

Root Cellaring: How to Extend the Season with Storage
Dieppe Farmers' Market - Wednesday, September 12th
Workshop Notes

Speaker: David Cohlmeier, Sustainable Good Foods Consultant; former owner/operator Cookstown Greens

A Bit About Cookstown Greens

- 25% crops, 75% in cover crops, getting ready for future years with no need for fertilizer
- Products sold mostly to restaurants, which is a great market - if you're doing it right, you can sell wholesale crops at retail prices - best not to start off your growing serving this market though; take time to develop your production abilities

About their root cellar

- 3 rooms, 6 feet wide, 25 feet long (size of small bungalow) with concrete floor
- door in ground, with stairs descending to door to root cellar
- each room has 2 chimneys (pieces of 4" tubing); at one end the tubing comes from the ceiling to the outside, at the far end they go right down to the floor - this allows the cold air to go to the bottom, and lets the warm air out the top, creating a natural flow that doesn't take any extra energy
- cost \$11,000 at the time, but would probably take \$20,000 now

Refrigeration

- he added a refrigeration unit to his root cellar, but there are cheaper options now
- the Coolbot allows you to buy an inexpensive air conditioner and overrides its controls to make it keep running, and keep it from freezing
- \$500 air conditioner versus \$5000 refrigerator
- if you get an air conditioner, try to get standard AC - a brand you know and a standard size that will be easy to replace
- Coolbot can actually recommend certain types of air conditioners with sizing recommendations and using the Coolbot doesn't violate your warranty on the AC
- David has had an AC last 4 years
- energy saving tip: leave veg outside at night after harvest (if not too cold; otherwise use shed) - this pre-cools everything so when it goes into the cellar in the morning, less energy was needed to cool the veg down

Inside the Root Cellar: How to Store Your Vegetables

Wooden Crates

- used ones can be cheap, but have to ensure they are cleaned and sterilized at start of the season
- after a year or two, his used crates started falling apart
- new ones are costly

Plastic Bags

- he has found to be the best option
- can keep the moisture up in the bags - 70% easily maintained in the bags
- sourced polyethylene bags (bit smaller than big garbage bag) from Quebec with 25 holes per bag, but found that was not enough holes; 125 holes is ideal
- drilled holes in the bags himself with a 1/4 inch drill bit; this is easiest to do when the bags come in a roll vs flat stacks (but the latter can still be drilled with an extra set of hands to hold them steady)
- there might be a PEI bag company that has such bags

Mesh Bags

- better for potatoes, garlic and onions than plastic

Leaving the Dirt vs Pre-Washing

- there are conflicting views on whether to store vegetables as they are right from the earth or pre-washed
- David prefers to leave them dirty because he finds they keep better, but others say the opposite
- he suspects there really isn't a difference and that the bigger issue is time management: harvest time in the fall is really busy while there is more time for washing in mid-winter when you're selling your storage crops

Humidity

- Humidity is a balancing act: if it's too high, your vegetables will rot, but if it's too low, they will dry out and shrivel
- too low is a better option because it is still a useable product
- if they do start getting wilted, you can soak them overnight in cold water; this will firm your carrots up (for example), but they won't keep very long after a soak
- ideally you want 90% humidity
- measurement gadgets aren't generally very reliable; the best way is just to rely on your breath: if you can see the vapour when you exhale, that's about 90%
- this is not the humidity level the room wants to be, so you have to work to keep it high
- if you have a dirt floor, you can wet the floor occasionally to bring up the humidity
- can also spray the walls

What to Store: Vegetable-Specific Storage Considerations

Jerusalem Artichokes

- all good and easy to store
- pull the whole plant and break off the tubers to store

Carrots

- varieties particularly important; look for storage types in seed catalogues
- yellow and purple keep especially well, orange are pretty good
- Bolero is a good one, but not as good as it used to be

Potatoes

- pretty easy to keep them for a full year
- lessons in crop quality: he compared potato crops from a wet summer (that season) vs a great year previous: there were no visual differences and taste tests with chefs indicated the older ones were preferred, so he sold the new crop first
- sprouting: it does naturally happen if the storage is too warm, but you want to avoid it by having a steady temperature
- if sprouting does happen, you have to break off the sprouts
- potatoes will actually keep better at a colder temperature, even around freezing
- this temperature is a problem if the potatoes are to be fried: the cold converts the potatoes' starch to sugars, which may cause the potato to burn before it's cooked
- so best to store potatoes at cold temperature (for a sweeter potato that won't be fried), since if you do want them for frying, you can take them out of storage and put them in a warmer temperature two weeks prior to selling and the sugars will turn into starch again

Winter radishes

- people less aware of these varieties than spring/summer radishes, but these are meant for fall and winter storage
- don't plant until late August, but even mid-September could be okay
- they grow very fast and allow a late harvest ... (except maybe your potatoes), that means planting late, you'll have to experiment for yourself

Leeks

- If you have a dirt floor, store your leeks standing up with the roots touching the ground (add a couple inches of soil)
- the roots will grow into the soil, then they're living and staying healthy

Onions

- generally advised to keep colder, but like most vegetables, it's the steady temperature that matters

Garlic

- 10 degrees usually recommended as a storage temperature
- but the key thing is to keep them dry, which is easier to do if kept in mesh (onion) bags
- best to trim roots, but not too short; they don't rot and help space the garlic a bit to improve air flow

Fennel

- keeps pretty well; won't start to rot until late December/January
- outer layers will start to rot first; these can be removed while the underlying layers are fine
- grow them big so you have lots of outer layers to pull off

Spinach

-pretty good; if picked late it will keep for at least a month

Bok choi

-stores well too (better than spinach)

Kale

-stores 2-3 months

-harvest just before good hard freeze (December)

-keeps better if you pull it out with roots

-could also transplant them into the greenhouse instead of storage

Romanesca Broccoli

-he discovered they store well by accident: put them in a milk crate in the cellar and forgot about them until he came across them in his March clean-up and they were perfectly fine

-mature really late and can take a lot of frost

-start in August and harvest in October

Rapini

-keeps better than broccoli

Escarole

-specifically the Sugarloaf variety

-open-pollinated varieties don't do as well here, so a hybrid made for Canadian conditions is recommended

-plant last week of July or first of August (from seed)

Brussel sprouts

-Haven't kept them in root cellar, but in a freezer

-they need a HEAVY frost - don't think of harvesting them before December

-a grower he knows harvested all his brussel sprouts at once: cut the stalks with a hatchet, filled his 4-car garage with the stalks and put on layers of tarp to help them stay frozen, and every week he'd bring out some stalks in time to thaw for market

Treviso

-Italian radicchio

-tricky to grow

-fall crop (but can be great spring crop)

-deer LOVE it too...

Other vegetables that store well: beets, turnip (red), rutabaga, parsnip, salsify (type of lettuce grown for root), black root (has a musky flavour of oysters)

Other items you can store in your cellar: cheeses, sauerkraut, sausage, curing meats / hams, etc. Rodents are an issue though.

What NOT to put in your storage: fruit!

- apples are tempting, but a BIG MISTAKE because they give off gas called ethylene, which helps to ripen fruit, but effectively ripens veggies as well, making them rot earlier
- fruit needs a separate storage room with different controls

Planting Dates*

- carrots: July 15th, unless really slow-growing
- beets: end of July
- winter radishes: middle/end of August
- salsify: May
- parsnips: go in pretty late, mid-July
- parsley root a little earlier than that
- onions: May or earlier is even better (start indoors); they're daylight sensitive, grow green as days grow longer, die down when days get shorter (this is why they can't grow onions on the Equator)
- garlic: October 15th
- Jerusalem artichokes: anytime
- potatoes: for storage potatoes as late as June 10-15th, which is pushing too late, so to ensure they get a good start, you want to be sure they've broken dormancy (ie, sprouted)
- if there are some with no sprouts, bring them out for "chitting": put them in a warm place with moderate light (greenhouse, warmest room in the house ~25-30 degrees) until small sprouts form
 - mist them once/day helps speed things along
 - once they sprout, cool them down again by returning them to the root cellar

*These dates are based on David's experiences in Ontario, so move all dates up a week or so earlier for the Maritimes. Your soil conditions can dictate different planting dates as well.

When to Harvest

- For keeping, crops need to be matured, and the tops need to die down (which sends sugars to the roots)
- As for potatoes, best to leave them in the ground if it's dry enough (wet ground leads to black tar-like stuff on them, which is harmless, but not pretty)
- Experiencing later and later frosts (one year not til Oct 28th), which does not encourage potato plants to start to die down: he experimented with the flame weeder, but eventually settled on mowing the plants down every 3-4 days to allow potatoes to harden up

*A note about blight: David has had really good luck using compost tea to prevent blight. He sprays them under the leaves when they're about 5 inches, using a compost

tea that has been created with a high fungal compost. He boosts the fungus in his compost tea by mixing the compost with some oatmeal before making tea with it. After about 5 days the oatmeal-compost mix will have grown white fungus. This compost tea works well because you are covering your leaves with beneficial fungus, leaving no room for the undesired blight fungus.

Root Cellar Design

-starting from scratch is ideal and below ground is best because above ground storage requires both heating and cooling while below ground sometimes doesn't need either control

-ideal is to build into hillside with a ground floor entrance (allows for tractor, carts, etc)

-if you're wanting to add something onto your home's current infrastructure, humidity is going to be a challenge: you want it high, but 90% is going to cause problems in your house, so 70% is fine to aim for, but will still present problems

-need to find a room (part of basement on an outside wall or corner) and build an insulated box around it

-the challenge is where to place the vapour barrier: 4" insulation can act as this barrier

-advisable to cover the insulation with plywood (just to avoid banging up the foam)

-if you want to use drywall, be sure to use drywall for bathrooms because of moisture issues

-ceiling also should be insulated

Ventilation

-if creating this in your existing basement, it's pretty challenging to add a hole for a fan in your foundation, but it is possible to drill a hole with an impact drill (4-6" bit); you want one at each end of the room, one higher and one lower

-come in through the wall and run your tubing down to the floor to the middle of the room

-be sure to use a bigger tube for the low hole (it will have more runs)

-to make it work without a fan, make an insulated chimney out of the high hole (6-12' height)

-you always want to be blowing warm air out rather than blowing cool air in

Flooring

-dirt floors are fine, unless your basement floods, in which case you'd need to put in a false floor

-if it gets too dry, you can simply water the ground and bring in some gravel so it doesn't get muddy

Doors

-regarding placement: want something that gives you enough room, as you'll be walking in with a fair bit of weight, and will need a clear route to get in and out

-ideally, you don't even have a roof, you just have a door inside a hill

-the door from the inside should be insulated and the outdoor door sealed tight

Size Considerations: How big should it be and how much can you store?

-a root cellar works best when full

-when investing time and energy to build though, it's wise to build bigger than you need right now if you have expansion plans

-David wasn't able to fill his cellar at first, so he invited neighbours to use some of the space and it was easier for him to stabilize the temperature

-don't want it too full though because vegetables give off about 15 BTUs/hour/tonne, which can pose a challenge in moderating your temperature

-good habit is a mid-season cleaning of the storage: around February/March, go through all the bags of produce in storage and throw out all that are going bad; David then uses brand new bags for sanitation purposes when rebagging the produce that is still good

Cheaper Alternative

-create a big pit (2-4' deep) with a shovel or back-hoe to store your veggies

-should put veggies in bags (mesh)

-ensure they're organized for easy retrieval

-fill in the hole and top it off with 3-4' straw, covered by a tarp or something to keep straw dry

-good introduction to root cellaring with no concern for stabilizing temperature or humidity