



Harvest-to-Sale Vegetable Handling

Quality produce
from the field to the table

Laura Frerichs, Loon Organics
Lisa Baker, Bakers' Acres
Joan Olson, Prairie Drifter Farm



This presentation is designed to help growers understand how to get produce from the field to the point of sale at the highest quality, by attending to good handling practices along the whole chain: harvest, cleaning, cooling (hydro- or air), storage, packaging, transportation, display.



Laura Frerichs with husband, Adam Cullip, co-own and operate Loon Organics, a 40-acre certified organic vegetable farm in Hutchinson, MN. Laura and Adam worked on over five different vegetable and fruit farms across the country before starting their own operation in 2005. Loon Organics grows vegetables and herbs for a 170- member CSA, local retailers, restaurants and the Mill City Farmers Market in Minneapolis.



Lisa Baker manages Bakers' Acres, LLC, a 15-acre farm in Avon, MN. Her parents and partner Travis live nearby and help with a variety of roles and responsibilities at the farm. Lisa bought the land in 2010 and has been slowly growing the farm. She and her farm photos in this presentation represent a small, beginning farmer operation.



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Goal: Quality Produce



Quality produce is important for every channel farmers sell through: both direct-to-consumer markets (e.g., CSAs, farmers' markets) and institutional/wholesale markets (e.g., distributors, restaurants, institutions).

Goal: Quality Produce



Quality produce in a CSA share

Why Improve Post-Harvest Handling?



Improving post-harvest handling will improve your food safety and efficiency on the farm, which will lead to high-quality and long-lasting produce, which leads to customer satisfaction and building of your business!

Respiration rates and ways to slow deterioration.

RESPIRATION

Now we're going to cover some general information that you should have in mind before you even start thinking about particular post-harvest handling procedures, and the first of these is respiration.

Respiration Categories

Know each crop's respiration rate to help maintain highest quality and longest shelf-life of produce

High

Sweet corn
Asparagus
Broccoli
Lettuce
Spinach
Leafy greens
Peas
Green onions
Kale

Moderate/Low

Need Refrigeration

Bulk roots
Apples
Cabbage
Celery
Garlic and onions after
curing process

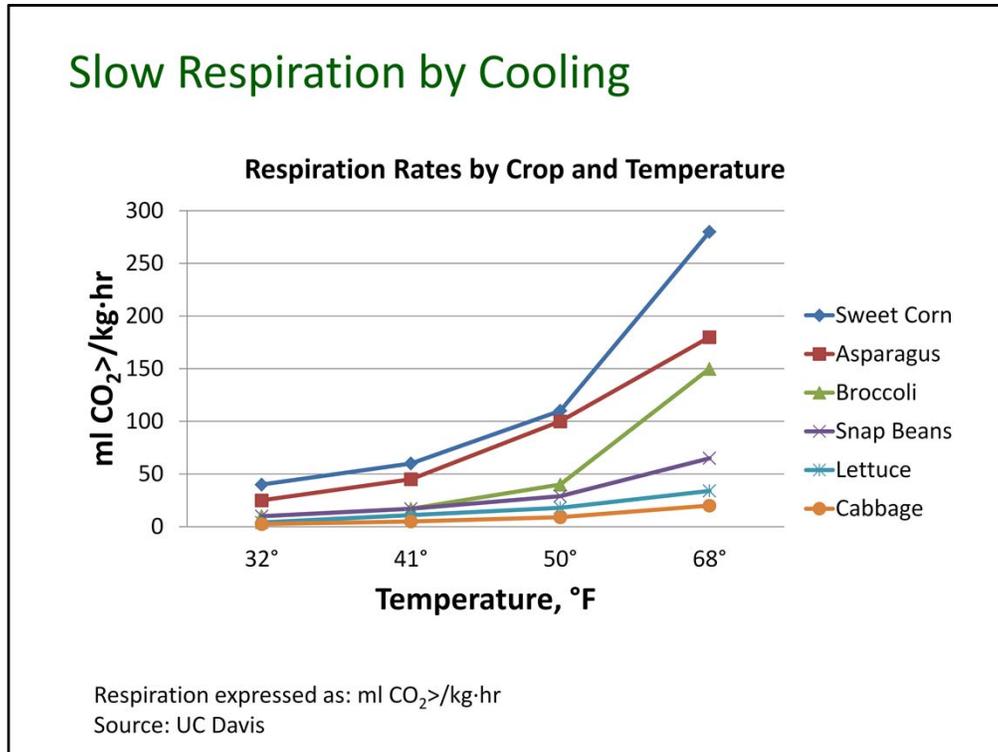
Sensitive to Chilling Injury

Green beans
Zucchini/Summer squash
Peppers
Cucumbers
Melons
Eggplant
Winter squash
Basil
Tomatoes
Okra
Seed garlic

After produce is harvested, it takes in oxygen and gives off water vapor, heat, and carbon dioxide during storage. This process is called "respiration." The result is deterioration and loss of nutritional value, flavor, salable weight, and overall quality.

Each type of produce can be categorized into high, moderate, or low respirators, which dictates how you should harvest and handle each item for maximum quality and shelf life. It's important to keep in mind that shelf life begins the moment produce is harvested.

Slow Respiration by Cooling



You can usually help slow the rate of respiration by controlling the temperature and humidity of the product, starting at harvest.

Cooling produce typically slows the respiration process. For high respirator crops, as the temp of the produce increases by just a few degrees, respiration rates increase exponentially.

Summary: Increased product temperature --> Increased respiration rate --> Increased deterioration rate

Note that sweet corn is a high respirator. Farmers often don't think of sweet corn as being so perishable.

High Respiration Rate = Highly Perishable

Harvest Early When Cool Outside

Cooler air temp outside = cooler internal temp of produce



High-respiration crops are the most perishable, and field heat needs to be removed from them as quickly as possible; they will deteriorate or lose quality if not cooled rapidly.

Start by harvesting high-respiration crops in the cool of the day if possible. A cooler air temp outside means the internal temp of the produce is also cooler (as opposed to the internal temp at midday). It takes less energy to cool produce if you start out with it already as cool as possible at the time of harvest.

Hydro-Cool or Ice

To cool internal temp of produce quickly



Many high-respirators will benefit from hydro-cooling or icing to rapidly drop their core temperature.

Hydro-cool means using water that is colder than the produce to draw out the internal heat. Well water in Minnesota is typically 40-50 degrees. Top icing is common for wholesale channels in warmer climates where ground water is as warm as 80 degrees in southern Florida and Texas.

On the Loon Organics farm, we don't have an ice machine so we use water for cooling. In the process of cooling in water we are also cleaning the produce, removing dirt and bugs – but the main reason for the water is the cooling.

Maintain Cold Chain & Humidity

Move to cool storage immediately and prevent moisture loss



After high-respirators are cooled, they need to be refrigerated.

Coolers use circulating cool air to cool product, but this can also dehydrate and cause wilting/limpness. Use covered bins, icing, plastic liners, or pack produce wet to keep humidity in. We always cover leafy greens and berries in plastic to prevent water loss. For shorter term storage (a few hours), sturdier produce like carrots can handle being exposed to air.

In summary, crops with a high respiration rate should be harvested cool and stored cold with adequate packaging to prevent moisture loss and have maximum shelf life.

Moderate/Low Respiration Rate

Less urgency with harvest, but still need to store some cool



Moderate respirators aren't quite as sensitive, but still need to be taken care of – they don't hold quality if they are left too warm. Many need some cool storage.

Low respiration crops are the easiest and most forgiving in terms of harvesting. For some, cool storage is ideal, but they are more tolerant of less-ideal conditions and can sometimes stay in good condition for weeks to months outside of refrigeration.

For example, cabbage is a low respiration crop; there is less urgency with harvest. Loon Organics uses an open wagon for harvest of cabbage. Crops still need to cool down and keep in moisture for long-term (months) storage.

Moderate/Low Respirators that Need Refrigeration



- Bulk roots (e.g., carrots, beets, turnips, parsnips, celeriac), potatoes
- Apples, cabbage, celery
- Garlic and onions after curing process (except seed garlic for planting)

Bulk roots, apples, cabbage, celery, garlic and onions are moderate/low respirators that need refrigeration.

See Umass Handout on “Harvest and Post-Harvest Needs of Fall/Winter Storage Crops” for exact harvest, curing, and temperature requirements for many of the storage crops.

Moderate/Low Respirators that are Sensitive to Chilling from Refrigeration

- Green Beans
- Zucchini/Summer Squash
- Peppers
- Cucumbers
- Melons
- Eggplant
- Winter Squash
- Basil
- Tomatoes
- Okra



The other category of low/moderate respirators are crops that are sensitive to cold storage temperatures, especially for long periods of time (over 24 hours and beyond).

At Bakers' Acres, we harvest these crops in the evening before delivery or on delivery day and store them on shelves designated to produce in the pack shed. Sometimes they're stored in crates or covered bins; other times they are packed into waxed boxes with liners to help retain moisture.

We will talk more about how to handle storage of these products later on in the presentation.

Greentop Roots vs. Bulk Roots

Very different respiration rates



Greens cause high respiration rate



Remove greens for longer storage

Some respiration nuances to be aware of: If storing with tops, root crops will perish faster. If you need to store crop for a longer period of time, store them topped (with tops removed) and in plastic.

Harvest tips, ways to slow deterioration, and transportation to pack shed

HARVEST

During harvest, there are things you can do before produce even gets to the pack shed to help maintain quality. We're going to talk about a few tips we use on our farms to start with the highest quality product, slow deterioration in the field, efficiencies, and transportation from the field.

Timing of Harvest

1. Time of day

- Ambient temperature affects internal temp of produce and respiration rate
- Harvest nightshades, cucurbits, and snap beans dry (no dew) to prevent fungal disease

2. Ripeness of produce

- Peak quality & maturity (Broccoli: tight beads, no yellowing; watermelons at maturity)
- Harvest stages (tomatoes)



Start with the highest quality product by harvesting at the right time – both time of day and maturity.

While high respirators should be harvested in the cool of the day, others should be harvested later in the day after the possibility of dew/moisture has evaporated and produce is dry to prevent fungal disease.

The peak quality varies depending on the crop's ripeness as well. Broccoli should be harvested when its beads are tight and no yellowing has started. Some crops won't ripen further after being picked (ex: watermelons, winter squash). Important to pick these crops at maturity for optimum flavor and texture.

Tomatoes on the other hand, continue to ripen after harvest and are categorized into "harvest stages". Harvesting stages may be different depending on the buyer for the product. Tomatoes going to a distributor should be less ripe than what you may sell at farmers' market.

Harvest Tips

Tricks that make post-harvest handling easier or result in better quality produce

- Harvest date
- Item
- Field name
- Customer
- Quantity needed
- Quantity actually harvested
- Initials of employee responsible

Harvest Date:	FIELD	CUSTOMER	QTY	Act	Initials
10/7-10					
① CSA Mls ② CSA - Cabot's MN ③ Immigrant Bkts					
Tomato - Large	NORTH	CSA			✓
Hokulei Tomatoes	NORTH	CSA	53		✓
Onions Rutabaga	South	CSA			✓
Potatoes	South	Onion MN			✓
Eggplant/Peppers	NORTH	CSA			✓
Salad Mix Spinach	North South	Onion MN CSA	25#		Janet Emily
Onions Scallions	South	Onion MN			✓
Baby Kale Herb Lettuce	Onion MN North South	CSA			Kelly Lisa
Bunch Kale Bok Choi	North	CSA			✓ JJ
White Sq. Choke	North	CSA			✓ TRAV
Cukes Kohlrabi	South	CSA			✓ Kelly
Bill	South	CSA			✓

The harvest board is a helpful tool on both Loon Organics & Bakers' Acres farms. Date, what you're harvesting, which field, what actually came out of the field, any notes – then take a photo of the board at the end of the day and that becomes your daily documentation of your procedures for organic certification, or GAP certification, or for your own recordkeeping of yields.

Harvest Tips

Tricks that make post-harvest handling easier or result in better quality produce



Leave as much as you can in the field – leaves, roots, non-saleable (e.g. “topped”) parts. Clean product can be field packed to save time. Keep crop clean by not letting it touch the ground and cutting with a clean knife.

Harvesting some crops in small buckets helps you move faster through the row.

Keep bunches under arm to minimize trips to tote.

Count rubberbands before beginning harvest so you don’t have to shuffle harvested produce to count after bundles are stacked in a crate.

Bundle rubberbanded/twist-tie items in the field if you can – either as you move with a crate, or on a trailer like Bakers’ Acres does with rhubarb. The result is less handling/opportunities for bruising/breaking later, and, rhubarb leaves are easily transported to the compost pile.

Harvesting heavy things directly into bins moved with a tractor is easier on workers’ bodies.

Wearing an apron when harvesting wet greens or washing produce is more comfortable than getting work clothes wet.

Ways to Slow Deterioration

In the field, during and immediately after harvest

- Shaded areas, carts, wagons
- Move produce to the pack shed frequently
- Covered bins, especially for greens
- Hydro-cooling in the field



Even when you're harvesting at the cooler time of day, take additional steps to protect produce quality. Find ways to use shade in the field, or use bins with lids to keep sun off of the harvested produce. If you are harvesting in the heat of the day or on a warm, humid morning – get produce back to the pack shed for cooling as soon as possible, or bring water out to the field for hydro-cooling.

Transport from Field to Pack Shed



Wagon – golf cart – trailer – tractor. Ideally, on a warm day you should have shade over the produce, especially for longer transport distance from field to pack shed. Covering produce to keep off dust or bird droppings is another good practice.

Cleaning produce, hydro-cooling and air cooling.

CLEANING & COOLING

As you can see, good post-harvest handling practices actually begin in the field. Next, we'll talk about cleaning and cooling produce for storage and distribution.

Cleaning

- Wash tubs
- Spray hose
- Pressure wash roots (not greens)
- Brush washer
- Barrel washer



Photo courtesy of Grindstone Farm.

These slides show the process of cleaning (always with water), and cooling is a by-product of the cleaning process. When you put crates in water, use clean crates that have not been on the ground. A salad spinner removes water from greens after washing. A pressure washer can be used to clean the root part of root crops, not the greens. More mechanized cleaning aids: Brush Washer for cucumbers, peppers, melons, squash, potatoes and some root crops. Root Washer (barrel washer) for bulk root crops.

Brush washer = \$1200 to \$1500 for just the basic washer. Add sorting rack, loading rack, extra brushes, \$3200. About \$4000 with roller table.

Barrel washer = about \$3000; also there are ways to buy pieces and put it together rather than buying the whole thing.

Pressure washer = about \$500 to \$600.

Hydro-Cooling & Air-Cooling

- Hydro-cooling is the FAST way to drop temp
- Cooler will then keep it cool



Dropping the core temperature of the produce as rapidly as possible adds a lot of shelf life. Hydro-cooling is a very effective way of dropping that core temperature. In the broccoli photo, we are hydro-cooling to drop core temp of product since we don't have an ice machine. Larger vegetable operations would use ice to drop core temps, and even field pack and ice in the field.

Most coolers are considered cooling rooms, refrigerated storage units that will take a long time to get field heat out and to cool high and moderate respirator crops. Coolers work best when cool product goes in and they will keep it cool. A cooler is an indispensable tool for produce growers to maintain quality.

This cooler at Bakers' Acres cost \$2700 and we've installed a simple solar light in it.

Resource Sheet: Cooling Resources

Green Beans at Loon Organics

- Harvest dry to prevent fungal disease
- Wash to clean and cool
- Package dry for no quality loss



Some crops are handled differently on different farms, both with good end results. At Loon Organics, beans are harvested dry, washed to clean and cool, dried, then packed into individual bags for CSA shares or 25# into a 1 1/9 bushel box. They are stored for a short time in the cooler, near the front where its warmer. Chilling injury can happen if stored below 40 degrees for more than a few hours.

Pack shed evolution, drainage, washable surfaces, and equipment.

PACKING AREA INFRASTRUCTURE

Pack shed evolution, drainage, washable surfaces, and equipment.

Pack Shed Progression

As farms grow and evolve,
so do their pack sheds.



Outside, covered lean-to



Concrete with better drainage

Packshed progression:

Before Prairie Drifter Farm moved to their current farm and were renting land, they started with a trailer for supply and tool storage, pop-up tent for shade in the field, stacked pallets to keep harvest totes and wash tubs off the ground, and portable screen spray tables for spraying off and drying produce.

After buying property, Loon Organics started out their packing area with a lean-to against the barn, then gradually made improvements. The space had concrete floors, sheet steel on barn walls, and a heavy duty lean too. Three season low-cost packshed that also meets food safety needs.

One of their most important improvements they wanted to make was drainage control (where is all the water going to go?).

Drainage

Divert water out of pack shed and fields



Good drainage in the pack shed is important for food safety. Water pooling in the packing area can harbor & transmit pathogens – foot traffic, wheels. That was the cause of an illness outbreak associated with melons.

Slanted concrete in pack shed lean-to directs water into a wooden gutter that goes into a drain at the end of the pack shed. From that drain, drainage tile runs underground to a wetland/wooded area. The wooden frame around the drain is exactly the size of a square-headed shovel that is used to scoop out debris and mud in the drain.

Washable Surfaces



Washable surfaces make packing clean produce easy. Sanitize surfaces that come in contact with produce. Wood can harbor pathogens.

Loon Organics has cleanable steel sheeting on walls behind the wash table, and the wash table itself is cleanable metal. The wash tubs can be emptied and cleaned. The host hook keeps the hose end clean by keeping it from falling out of the tub onto the floor.

At Bakers' Acres, a stainless steel sink is used for washing early and late season greens indoors. We use a metal spray table as well.

Indoor Pack Room

Pros

- Concrete floor
- Walls for food safety
- Warm air, water

Cons

- Drainage needs to be converted to daylight, not septic
- Small
- Cooler access is through two doorways across the barn and gravel floor



The pack room at Bakers' Acres started as a small enclosed room for food safety with concrete and heated water. The walls have since been covered. The drawback here is that water drains into the septic and needs to be rerouted to the fields not in production, we quickly outgrew the space, and the cooler is across the barn.

All Farms Need: Hand washing sink



Photo credit: Michele Shermann

- Proper hand washing
- Single-use towels
- Bathroom facilities
- Not working when ill
- Training

Proper hand washing technique is important for both workers and farmers; there are resources available for training. Use signage to remind workers of proper hand washing and other sanitation procedures, and to remind them not to wash hands in veggie-washing sink.

Best to locate sink where farm manager can monitor hand washing.

Single-use towels prevent germs being spread through a re-used towel.

Bathroom facilities need to be located within $\frac{1}{4}$ mile of the fields.

No one should work with food when they are ill – including you!

Pack Shed Ease

Carts, pallet jacks, hand carts, fork lifts



Minimize lifting and maximize efficiency with wheels! This usually requires concrete floor—another very worthy investment.

Quality and buyer preference.

SORTING & GRADING

Sorting and grading is something you are constantly doing in different places at different times; you're always checking for blemishes, rot, etc. during harvest and post-harvest.

Sorting & Grading

Sort tomatoes for quality

Grade A: no cracks or blemishes, not misshapen, similar variety & medium size



Cull tomatoes with open cracks



Canning tomatoes



CSA quality? Your call.

Wholesale usually wants Grade A – very uniform. Some institutional markets may accept less uniformity if their emphasis is on taste, flavor, quality, and/or using product for processing. (Lower grade may mean lower price for farmer). Talk to your buyer about their preferences.

Loon Organics sorts for Grade A tomatoes, culls those with open cracks, and sorts tomatoes suitable for canning customers. We only put top quality tomatoes in CSA boxes, unless maybe during the first tomato harvest of the year and we don't have quite enough to fill all of the boxes.

Resource: USDA AMS grading, with visuals, and example inspection certificate for all the Grades of Produce.

QUALITY: Keep Open Cracks on the Farm

Cracks expose fruit to potential pathogens in soil and water



Open cracks can be a route for pathogens to enter the produce. You can't wash off any contamination once it's internal. Tomatoes and melons are now both considered "potentially hazardous." Cracked produce are a food safety risk.

Tip: Use soft gloves when harvesting fragile or prickly produce.

Pack size, packaging, process.

PACKING & PACKAGING

There is a variety of acceptable packing and packaging practices. How you pack and package your produce varies depending on the crop and the customer. Pack sizes, materials, and grading should fit your buyer's needs.

Packaging Materials

- Plastic clamshells
- Bio-degradable plastic bags
- Cartons
- Waxed boxes, box sizes
- Waxed freezer /butcher paper
- Box liners
- Twist-ties
- Rubberbands



It's helpful to start with an efficient layout in the pack shed where you have your boxes, butcher paper, markers, labels, scale – all the things you need for packing close at hand.

There is a wide variety of packaging materials used in the industry: Plastic clamshell, waxed boxes, twist-ties, etc. Common practices: Pint clamshells for cherry tomatoes, ½ bushel boxes for beans, one-layer tomato boxes for heirlooms, 1 1/19 bushel box for cucumbers.

Waxed Butcher Paper Over Top of Product

Keep the produce clean, keep moisture in



Waxed paper on the bottom and/or top of product in boxes helps to keep the produce clean and also to hold in moisture and reduce wilting. Note: waxed boxes have some insulating properties; if you put cool produce from the cooler into a waxed box, the box will keep it cooler, but the reverse is also true – warm produce put into waxed boxes will stay warmer (which is bad for shelf life).

Wholesale

Distributors, restaurants, farm-to-school

- Selling to another buyer or for processing
- Priced by weight or quantity
- Pack in bulk or multiple bunches
- Follow standards for bunch and pack sizes



For wholesale, distributors that are re-selling to retail outlets may have different expectations for grading and packaging compared to farm-to-school and restaurants that are processing produce and may tolerate looser grading. Produce is packed in bulk or in multiple bunches. Refer to USDA Handbook 66 for standards and Penn State Produce Packing Guidelines listed on your Resource Page.

Retail

Food co-ops, farmers' markets

- Selling to a consumer, an eater
- What do end consumers like?
- Small store = you help with packaging, display
- Branded packaging helps build loyal customers



For retail sales, you are either selling directly to the eater at a farmers' market, or to a co-op that will sell to the end-consumer. If selling to a smaller grocery store or co-op, you may need to do the retail packaging – putting produce in the bags or boxes preferred by consumers, putting on the twist-ties on bunches, etc. Always talk to the co-op buyer about their preferences for packaging.

CSAs

- Direct sale goal is to provide equal-to or better-than value from a store
- Box size
- Reusing packaging
- Minimize damage to produce
- Beauty!



Loon Organics



Bakers' Acres

For CSAs, box size varies; listen to feedback from customers on appropriate quantities. Many CSAs use $\frac{3}{4}$ bushel boxes. Some start with $\frac{1}{2}$ bushel or $\frac{5}{9}$ bushel and increase to $\frac{3}{4}$ toward the middle of the season.

Consider food safety when re-using boxes or crates. Re-use is good in terms of conserving resources. You can use a plastic liner inside re-used boxes.

Make sure that you are packing CSA boxes to minimize damage to produce; put heaviest things on the bottom.

The aesthetics of the boxes are also important – you want people to say “Wow!” when they open their box.

Packing: Same Quality, Different Packaging

Wholesale



Retail



CSA



Consumers are used to a certain level of quality in their grocery store's produce section. Your farm can easily surpass that with good post-harvest handling practices, grading, and sorting. Buyer preference determines packaging for different products in different markets, but good quality for any marketing channel means returning business and high retention rates. Notice the differences for broccoli and lettuce.

Temperature, location, humidity.

STORAGE

Good storage practices including temperature, location, humidity, curing, and length of time in storage help maintain produce quality from your farm both short-term and long-term.

Cooler Storage

- Temperature
- Respiration rate
- Cover with plastic, in covered crates, or in boxes to hold in moisture
- Be mindful of ethylene sensitivity and exposure



In coolers, cover highly perishable, high respirators with plastic before going into the cooler – reduces exposure to the air, keeps vegetables crisp.

Ethylene is a gas caused by ripening produce, which can accelerate decomposing / ripening of other nearby crops. Beneficial/detrimental. Inside greenhouses, cold storage rooms, and transportation vehicles, ethylene can accumulate to active levels. To reduce exposure: use ventilation and store at the lowest temperature possible (without freezing...e.g., carrots freeze at 29 degrees), minimize time before consumption.

All leafy greens are sensitive to ethylene in the post-harvest environment, which accelerates deterioration and leaf yellowing. Sweet corn doesn't need to go in plastic, but it's important to store it cool.

Storage Temperature & Location

Cold Storage

Cooler

(32-35°)

- Greens (lettuce, chard, spinach, kale)
- Broccoli
- Asparagus
- Sweet corn
- Peas
- Green onions
- Onions and garlic after curing
- Carrots and root crops for winter storage

Crops Sensitive to Chilling Injury

Cooler

(45-50°)

- Green Beans
- Zucchini/Summer Squash
- Peppers
- Cucumbers
- Melons (Ripe)
- Eggplant

Not refrigerated

(Cool place in pack shed)

- Winter Squash
- Basil
- Tomatoes
- Melons
- Eggplant (1-2 days)
- Okra
- Seed Garlic

There is some flexibility in this list; different farms do different things based on preference, space available, etc. 35 degrees is a common cooler temperature.

Chilling injury of cold-sensitive crops (okra, cucumbers, zucchini, internal browning of head lettuce): The customer will see the problems a few days later when the produce has come out of storage and warmed up to room temperature. Beans at our farms do go into the cooler but are stored in the front where it's typically warmer.

Reference your respiration rate handout for proper storage temperatures.

Curing & Storage Crops

- Cure onions, winter squash for 1-2 weeks
- Onions and (non-seed) garlic after curing go into cold storage
- Root crops for winter storage at 32°



If you're planning on winter-long sales, your crops need to be stored at appropriate temperatures. Some crops need a curing step in order to retain maximum quality in long-term storage. Curing process varies per crop and variety. See Umass "Harvest and PostHarvest Needs of Fall/Winter Storage Crops" for full info by crop.

Onions are prodigious re-rooters and re-sprouters; curing during high-humidity conditions or exposure to humidity after curing could cause this problem.

For example, Lisa, while visiting her parents' house noticed why they were having such a hard time curing their onions. Onions were spread out in the house and growing new green shoots already, and it was only late September. The house was very humid and hot, and no air was circulating. We promptly moved them outside where there was a breeze and hot, dry sun for a couple of days.

Onions and garlic: need to be at 32°F post-curing for winter-long storage – cold and DRY.

Seed garlic: don't refrigerate

Potatoes: 40°F for long-term storage

Winter squash: 50°F for long-term storage

Storage of carrots, other root crops – personal preference whether field dirt is removed before or after storage. Not a food safety issue. Soil type may dictate when

you clean roots: clay soil will stain carrots after it's dried on the roots. Keep in plastic to retain humidity and prevent shriveling.

TRANSPORT

Transporting from the Farm to the Customer

- Keep cool, deliver early, use air conditioning
- Set pick-up timeframes for CSA boxes



If delivering product a distance from the farm and doing so without refrigeration, deliver early in a.m., cover cold product out of cooler with blankets to insulate the cold in, use the a.c., don't put produce in an open flat bed truck (very hot and windy), trailers that are insulated and even outfitted with a cooler unit are handy.

Bakers' Acres uses a dedicated station wagon and park it in the shade before loading boxes. Ideally, we would use a refrigerated truck but our scale doesn't justify it economically or environmentally yet. We also use an enclosed trailer when deliveries are larger than the capacity of the station wagon.

Loon Organics uses the white passenger van.

Resources for cooling a trailer – see resource handouts.

People grocery shop with their eyes.

DISPLAY & POINT-OF-SALE

Your product presentation and quality make a difference for customer satisfaction.

Display/Point-of-Sale: Farmers' Markets

- PHD: Pile it High and Deep
- Alternating colors, bountiful, height: eye candy
- Good signage



People notice a beautiful display, and it makes a difference in how much produce you sell. After doing all the work to grow and harvest and pack, take extra care to build a beautiful display for effective selling. People shop with their eyes. PHD from Chris Blanchard, alternate colors and height, use good signage.

Tips to maintain quality through a long market:

CSA boxes from Loon Organics



- Only first quality for our CSA
- Size variation is acceptable (unlike wholesale)
- Our niche: Very clean, very high quality = High retention rate

People should open their CSA box and say WOW! Again this comes back to ultimately building your business through good post-harvest handling techniques.

Quality Produce = Happy Farmers & Happy Customers!



Our take away is to think about the post-harvest handling chain on your farm and how it is working (or not working for you). Is there a crop or two in particular on which you might want to focus and improve your post-harvest handling? Or perhaps improve part of your post-harvest handling infrastructure and efficiency? Even a small investment of time and resources can make a huge impact on your product quality.

Improving post-harvest handling on our farms has been and still is a gradual progression from year-to-year, a process of increasing our knowledge and education, training employees, improving infrastructure, adding in new tools/systems, etc. Every year we improve a little bit more.

Improving post-harvest handling is important to us as farmers because we work really hard to grow, care, and harvest quality products. We want to ensure that quality product stays that way as long as possible, thereby satisfying our customers and sustaining our businesses. All while feeding people great, local food in the process.

Questions?



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Questions?

Remind about handouts, if Wholesale Success is for sale, etc.

Surveys.