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G92-1084 Culture of Cole Crops

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Culture of Cole Crops

How to grow successfully broccoli, brussels sprouts, cabbage, cauliflower, and kohlrabi.

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Cole crops, which include broccoli, brussels sprouts, cabbage, cauliflower, and kohlrabi, can be successfully grown on most soils if drainage is good and the crop is supplied with adequate water and nutrients, particularly nitrogen. Light-textured soils usually produce earlier crops but heavier soils hold more moisture and tend to produce crops that hold quality longer at maturity.

Cole crops have shallow root systems. Inadequate moisture may cause small cauliflower heads to form prematurely. Rainfall or irrigation following a prolonged dry spell may cause splitting of cabbage and kohlrabi. Supplemental irrigation is important for growing cole crops in Nebraska.

Cole crops grow best between 60° and 70°F. Late varieties will continue to grow at fall temperatures as low as 41° F, but few varieties make much growth above 78°F. Properly hardened mature cabbage plants can withstand temperatures as low as 25°F for shorticulture durations. Broccoli and cauliflower can withstand light frosts. However, exposure of young plants to temperatures below 50°F can result in premature seed stalk development or failure to develop full-size heads. This can be a particular problem in broccoli and cauliflower. Cabbage is the most heat tolerant, but prolonged high temperatures cause puffy heads with long cores and increased tipburn. High temperatures cause broccoli and cauliflower heads to become loose and branchy and may increase the occurrence of bracts (leaf-like structures) in the heads. Broccoli buds turn yellow and flower rapidly in hot weather, while cauliflower buds develop a characteristic "ricey" appearance. Quality deteriorates and plants develop bitter flavors and a tough texture. Young plants can tolerate colder and warmer temperatures than older plants. This favors the use of transplants for early spring crops and seed for fall crops.

Cabbage, kohlrabi, and broccoli, in that order, are the easiest cole crops to grow. Cauliflower and brussels sprouts are more difficult. When irrigationd, both yield and quality of cole crops increase from east to west across Nebraska. Excellent yields of high quality cauliflower have been harvested in the fall at the North Platte and Scottsbluff Experiment Stations.

Soil Preparation and Planting

Rotate cole crops to avoid planting in the same area more frequently than once in four years. Cole crops need a fertile soil for high yields. Most Nebraska soils are well supplied with potassium and some with phosphorous. A soil test can determine phosphorus needs. Apply and work into the soil nitrogen fertilizer before planting unless the soil has received a recent application of manure or compost. Apply 1 lb actual nitrogen per 1,000 square feet (equivalent to 6 cups of ammonium nitrate or 10 cups of ammonium sulphate).

Transplants of early maturing varieties are best for spring planting and early summer harvest. Although tolerant of frost, do not transplant cole crops until temperature has become warm enough to support young seedling growth.

The usual time when such conditions first occur and the latest time for transplanting in different regions of Nebraska are shown in *Table I*. Transplants may be purchased or home grown under proper conditions.

Set transplants 12" to 18" apart in rows 24" to 36" wide. Use the wider spacing for later maturing varieties. Cole crops transplant easily but will suffer less shock with little check in growth if water is applied when they are set in the field.

Table I. Time for transplanting and seeding cole crops.

	Region in Nebraska		
	East	*Central*	*Panhandle*
Transplanting for early harvest	April 5-May 5	April 10-May 10	April 15-May 20
Seeding for fall harvest	June 25-July 15	June 20-July 10	June 15- July 5

Suggested periods for seeding cole crops for fall harvest are also given in *Table I*. Later maturing varieties are best suited for fall production. Crops can be seeded where they will grow to harvest or, if space is at a premium, may be seeded in some smaller garden area for transplanting at a later date.

Late cole crops can be seeded or transplanted in an area cropped to lettuce, peas, spinach, or snap beans but should not follow radishes or other crucifers. Rows should be 24" to 36" apart with transplants set or seedlings thinned to 12" to 18" apart. Plant seed about 1/4" deep. Proper spacing for seeded plants is best accomplished if three or four seeds are dropped in one place and later thinned to a single plant before they become overcrowded.

Weed Control

Cole crop roots grow near the surface, so cultivation and hoeing should be shallow. This is particularly important as plants increase in size and root injury is more likely to occur. Weeding is usually necessary until plants are about half grown to shade the soil and reduce weed competition. Timely cultivation is important, since weeds are controlled best when they are small.

Cultivation and hoeing are preferred weed control methods in small gardens. Chemical herbicides are available for larger plantings. For information regarding pesticides currently registered on each cole crop, contact the county Extension office or the Department of Horticulture, University of Nebraska, Lincoln, Nebraska 68583-0724.

Irrigation and Side-dressing Fertilizer

For good yields and quality, cole crops should grow at a rapid and regular rate. This is particularly important with broccoli and even more so with cauliflower to avoid premature forming of small heads.

Maintaining adequate moisture and nitrogen is essential for this continuous, rapid growth. Roots of cole crops are shallow, so irrigation should be more frequent but lighter than for deeper rooted crops. Water immediately after transplants are set and whenever the soil surface begins to look dry. Several irrigations may be needed when rain is infrequent. Avoid over-irrigating, as poor drainage as well as lack of water is harmful.

An application of 1/4 pound of actual nitrogen per 100 feet of row (equivalent to about 1 cup of ammonium nitrate or 1 1/2 cups of ammonium sulfate) about two weeks after transplanting and a second application when heads are beginning to form will assure adequate nitrogen. Nitrogen can be side-dressed when cultivating or hoeing or applied and irrigationd into the soil.

Insects

Aphids, the larvae of diamondback moths, cabbage loopers, and other worms are common cabbage pests. To control these, start a good spray program before the insects build up to any extent. Good spray coverage of both sides of the leaves is necessary since many insects are found on the underside of leaves and in leaf crevices. The biological control agent, *Bacillus thurengiensis* (B. t.), can provide effective control of cabbage worms and can be combined with an insecticidal soap for aphid control. It is best to apply products containing B. t. late in the evening, as ultraviolet rays will destroy this material. Applications will need to be made every five to eight days. For larger plantings, contact your county extension office for pesticides registered and effective against specific insect pests.

Diseases

Use of resistant varieties and crop rotation are the best ways to avoid cole crop diseases. Fusarium yellows and black rot are common problems in soils formerly planted to cole crops. Resistant varieties are available and usually are so designated on the seed packets or in the seed catalog. Good soil drainage will reduce the occurrence of various bottom rots and seedling diseases. Disease-free seed and a crop rotation with no crucifers more frequent than once in four years are the best ways to avoid these diseases.

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