Your Winter Vegetable Garden

The Second Act

Mike Kluk, Nevada County Master Gardener

For many of us, when the curtain of frost falls on our summer vegetables, we put away our tools and wait for spring to begin again. But it is possible to have a second act with a whole new cast of characters. Growing a winter garden is a great way to continue to enjoy fresh, healthy vegetables throughout the year. With a bit of planning and a few winter-specific approaches, you can successfully grow vegetables that are as varied and tasty as anything summer has to offer.

The guru of winter vegetable gardening, Eliot Coleman, is a market gardener on the coast of Maine. If he can grow winter vegetables profitably there, it should be easy here in the foothills of Nevada County.

In many respects, your winter garden will take less work than the summer version. You will not need to water as often. Weed and bug problems are fewer. The key is getting started early and planting cold-tolerant varieties. Mature plants can withstand cold temperatures better than younger plants. Most of the plants you will grow in winter such as lettuces, leeks, onions, mache and kale, can survive temperatures into the teens or even single digits once established, especially if given some protection. A well-hydrated plant will handle the cold better than one that is drought stressed. So, be prepared to water if there is an extended dry spell in the winter. Choosing beds that are protected from the prevailing winter wind will also help.

I have managed to have a respectable winter garden for several years. Our nighttime temperatures on clear nights are generally in the low 20s with excursions into the teens a few times during the winter being predictable. The lowest temperature I have recorded at our place was 10F, and our winter garden pulled through in decent shape.

One of the big challenges to growing a winter garden is figuring out where to put it. Many of your winter vegetables will need to be planted in July, August or early September—when your summer crops are still producing well. You can never have too many garden beds, and this is a good argument for establishing more. You'll find that the rotation is actually fairly simple if you plan ahead. You may have a summer cover crop such as buckwheat on some beds, just waiting for your winter vegetable starts. Beds that had peas in the winter and spring are also likely candidates. Instead of winter cover crops or straw on all of your beds, some will be growing salad and a vegetable side dish. If you live in snow country, you will probably need to use a season-extender structure. You will also need to clear the snow away to allow enough light to reach the plants. The exception would be root crops such as beets and carrots. If you plant a sufficient number in the spring, you can enjoy them all winter. Unless your soil freezes, mature beets and carrots will do just fine under the snow waiting to be pulled up for dinner. But the spring planted crop will not be as sweet as those you plant in the late summer or early fall after the frost hits them.

The following chart includes hardy vegetables you may want to consider growing and the number of days to plant prior to your first frost date. It is by no means a complete list. This information came from Eliot Coleman's book *Four Season Harvest* with some modifications based on my experience. Of course the best planting date depends on whether the cold settles hard in the fall at your garden site or if you tend to have a period of warmer weather after the first frost.

Sequential planting through the period will extend your harvest

although that is not a big issue for a winter garden because the plants mature slowly. If you use the covers discussed in the next article, you can plant in the shorter time frame. If you don't, you should start your plants near the earlier date. In any case, mustard, in all of its manifestations—from broccoli to tatsoi—is likely to be the star of your winter garden.

Site selection to take advantage of the warmest microclimates in your garden important. For example, areas near a south-facing fence or wall will benefit from reflected heat and light during the day. Concentrating your winter garden in areas that are protected from cold, drying winds will also go far to increase your plants' chances of surviving the winter.

Vegetable Varieties for the Winter Garden

Direct seed	*Days before first frost*
Beets	30-60
Carrots	45-60
Cilantro 20-60	
Claytonia (Miner's Lettuce)	15-45
Lettuce (leafy cut and come again varieties seem most successful)	15-70
Mache (Corn Salad)	15-45
Peas	45-90
Scallions	15-90
Spinach	0-30
Swiss chard	30-60
Turnips	45-60
Seed Transplant Starts (Plant out approx. 30 days after seeding)	
Broccoli	75-105
Cabbage	60-90
Cauliflower	75-105
Kale (Red Russian)	45-105
Leeks	90-120
Mustard Greens, Boc Choy, Pak Choy, Mizuna, Tatsoi	15-75
Parsley	45-90

References: *The Winter Harvest Handbook* and *Four-Season Harvest,* Eliot Coleman
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The Art of Season Extending, University of California Cooperative Extension

Season Extenders

Maybe You Can Fool Mother Nature

Mike Kluk, Nevada County Master Gardener

A greenhouse—the biggest, most expensive type of season extender

The phrase "season extender" refers to a wide range of generally low-tech items and approaches that can keep your warm-season plants warm when it's cold outside and your cool-season crops cool when the mercury is rising.

Season extenders will not fool Mother Nature enough to let you grow tomatoes in the winter or most lettuces in the height of summer. But season extenders can help you get a jump start on your summer garden, keep your cool-weather crops going longer into the summer, extend your summer vegetables deeper into fall and grow cold-tolerant vegetables through winter.

Some common season extenders are cloches or hot caps, low tunnels with coverings of polyethylene plastic or row cover, cold frames, high tunnels, greenhouses and shade cloth. This article will give you an introduction to the most common season extenders and hopefully inspire you to give them a try.

Fall and spring season extenders

The early spring is a time of changeable, fickle weather in the foothills. Season extenders make it possible to start warm-season crops at times that would not otherwise be optimum. Home gardeners are most familiar with the season extenders used in spring. All of them work on the principle of creating a microclimate by holding in the heat of the sun and humidity during cold days and protecting the plants from damaging winds. At night, they hold in some of the heat stored in the soil during the day, not letting it escape to the atmosphere as fast as it otherwise would.

Hot caps

Over 350 years ago, gardeners discovered that they could protect heat-loving summer varieties from late frosts by covering each individual plant with a small oiled paper tent or a large "jar" made of glass, often called a cloche or bell jar. Gardeners still use these although they are most often made of thin plastic supported by a wire hoop or homemade out of a plastic milk jug with the bottom cut off. Unfortunately, these individual coverings must be removed on warm sunny days to avoid overheating the plants and, because of the small size, can have only a limited affect on nighttime temperatures.

Floating row cover

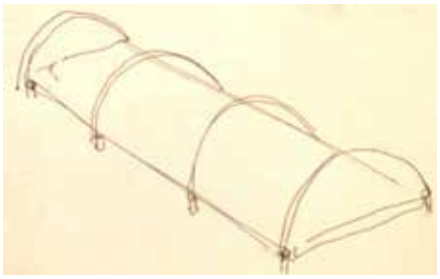
Another spring option is row cover, generally spun polyester, which is laid directly on the plants and held down on the edges with soil or rocks. Floating row cover serves the same function of increasing daytime temperatures and humidity when necessary and holding some of the day's heat in at night for at least a while. It has the added benefit that it

breathes" so that it is unlikely to overheat on sunny, warm spring days. The material used in this way is a thin version of row cover. The various covering options will be discussed separately below.

Hot caps and floating row cover work in the relatively warm days and nights of late spring. Floating row cover is a practical way to protect your mature summer vegetables from the first cool nights of fall, extending your harvest of cucumbers, squash and tomatoes. However, these season extenders provide little protection from frost or freezing temperatures. Floating row cover will freeze to the plants it is laying on during an icy night, providing no real protection.

Late fall and winter season extenders

In general, the more area you can enclose in a structure, the more efficiently it will maintain an environment of somewhat higher temperatures and humidity that will help your plants make it through tough weather. Larger and more substantial structures will provide more protection than hot caps and floating row cover. They will hold heat longer, shelter from stronger winds and protect from the effects of direct frost. They will allow you to grow cold weather plants and vegetables such as kale and lettuce through the winter in the foothills without an external heat source except the sun. But they will not maintain an environment that will support warm-weather plants such as tomatoes or squash far into the cold days of late fall without a heater or fairly elaborate system of heat storage. Both of those options are beyond the scope of this article.



Low tunnel

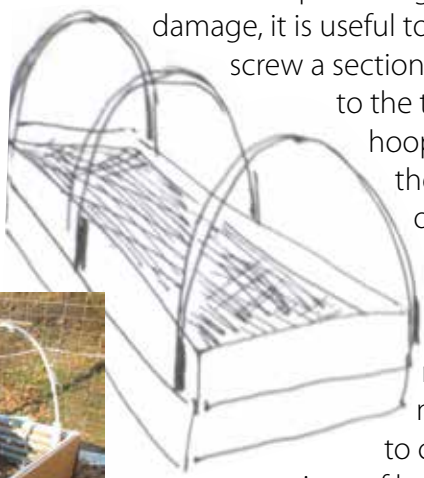
Cold frames and low tunnels

The next step up in effectiveness, beyond floating row cover, is a cold frame or, its more modern cousin, the low tunnel. Traditional cold frames are constructed of wood with a hinged glass covering. They are generally oriented with the long side running east/west. The south edge is typically lower than the north to allow better access to the low winter sun. Cold frames can be purchased at many garden supply stores. They can also be built by anyone with even modest building skills. You can even construct the sides of a "frame" out of straw bales. Fill the center part-way with soil and cover it with a clear panel and you have a serviceable cold frame.

If you hinge one side of the cover, the cold frame must be narrow enough to allow you to reach all of the plants from the open side. An alternative is to use 4' x 8' polycarbonate panels that are simply laid on the frame. They will span a typical garden bed, can be held down with boards or bricks and simply slid off when you want access. Cold frames have the disadvantage of being fairly expensive to buy and somewhat complicated to build and may not be practical to cover multiple beds.

More low tunnels

Low tunnels are easy to construct, and covering several beds is quite feasible. They are simply a series of hoops, stuck in the soil or fixed to a raised bed, that form a tunnel down the length of the bed. Putting a hoop every three or four feet is generally adequate. The hoops can be constructed from any material that can be bent into a hoop shape. Some nurseries sell heavy-gauge wire in sections that is designed to be bent into hoops. However constructing hoops from rebar or ½" PVC or thin-wall metal conduit can result in a stronger structure. To protect against wind damage, it is useful to tie or screw a section of pipe to the top of the hoops, running the length of the bed. If you get substantial snow, it may also be necessary to cut short sections of board or pipe that can be set vertically to support the hoops. Once your hoop structure is in place, a cover is then laid over it. The cover



should be large enough to cover both ends and sides to the ground with some extra. Cover and securing options will be discussed below.

High tunnels or hoop houses
A high tunnel or hoop house is a bigger and more substantial version of a low tunnel. It can span the width and length of several garden beds or more. Given its greater size, the construction needs to be more careful and beefier. A common choice for hoop material is 1¼" PVC pipe. But the principal is the same: using the inherent strength in a series of arches to support a cover that will maintain a relatively warm and protected environment for your plants. The end walls of the "tunnel" are typically constructed of 2 x 4s. A door for access and windows for venting are added. In heavy snow areas, these structures can be strengthened with a 2 x 4 placed vertically supporting each hoop. Hoop houses sometimes even have a double wall of plastic sheeting with air blown between them for insulation but such an elaborate system is not necessary in our climate to provide adequate protection for cold-hardy plants such as broccoli or Swiss chard. It is helpful to not attach the cover permanently to the lower 3–4 feet of one side so that it can be rolled up on a hot day.

Greenhouses
You can buy prefabricated greenhouses at most garden supply stores. In addition, automatic window openers, fans and other accessories make greenhouses very adaptable to various climates and seasons. Greenhouses can also be custom designed and built out of new or used materials. Greenhouses are typically more complicated to construct than hoop houses but can be a more permanent structure.

A very serviceable greenhouse can be made from a metal carport structure, often available used, that is then covered with polyethylene plastic. People who live in snow country may want to use polycarbonate or fiberglass panels for the roofing. Plants in a winter greenhouse should be planted in the ground where they will be much warmer than if planted in pots on benches. For added protection, you can add low tunnels over the plants within the greenhouse. You can also put barrels of water in the greenhouse as an added reservoir of daytime heat that will moderate temperatures at night.

Coverings
Your choice of covering material will be dictated by a number of factors; cost and practicality being chief among them.

Glass or polycarbonate. If you live in an area that gets heavy snow, your best choice is glass or polycarbonate panels. Glass can be expensive, although used windows are generally cheap or free. Polycarbonate panels are also pricey but will last many years, and as stated above, can cover an almost 4' x 8' bed.

Polyethylene plastic. Polyethylene is the traditional cover for low tunnels and hoop houses. If you use this, purchase greenhouse plastic (not regular "construction" plastic) that is at least 6 millimeters thick. It will resist deterioration by UV light and should last five years or longer if you protect it from the sun when not in use during the summer. You can also get plastic that has an additive to increase its ability to reflect heat. Polyethylene is tough and will work fairly well in snow country if you are able to clear it after each snow fall.

The big disadvantage of the rigid cold frame covers or polyethylene is that they do not vent to keep heat from building up during sunny days, possibly cooking your vegetables prematurely. For tunnels, you will need to be able to roll up at least one side to vent the structure on any sunny day warmer than about 45F. There are automatic openers available for cold frames. Although that adds expense, it makes them practical


Low tunnel with row cover

for people not able to open and close them during the day.

Row cover and Dio-Betalon. The need to vent a tunnel is solved by using row cover or a product made from polyvinyl alcohol marketed as Dio-Betalon (formerly Tuffbell.) Both are porous enough to allow built-up heat to escape. Even though porous, on a freezing night, frost will form on the surface, closing off the holes and creating a snug environment for your vegetables.

Row cover comes in multiple thicknesses. The version that

blocks out 30% of the light seems to be a good compromise between protection and light availability in the winter. It lets in enough light for hardy plants to do fine during our winters that generally feature quite a lot of sun yet it offers meaningful protection. If you anticipate a particularly cold night, you can throw on an additional layer. One disadvantage of row cover is that because it is opaque, it is easy to "forget" to attend to your vegetables—out of sight out of mind.

Dio-Betalon is clear. It lets in more light than row cover and the plants within are visible. The primary disadvantage of Dio-Betalon is cost. A piece large enough to cover two 4' x 8' beds costs about $100 locally.

If you use one of the flexible covering materials such as polyethylene or row cover, you will need to secure it to the hoop structure. This can be done by leaving enough trailing on the ground to hold down with rocks or shovelfuls of soil.

A much more convenient means of connecting the cover to the hoops are plastic clips specially made for this purpose (available from garden supply stores) or large binder clips (available from stationary stores.) In any case, be sure that the ends and sides are securely sealed to prevent cold air from blowing in.

Whatever structure and cover combination you choose, the added protection will allow you to grow cold-tolerant vegetables through the winter in western Nevada County. A hot soup rich with vegetables and a salad, all from your back yard, can brighten the coldest winter day.

Summer season extenders

As the weather warms into summer, you may want to extend the season for your cool-season vegetables. In that case, protecting plants from the harsh direct rays of the sun is the key. This can be done with some success by planting in an area that will get afternoon shade. But that will probably not be enough in itself to protect your crop of kale, rapini or lettuce as summer ramps up.

Shade cloth is the most practical tool to use to bring summer relief to your cool-weather crops. Shade cloth comes in a variety of "weights" that will block out more or less sun, but also light. If shade is too heavy, it will stunt or kill even the toughest of winter vegetables. A cloth that blocks out 50% of the light seems to strike about the right balance in our environment.

Shade cloth is either woven or knitted. The woven must be hemmed to prevent it from unraveling. The knitted is generally cheaper and has the advantage of not unraveling when cut. Thus you can buy it in bulk and simply cut off a piece the size and shape you want.

If you have constructed low tunnels, you can use the same structure to support the shade cloth. The same clips will hold it on. Shade cloth in itself will generally extend the season of your favorite cool season vegetables into summer.

If you add a water system that mists from above, you will get an added measure of protection. If, in addition, you grow heat tolerant varieties of kale, lettuce and other cool-season crops, you will be a long way down the road to having fresh salads and greens in the summer.

Other plants can benefit from shade as well. Raspberries and some blackberries suffer from our hot summer days but will do better if grown under shade cloth. Mint is always a candidate for a little shade. Even basil, the queen of high summer herbs, will have bigger leaves and more tender stems if grown under shade cloth.

If you combine the summer and winter season extenders discussed in this article, your vegetable garden will be more varied and more productive through the year. Your own home-grown vegetables are, after all, the freshest and most local you will ever eat.

Sources

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