Berry and small fruit postharvest handling

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Berry and small fruit storage and handling

“How not to lose the product of all your hard work”

• Fresh market and processing varieties
• Berry and small fruit postharvest research at WARC
Berries and small fruits

• High potential price and high potential loss
• Plan in advance!

Fresh Market Fruit
• Perishable
• Short shelf life (a few days to a week)
• Careful handling required

Processing Fruit
• The faster processing can occur, the higher quality the product will be!
<table>
<thead>
<tr>
<th>Fresh market varieties</th>
<th>Processing varieties</th>
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<tbody>
<tr>
<td>• Haskaps</td>
<td>• Haskaps</td>
</tr>
<tr>
<td>• Serviceberries*</td>
<td>• Serviceberries</td>
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<tr>
<td>• Sour cherries*</td>
<td>• Sour cherries</td>
</tr>
<tr>
<td>* Uncertain consumer acceptance</td>
<td>• Currants</td>
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<tr>
<td></td>
<td>• Elderberries</td>
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Fresh market: minimize fruit handling after harvest

• Pick (or immediately transfer) into the container the fruit will be sold in
  • Soft fruit / berries are easily damaged by handling
• Sort out the bad ones as they go into containers
• Don’t wash the fruit!
Fresh market: packaging

- Haskaps can release juice after storage
- Absorbent cloth for inside clamshells
- Serviceberries are drier and probably don’t need a “diaper”

Images from: Webstaurant Store
Fresh market storage: slow down respiration rate by cooling the fruit

- Fruit age quickly once off the plant
  - Fruit are stored CO$_2$, sunlight, and water
  - Once off the plant, fruit are using energy (stored carbon) for maintenance
  - The slower the rate energy is needed, the better

- Cooling the fruit slows the respiration rate / ageing process

- Target temp: 33 – 34 F
Cold storage option - CoolBots

Harnesses the cooling power of an off-the-shelf air conditioner to turn a well-insulated room into a cooler!
Fresh market storage: water loss

• Haskaps: 83% water (healwithfood.org*)
  *questionable source
• Serviceberries and sour cherries: unknown water percentage

• Water loss marketing impacts:
  • Saleable weight loss
  • Fresh appearance loss
    • shriveling, less glossy

• Smaller fruit have a higher surface to volume ratio – water loss is even faster in a berry than a larger fruit

Monitor relative humidity and temperature!
Fresh market storage: preventing water loss

• High relative humidity
  *For small-scale growers: most household refrigerators do not have mechanisms for high relative humidity
  • Where possible, increase humidity settings, and decrease fan speed
  • Wet sponge or pan of water for increasing humidity
  • In a secondary container that allows some gas exchange but keeps humidity higher
  • Still need air movement to reduce molds!

• Clamshells help provide secondary barrier
• Target: 90-95% relative humidity
• Sell fast!
Fresh market: teach your customers

• Don’t wash the fruit until right before eating
• Check the fruit for soft or damaged berries upon arriving home
• Products for in-home produce storage*:
  Rubbermaid Freshworks
• Manage expectations – serviceberries and sour cherries are atypical – but good!
• A happy customer is a returning customer!

* We are not condoning a specific product; this is just an example
Processing berries and small fruit -- freezing

- Fruit produce heat as they respire
- "Pre-cool" the fruit by harvesting at cool times of the day
- Move fruit into storage as quickly as possible to encourage rapid cooling
- Clean fruit before freezing!
- Freeze fruit in thin layers
- Resources for contracting faster freezing?

Commercial blast chiller, $20,000...
Fits 18 full size sheets
Processing berries and small fruit

- Value added products
  - Wines
  - Jams and jellies
  - Dried

- Upcoming presentation on marketing and products...
Summary

1. Plan your fruit storage and marketing in advance
2. Cool fruit quickly
3. Maintain high relative humidity but allow airflow
4. Sell or process fruit quickly
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research plans

1) Assess treatments to increase fresh market storage window

• Test an OMRI approved treatment to keep haskaps berries on plants longer

• Research haskaps ripening mechanisms – is there a way to alter how they ripen to increase their storage duration?

• How long can serviceberries be stored for fresh market?
2) determine consumer acceptance for fresh market **sour cherries, haskaps, and serviceberries**, relative to other fruits available at similar seasonal time frame

• Dr. Wan-Yuan Kuo, MSU, Food Science
3) Determine fruit postharvest characteristics for value-added products
   • Juice characteristics for wine-making (acidity and Brix; sugar and organic acid composition)
   • Phenolic levels; composition?
     • MSU grad student has been working on this already
   • Aroma profiles
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research plans

4) tabulating and reporting expected labor costs
- Care and maintenance
- Harvest:
  - hand-harvested
  - mechanized – Sawzall and kiddy pool
  - others?
Thank you!

Questions?

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