

TART CHERRIES

growing, harvesting and processing for good quality

COOPERATIVE EXTENSION SERVICE

MICHIGAN STATE UNIVERSITY

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The key to a stable tart cherry industry is the continued supply of a good-quality processed product. Factors affecting quality start in the spring with pruning and fertilizing and continue with each step in the growing, harvesting, handling and processing of the fruit. The following are important considerations in obtaining quality processed tart cherries.

Prune During Dormant Season for Mechanical Harvesting

Bearing tart cherry trees trained for hand-harvesting require drastic pruning for mechanical harvesting. The tree shown in Fig. 1 is an example of a tree grown for hand-harvest. Fig. 2 is the same tree pruned for mechanical-harvest.

Note the reduction in the number of main scaffold branches and the thinning-out of the lower portion of the tree to allow for movement of shaking and catching equipment (Fig. 2 as compared with Fig. 1). This also reduces bruising of cherries when shaking. It is important to eliminate willowy, weak hanging branches and to reduce excess tree spread, beyond the catching frame.

Opening the tree may result in better colored, or more even colored, cherries.

Fertilize for Annual Production and Firm Well-Colored Cherries

Excessive nitrogen causes large, soft cherries which are difficult to pit. These cherries scald more easily, resulting in inferior color and character in the processed product. Unpitted fruits or loose pits in the product are the most serious problems of processed cherries. A combination of heavy pruning for mechanical harvesting, chemical weed control coupled

with applications of nitrogen can induce excessive tree vigor and bring about soft, difficult-to-handle cherries. A range of 115 to 125 fruits per 500 grams (454 grams = 1 pound) is a desirable fruit size.

The best guide for the nutritional needs of mature bearing tart cherry trees is leaf analysis taken anytime during July. (Obtain information for leaf analysis from your Extension Agricultural Agent). The standard values for the various nutrients (percent dry weight in leaves) needed by Montmorency trees of good bearing vigor are as follows:³

Nitrogen, 2.95; potassium, 1.67; phosphorus, 0.25; magnesium, 0.68, and calcium, 2.09.

Soil Management for Mechanical Harvesting

A grass cover in the travel area between the tree rows is a good soil management practice. This cover can be maintained by mowing. The grass may be sowed or obtained by volunteer growth. Weed control chemicals can be used to keep down weeds and grass around the trees which could interfere with operation of the catching equipment. This procedure also conserves soil moisture. A sod cover usually makes mechanical harvesting possible even under wet conditions.

Delivery to Processing Plant

Develop your plans for harvesting, handling and delivery to processing plant with the fieldman who represents your processor. Delivery of machine-harvested cherries may have to be scheduled.

Prior to harvest, grower and processor must evaluate total tonnage, harvesting equipment and handling methods. Together, they must develop a tentative timing and rate of harvest. As harvesting and processing progress, schedule adjustments will probably be

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Fig. 1—Bearing cherry tree before pruning for mechanical harvesting.

necessary which will require frequent communication and cooperation by both parties.

Have a thorough understanding of the total tonnage involved, and the rate at which the cherries are to be delivered. Arrange for the necessary number of tanks to handle harvesting, cooling and the delivery schedule of cherries as agreed upon by grower and processor.

Water Cooling or Water Handling

The effectiveness of a cooling or flushing area depends on its site, design and volume of cherries it can handle. A double row station is shown in Fig. 3. As there are many ramifications in the planning and construction of a cooling or flushing area, see Michigan State University Extension Bulletin 615, "Cooling Stations for Red Tart Cherry Orchards" for details.

Preparations for Mechanical Harvesting

It is important to select a good, responsible crew and to train the workers thoroughly. These men will be operating expensive equipment and harvesting a valuable, perishable crop. Take the time to explain the damage to the fruit by improper shaking, the problem of leaves and twigs in the tank and where negligence frequently results in an unsatisfactory product or accidents.

All hard surfaces which may be hit by falling cherries must be carefully padded. This includes the shaker arm and supports as well as parts of the catching equipment.



Fig. 2—The same cherry tree after pruning for mechanical harvesting.

Make a test run to check out equipment and crew.

Check each block of cherries carefully to determine stage of maturity. If you have a "pull gauge",⁴ when cherries pull with a 300- to 350-gram force or lower, cherries can be harvested satisfactorily mechanically.

Mechanical Harvesting

In harvesting, attach the shaker claw to the limb at as close to a right angle as possible. This reduces undue skinning (injury) to branches.

Shake in short bursts ($\frac{1}{2}$ to 3 seconds) at frequencies of 1,000 to 1,200 per minute. Obtain a steady, light flow of cherries. Do not overload the catching equipment and conveyor by shaking down a large mass of cherries at one time. When using sloping catching frames, keep fabric tight. Do not allow cherries to collect in pockets.

Let the cherries remain on the tree that do not shake off readily. They are mostly the poorly colored, not fully ripe fruit. Do not knock these cherries from the tree with a stick. Let them hang. Do not pick up cherries which have fallen on the ground.

Remove leaves and twigs as the cherries are conveyed from the catching frame to the tank. Leaves inhibit water circulation in the tank and twigs bruise the fruit. Both leaves and twigs clog conveying and processing equipment at the plant.

Watch for oil leaks. Do not get oil on the cherries; it cannot be washed off in handling and processing.

⁴Hunter pull-push mechanical force gauge, Model L-1000-M equipped with an adapter to project around the stem of the cherry. Manufactured by Hunter Spring, Division of Ametek, Inc., Hatfield, Pa.



Fig. 3—Double-row cooling station.

When the air temperature reaches 85° F or above, either stop machine-harvesting or spray-cool cherries before shaking. (See Michigan State University Experiment Station Research Report 69—"Preharvest Spray Cooling for Tart Cherries.")

Handling Cherries From Catching Equipment to Processing Plant

Catch cherries in water 50° to 54° F. Keep soak water under 60° F at all times. If water cannot be kept under 60° F., use ice.

As soon as a tank is filled with cherries, move the tank to the flushing or cooling area. Do not let tanks of cherries stand in the orchard.

At the flushing area, discharge the cold water into the bottom of the tank, using a discharge rate of 8 to 10 gallons a minute for the first 30 minutes. Stir the cherries carefully to eliminate hot spots. If they are not stirred carefully, cherries can be unfavorably bruised making them very susceptible to scald and loss of color of the processed product. During the stirring operation of about 5 minutes, remove leaves, twigs and unfavorable cherries which rise to the top of the water. After 30 minutes of flush, reduce the water flow to 2 or 3 gallons a minute.

Record the time soaking started and send it with the tank to the processing plant. A good way to do this is to plainly mark the beginning of soak time on

a chip of wood for each tank of cherries and let it float on the water in the tank. Keep chip of wood in the tank until it is removed by the processor.

Deliver the tanks of cherries to the processing plant in accordance with the schedule so that the cherries can be processed within 6 to 9 hours after picking. Be sure the water in the tank is kept below 60° F at all times. Mechanically harvested cherries soaked more than 12 hours before processing show extensive scald and loss of color as a processed product.

Maintain the delivery schedule agreed upon with your processor.

Handling at Processing Plant to Maintain Good Quality

Keep the tanks of cherries received at the processing plant below 60° F until ready for processing.

Handle all cherries and tanks of cherries carefully. Avoid all drops when handling and dumping tanks and even after the cherries are on the processing lines.

Limit total soak time before processing to 8 hours. This includes the time at grower's flushing or cooling area, during transportation, and holding at the processing plant. Soaking longer than 8 hours increases incidence of scald and loss of color in the processed product.

Transfer cherries outside and inside the plant by well-designed water-flumes or by properly adjusted conveyor belts.

A mechanical de-stemmer,, necessary early in the season, should be provided with a by-pass for late season fruit when stems are not a problem.

Remove small and crushed cherries with an eliminator. Keep cherries one layer deep on the eliminator so that the machine will be effective.

Keep electric sorters in proper adjustment. Discharge the cherries from the sorter into a properly designed water flume.

Check pitters frequently to insure proper pit removal without undue tearing of flesh. Use jets of air to keep pitter cavities clean.

Proper care in holding, handling and conveying cherries at the processing plant is important to insure a high quality processed product. A good fresh product delivered by the grower may be a poor

processed product because of improper handling at the processing plant.

Volume Buying

Volume buying or ownership transfer of cherries should be seriously considered by both the grower and processor. It eliminates the extra handling necessary for weighing the cherries which in itself automatically reduces bruising.

The ownership transfer of cherries on the basis of cubic measurement of tart cherries suspended in water has proven equitable for both the grower and processor in studies made by unbiased parties. (See Michigan State University Research Report No. 7, "Weight to Volume Relationship of Tart Cherries.")

NOTE: Reference of trade names does not imply endorsement by Michigan State University or discrimination against similar products which may also be suitable.