

Stretching Out Your Gardening Season

By [Vaughn Hammond](#), UNL Extension Educator-Specialty Crops

Getting the most out of a vegetable garden is a goal that many growers strive towards. Techniques such as interplanting, succession planting and companion planting are all strategies that can be used during the traditional gardening season that help accomplish this goal. Fall gardening takes the process another step toward increased productivity, but does growing vegetables have to stop with the threats of frost and freezes? The answer is no! It can be the beginning of another gardening season that can continue to provide fresh produce well into winter and in some cases stretch production into spring.

Raised Beds

Using raised bed throughout the gardening season is a great way to increase the productivity in a garden. Both raised beds within a frame and those utilizing no frame accomplish the same goals. They are ultimately easier to maintain and provide a better environment for plant growth due to reduced soil compaction, better use of water and increased air circulation.

The soil temperature in raised beds warms up quicker in the spring and stays warm later into the fall than level planting areas. This increases the length of the growing season on both ends of the gardening year. Crops can be planted earlier in the season because the warmer soil temperatures will promote seed germination. During fall the warmer soil temperatures will promote seed germination later into the season allowing for the extended planting of cool season crops such as spinach and other salad greens.

Plastic Mulch

Plastic mulches applied to the soil surface of either raised beds or a ground level planting works to conserve moisture, inhibit weed grow and warm the soil. As with the raised beds, raising the soil temperatures at either end of the season allows for both earlier and later planting and extends the growing season.

Plastic mulches are available in a variety of colors and widths. Each color has its advantages and disadvantages. The most common color used is black which acts to warm up the soil the best. Clear plastic is only color that needs to be avoided. While the clear plastic does heat the soil it also allows for weed growth under the plastic which promotes competition between the weeds and crop.

Floating Row Covers

Floating row covers are another gardening tool that works toward extending the season as well as having several other advantageous qualities. Floating row covers are generally made of spun polypropylene which allows for the penetration of sunlight and water while at the same time helps retain heat and excludes insects. The material is installed directly on the soil surface and is light enough that it allows the plants growing underneath without causing damage. There is an exception to this which is single stemmed plant such as peppers that may break-off if the application is not loose enough as they grow. Floating row covers come in several thicknesses which varies their effectiveness as a season extender. Depending on the thickness, soil temperatures may vary 2-7 degrees between protected and unprotected rows. The heavier materials offer the best frost protection but also result in the most sunlight being excluded.

Using floating row covers in the spring warms the soil and the air between the soil surface and the cover promoting seed germination, root growth, shoot growth and speeds up crop maturity. Use of row covers will also potentially increase yields because of the increased growing time afforded by the row cover and protection from wind and other detrimental factors that would tend to damage the plant.

In the fall the floating row covers will offer the same advantages to cool season crops that the spring application offers. Warm season crops that are approaching maturity towards the end of the growing season can be covered with a floating row cover prior to the first frost protecting them from the damage and possibly extending the growing season for several weeks. The ease with which floating row covers go on and come off allows the grower the opportunity to remove the protection after the danger of frost has passed. Good growing weather will often follow the first frost and when cold temperatures return the cover can be easily be put back into place.

Cloche

Garden cloches have played a very important role in gardening since the early 1600's. Cloche is a French word meaning "bell". The first cloches were created in Italy in 1623 and made out of hand blown glass. They measured 18" in diameter and 15" in height. The cloches were placed over cold sensitive plants to protect them from freezing. The French were the first to popularize these glass bells and they became an important part of the gardening method known as French Intensive Gardening Techniques. These early cloches were known to protect plants at temperatures as low as 16 degrees F because they act as a mini greenhouse trapping solar heat within and warming the soil around them.

Today the term "cloche" encompasses a wide array of products used to modify the environment directly associated with garden plants. Empty milk jugs with the bottoms cut out and placed over the plant is an inexpensive cloche but with their thin plastic walls provides limited protection compared to the early glass cloches. One of the more recent commercial cloches introduced to gardeners used an 18' diameter tube of double layer of heavy plastic that is divided into sections that are filled with water. The water acts as an insulator as well as a solar collector warming the interior portion where the plant is located then slowly releasing the stored heat from the water. The top can be closed retaining the heat well into periods of cooler temperatures.

Another modern form of the cloche consists of row covers being supported by wire or PVC hoops creating a mini greenhouse of sorts that cover the entire length of a row or bed. Both plastic and spun polypropylene can be used for the covering. The edges must be weighted down with soil or landscape staples used to keep the material in place. One of the challenges that this form of protection offers is ventilation. Provisions need to be made that allows for air exchange to reduce heat build-up within the tunnel. This is especially important when plastic is used. Spun polypropylene will allow for some air exchange but additional ventilation may also be needed.

Cold Frames and Hotbeds

Cold frames and hotbeds are similar structures but differ in that the hotbeds use supplemental heat to warm the soil within the structure. Both are built in much the same fashion. Common dimensions are 3-4 foot wide and the length in increments of 3 feet. The back of the structure should range from 14-24 inches high while the front slopes to 8-12 inches. The length is often dictated by the sash that is used to cover the structure. Both cold frames and hotbeds should be oriented to face south to receive as much sun exposure as possible. It is important that a thermometer be used to monitor the temperature within both types of structures as temperatures can easily rise high enough that damage to the plants within can be sustained. Ventilation to cool the structures is essential for plant health and can be achieved by propping open the sashes when the temperatures rise. Automatic openers that open the sashes in response to higher temperatures are also available.

Cold frames construction begins by working the soil to a depth of 6 to 15 inches. Once the soil has been worked the structure can be built or placed over the area. Cold frames are somewhat more versatile than hotbeds in that they can be moved from one location to another more readily. Cold frames can easily be placed over a raised bed that is located in the garden taking advantage of the beds construction and used to modify the growing environment of a crop already in place.

Hotbeds, although structural the same as cold frames require different ground preparation. Hotbeds are essentially cold frames with supplemental heat added. The heat can be produced using electrical heat cables or by the more traditional method of using fresh manure. When using manure to generate heat remove 16-24 inches of dirt from the area that the frame will be covering. Add 4 inches of gravel or cinders to accommodate drainage and aeration. Atop the drainage material fill the rest of the pit with 8 to 10 inches of fresh manure adding 5-10% straw as you go. Tamp the mixture into the pit firmly throughout the pit paying particular attention to the corners. Once the manure is firmly in place moisten with warm water and then cover the filled pit with 3-4 inches of quality, weed free soil. The composting manure generates heat within the structure. Soil temperatures can reach levels harmful to plants so monitor the soil temperature using a soil thermometer and once soil temperatures drop to 75 degrees F you can begin planting.

If heating cables are going to be used in the hotbed remove 6-12 inches of soil. Add 4 inches of sand or pea gravel to for drainage and as a level base to lay the heat cable on. The base will also act as a heat sink storing some of the

heat. The heat cable should be placed on the gravel surface in a serpentine fashion weaving the cable back and forth across the bed leaving 6 inches between the cable loops. The cable should come no closer than 3 inches from any of the sides. Once the heat cable is installed place a layer of ¼ inch mesh hardware cloth over it to protect it from damage. Add 4 to 6 inches of quality soil over the hardware cloth.

High Tunnel

High tunnels are a relatively new addition to the gardener's season extending arsenal. The difference between a high tunnel and a greenhouse is not clear cut. Generally, high tunnels are unheated and use passive ventilation. They are often considered temporary structures because no footings are used in construction in most situations. The structure is tall enough that the producer can easily stand upright and use mechanized equipment such as a rototiller and depending on the size even tractors. Most often a high tunnel is covered with one or two layers of 6 mil polyethylene.

Determining the structure size is dependant on the growers needs. For a home or acreage owner that is looking at producing fresh produce for their own use a structure measuring 14 or 17 feet wide by up to 20 feet long would provide more than enough space to produce a wide variety of crops. Construction plans for simple, inexpensive structures are available on the internet as well as commercially produced "hobby" tunnels from several different manufacturers. For a grower considering commercial production several sizes are commercially available with varying widths and lengths to fit their production needs.

Growing in a high tunnel offers several advantages beyond extending the growing season. Production can be achieved almost year around depending on the crops chosen. The general size and fruit quality is improved and yields can be increased. A high tunnel offers protection from inclement weather and insects and helps keep moisture off the leaves reducing disease.

There are also disadvantages. Cost may be the primary obstacle. Temperature control can also present production challenges throughout the year. During the winter and early spring keeping snow off the structure is important to minimize the weight load and increase the sunlight that is available to warm the structure and maximize plant growth.

Greenhouses

A greenhouse is the ultimate season extender allowing the producer to grow vegetables and fruit throughout the year. Greenhouses utilize both active heating and cooling mechanisms that allows plant growth during the coldest and hottest times of the year. Greenhouse production is not for everyone as year around attention is needed to keep both the greenhouse and plants in top condition. As with the high tunnels, plans are available to construction greenhouse structures from commonly found materials. A variety of kits are also available in a wide range of sizes and prices that will fit any need.

Many of these season extending practices can be used together to achieve an even longer period of productivity in your garden. Moving a cold frame over a raised bed at either end of the season will add weeks onto your growing season. The use of row covers or cloches in a high tunnel can possibly stretch the growing season to year around depending on the crops being grown. There are many possibilities to consider when trying to achieve the greatest production from your garden. Gardening ingenuity will go a long ways in getting to the goal of eating from your garden year around.