The Winter Garden

By Dana Visalli

Winter gardening in the Methow—it seems like an unlikely proposition, doesn't it? But the fact is that with a minimal investment of money and energy, you could be harvesting fresh garden greens and vegetables in this Zone 3 climate in December and January. And while this article will focus on mid-winter food, let's not allow the more important fact escape us, that the growing season here can be stretched like a rubber band earlier into the spring and later into the fall. As the price of energy and food continue to rise due to increasing demand and decreasing availability, we can all work toward taking care of our own food needs.

A hoophouse buried in winter snow. Lettuce and spinach survived nicely inside until December 15; the hoophouse can be replanted by March 1st.

Perhaps I should start with the caveats; in the preceding paragraph I said that you could be *harvesting* your own food in January; I didn't say you could be *growing* it. There are a few specialized techniques that need to be learned for the late fall and winter garden, and one of them is to plant the right crops at the right time, so that most of the necessary growing is done before the cold season arrives. Then, if adequately protected, the lettuce, spinach, arugula, carrots and other cold-hardy crops will just *sit* there and wait for you to come eat them.

A second caveat is that the winter environment varies greatly over the length of the Methow Valley, with generally much more snow, colder temperatures and less sunshine the closer one's home is to the mountains. While the gardening season can be lengthened anywhere in the Methow by using the techniques mentioned in this article, winter gardeners will have more success the further they are from the high mountains and deep winter snows.

The process for extending the garden season into winter and out the other side in early spring involves three simple ideas: 1) using a hoophouse or greenhouse to modify the outside environment, 2) covering the indoor crops with a light-transmitting and breathable fabric as a second layer of insulation, and 3) planting hardy vegetables. In addition, to have a succession of harvests throughout the winter, a succession of plantings will be necessary in the late summer and fall.

Hoophouses are just mini-greenhouses; for example the ones that I own are three feet high, six feet wide, and twenty feet long; they cost $100 each (resources are given at the end of the article). Hoophouses are perfect for people under three feet tall, beyond that you have to crawl through them on your hands and knees. On the positive side, they are cheap, they hold ground heat better than greenhouses, and winter snow adds useful insulation along their sides. They can also easily be moved around.

Many readers will be familiar with the "light-transmitting fabric" that has come to be known as "row-covers" or "Remay" (this latter term is a brand name). This is a white polyester fabric that helps retain heat, but is permeable to both light and water. For the winter garden these are used inside the greenhouse, supported 12" above the soil with wire hoops. Used together, the greenhouse and row-covers create a micro-habitat

that will average twenty degrees warmer than outside temperatures. Small swatches of row-cover material are available locally, and larger quantities are available in many seed catalogs.

Extending the growing and the harvest season is not just a matter of temperature; equally important is modifying the stress of cold wind and strong temperature fluctuations. While our home-made environment for the winter garden can only modify the temperature by degrees, it can completely cut out the wind, and greatly reduce changes in temperature. The simple combination of greenhouse plus row-covers transforms our environment from a harsh Zone 3 to a balmy Zone 6, the equivalent of southern New Mexico.

Lettuce and spinach (upper left) planted February 25th, ready to eat or sell on April 25th.

Some crops thrive in cool weather, and are remarkably hardy in cold weather. Among the ones we want to plant for winter harvest are lettuce and spinach (both much hardier when young than when mature), arugula, cilantro, parsley, chard, kale, broccoli, Brussels sprouts, carrots, beets, radicchio, radish, scallions, sorrel and watercress. Potatoes will survive nicely underground if they don't freeze. These vegetables can tolerate temperatures as low as 12 degrees Fahrenheit without damage, as long as they are not exposed to the additional stresses of outdoor conditions. In fact, these cold-adapted vegetables are more savory in the cool temperatures of the season of short days and long nights.

Planting for the winter greenhouse begins on about August 1st, and then continues through the month and into the fall. August plantings are done in the open, and the greenhouse/hoophouse is moved to the pre-planned site in early October. Timing for winter crops is more crucial than in spring, as the goal is to get the plants up to a reasonable size before the length of day drops below ten hours (which occurs about October 15th at our latitude). Beyond that point growth slows down and then stops, and plants basically hibernate until we harvest them, or until they begin vigorous growth again in response to increasing day length.

Younger plants from a succession of late summer planting dates are hardier during the winter than older plants. New sowings after about October 15th , although they will germinate, will not grow until longer days return in the early spring. At that point, those which were sown first will mature first as the season progresses. You can keep on planting right through the winter as spaces open up following harvest. Under the double cover, the soil only freezes hard during the coldest winter nights. When harvesting in mid-winter, plants must be thawed out. Plants that are frozen solid on winter mornings will be thawed and healthy after the greenhouse warms.

Because of low evaporation, little supplemental moisture has to be provided during the winter. By April 15th it will be necessary to begin folding back the inner covers on sunny days to prevent overheating, and to start watering the crops, in preparation for the summer season in your new, all-year garden. There is no reason other than inertia that we can't feed ourselves for most of the year here in our mountain home.

For more information:
The details of winter gardening have been worked out by farmer/author Eliot Coleman, and are given in his book *The New Organic Gardener* (which is widely available), and in his self-published booklet, *The Winter-Harvest Manual*, available from Eliot at www.fourseasonfarm.com or on loan from the PSM office.
$100 hoophouses are available from Grower's Supply at www.growerssupply.com, item number 104940. This company sells dozens of greenhouse models as well.
Row-covers are available from Johnny's Selected Seeds at www.johnnyseeds.com

Storing the Harvest

Garden Produce Keeps Best of you Know What You Are Doing

It's one thing to figure out how to extend the garden season in northern climates, it's another to know how to store produce in winter that has been grown in the warmer seasons. Just as each crop grown in the garden has a different set of optimum conditions for growth, each different type of produce that can be stored has different optimum storage conditions. The primary variables that affect long-term storage are temperature and humidity.

For example, the optimum temperature for storing carrots is 32 degrees, just above their freezing point of 30 degrees (see the chart on the following page), and their optimum relative humidity is 98-100%. But if you try to store winter squash under these conditions, you'll have a lovely pile of rotten vegetables to deal with by early January. Squash needs warm and dry conditions, 50-60 degrees and 50-70% humidity.

If you didn't include a "carrot storage room" and a "squash storage room" in your house plans, don't despair. All you really have to do is approximate optimum conditions, which you can do by storing different produce in different areas of the house. The only disadvantage to this strategy is that you end up living with your food supply__squash may be in the stairwell and tomatoes on the television__but your friends will be intrigued by how colorful your house has become.

Once you have redistributed your produce according to its need, you will find it is possible to creatively nudge the local microclimate towards the optimum. Carrots, for example, which require a very humid environment, can be stored for many months in cool, moist sand. The humidity of heated areas of the house is typically low, so random corners on the floor in heated rooms will approach optimum conditions for squash. Study the needs of each type of produce and consider how you might best approach their optimum storage conditions in your home.

One other item to keep in mind—ethylene gas. Ethylene is a hormone given off by some ripening fruits that is active at very low concentrations (0.1 to 10 parts per million, or ppm). Ethylene increases the speed at which some fruits and vegetables ripen, and increases the aroma of some fruits. It is very important to protect the stored fruits, vegetables, and flowers from exposure to ethylene concentrations above 0.1 ppm.

Which produce items give off ethylene, and which are susceptible to its ripening effect? This information is given in the accompanying chart. Notice for example that apples and pears are high both in the production of ethylene and in sensitivity to it. What to do? Ideally, provide some kind of gentle ventilation in the area that these items are stored to prevent buildup of ethylene gas.

Some produce, like beets and carrots, produce very little ethylene of their own, but are still sensitive to the gas and will deteriorate much more rapidly in its presence. Thus we should not store beets and carrots alongside of apples if we have that option.

Those are the basics of successfully storing your own garden produce. Then instead of your apples traveling 10,000 miles from New Zealand to get from the tree to your mouth, they will only have to go30 or 40 feet. And when someone asks you what you are doing to address Peak Oil and Global Warming, you can tell them about your beets in the basement and tomatoes on the television. That will shut them up.

Garden Produce Storage Chart

Produce Type	Approximate Storage Life	Optimum Temperature	Freezing Temperature	Optimum Humidity	Ethylene Production	Ethylene Sensitivity
Apples	2-6 months	30-32	29.3	90-95%	Very High	High
Beet	4-12 months	30-32	30	95-100%	Very Low	Low
Brussels Sprouts	2-4 months	30-32	30.5	95-100	Very Low	High
Cabbage	5-6 months	32	30.4	95-100%	Very Low	High
Carrots	3-6 months	32	29.5	98-100%	Very Low	High
Garlic	6-7 months	30-32	28.4	65-70%	Very Low	Low
Leek	2 months	32	30.7	95-100%	Very Low	Moderate
Melons	2-4 weeks	45-50	30	85-90	Moderate	High
Onions	1-8 months	32	30.6	65-70%	Very Low	Low
Pear	2-7 months	30-32	29	90-95%	High	High
Pepper	3-6 weeks	40-50	30.6	95-100%	Low	Moderate
Potato	5-10 months	40-46	30.5	95-98%	Very Low	Moderate
Salsify	2-4 months	32	30.1	95-98%	Very Low	Low
Squash, winter	2-3 months	50-60	30.5	50-70%	Low	Moderate
Tomato, mature green	2-6 weeks	50-55	31.0	90-95%	Very Low	High
Tomato, firm ripe	1-3 weeks	45-50	31.0	85-90	High	Low