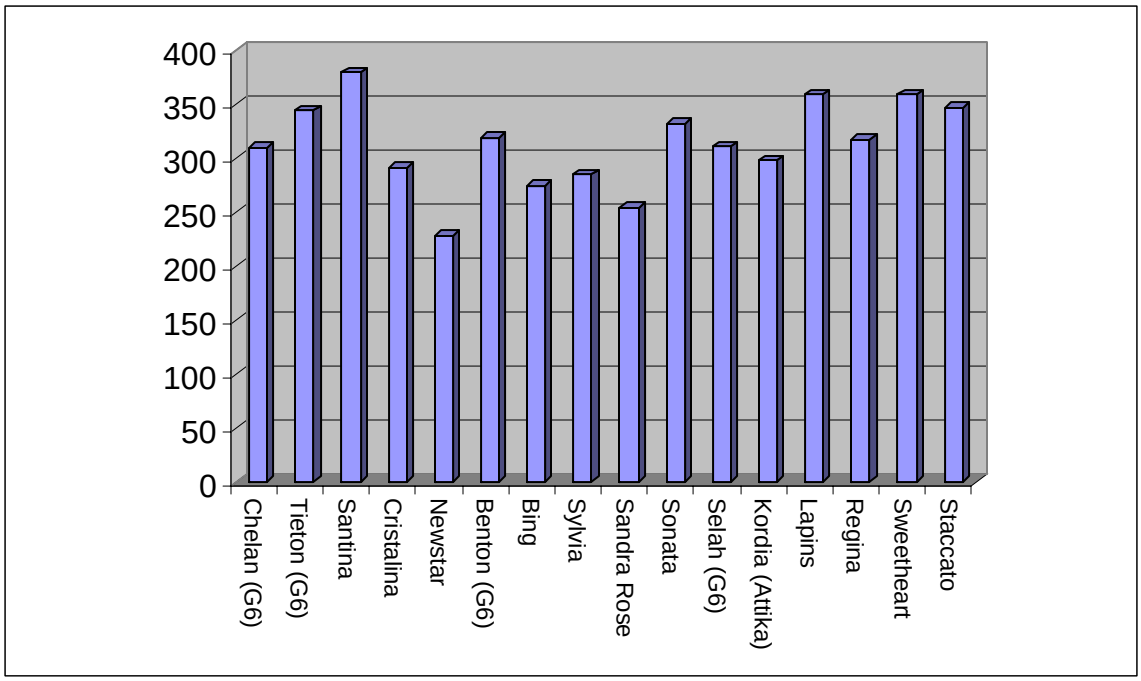

Figure 4. Fruit firmness of tested varieties treated with gibberellic acid expressed in g/mm.

Table 1. Attributes of various sweet cherries grown in the Pacific Northwest, USA.

Variety	Rootstock	Harvest timing (+) or (-) Bing	Av. Fruit Size (mm)	Av. Fruit Firmness (g/mm)	Productivity 4=high	Rain Cracking 4=high
Chelan	Gisela 6	(-) 10-12	25-27	311	3	2
Tieton	Gisela 6	(-) 6-9	28-32	345	1	4
Benton	Gisela 6	(-) 1-2		320	3	3
Bing	Mazzard	0	29.1	275	2	4
Selah	Gisela 6	(+) 7-10	30	312	3	4
Attika	Mazzard	(+) 8-12	29.1	299	3	1
Lapins	Mazzard	(+) 10-15	30.5	360	4	2
Skeena	Mazzard	(+) 14-17	31.5	339	4	3
Regina	Mazzard	(+) 15-17	31.2	318	1	1
Sweetheart	Mazzard	(+) 18-23	30.3	360	4	3
Staccato	Mazzard	(+) 30-31	31.4	348	3	