Soil

Strawberries will grow satisfactorily in most garden soils, but they require a relatively high level of soil fertility for optimal production. The soil pH should be between 5.5 and 6.5. Livestock manure, preferably composted, may be applied the year before planting. If manure is not available, compost and commercial fertilizer can be added when preparing the soil. Apply fifteen to twenty pounds of 10-20-20 fertilizer, or equivalent, per 1,000 square feet, and work the fertilizer into the top six to eight inches of soil.

Planting and Spacing

Strawberries should be planted as soon as the ground can be prepared in the spring. Do not plant if the soil is wet. Planting is best done in March or April in Illinois to allow the plants time to become well established before the hot summer weather begins. If possible, the plants should be set during cloudy weather or during the late afternoon or evening. Set the plants to the proper depth and apply one pint of water per plant (Figure M-4.). Within four to five weeks, mother plants will produce runners and new daughter plants (Figure M-5.).

The matted-row system (Figure M-6A. and M-6B.) is the most popular method for growing June-bearing

Table M-2. Strawberry cultivars for Illinois, listed by season from earliest to latest within groups.

Strawberry type	Fruit size	Disease resistance: Red stele[a]	Disease resistance: Verticillium wilt[a]	Region of adaptation*
June bearing				
Earliglow	medium	R	R	N,C,S
Annapolis	large	R	S	N
Honeoye	large	S	S	N,C,S
Delmarvel	large	R	R	N,C,S
Seneca	medium	S	S	N,C
Jewel	large	S	S	N,C
Kent	large	S	S	N,C
Allstar	very large	R	R	N,C,S
Day neutrals				
Tristar	medium	R	R	N,C,S
Tribute	medium	R	R	N,C,S

[a]R = resistant to this disease
[a]S = susceptible to this disease
**N = adapted to region north of Interstate 80*
**C = adapted to region between Interstate 80 & Interstate 70*
**S = adapted to region south of Interstate 70*

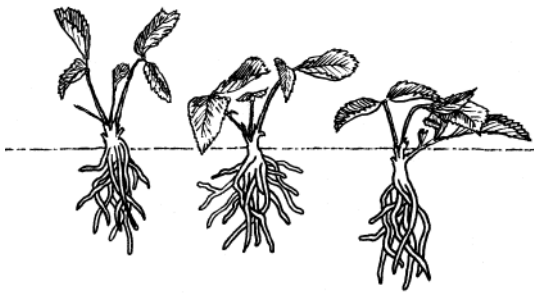

Figure M-4. Proper planting depth. The center plant is set correctly, with the soil just covering the tops of the roots. The plant on the left is too shallow; the plant on the right, too deep.

Figure M-5. Young plant soon after planting, with runners.

Figure M-6A. Runners can be made to grow in "matted rows" by training most of the runners into the row and rototilling out the others (also see Fig. M-7. on pg. M-6).

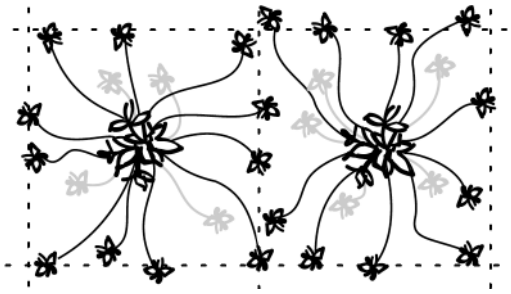

Figure M-6B. Matted row plantings.

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(standard) cultivars in Illinois. The plants should be set eighteen to thirty inches apart in rows that are three to four feet apart. The daughter plants are allowed to root freely to become a matted row no wider than two feet.

Spaced-row systems (Figure M-7.) limit the number of daughter plants that develop from a mother plant. Under this system, the original mother plants are spaced the same as before, but the daughter plants are spaced to root no closer than four inches apart. All other runners are cut from the mother plants. Such spacing gives optimal growing conditions because strawberry rows can often be too dense for good production. Spaced-row culture requires more care than matted-row plantings, but higher yields, larger berries, and fewer disease problems may justify the extra effort.

The hill system (Figure M-8.) is the best method to grow everbearing and day-neutral cultivars. All runners are removed so that only the original mother plant is left to grow. Runners develop from the same region as flower stalks, so runner removal enables the mother plant to develop numerous crowns and more flower stalks. Multiple rows are often arranged in groups of two, three, or four plants with a two-foot walkway between each group of rows. Plants are set one foot apart in the multiple rows. The planting should be cultivated and hoed for the first two or three weeks; then the entire bed may be mulched. Sawdust or wood chips or even layers of newspaper laid flat between plants may be used as soil mulch during the growing season. Apply sawdust or corncobs in a layer one to two inches deep. About four cubic yards are needed to cover 1,000 square feet.

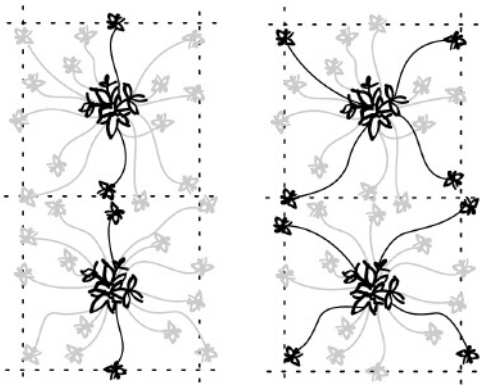

Figure M-7. Spaced row plantings. These spaced plantings were made by limiting the number of runners to two or four, or all runners can be removed to yield hills (see Figure M-8.).

Figure M-8. Hill plantings for day neutrals.

Blossom Removal

Remove flower stems as early as they appear from newly set plants during the first summer. Allowing the fruit to develop during the first season delays root and runner development and reduces the crop the following year. Flowers that develop after July on everbearing and day-neutral cultivars can be left to produce a crop later in the fall.

Weeds

Cultivation and hand hoeing should begin soon after the plants are set. This practice will control weeds and make the soil more suitable for runner plants to take root. Repeated cultivation every seven to ten days is effective against weeds because weeds are easier to kill when they are small. Cultivation should be shallow around the plants to prevent injury to the roots.

Chemical herbicides can be used to control weeds, but they may be impractical for small gardens. If herbicides are used, follow the spray schedule in *University of Illinois Extension Pest Management for the Home Landscape.*

Fertilizing

Strawberry plants should be fertilized in early August with four to six pounds of ammonium nitrate (33 percent nitrogen) fertilizer, or equivalent, per 1,000 square feet. This amount of nitrogen (one tablespoon spread in a narrow band about three inches from the crown of each plant) may also be applied about a month after planting if the plants are not vigorous. The August application may be broadcast over the rows but only when the foliage is dry. Brush the foliage with a broom or rake immediately after application to remove fertilizer particles; if left, the fertilizer particles may burn the leaves. Irrigate to carry fertilizer down into the root zone.

Be careful when applying fertilizer. Too much will cause excessive vegetative growth, reduce yields, increase losses from fruit and foliar diseases, and result

in winter injury. Application of fertilizer during the spring of a fruiting year can produce soft berries and is not recommended.

Mulching

Strawberries should be mulched during the winter months to protect the plants from extreme cold as well as to reduce damage from frost heaving that occurs when the soil alternately freezes and thaws. Mulching also conserves soil moisture, keeps the berries clean, and provides better picking conditions. Use a loose organic material such as clean, seed-free wheat straw. The straw also can be used to cover the plants temporarily during cold nights in the spring to protect the flowers from frost injury.

Apply straw mulch after several frosts in the fall, but before the temperature drops below 20° F. This generally occurs between mid-November and mid-December in Illinois. If using heavy equipment, it is best to wait until the ground is frozen. Apply 100 to 150 pounds of straw per 1,000 square feet (two to four bales) three to four inches deep over the rows. If the straw blows off of the plants, it should be raked back on them (Figure M-9.).

Remove part of the straw in the spring before new growth starts after the soil temperature remains at 40° F for at least three or four days. Put the excess straw between the rows.

Frost Control

Strawberry buds, blooms, and immature fruits are very susceptible to frost and freezing damage in the early spring (Figures M-10A., M-10B., and M-10C.). These losses can be lessened or prevented by covering the plants with straw or other insulating material or by careful and timely application of irrigation water. Irrigation water should be applied continuously when the temperature at the plant level reaches 34° F.

Figure M-10A. In the spring, it is necessary to remove the straw to avoid suffocating the plants. Pull back the straw and look at the plants. If they are green and growing, remove the straw before they become pale.

Figure M-10B. Strawberries will flower soon after the straw is removed. Strawberry blossoms are very susceptible to frost. Frost-damaged blossoms can be seen the next morning as "black eyes."

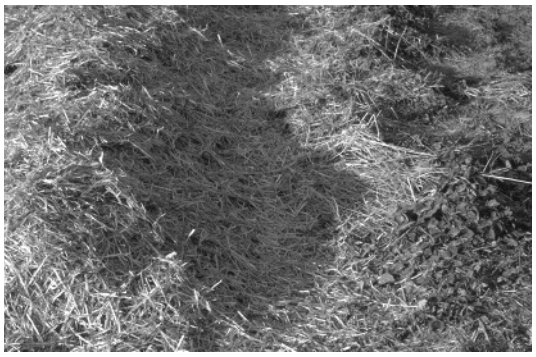

Figure M-9. This field of strawberries had been covered with straw (left), but it has blown off (right). To avoid plant loss, rake the straw back on the plants.

Figure M-10C. Strawberry flowers with frost-damaged centers called black eyes. These can be seen the morning after a frost.

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Remember, because warm air rises and cold air sinks, the air temperature above a planting can be considerably higher than at the ground level. Sprinklers that put out a minimum quantity of water (0.1 to 0.3 inches per hour) should be used to prevent unnecessary flooding. A finely perforated plastic hose may also be used. Water will freeze on the plants and blossoms; the blossoms will not be injured as long as water is applied during the entire freezing period. This system is effective down to temperatures of 25° F or lower. Once irrigation has begun, it must be continued through the night and into the next morning until all of the ice has melted from the plants.

Straw from between the rows may also be raked over the plants for protection. In small home patches, the placement of old blankets or sheets can often insulate the plants enough for them to survive frost. If this system is used, remove the covering (especially straw) during the day, and cover the plants on nights only when there is danger of frost. Spun bond material is available commercially to serve as a blanket over entire rows and will protect plantings down to temperatures of about 23° to 25° F.

Renewing the Patch (Renovation)

Properly managed strawberries will bear fruit more than one year. Usually a patch may be picked two to four years or more, but only good plantings should be maintained. Weedy or diseased plantings are best destroyed and replaced.

Immediately after the harvest is complete, the strawberries grown on the matted-row system should be renovated to achieve good production the next year. Mow the old foliage with a power mower, cutting off the leaves about *one inch above the crowns.* Rake the leaves and other debris from the patch and burn, compost, or incorporate them in the soil. To avoid spreading leaf diseases, do not return the leaf mulch compost to the strawberry planting. Do not mow the leaves if renovation cannot be completed within a week to ten days after harvest. Broadcast ten to fifteen pounds of 10-10-10 or 12-12-12 fertilizer, or equivalent, per 1,000 square feet over the planting. Narrow the rows to six to twelve inches wide by spading, hoeing, or rototilling. Eliminate all weeds by hoeing or cultivating. If the remaining plants in the narrowed row are too crowded (closer than four to six inches apart), it may be advisable to remove some of them. If an herbicide is used, apply it carefully and as directed on the label. Irrigate thoroughly to encourage the plants to recover and make new runners for the next season's crop.

Day-neutral and everbearing strawberries are usually grown in a hill system (Figure M-8.). Home gardeners who have limited space may grow these strawberries in terraced beds, pyramids, or barrels. These strawberries also make good edging plants or ground covers in the landscape. Sometimes they are grown as potted house plants or trained on "totem poles." If grown indoors, the plants must have good light, and the blossoms must be pollinated by hand to form well-shaped berries. Although these methods are not as productive as conventional systems, they do have ornamental value.

Cane Fruits or Brambles

Raspberries (Rubus spp.*)*

Raspberries ripen shortly after strawberries and are popular in all parts of Illinois. Plantings that are well cared for may produce crops for five years or more. Red, black, purple, and yellow fruit types are available. Red and yellow raspberries also have single- and double-cropping types. The double-cropping or everbearing cultivars bear one crop in the early summer and another crop in the fall. A careful pest-control program should be followed for all brambles. Prior to planting, destroy any wild brambles growing around or near the new plantings because they harbor destructive insects and diseases.

PLANTS AND PLANTINGS

Traditionally, one-year-old, No. 1 Grade plants have been best for establishing new plantings. Certified virus-free plants should be obtained. However, many commercial growers and homeowners are now planting tissue culture-derived brambles. These are small and require a little extra tending during establishment, but with proper care, will outgrow and yield more than conventionally propagated plants. Some nurseries offer "nursery-matured" tissue culture-derived plants that offer the same benefits as other tissue culture-derived plants but are easier to establish due to their larger size. The cultivars listed on Table M-3. have proven adaptability to Illinois.

Raspberries are best planted in early spring (March or April). Prevent the plants from drying out in the field prior to planting by placing their roots in a bucket of water. After cutting off any broken roots, carefully spread the remaining roots in the planting hole and firm the soil over them. Set red raspberries at the same depth they were in the nursery; set black and purple raspberries about one inch deeper. Apply one or two quarts of water around each plant.

At planting time, conventionally propagated red raspberry plants should be cut back so that an eight- to twelve-inch "handle" protrudes from the soil after planting. The handle serves as a marker for the plant's location. Handles of black and purple raspberries should be cut off at ground level, removed and burned to prevent disease infestation. Tissue culture-derived plants need no pruning at planting.

PLANT SPACING AND SUPPORT

Raspberries may be grown in hills or in hedgerows. The plant spacing depends on the system

of training to be used. Red and yellow raspberries spread by root suckers and naturally form a hedgerow. Black and purple raspberries seldom spread by root suckers and will remain as individual plants or hills.

FERTILIZING

- For maximum production, fertilizer should be applied prior to planting. Ten to fourteen days after planting, apply two ounces of 5-10-5 fertilizer, or equivalent, around each plant.
- In the second and subsequent years, the plants should be fertilized with 10-10-10 or equivalent fertilizer at a rate of fifteen to twenty pounds per 1,000 square feet broadcast along the hedgerow or about one-half cup spread around each plant in the hill system (Figure M-11.). Apply fertilizer in early spring before new growth begins.
- Dry animal manures may also be used to fertilize established raspberry plants. In the spring before new growth begins, apply 300 to 400 pounds of cow manure per 1,000 square feet or 100 to 200 pounds of poultry manure per 1,000 square feet.
- Do not apply fertilizer during the late summer or early fall. Such applications may injure the plants or stimulate soft, succulent growth that is very susceptible to winter injury.

MULCHING

Generally, raspberries should be cultivated shallowly during the early part of the first summer to suppress weeds. After the plants are established, a light organic-matter mulch may be applied. Mulched raspberries grow better, produce more, and have larger berries. A light cover of wheat straw is a good mulch. To suppress weed growth, mulch should be two to four inches deep. Mulch that is too deep will suppress cane emergence as well as weeds. Heavy mulches such as leaves and corncobs will suppress cane growth. The mulch should be renewed annually if needed. If turf is used between rows, it is best to keep it closely mowed and out of the row.

Mulched plantings will require extra nitrogen over the first two years. Apply double the amounts of fertilizer recommended earlier. After two years, the amount of nitrogen fertilizer applied may be reduced to normal levels because the decomposing mulch will begin to release fertilizer nutrients to the plants.

Figure M-11. Fertilizer application should be made around the plant at the drip line.

■ *Blackberries (Rubus* spp.*)*

Blackberries are well suited to the home fruit garden in the southern half of Illinois. Most blackberry cultivars are too susceptible to winter damage for dependable production in northern Illinois. However, the cultivar 'Illini Hardy' is suitable for

Table M-3. Raspberry cultivars for Illinois, listed by season from earliest to latest within plant type.

Raspberry type Cultivar	Harvest season	Region of adaptation*	
Red raspberry			
Boyne	summer	N	old cultivar that is very winter-hardy
Latham	summer	N,C	old cultivar that is relatively thornless and dependable
Heritage	fall	N,C,S	widely adapted, erect, very dependable, firm berries, good flavor, susceptible to *Phytophthora*
Yellow raspberry			
Anne	fall	N,C,S	large fruit, ripens at the same time as Heritage
Fall Gold	fall + spring	N,C,S	conical-shaped fruit
Black raspberry			
Bristol	spring	C,S	medium to large fruit
Jewel	spring	N,C,S	largest fruits of the black raspberry cultivars
Haut	spring	C,S	very good flavor
Purple raspberry			
Brandywine	spring	N,C,S	large fruits that are good for jams or jellies
Royalty	spring	N,C,S	best-flavored purple, it can be picked when red to resemble the flavor of a red raspberry or left to darken and develop a flavor more like a black raspberry

**N = adapted to region north of Interstate 80*
**C = adapted to region between Interstate 80 and Interstate 70*
**S = adapted to region south of Interstate 70*