

2012 Report:

A Postharvest Kit and Training for Small Acreage Raspberry and Blackberry Growers: Phase 1: beta testing of kit and training

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Category: Production research

Rationale:

The components needed for postharvest cooling and storage of blackberries and raspberries (caneberries) involve accurate temperature measurement, good packaging, effective and rapid cooling, cold storage, and good transportation systems. For small growers, a lack of resources combined with the current loss of extension specialists become barriers to producing a quality product and competition for larger market shares. Lack of proper cooling and handling, leading to leak and fungal growth, are the biggest causes of loss for highly perishable blackberries and raspberries (Mitcham et al., 1998 <http://postharvest.ucdavis.edu/PFfruits/Bushberries/>).

The most commonly asked questions from growers are about acceptable firmness, color, pack grades, cooling and storage, and marketing displays. Fresh market caneberries are usually hand picked and packaged in the field then field heat is removed. Knowing the amount of field heat within the fruit load plus knowing how long it will take to remove field heat will give growers simple and effective tools to calculate time needed in room or forced air cooling and to determine how fruit should be moved to markets.

An area of increasing concern is food safety and liability during storage and handling. A checklist of things to look for will aid small growers in compliance for food safety principles.

Objectives:

We propose to develop a kit that combines easy to use components with simple training videos and hands on training. The idea is that small growers and/or agents can easily and effectively use these tools to assimilate and use principals and practices of cooling and handling and postharvest quality. We will test this kit in two states and if successful, we will expand the project to other states.

Procedure:

Hands on training will consist of meeting with growers and doing a demonstration with kit components. In addition, a video, to be posted on the NCSU blackberry and raspberry portal (<http://www.ncsu.edu/enterprises/blackberries-raspberries>), will show how to test fruit on the plants for firmness, and how to do each of the major steps needed for postharvest life.

If this phase of the proposed project is successful, we plan to refine the contents of the kit, fine tune the video and handouts, and expand training to other regions (Phase 2). In Phase 2 we would use the kit/video/training as part of an agent training at the Southern Region Small Fruit Consortium. And to reach a wider audience, we would like present the project at a future NARBA meeting. Phase 2 would need additional funding.

Deliverables:

The following kit components were developed. Kit was demonstrated to growers at the North Carolina Strawberry Expo (Charlotte, NC) and at the SE Vegetable Growers Expo (Myrtle Beach, SC), and will be presented at the NC tomato growers meeting in Asheville, NC.

Kit:

1. infrared thermometer that can be used to check surface temperatures at the inside of a pallet of fruit
2. Digital probe type thermometer to measure internal temperatures of fruit
3. Large digital readout thermometer/relative humidity to place near cooler door
4. portable digital refractometer to measure sweetness of fruits
5. anemometer to measure air flow, humidity in refrigerated storage
6. pocket size scale with calibration weight (to 600 g or 1.5 lb)
7. lens cloths and transfer pipets to clean refractometer and place juice on lens
8. disposable wipes to remove soil, juice from hands or equipment
9. Plastic insulated ice chest equipped with refreezable ice packs to carry above easily
10. Laminated card with important steps for harvest, handling, cooling, storage, transport, check list for food safety details
11. Laminated sheet with photos of fruit with problems (injured, white drupelet etc)
12. master with ½ and 1 pint vented clamshells to demonstrate correct air flow, smoothness of packaging, and pack, plus a sample of other types of packs such as splint boxes, pulp cups

Attendance at NC strawberry growers and Vegetable expo: about 50 and 30 people, respectively. The kit, fan, and trailer were used to create a special workshop on cooling, economics of cooling, and using cooling as a way to brand direct marketed fruit.

Other equipment: We found that a regular house fan simply was not usable to effectively cool flats of berries. Therefore, we updated and adapted a forced air cooler fan and placed it on wheels to make it easier for demonstration and for positioning in a cold room. Photos and instructions will be finished by Jan 1, 2013.

Also, a separate project tangential to this was development of the Pack N Cool, an insulated trailer that can be hooked behind a van or truck, used to transport produce to direct markets, and plugged into 110V to maintain coldness. We decided that the fan and kits needed to be part of the trailer as a full demo project for growers and extension personnel. Photos and instructions can be found at:

<http://plantsforhumanhealth.ncsu.edu/>

Video: We did a trial video in June 2012 but it still needs modification for better information and ease of learning for growers:

1. When to pick, how to pick, how to judge firmness
2. USDA grading standards-injured fruit, other defects to watch for
3. Packing berries into clamshell or other container
4. Transport to cooler
5. Cooling systems (room and forced air)
6. Monitoring fruit, cooler, transportation for temperature, humidity, air flow
7. General cleanliness and food safety in field and packing areas
8. Display for sales

Future plans: Kits can be made up for sale to growers, for a cost of about \$250 each (most of cost is in the refractometer and anemometers), perhaps put for sale at grower meetings. One of the best aspects of the kit is that most materials can be found at Walmart, Harbor Freight Tools, or Amazon. QA technologies was an alternate (higher priced) source. One of the biggest challenges we found, besides emphasizing cooling and cleanliness, was the huge need for a simple means to cool fruit quickly. We have already started work on another style of cooling system for small loads of fruit (four cartons), and plan to continue to work out details of the Pack N Cool trailer to determine cooling times and maintenance of cooling temperatures.