



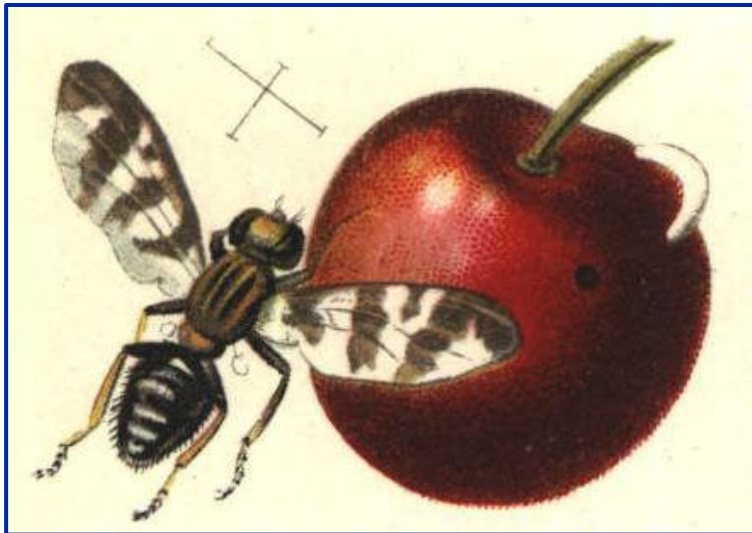
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Protocol for the Distribution and Sale of Cherries Produced in the ECFF Quarantine



Drawing of ECFF living on a cherry fruit, circa 1920

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Protocol for Distribution and Sale of Cherries Produced in the ECFF Quarantine Areas

Objective:

The purpose of this protocol is to facilitate the production, harvest, and sale of cherries from areas where the European cherry fruit fly (ECFF), *Rhagoletis cerasi*, has been detected, while reducing the risk that the production, harvest, and sale of these cherries will contribute to the expansion of the invasive range of ECFF. Of particular importance is the prevention of the spread of ECFF to major areas of cherry production in the United States.

Introduction:

The protocol includes a systems approach that combines multiple interventions that allow for the safe production, harvest, and sale of cherries from ECFF quarantine areas (FAO/IPPC 2012, Van Klinken et al. 2020). The extent of the ECFF quarantine area is primarily determined through an area-wide trapping program following international standards. The determination of the ECFF quarantine area is a separate process from the ECFF protocol and is not covered in this document. The principal safeguards of the protocol include the following:

1. A pesticide-based management program.
2. The application of a float test to check against pest-management failure.
3. Application of approved destruction and disposal methods for high-risk culled fruit outside of quarantine areas.
4. Restrictions against the shipment of quarantine fruit to areas where ECFF establishment would have major impacts.

Scenarios where transport and sale of quarantine cherries outside the ECFF quarantine is permitted are limited to the following.

1. Cherries destined for processing and cherries sold fresh, destined to a low-risk area, produced under a compliance agreement, that pass the appropriate float test.
2. Cherries destined for processing in a high-risk area, produced under a compliance agreement, that pass a standard float test and are received by an approved processor that will dispose of all unprocessed and culled fruit following an APHIS-approved method.

ECFF Protocol:

Figures 1 and 2 outline the relevant requirements for processing and fresh cherries, respectively, when produced under the protocol.

Figure 1. Outline of requirements for cherries destined for processing produced under the ECFE protocol.

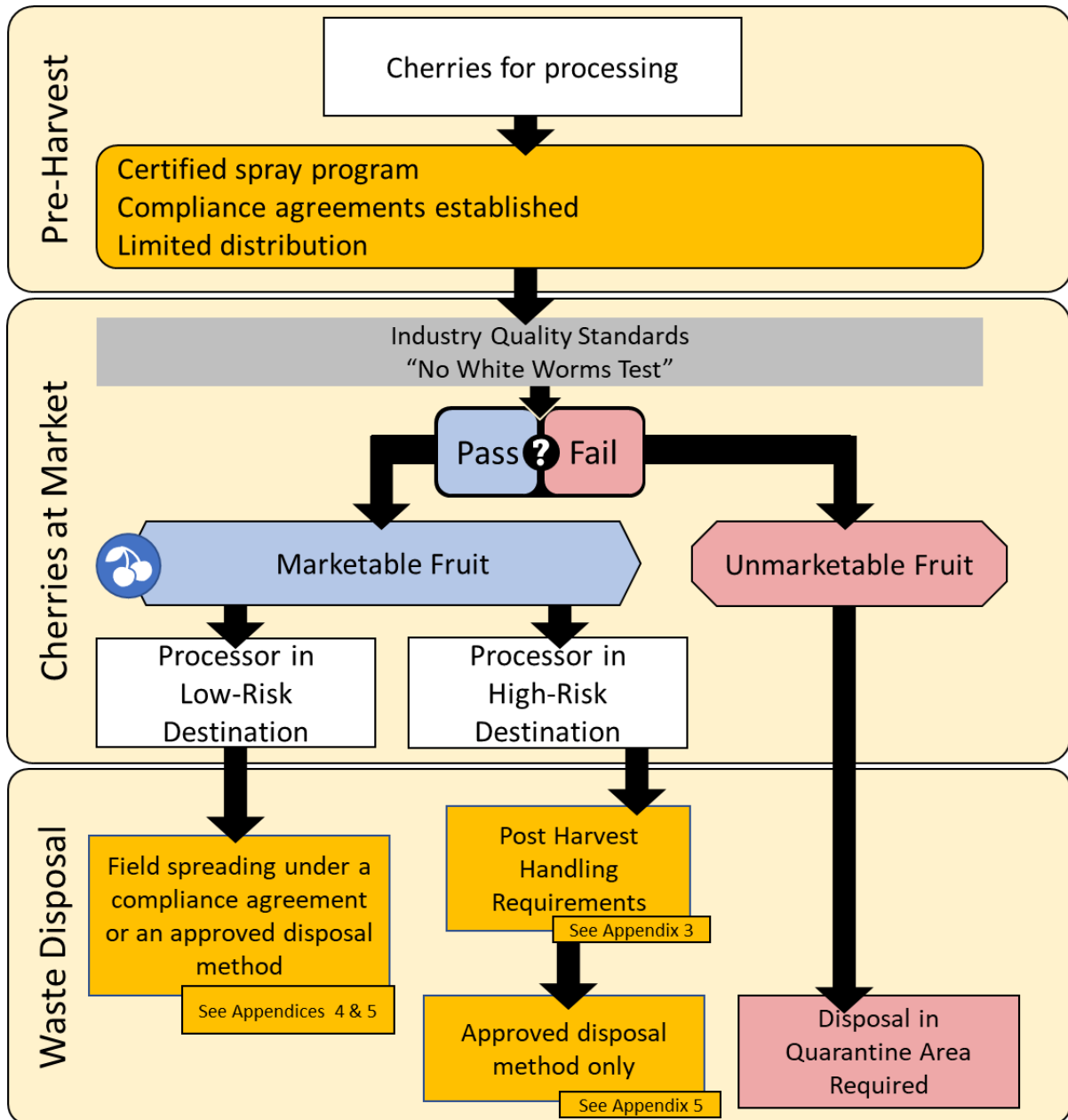
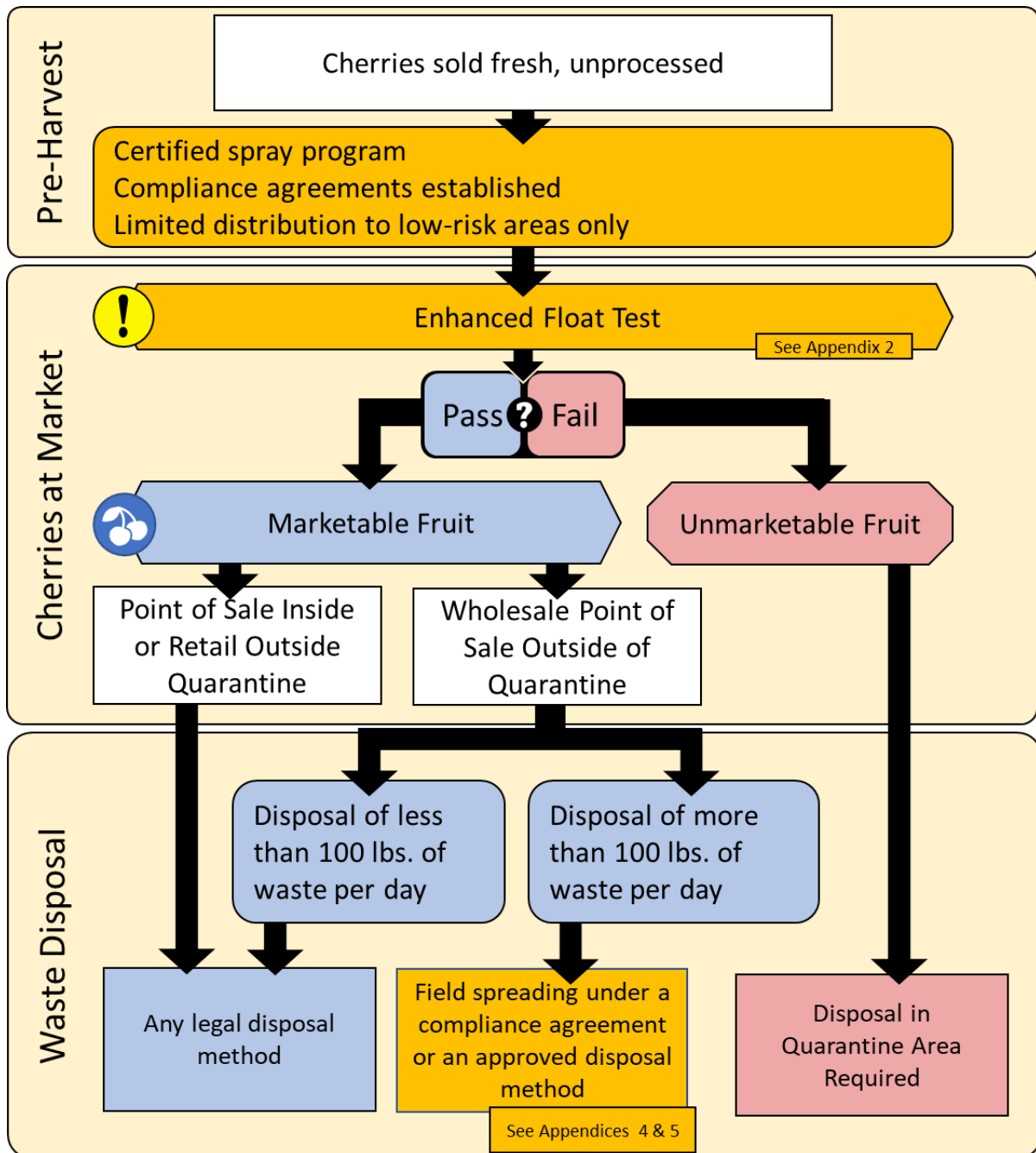


Figure 2. Outline of requirements for fresh, unprocessed cherries produced under the ECFE protocol.



Protocol Requirements:

This section provides a general outline of the requirements for the protocol. Details of the specific protocol requirements are provided in the appendices.

1. *Establishment of a Compliance Agreement:* The compliance agreement is meant to ensure all parties are aware that only fruit produced under the ECFF protocol may be moved outside of the quarantine area, to acknowledge the restrictions against moving cherries into high-risk areas, and to ensure that the appropriate disposal methods are used for culled and unprocessed fruit.

Producers of cherries within the ECFF quarantine that intend to have their product moved outside the quarantine area must enter into a compliance agreement with the appropriate regulatory agency. The compliance agreement should be signed and active before the commencement of the spray requirements detailed below.

In some cases, the grower responsible for production is not directly involved in the packing and processing of the fruit for sale to the public. In such a case, a separate compliance agreement must be entered into with the packer and/or processor. The compliance agreement will also specify float test requirements and requirements for the destruction of unprocessed and culled fruit using approved methods if these measures are required under the protocol.

2. *Certified Spray Programs:* As part of ECFF protocol, producers within quarantine areas must conduct a spray program to reduce fruit fly populations within the orchard. Applications of pesticides labeled for the control of fruit flies on stone fruits should be made at 7-to-10-day intervals beginning at least 30 days prior to harvest. Ensure all label requirements and local/state regulations are followed and consult with state cooperative extension resources to identify best practices for pest management. Appendix 1 provides a list of recommended pesticides. Detailed spray records must be maintained as a requirement of the ECFF protocol and shall be made available upon request.
3. *Harvest Float Test:* Float tests must occur before fruit has been transported outside the quarantine area. Fruit destined for processing may use the industry standard float test which is conducted to ensure the fruit meet a "no white worms" standard. This float test must follow industry-standard practices (USDA AMS, 1993) and does not require specific training or direct oversight, however the individual or individuals who conduct the standard float tests must be listed on the documentation which accompanies the fruit during transport out of the quarantine area. Fruit that fails the "no white worms" standard must be reported to the appropriate regulatory agency identified on the compliance agreement and must not be transported out of the quarantine area.

Cherries to be sold as fresh, unprocessed fruit (typically sweet cherries) which are to be transported for sale outside of the quarantine area must undergo an enhanced float test within 5 days of the first projected harvest date, with a follow up test required 10 to 14 days

after the first harvest date if harvest is still ongoing. The enhanced float test must follow a specific procedure detailed in appendix 2. The enhanced float test requires an increased number of fruit and the application of research-supported best practices. The enhanced float test must occur under direct supervision of a regulatory official or it must be conducted by a person trained and deemed qualified by the regulatory official, with said person identified on documentation accompanying the fruit.

4. *Restriction on the Movement of Fruit to Areas Designated as High-Risk:* A key goal of the ECFF protocol is to prevent the spread of the ECFF to areas of the United States where cherry production is a major industry. Such areas may be designated as “high-risk” per the FY2022 revised Federal Order. Fresh, unprocessed cherries produced in the quarantine area are prohibited from being shipped to areas designated as high-risk. Cherries from the quarantine area may be shipped to high-risk areas for processing provided that the post-harvest handling requirements (appendix 3) are followed, and all waste generated at the processing facility which contains quarantine fruit is disposed of following an approved disposal method (appendix 5), with field spreading of unprocessed waste explicitly prohibited.
5. *Waste Disposal Mitigations:* Unprocessed fruit outside the quarantine area poses a risk and should be disposed of properly. Entities which sell fresh market cherries directly to the customer (retail) or who produce less than 100 lbs. of cherry waste per day, may use any legal disposal method.

Packing houses and other wholesale operations which dispose of more than 100 lbs. of cherries per day, and all processing facilities, must identify a written and approved plan for disposing of unprocessed cherries from the quarantine area. Available options for disposal include field spreading (appendix 4) or an approved disposal method (appendix 5). The approved disposal options available in appendix 5 may be used in both low and high-risk areas outside of quarantine, however field spreading of any amount of unprocessed fruit waste in high-risk areas is prohibited.

6. *Traceability & Demonstration of Compliance:* Fruit produced within the quarantine area for sale or processing outside the quarantine area must be accompanied with documentation issued by the appropriate regulatory official (Limited Permit or Certificate of Inspection) that specifies the following:
 - i. The shipper and shipment date.
 - ii. Identification of the grower location, orchard block where the cherries were produced, and date of harvest.
 - iii. Destination facility, including name and address.
 - iv. Attestation that the fruit has passed the appropriate float test and the date the test was conducted.
 - a. Processing Cherries – Self-attestation of industry standard float test provided by the party who conducted the float test.
 - b. Fresh Cherries – Attestation of enhanced float test provided by a regulatory official.

Appendix 1 – 2022 ECFE Program Recommended Pesticides for the ECFE Protocol

The following pesticides are recommended for use with the ECFE Protocol as of 2022.

Pesticides included in this list for use against ECFE meet the following criteria (PPQ, 2020):

- chemicals that are not or are not likely to be banned,
- chemicals with consistent published efficacy data for *Rhagoletis cerasi*, *R. indifferens*, or *R. cingulata*, in which no trial reports lower than 71% efficacy,
- chemicals listed as having “high” efficacy in the Cornell Pest Management Guidelines (Cornell Cooperative Extension, 2020).

This list is not a substitute for pesticide labeling. Always read and follow the product label before using any pesticide.

IRAC Group	Product	Rate	Active ingredient	EPA Reg. No.
1A	Sevin XLR Plus	2-3 qt/acre	Carbaryl	61842-37
1B	Imidan 70W	2.13 lb/acre, or 0.75 lb/100 gal	phosmet (not on sweet cherry)	10163-169
3A	Asana XL 0.66EC	4.8-14.5 fl oz/acre, or 2-5.8 fl oz/100 gal	esfenvalerate	59639-209
3A	Baythroid XL 1EC	2.4-2.8 fl oz/acre	Cyfluthrin	264-840
3A	Warrior II 2.08CS	1.28-2.56 fl oz/acre	lambda-cyhalothrin	100-1295
3A	Mustang MAXX	1.28-4.0 fl oz/acre	zeta-cypermethrin	279-3426
4A	Assail 30SG	5.3-8 oz/acre	acetamiprid	8033-36-70506
4A	Assail 70WP	2.3-3.4 oz/acre	acetamiprid	8033-23
5	Delegate 25WG	4.5-7 oz/acre	spinetoram	62719-541
5	Entrust 2SC	4-8 fl oz/acre, or 1.3-2.7 fl oz/100 gal	Spinosad	62719-621
5	Entrust 80WP	1.25-2.5 oz/acre, or 0.42-0.83 oz/100 gal	Spinosad	62719-282
5	GF-120NF	10-20 fl oz/acre	spinosad & bait	62719-359
28	Exirel	10-17 fl oz/acre	cyantraniliprole	279-9615

Appendix 2 – Approved Enhanced Float Method Protocol

The following “enhanced float method” is intended to increase the likelihood of detecting ECFE infestation when compared to the industry standard float test by: 1) increasing the quantity of fruit tested, and 2) applying best practices when conducting the float test. The enhanced float test must be conducted or supervised by a regulatory official. This differs from the “standard float test” (USDA AMS, 1993), which can be conducted using industry standard procedures without direct oversight.

Testing Interval

- An enhanced float test must be conducted no earlier than 5 days and no later than 1 day before the first harvest of the block.
- Approval of a block for harvest based on a float test will be valid for 14 days from the date of first harvest.
- If harvesting in a block lasts more than 14 days a second enhanced float test must occur within a 5-day window before the 15th day of harvest. The second test will be valid for the remainder of the harvest.

Sampling Procedure

- Orchard blocks 2 acres or less will require a sample of 4 lbs. Blocks over 2 acres will require a minimum of 2 lbs. per acre to be sampled.
- Testing may occur separately for each orchard block at the required sampling rate. An exception is if two or more blocks share a common border and are of the same cherry variety. Orchard blocks that share a common border and are of the same variety will be sampled and tested together, with the sample size computed from the total area of the combined blocks and with fruit sampled from each block in proportion to its size. A larval detection will apply to the entire grouping of orchard blocks included in the common sample.
- Sample from multiple trees throughout the area being harvested to produce a representative sample. Sample no more than 12 pieces of fruit from the same tree. Do not sample from adjacent trees and ensure sample includes trees located near block borders.

Float Test Procedure

- Divide the sampled fruit into 2 lbs. / 907-gram sub-samples. Each subsample must be tested separately.
- Thoroughly crush the cherries using a cherry crusher or apparatus that ensures no cherries in the subsample will remain uncrushed.
- Prepare a brown sugar or salt mixture containing 3.40 kgs / 7.5 lbs of brown sugar or 1.80 kgs / 0.90 lbs salt in 20 liters / 5.30 gallons of warm water. Add an anti-foaming agent following label instructions, if possible.
- When using brown sugar, the solution should be checked with a refractometer. A Brix reading of > 15° should be obtained to guarantee good larval floatation. Add brown sugar to raise the Brix value, if needed.

- Mix one sub-sample of crushed cherries in 4 liters / 1.06 gallons of brown sugar or salt mixture in a tub. The depth of the solution in the tub should be approximately 6-12 cm (2.5 - 5 inches).
- Let tub sit for 5 minutes before inspection. Cherries will sink and larvae will float. If surface is covered in foam allow additional time for the foam to clear before checking for larvae, a minimum of 10 minutes.
- Visually check surface of tub for floating larvae, stirring gently to loosen larvae. Inspection should last 5 minutes per tub if anti-foaming agent was used. If no anti-foaming agent was used, inspect surface for about 8 minutes.
- If a *Rhagoletis* larva is detected, the lot has “failed” the float test, and if no *Rhagoletis* larvae are detected, it has “passed”. Fruit produced in a block that has failed the enhanced float test will not be eligible for transport and sale outside of the quarantine area for the remainder of the season.

Appendix 3 – Post-harvest Handling Requirements for Processing

This section is only applicable to cherries for processing that are being sent to processing facilities in areas designated “high risk”.

Fruit processing is a mitigation that will destroy any fruit fly life stages present within fruit. Therefore, the major risk of ECFF spread from fruit processors is associated with mishandling of culled fruit, which may contain viable ECFF larvae. The primary safeguarding procedures involve ensuring all fruit delivered from the quarantine zone is either processed or properly disposed of via an approved method.

Post-Harvest Handling Requirements:

1. Transport
 - a. Fruit must be transported in an enclosed truck-trailer or in containers that are sealed.
 - b. Bins used for transport must be resistant to fruit spillage, achieved by one or more of the following:
 - i. Filling bins such that sufficient space (at least 6 inches) remains between the rim and the upper limit of loaded fruit.
 - ii. Use of a lid or other physical barrier.
 - iii. Fruit is submerged in water.
 - c. Fruit bins must be labeled in a way that clearly denotes fruit came from an orchard located in a quarantine zone.
 - d. Trailer door / tailgate must be kept closed when fruit is not being loaded.
2. Delivery at processing facility
 - a. At the point of delivery, the recipient must be made aware that fruit has originated in a quarantine zone. Fruit may only be delivered to a facility under a compliance agreement with the appropriate regulatory agency for processing quarantine fruit under the ECFF protocol.
 - b. During the unloading of harvested fruit any spilled fruit will be either returned to the harvested fruit for processing or treated as culled fruit / quarantine waste.
 - c. After unloading of fruit at the processing or refrigerating facility the truck trailer must be thoroughly inspected for any plant material, including spilled fruit. All plant material removed from the truck-trailer must be treated as culled fruit / quarantine waste.
3. Processing
 - a. Fruit processed from a quarantine zone should be isolated from non-quarantine fruit and processed separately so as to prevent comingling of quarantine and non-quarantine fruit. If quarantine fruit is not isolated, then all fruit and fruit waste from the processing facility should be treated as quarantine material when processed in the same run as the quarantine material.
 - b. Processing must result in a product that cannot contain viable ECFF eggs, larvae, or pupae. The end products produced by the processing facility must be listed on the processor’s compliance agreement.

4. Treatment of culled fruit, pomace, and other unprocessed fruit waste
 - a. Acceptable treatments for fruit waste are detailed in appendix 4 and 5 of this document.
 - b. The design and equipment of the selected treatment option must be approved prior to the arrival of quarantine fruit. Approval will be provided by the party administering the compliance agreement. APHIS-PPQ-S&T may provide input when the effectiveness of the design and equipment used for the treatment is considered questionable.
 - c. Waste fruit can be held on-site prior to disposal provided the following occur:
 - i. Waste bins are held on a paved surface at least 10 feet from soil.
 - ii. Waste bins are properly labeled, indicating they contain quarantine fruit.
 - d. Dumpsters or other storage containers which previously held quarantine fruit shall not be used for non-quarantine fruit unless they are thoroughly cleaned between uses.
 - e. Following heat, freezing, or submersion treatment, the waste can be handled at the discretion of the facility.

Appendix 4 – Requirements for the use of Field Spreading as a Disposal Method

Field spreading is a common, low-cost method for disposing of waste fruit. Field spreading is defined as the dumping of unprocessed cherries into the environment without prior application of an approved treatment or burial under more than 12 inches of substrate. This method carries significant risk of ECFF establishment should ECFF larvae be present in the unprocessed fruit waste. To mitigate this risk the following requirements must be followed:

1. Field spreading may only be conducted in areas deemed by USDA APHIS PPQ to be low risk.
2. Field spreading may not occur within or adjacent to cherry orchards.
3. Entities that wish to utilize field spreading as a disposal method must be under a compliance agreement which acknowledges their intent to dispose of unprocessed waste fruit via field spreading.
4. Fruit that is disposed of via field spreading must have passed either an enhanced float test (fresh cherries) or an industry standard float test (processing cherries) as a condition of its movement out of the quarantine area and prior to arrival and acceptance by the processor, packing house or other wholesale entity. Verification that the fruit has met these requirements will be present on the limited certificate or permit accompanying the fruit.
5. The entity conducting the field spreading agrees to facilitate the random sampling of waste fruit through a pre-disposal float test, to be conducted by the USDA or State Department of Agriculture.
6. The location(s) where field spreading occurred will be reported to the USDA to facilitate surveillance trapping for ECFF in the vicinity.
7. Fruit is disposed of in a manner that is in accordance with all local, state, and federal regulations.

Appendix 5 – Approved Disposal Options for Fruit Waste

The following treatment and disposal options are acceptable for disposal of fruit in high and low risk areas.

In low-risk areas the disposal options provided in this section are an alternative to field spreading (appendix 4). Processing facilities in low-risk areas can select any disposal option from this appendix or field spreading (appendix 4). Entities that dispose of small volumes of fresh cherry waste (less than 100 lbs per day) can use any legal disposal method, including standard landfill disposal. Entities which dispose of large volumes of fresh cherry waste (more than 100 lbs per day) should utilize a method provided in this appendix or field spreading according to appendix 4.

Any unprocessed fruit in high-risk areas must utilize one of the methods provided in this section without regard to the volume being disposed of. Field-spreading is never a disposal option for any waste in high-risk areas.

Report all treatment failures to APHIS or the relevant regulatory official overseeing the compliance agreement.

Option A: Deep burial

- a. Fruit is buried under no less than 12 inches of soil. Depth is to be measured from the top of the soil level in the area surrounding the pit/trench. Landfills generally meet these requirements.
- b. Sand and soil are acceptable substrates for deep burial. The burial area must be firmly packed and in a location not prone to erosion or other events which may disturb the buried content.
- c. Fruit may be added to a pit or trench. Such fruit should be covered with the required minimum 12 inches of soil with as little delay as possible.
- d. When practical and necessary, quarantine fruit can be disposed of as regular household garbage, provided that the fruit is placed in a double bagged plastic trash bag and the waste is destined for a landfill or destructive disposal (incineration, compacting, etc.).

Option B: Heat treatment – one of these methods:

1. Steam Heating

- a. Materials to be treated are held in a container with a lid. The lid should not form a tight seal with the container as pressure may build in the container.
- b. Steam is introduced into the container at a level below the midpoint of the container.
- c. Air temperature readings are taken at the surface layer of the fruit at the location furthest from the steam source.
- d. Once temperature readings surpass 55.1 °C / 132 °F allow for continued steam introduction for 1 hour. Temperatures should be maintained above 55.1 °C / 132 °F during the treatment period.

- e. Allow fruit to return to ambient temperature before removal of lid or other manipulation of treatment environment.
- 2. Submersion/immersion heating
 - a. Materials to be treated are held in a watertight container.
 - b. Container is not more than 80% full.
 - c. Water is added to the container such that contents are completely submerged.
 - d. An immersion type water heater (or multiple units) is added to the container.
 - e. The water is heated to 56 °C as determined by a temperature reading made at the surface from three separate locations on sides opposite the heating apparatus.
 - f. Once a temperature of at least 56 °C is obtained heating can be terminated.
 - g. Allow container to return to ambient temperature before draining water and other manipulation of fruit.
- 3. Incineration
 - a. The use of equipment to incinerate waste is acceptable provided the incineration reduces the waste to ash. Open air incineration practices are allowed.
 - b. Regulations related to safety and air quality may be applicable. The processor is responsible for ensuring incineration is done in a legal and environmentally compliant manner.

Option C: Submersion treatment

- a. Materials to be treated are held in a watertight container such as a plugged roll off dumpster or a large capacity tilt truck.
- b. Culled fruit is added to the container, not to exceed 90% of the containers volume.
- c. Water is added to the container such that contents are submerged.
- d. A lid is placed on the container, with a vent or other means which would allow air to escape.
- e. Container is placed on paved surface at least 10 feet from bare ground/soil.
- f. Container remains on premise, covered, for a minimum of 8 days.
- g. Fruit from separate shipments can be combined in the same container during the harvest period. The container should be “topped off” with water to the level of the accumulated content whenever fruit is added. The 8-day duration begins after the final addition of fruit.
- h. Contents can be disposed of as regular waste at the discretion of the operator following the 8-day submersion period.

Option D: Return to quarantine zone

Fruit can be returned to the quarantine zone provided it is transported in a manner which eliminates the possibility of fruit being spilled or otherwise lost during transport. Fruit must be disposed of upon arrival and the disposal must take place entirely within the quarantine area.

- a. Fruit is loaded in a truck or conveyance which eliminates the possibility that fruit will be spilled. For open air transport (I.e., in a dump truck), the fruit should be loaded no higher than 1 foot below the lowest edge of the container.

- b. The shipping container should have no openings on the sides or bottom of the container that may allow fruit parts or fly larvae to escape.
- c. Once fruit has entered the quarantine area it can be disposed of via field spreading, dumping at a landfill site or other legal means, provided the fruit will remain in the quarantine area thereafter.
- d. After dumping, the container used to transport the fruit should be thoroughly cleaned, so as to remove any fruit remnants, emerged larvae, or pupae. The cleaning must occur in the quarantine area.

Option E: Grinding and discharge into a sanitary sewer

Culled cherries and other cherry waste from the processing facility can be disposed of via grinding and discharge into a sanitary sewer. The following requirements apply:

- a. Grinding can be accomplished by an industrial grinder. The model of the industrial grinder should be provided to APHIS-PPQ and listed on the compliance agreement.
- b. Grinding and discharging is allowed into an approved sewage system. An approved sewage system is designed and operated in such a way as to preclude the discharge of sewage effluents onto land surfaces or into lagoons or other stationary waters, is adequate to prevent the dissemination of plant pests and is certified by an appropriate government official as complying with the applicable laws for environmental protection.
- c. Discharge of solids and materials with high biochemical oxygen demand may result in additional charges by the sewage/wastewater provider. The processor should confirm that they are aware of the potential costs associated with discharge of fruit waste into the sewer system.
- d. Processors should provide documentation that the particle size and volume of waste can be accommodated by the sewer system and that the wastewater provider is aware of the processors intended use.

Option F: Freezing

Entire shipments from quarantine areas may be frozen prior to processing or the culled cherries and other cherry waste may be separated from the processed fruit and frozen. The following requirements apply:

- a. Processors who wish to utilize the freezing option must demonstrate in their compliance agreement that their equipment is able to obtain temperatures of 0° F (-17.77° C) or lower.
- b. The fruit must be held in a freezer set at 0° F (-17.77° C) or below. The freezer should obtain the temperature of 0° F (-17.77° C) or below prior to the addition of fruit. This will ensure that freezing occurs rapidly and persists throughout the treatment period.

- c. Fruit temperatures at 24 hours must be at or below 2° F (-16.67° C). Temperatures should be taken from the interior of the commodity. If this requirement is met, continue freezing for an additional 48 hours.
- d. If fruit temperatures at 24 hours are above 2° F (-16.67° C) but below 20° F (-6.66° C) continue treatment for an additional 72 hours.
- e. For all treatment durations, confirm at the conclusion of treatment that the commodity temperature is below 20° F (-6.66° C).
- f. If fruit temperature at 24 hours, treatment conclusion, or at any point during the treatment is above 20° F (-6.66° C) abort treatment and utilize a different treatment option such as deep burial.

References

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