

Though often overlooked by the gardener, planting vegetables in July and August for fall production is an excellent practice. Late plantings of cool- and warm-season vegetables can extend the harvest long after spring-planted crops have ceased production. Most cool-season vegetables grow as well as or better than those planted in the spring as they mature during shorter, cooler days. Flavors of vegetables maturing in the cool, crisp days of autumn are often sweeter and milder than those grown during hot summer weather. This is especially true for cole crops such as broccoli, Brussels sprouts, cauliflower and kale. Plants such as lettuce and spinach which tend to bolt (develop flower stalks) in late spring, stay productive due to the shorter day lengths. For those who love to garden, extending the harvest as long as possible helps ward off the dreariness of cloudy autumn days.

## What to Grow

Available space, grower preference and the intended use all influence the crop choices.

Heat-loving crops such as tomatoes, peppers, eggplant, sweet potatoes, okra and New Zealand spinach will continue to produce until frost. Other heat-loving vegetables, including snapbeans, cucumbers and summer squash, often slow or quit producing in late summer. Mid-summer plantings of these vegetables will provide vigorous plants from which to harvest up to or (with protection) beyond the first frost. In Nebraska, the first frost is often followed by a few weeks of good growing weather, providing an even longer harvest.

Some gardeners like the idea of serving fresh garden tomatoes for Thanksgiving dinner. Mid-summer plantings of short-season tomato cultivars can provide vigorous, robust plants from which to harvest high-quality fruit. Tomatoes harvested just before frost from healthy plants tend to keep better in long-term storage than fruits salvaged from older, diseased plants. While semi-hardy vegetable plants can tolerate light frosts, hardy vegetables will continue to grow until temperatures drop to about 20°F. Although the tops of semi-hardy root and tuber crops may be killed by hard freezes, the edible portion will store well in the ground if mulched with a heavy layer of straw. Cool-temperature-adapted crops are excellent for fall gardening because they continue to grow well into autumn and can be harvested after many tender plants have been killed by frost.

- **Semi-hardy vegetables** (can stand light frost, 30-32°F)

Beets	Mustard
Chinese Cabbage	Radishes
Collards	Spinach
Potatoes	Swiss Chard
Bibb Lettuce	Green Onions
Leaf Lettuce	

**Hardy vegetables** (can stand several frosts, but are killed when temperatures drop near 20°F)

Cabbage	Carrots
Broccoli	Turnips
Cauliflower	Rutabagas
Brussels Sprouts	Kale

### Selecting and Buying Seed

For a fall garden, select the shortest-season cultivars available to insure harvest before killing frosts arrive. Look for cultivars labeled "early season" or compare the number of days to harvest and select those with the fewest days to maturity. This information is usually printed on the seed packet or in the cultivar description in seed catalogs. Plan seed purchases for the fall garden when you are planning your spring garden. Seeds can be purchased either locally or from mail-order companies. However, quality seeds disappear from garden stores in mid- to late-summer when seed companies remove their displays.

Always store seeds in a cool, dry location.

### When to Plant

To determine when to plant a particular vegetable for the latest harvest, you must know the average date of the first killing frost (see [NebGuide G96-1312, Autumn Freeze Probabilities](#)) in your area, as well as the cultivar's number of days to maturity. To estimate when to plant fall crops, use the following formula.

- + Number of days from seeding or transplanting outdoors to harvest.
- + Number of days from seed to transplantable size (if you start your own transplants).
- + Average harvest period
- + Fall Factor (about 14 days)
- + Frost Tender Factor (14 days) (if applicable)

= Days to count back from the first expected fall frost.

The Fall Factor takes into account the slower growth which results from cooler weather and shorter days. The Frost Tender Factor is added only for frost-sensitive crops, such as corn, beans, cucumbers, tomatoes or squash. These plants must mature at least two weeks before frost in order to produce a reasonable harvest.

## **Preparing Ground for Fall Planting**

To prepare the soil for the fall garden, first salvage any usable produce from existing crops.

Because weeds often take over a garden as summer progresses, starting fresh with a fall garden is one way to get ahead of a weed problem. Remove and compost or mow off any remaining spent crops or weeds and allow the chopped residue to dry. Heavily diseased and/or insect infested plants should be buried deeply, burned or put in the garbage to reduce the spread of pathogens. Weeds with seedheads should be disposed of in the garbage to prevent repopulating the garden with fresh seed.

Cucumber and melon plants infected with or killed by bacterial wilt should be pulled up and placed in a closed garbage container. Cucumber beetles are attracted to the dying plants and if allowed to continue to feed, may spread the disease to new crops of cucumbers. Most other plant residues can be composted, if you have a well-maintained compost pile which generates enough heat to kill disease pathogens.

Spread 2 to 3 inches of compost or aged manure over the fall planting area to both boost the nutrient level and enhance the soil's water-holding capacity. If spring-planted crops were heavily fertilized, you may not need additional fertilizer. However, it may be beneficial to apply 1-2 pounds of a complete analysis fertilizer, such as 12-12-12, per 100 square feet of growing area.

Spade or rototill the top 4 to 6 inches of soil. This not only helps relieve compaction, but also incorporates the compost and other organic matter into the soil. Avoid deeper cultivation, which causes more moisture to be lost from the sub-soil. If the soil is too hard to work, apply approximately 1/2 inch of irrigation water and let it soak in overnight. While it isn't good to work the soil when it is too wet; it may be impossible to do if it is dry and compacted.

The small rototiller/cultivators that have become popular in recent years have a difficult time working in dry, compacted soil. Use a spading fork to break up hard ground, then follow with a tiller to incorporate the organic matter. Excessive rototilling, however, destroys the soil structure, resulting in poor drainage and surface crusting. Crusted soil makes it difficult for seedlings to emerge.

Once the soil is prepared and you are ready to plant, check soil moisture content again. If it is extremely dry, irrigate lightly a day or two before planting. Plant seeds in shallow trenches to conserve moisture. Cover the seeds about twice as deep as you would during spring planting to keep seeds from drying during germination. Light irrigation 2-3 times per day during extremely hot weather will keep the soil moist and prevent seed death.

Although most seeds will germinate quickly in the warm summer soil, some, such as lettuce, peas and spinach, will not germinate well if the soil temperature is above 85°F. Shading the soil with a board or a light mulch will keep the soil cooler, enhancing germination. To shade seeds with a board, place a brick or flower pot under each end to hold the board off the soil surface. Remove the temporary shade when you see sprouts emerging. Light coverings of straw or dry grass clippings (1/2 inch deep or less) may be

left in place. Thicker mulch needs to be pulled back so the seedlings can receive full sunlight. Once the seedlings are 1 to 2 inches tall, apply additional mulch to help retain soil moisture and insulate the soil from the sun.

## **Insect and Disease Management**

While some insect pests are not as prevalent on fall crops as on spring-planted crops, others are just as bad or worse. By mid-summer, both grasshoppers and corn earworms can be heavy feeders on a variety of crops. Cucumber beetle and squash bug populations peak in August and can quickly destroy cucumber and squash seedlings.

Imported cabbage worms and cabbage loopers can decimate new cole crop transplants if not diligently controlled. Regular sprays of the bacteria *Bacillus thuringiensis*, commonly called *B.t.* applied according to label directions can keep caterpillars in check. Readily available brands of *B.t.* kill only the larvae of butterflies and moths, not the adults. It is a safe pesticide to use on food crops, as humans and other animals are not affected by the bacteria. Because *B.t.* also will kill desirable butterflies and moths, it should be used only on crops infested with undesirable caterpillars.

To reduce the need for pesticides, use extra-lightweight floating row covers as a way to exclude insects. Floating row covers should be placed over new transplants or newly seeded areas following planting to prevent insects from attacking emerging plants. Because light and moisture pass through the coverings, removal for irrigation isn't necessary. Floating row covers should be removed from insect-pollinated crops when plants begin blooming. Row covers will also help shade the soil and may enhance germination.

Both powdery mildew and downy mildew often infect squash plants as autumn nights grow cooler and dew keeps the foliage moist through the night. Fungicides can be applied when disease symptoms first appear to reduce their spread.

## **Weed Control**

Preparing the soil for new plantings will bring weed seeds to the surface where they can germinate. Be diligent about pulling or hoeing young weeds as your new crop grows.

Mulching will help reduce weed germination by both blocking light to the soil and smothering tiny weeds.

## **Transplants**

As with spring plantings, some crops are more easily established when started early and transplanted into the garden. In Nebraska, garden stores rarely offer freshly grown transplants for fall planting, but seedlings can be grown in 5 to 6 weeks. Growing

transplants in the summer is easy; once seeds have emerged, they can be grown outdoors in partial shade to full sun. There are no worries of freezing weather and no need for plant lights for these transplants and the blowing wind and bright sunlight will help produce stocky, vigorous plants. However, one must keep an eye on cole crop and seedlings grown outdoors to prevent them from being skeletonized by cabbage worms.

### **Pre-sprouting**

If summer temperatures are especially hot, cool-season seeds may be pre-sprouted inside in air-conditioned comfort. To sprout seeds, sprinkle them on a moist paper towel; roll up and place in a plastic bag. Check the seeds daily. Once most have sprouted, they are ready to plant outside. Plant the pre-germinated seeds as soon as possible, allowing the roots to grow no longer than 1/4". Sprouted seeds may be planted deeper than normal to help prevent drying out, but do not damage the small root when planting. Keep pre-germinated seeds moist until emergence.

### **Frost Protection -- *How Low Can It Go?***

In Nebraska, the first autumn frost is often followed by 2-3 weeks of warmer weather. With a little help, frost-tender plants can grow throughout those weeks. Lightweight blankets, sheets, newspapers, buckets and floating row covers all can be used to protect tender plants. Usually the first frost hits on a cloudless night, preventing heat from being reflected back to earth's surface. Covering plants keeps the ground heat around your plants so they do not freeze.

Following a freeze, uncover your plants after the temperature rises above 32°F. Read [NebGuide G95-1264, \*Storing Fresh Fruits and Vegetables\*](#), to learn how to maximize storage time and get the most from garden produce.

Root crops, such as beets, carrots, parsnips, rutabagas and turnips, can be left in the ground through the fall. Once hard freezes occur, mulch these plants with a heavy layer of straw to keep the ground from freezing. Root crops can be dug as needed throughout the winter by temporarily removing the mulch cover.