

Maintaining Storage Crop Quality at Pleasant Valley Farm

Paul and Sandy Arnold

Pleasant Valley Farm

118 South Valley Road, Argyle, NY 12809

arnold.pvf@gmail.com (518) 638-6501

Pleasant Valley Farm is located in a valley in a rural town 25 miles northeast of Saratoga Springs, New York and we have been operating it as an organic fruit and vegetable farm since 1988. We have two children, Robert (age 21) and Kimberly (age 18) who were home-schooled, attend college, and are an integral part of running our family farm. We own 60 acres and rent our neighbor's 120-acre farm; we use a total of 5 acres for vegetable production, 1/2 acre for large fruits and 1/4 acre for small fruits, and keep another 3 acres in cover crops for rotation. We grow a diverse selection of more than 40 types of vegetables and fruits with organic methods (certified through Certified Naturally Grown www.naturallygrown.org) for retail sales at three area summer farmers' markets, two winter farmers' markets, and a small amount is sold to several local restaurants.

Along with winter growing of greens in three unheated high tunnels, we utilize our 20ft by 30ft root cellar, buried on 2 ½ sides under our large barn, to store unwashed crops, which are sold all winter/spring. In the spring of 2007, a specialized cooling system was installed in the root cellar, which maintains a constant high humidity and cold condition, about 95% relative humidity and 34-37 degrees F. We increased production on crops that will store well for winter sales, and are learning more and more varieties of produce that lasts well under the right conditions. November harvested kale and swiss chard stored for over 6 weeks, and late November lettuce, cut and crated, will hold for 4-5 weeks in very good condition! Cabbage and leeks are lasting well into March, and the carrots, beets, and potatoes, will look near perfect in mid-summer when the new crops come in. Other crops we store are: radishes, celeriac, turnips, rutabagas, brussels sprouts, celery, kohlrabis, and cauliflower. Our root cellar holds about 24 tons of produce with a value of over \$85,000. The \$10,000 cooling system paid for itself in a matter of months!

Other crops that we store for winter sales are winter squash, sweet potatoes, onions, shallots, apples, and garlic, each in their own preferred environment. Winter squash and sweet potatoes are harvested in September, and then cured at 85-90 degrees for 4-6 days before cooling and storing for many months at 55-60 degrees and 50-70% humidity. We store these 2 crops together even though sweet potatoes prefer a higher humidity (85-90%). It is difficult to store each crop at their optimum conditions since we have over 20 varieties of produce for winter storage, so we compromise for what works satisfactorily.

Onions and shallots are cured in the field or on racks in our barns, then moved to our walk-in cooler with conditions at about 33-34 degrees and 65% humidity. Garlic is raked and dried in our high tunnel before storing in ventilated crates and then moved to the walk-in cooler. When the garlic starts to degrade, we dehydrate it and sell it as dried garlic powder. Our apples, because they give off gases and should not be stored with vegetables, are kept in a local orchard's cooler.

Our favorite device for helping to monitor all these different storage areas is our Davis Vantage Pro 2 (www.scientificsales.com), which has wireless temperature and humidity monitoring devices, each with the data transmitted back to the base unit in our house. We constantly monitor each location: root cellar, squash storage, and cooler, as well as the high tunnel, and outside conditions; alarms can be set in case of malfunctioning equipment. Temperature monitoring devices/alarms should be a top priority because of the value of the stored crops; not spending this minor amount of money would be penny wise and pound-foolish!

Storing crops and having them keep for long term with good quality, involves not only the correct environmental conditions, but also making sure that the crops we store are of good quality and few diseases when going into storage. Monitoring each crop, sorting out bad ones regularly, and maintaining optimum conditions is critical. Pre-cooling the crops or harvesting them for storage after the weather has cooled is important, and using varieties designed to store is helpful, especially for long-term storage.

STORAGE RECOMMENDATIONS AND STORAGE LIFE				
VEGETABLE	TEMP F.	RELATIVE HUMIDITY	STORAGE LIFE	HIGHEST FREEZING TEMP.
Beet, topped	32	98-100	4-6 mon.	30.3
Brussels sprouts	32	95-100	3-5 weeks	30.5
Cabbage, late	32	98-100	5-6 mon.	30.4
Carrot, mature	32	98-100	7-9 mon.	29.5
Celeriac	32	97-99	6-8 mon	30.3
Celery	32	98-100	2-3 mon.	31.1
Garlic	32	65-70	6-7 mon.	30.5
Kale	32	95-100	2-3 weeks	31.1
Kohlrabi	32	98-100	2-3 mon.	30.2
Leek	32	95-100	2-3 mon.	30.7
Lettuce	32	98-100	2-3 weeks	31.7
Onion, dry	32	65-70	1-8 mon.	30.6
Potato, late	38-40*	90-95	5-10 mon.	30.9
Radish, Winter	32	95-100	2-4 mon.	--
Rutabaga	32	98-100	4-6 mon.	30.0
Squash, Winter	50*	50-70	Varies	30.5
Sweet Potato	55-60*	85-90	4-7 mon.	29.7
Turnip	32	95	4-5 mon.	30.1
*Require curing before long-term storage				
Potato: 50-60 & 98% RH 10-14 days				
Winter Squash: 80-90 for 3-5 days w ventilation				
Sweet Potato: 85 & 90-95% RH for 4-7 days				

Adapted from Knott's Handbook for Vegetable Growers

Great free publication: www.ba.ars.usda.gov/hb66/contents.html