

Hardy Sour Cherries: choosing varieties, systems and markets

Dr. Bob Bors Assistant Professor Department of Plant Sciences University of Saskatchewan Saskatoon, Saskatchewan S7N 5A8

Sour cherry varieties available in Canada vary tremendously for cold hardiness, tree form and fruit quality. There are three different types:

Prunus cerasus or “Sour Cherry”

True **sour cherries** are native to the areas around the Black and Caspian Seas. In an effort to make them sound more appealing, growers in the States have been calling them **tart cherries**. These cherries are often pruned to be 3 m tall but have the potential to be 15 m. Often they are grown on rootstocks that restrict their height from 5 to 8 m. Recently, the **Evan’s Cherry** has been planted by many growers on the Canadian Prairie with mixed results regarding hardiness. Dieback can be severe in zone 2 and partial dieback is common in Zone 3. It may be possible to improve survival of Evans in colder areas with cultural practices that will be discussed later. The cultivars **Mesabi**, **Meteor**, and **Northstar** are recommended for Zone 4 in the southern half of Minnesota. Ontario is more conservative in its recommendation that sour cherries be planted in hardiness zones 5b or warmer. **Montmorency** is the most widely planted *P.cerasus* cultivar in the US and Canada providing 95% or more of the sour cherries on the market. Industrial cherry pitting machines, harvesting methods, and processing procedures have been developed for this cultivar, which may contribute to reluctance of sour cherry growers to switch to newer varieties. Harvesting of these cherries is usually done with trunk shaking equipment and large tarps that encircle the trees.

“Mongolian cherry”

In the late 40's, Dr. Les Kerr at Ag Canada's Morden Research Centre, began intercrossing *P. cerasus* and *P. fruticosa*. He continued this research when he moved to Saskatoon to become Director of the PFRA Tree Nursery (now Forestry Farm Park). What resulted was a cold hardy, bush sour cherry that grows 0.6 to 1.0m. (2 to 3 ft.) tall. Les began promoting these cherries to nurseryman and they began to be widely planted. These cherries are very sour, and most fruit are in the range of 2 to 2.5 gm in size or half the size of sour cherries. Their low form makes them difficult to pick. They are very hardy and can do well in Zone 2.

“Dwarf Sour Cherries” or University of Saskatchewan Cherries

In the 1970s, Dr. Nelson and Rick Sawatzky at the University of Saskatchewan imported and began evaluating (*P. cerasus* x *P. fruticosa*) hybrids from the Siberian Botanical Gardens. In the 1980's Les Kerr donated his germplasm to the University. A few years later hardy mongolian cherries with unusually large size were hybridized to some of the best varieties from Europe. The hybrid cherries that were 75% *P. cerasus* and 25% *P. fruticosa* seemed to have a good balance of characteristics from both parents. Possessing both improved hardiness, and good fruit quality the hybrids are

half the size of *P.cerasus*. At the U of S, nine year old, unpruned trees are between 1.5 and 3 meters in height. At this height dwarfing rootstocks are not needed so the trees can be on their own roots. It may be possible to use over-the-row harvesters that are more commonly used to harvest raspberries, blueberries, or saskatoons. The first cultivar released from the U of S was **SK Carmine Jewel**. Other advanced selections are being propagated for testing purposes.

Fruit Colour

Cherries are generally used according to their colour. Varieties, such as **Montmorency** and **Evan's Cherry**, are preferred for pies, preserves and toppings because of their bright red skin colour. However these varieties have yellow flesh and yellow or slightly pink juice. For this reason, most commercially produced cherry pie fillings are dyed red!

The dark black cherries, such as **SK Carmine Jewel** and **Northstar**, have intensely coloured juice which is preferred for making juice, wine, jelly and adding to dairy products and baked goods. When dark cherries are used in a pie, the fruit looks a darker than what you'd buy in the store. Some European varieties being tested in Michigan as well as some U of S selections have red skin and red flesh would be a good alternative for making pies without dyes. Cherries having yellow flesh are particularly prone to oxidation, and will turn brown if not cooled and processed shortly after picking. Cooking or freezing whole or pitted cherries will release pigment from the skin of the fruit, so it is possible to obtain red juice from Evans and Montmorency.

Pit Shape and pitting

Round pits such as those in **SK Carmine Jewel**, **Northstar**, and **Montmorency** are best for motorized pitting machines. Long pits like those in **Evans** and **Meteor** are less desirable because they may shatter. The hand operated pitters used by homeowners are acceptable for all varieties because they do not have enough force to break pits. Plunger type pitters take more time for homeowners to pit their cherries but are inexpensive (\$15-20). The old fashioned crank type are 7x faster, but the fruit comes out flat and pitters may cost \$70 to 150. Commercial pitting machines may cost \$5000 to 30,000 US depending if you buy it used or new. They can process up to a ton per hour.

Sweetness

Surprisingly, sour cherries can have as much or more sugar than sweet cherries. Some wine recipes require less sour cherries per batch than sweet cherries. Very late in the season, some varieties of sour cherries lose most of their acidity and astringency and can be eaten fresh. The tartness doesn't completely go away, but taste tests indicate that most people enjoy the fresh taste of Evans and SK Carmine Jewel late in the season. Children, in particular enjoy them, perhaps preconditioned by the variety of sour candies on the market. Also, sour cherries are much more juicy and smaller than sweet cherries. Sour cherries taste best when they can be shaken off the trees.

Suggestions for improving hardiness

0. Plant in a protected area with well drained soil. Avoid low lying areas where cold air collects. Windbreak are recommended for North and West sides of the orchard.
1. Never do general pruning in summer or fall, it would encourage late growth and increase chances of winter damage; late winter or early spring is the best time. Pruning of damaged branches can be done at anytime.
2. Don't remove more than 25% of the wood in any one year. To remove more wood may encourage vegetative growth and reduce fruit yield the following year.
3. Use fertilizer only if necessary and apply only in the spring.
4. Reduce or stop watering in the fall, this helps to make the trees go dormant. Exception: a drought year with young plants.
5. To encourage growth of young trees the area around trees can be cultivated to remove competition of weeds and grass. Later in summer, allow grass to grow into the row, as the competition will hasten the onset in dormancy. Full size trees can have grass growing close to the tree all season long, encouraging deep root growth.

Pollination

Sour cherries of all types are usually self-fruitful and do not require other varieties for pollination. However, bees are needed to transfer pollen from the anthers to the styles.

Wild bees may play an important role if bloom time occurs when it is too cool for honeybees. It might be possible that having several varieties will increase fruit set. Although self-fruitful, sour cherries are notorious for having fruit set in the 20 to 30% range, so actions taken that could potentially increase fruit set should be explored.

Pests and diseases

The most serious pest for the prairies has been has been deer and rabbits eating branches in the winter. They will also eat fruit an leaves in summer. Deer fences are highly recommended. At the University's research plots we had cherry fruit fly (*Rhagoletic cingulata*) and leaf rollers which we spray 2 or 3 times a year. We have not seen any bacterial leaf spot on our cherries, which in Michigan is a very serious disease. It is not known if Saskatchewan cherries have immunity for this disease or if Saskatchewan is climate is too unfavourable for it to become a problem.

Harvesting

The U. of S. cherries have been bred for mechanical harvesting and could be harvested with an over the row harvester. They can also be shaken by hand. The average size cherry bush can be harvested in about 3 minutes by this later method. Likewise, mongolian cherries can also be mechanically harvested. Pruning must be done to restrict the width of the bushes so branches can fit into the opening of the harvester.

The large tree type of sour cherry such as Evans or Montmorency require specialized hydraulic shaking equipment, which is considerably more expensive than an over-the-row harvester. The branches of these tall trees are too thick for shaking by hand and so ladders and hand picking would be the only other harvesting option.

Market potential

The cherry pie filling market is dominated by the Michigan growers but other cherry products are rare on the market. A natural pie filling without dyes could have potential in the market. Cherry juice, wine, dried cherries, cherry muffins are almost non-existent. Frozen cherries cannot be bought in the prairie provinces at any time of the year but in Ontario they are available only during harvest season. Cherries with yellow flesh, such as Montmorency or Evans, easily oxidize when thawed and become muddy brown in colour. The darker cherries such as SK Carmine Jewel, become purple after thawing.

For some of these products the cranberry would be the biggest competition, but I would venture to guess that cherries are more liked by the public. Some growers in the States have switched to a red juiced cherry and are selling concentrated cherry juice for its medicinal properties. As the U of S cherries are very dark red to black with highly coloured juice, it is likely that they will be used in products other than pies, but would be superior for other products.

Future Research

Advanced selections with good fruit quality are being propagated for testing purposes. Although hardy in Saskatoon (Zone 2b) some selection have had limited testing in zones 2 and 3, while other selections have not been tested. I am interested in co-operating with government researchers and grower groups across Canada. I believe that the Dwarf Sour Cherries have the much potential to be a new crop for northern regions.