CHRYSANTHEMUMS
OR THE HOME GARDEN
CHRYSANTHEMUMS FOR THE HOME GARDEN

Chrysanthemums are the most colorful garden plants for flowering in late summer and fall. The sturdy plants are covered with white, yellow, orange, bronze, red, purple, or pink flowers. A wealth of flower forms and sizes are available: formal, ball-shaped pompons; simple daisy-like singles; “spoons”; showy 5-inch “football” types. Chrysanthemums may be planted in masses or in small groups of 3 to 5 plants. The dwarf “cushion” types are useful as edging plants along a flower border. The tall kinds are suitable for the back of the border and valuable for cut flowers. Chrysanthemums are popular for flower arrangements because they keep so long.

The plants are easy to grow and even with little care produce flowers. With proper care many varieties will give outstanding results year after year.

GETTING STARTED

Spring is the best time to plant. Plant in April in southern Illinois and mid- to late-May in northern Illinois. Early planting is desirable, but wait until danger of killing frosts is past.

Chrysanthemums can be grown from rooted cuttings, but most home gardeners will have better results if they start with small established plants in pots or containers. Some florists, nurseriesmen, and garden centers offer small plants that have been forced into bloom in the spring. These plants will bloom again in the fall.

Some plants are grown in large containers or out in the field to be sold in the fall in full bloom. These plants are more expensive but make a quick display for the purchaser. They often winterkill unless given special care (see Winter Protection, page 8).

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WHERE TO PLANT

Full sunlight and a well-drained soil are the keys to success with garden chrysanthemums.

The plants need full sun at least 6 hours a day and preferably all day long. Plants grown under the shade of trees, shrubs, or buildings do not receive enough light. They become weak and produce few flowers. A southern exposure at the base of a wall or foundation protects late-flowering varieties against frost and is an excellent site if plenty of moisture is supplied during the summer.

Chrysanthemums grow well in almost any well-drained soil. Select a site that is somewhat elevated or has excellent underneath drainage. Avoid areas in which water accumulates after heavy rains. If natural drainage is poor, construct elevated beds by bringing in additional soil. Keep the bed in place with rows of concrete blocks, bricks, or other similar materials.

PREPARING THE SOIL

Any soil capable of producing a good crop of vegetables, flowers, or weeds can grow chrysanthemums.

Problem soils can be improved by additions of organic matter. Peat, leaf mold, and well-rotted manure are some good organic matter sources. Apply a 2- to 3-inch layer of one of these materials to the area to be planted. These soils also will require a corrective application of fertilizer. Exact amounts can be determined by a soil test. As a rule of thumb, apply ¼ to ½ pound of a complete garden fertilizer such as 10-6-4 or the equivalent to each 10 square feet of area to be planted. After the fertilizer and organic matter have been spread evenly over the soil, spade thoroughly to a depth of 6 inches.

SELECTING VARIETIES

There are hundreds of varieties of garden chrysanthemums. A good way to select varieties for your garden is to visit the display and trial grounds of florists and nurserymen or the gardens of parks during the autumn when the chrysanthemums are in bloom.

Varieties with appealing colors, forms, and sizes can be selected on the spot. Observe the growth habits of the plants; choose those that have made sturdy growth and have not been damaged by storms. Compare the heights and bloom dates. It is not possible to judge hardiness at this time, but varieties with many rosettes of leaves around the base of the plant are likely to be hardiest.
In selecting varieties for cut flowers, look for those with long stiff stems and loosely placed flower sprays.

The advice of the florist, nurseryman, or park gardener can be most helpful. Other gardeners near you will share their experiences with varieties. Finally, catalogs distributed by florists and nurserymen are useful. Besides illustrating many of the varieties, these give information as to color, flower form and size, height, and bloom date.

After several years of experience with growing chrysanthemums in your own garden, you will be able to select those varieties which you like and which do best and will discard the inferior ones.

PLANTING

Plants from containers are best set at the same depth at which they were grown. Plant rooted cuttings so that the roots are just barely covered. Firm the soil about the soil ball or roots and water thoroughly.

Space dwarf compact varieties intended for mass displays 18 inches apart. Spreading varieties or individual plants are best set about 24 inches apart.

PINching

Most chrysanthemums need to be pinched 2 or 3 times during the growing season. Pinching is the removal of about an inch of the tip of each branch or shoot by snapping it out with the thumb and first finger. Make the first pinch when the plant is about 6 to 8 inches tall. As the buds in the top 3 or 4 leaf axils start to grow after pinching, the plant develops a bushy, branched appearance. After these branches have grown to a length of 6 inches, again pinch out the tips as before. A third pinch may be necessary on fast-growing varieties or those planted early in the spring. Unless plants are properly pinched, they grow tall and straggly, are easily blown over by winds, and produce only a few flowers.

The date of the last pinch is important. Varieties that flower about September 15 should be given the last pinch about June 15; varieties flowering October 1 are last pinched about July 1; late varieties flowering after October 15 are pinched last on July 15. Some of the early-flowering “cushion” types are “self-pinching” and need not be pinched. The early flower buds produced by these types serve to periodically pinch the plants.
Pinching the plant.

Pinched plant several weeks after pinching, showing place of pinch and three branches that developed.
WATERING

Chrysanthemums require large amounts of water to grow and flower properly. If allowed to wilt frequently, the plants become stunted and the lower leaves turn brown and die. Chrysanthemums have a large shallow root system and quickly exhaust the water from the soil during periods of hot, dry weather. When watering it is necessary to apply enough water to thoroughly soak the top 6 inches of the soil. Do not water again until the soil is dry and the plants begin to wilt slightly. Apply water to soil; water splashed on foliage may spread diseases and nematodes.

SUMMER MULCHES

A mulch applied to the soil in late spring or early summer after the soil is warm is of definite advantage in most years in Illinois. Apply mulches only to moist soil. The mulch keeps the soil cooler, protects it from the compacting action of beating rains, conserves water, and prevents weeds from growing. Apply about 2 to 3 inches of mulch to either the entire area planted to chrysanthemums or just a 2-foot circle about the base of the plant.

There are many fine mulching materials. Coarse peat, mushroom manure, tobacco stems, partially decomposed leaves, and barnyard manure can be used without changing the fertilizer requirements. Ground corn cobs, sawdust, pine needles, buckwheat hulls, and straw require additional applications of a fertilizer containing nitrogen at the rate of $\frac{1}{4}$ to $\frac{1}{2}$ pound per 10 square feet. Inorganic mulches such as vermiculite or perlite are satisfactory in the coarse grades.

FERTILIZATION

In most soils chrysanthemums require fertilization several times during the summer. Plants growing properly make rapid growth and have thick leaves and stems and a dark green color. A 10-6-4 fertilizer or one of similar analysis may be applied at the rate of $\frac{1}{4}$ pound per 10 square feet or 2 tablespoonfuls spread over a 2-foot circle under each plant. Lightly cultivate the dry fertilizer into the soil. Make sure the soil is moist before applying fertilizer, and water thoroughly after its application.

Many fertilizers may be dissolved in water and applied to the soil. Follow recommended rates found on the fertilizer container. Again, make sure the soil is moist before applying the fertilizer.
Popular types of chrysanthemums.
SUPPORT

Correct pinching reduces the need for support, but support prevents wind and storm damage and keeps the lower leaves and flowers off the ground. The dwarf, compact varieties such as the “cushion” types require no support. Medium varieties often benefit from support, particularly at bloom time. Tall plants with large flowers must be supported.

To support plants in mass plantings, insert bushy branches in the soil near the main stem; the many twiggy branches support the plants. Or push strong bamboo or wooden stakes of suitable height into the soil near the stem and tie the main branches to the stake as necessary. Put all supports in place before they are needed.

CARE AFTER FLOWERING

After the plants have finished flowering, cut the stems off close to the ground. Destroy the old leaves, stems, and flowers by burning to prevent carryover of insects and above-ground diseases. If a summer mulch has been used, work it lightly into the soil. Take care not to disturb the tufts of green leaves near the base of the plant.

WINTER PROTECTION

Chrysanthemums grown in gardens are often listed in catalogs as hardy: that is, the plants overwinter in the garden and grow the following spring. The term “hardy chrysanthemums” has led many to feel that all varieties are completely hardy. Unfortunately, many varieties are not reliably winter-hardy in Illinois. Even varieties that have been hardy for years may not survive a disastrous winter.

The life cycle of the chrysanthemum reveals much about proper winter care. As the plant begins to flower, underground shoots or “suckers” are produced. These originate at the base of the plant; after growing underground and forming roots, the tip of the sucker emerges from the soil and produces a tuft of leaves. These tufts with their rooted suckers are the parts of the plant that will overwinter and produce flowering plants next year. The suckers with their roots help to anchor the plant and prevent its being heaved out of the ground except in severe conditions of freezing and thawing. Varieties that produce many suckers and leaf tufts are more apt to overwinter than those that produce but few. Varieties that produce few or no suckers seldom are winter-hardy. It is best to grow only varieties that produce many suckers.
Most varieties are hardy if the soil and the plants gradually become frozen in early winter and remain in that condition until spring, especially if there is a deep snow cover throughout the winter. These conditions seldom occur in Illinois. Because chrysanthemums are shallow rooted, when the soil freezes, thaws, and then freezes again during the normal Illinois winter, many of the plants are gradually forced out of the soil and the roots are broken off or displaced. A sudden drop in temperature then kills the exposed plants. Winter rains or melting snows that accumulate around the base of the plant smother and kill the plants. An early spring thaw in March or April followed by freezing temperatures often kills plants that have survived and have started into growth prematurely.

All of these factors affecting winter-hardiness must be given attention if most varieties are to be winter-hardy. First, provide excellent drainage so water does not accumulate about the plants. Second, after the soil has frozen solidly, apply a mulch on it. This mulch must be of loose materials that do not become compacted about the base of the plant. Such things as evergreen branches, coarse hay, twiggy shrub branches, or corn stalks are useful. Avoid peat, leaf mold, sawdust, and straw. Do not use the tops of chrysanthemum plants. Make sure that the mulch is not packed about the leafy growth. Gradually remove the mulch in the spring; wait until the danger of sudden freezes has passed before removing it entirely. If growth starts in the spring and there is danger of freezing, place a temporary mulch of straw over the new growth.

Even with such care some varieties will winterkill. It is probably best to avoid these varieties in future plantings, and grow only those that experience has shown are reliably hardy.

Some gardeners will wish to overwinter the more tender varieties. The best way to do this is in a cold frame. After flowering, cut off the tops of the old plants. Dig the plants with care so the suckers with the tuft of leaves at the end are not broken off and the roots are retained. Set the plants in a bed of soil that is higher than the surrounding soil. Make the frame of boards 12 to 18 inches high on one side and 6 inches higher on the opposite side and place it on the soil bed. The frame must be tight. The top of the frame will be covered by a sash glazed with glass or heavy plastic. After the soil has frozen, cover the plants with straw or loose hay and put the sash in place. Accumulations of water are kept from the plants, and they remain frozen all winter long.
PROPAGATION

Chrysanthemums left undisturbed and not winterkilled become overcrowded in a year or two. Divide varieties that make many tufts or rosettes of leaves yearly. Those that make few rosettes may be divided every two years. If plants cannot be divided this frequently, permit only one or two strong rosettes to grow in each clump. Remove all others in the spring by carefully digging them out or pruning off the shoots below the ground level. Plants that were previously diseased should not be propagated but dug and burned.

Propagation by division. After the last killing frost in spring, dig plants from the soil. Remove some of the soil from the roots. The plant will be found to consist of a clump of one to many leafy rosettes connected to the old plant by fleshy stems or "suckers" each with its own roots. Select the best-rooted, most vigorous rosettes and cut them away from the rest of the clump. Replant one or at most two rooted divisions, at the original spacing in newly prepared soil. Discard the other rosettes or plant them elsewhere.

Plant ready for division, showing rooted suckers each with its own rosette of leaves.
Propagation by cuttings. Rooted cuttings are preferred to divisions as they are less likely to carry diseases and often grow more vigorously.

Allow the plants to grow in the spring until the stems are 8 to 10 inches tall. Cut or break off the top 3 to 4 inches; these tops are the cuttings. Use a rooting medium of 1 part by volume of unused peat to 1 part sterile sand, perlite or, vermiculite. Mix the two materials thoroughly and fill a pot or shallow box to a depth of 4 to 6 inches. Dip the bottom half inch of the cutting in hormone powder to stimulate rooting. Insert the base of the cutting to a depth of 1½ to 2 inches in the rooting medium. Water immediately and thoroughly; thereafter water frequently enough to prevent severe wilting. The container of cuttings may be covered with glass or enclosed within plastic film and set in a warm (65°F) but shaded place.

Under good conditions and care, the cuttings will have roots half inch long in two to three weeks. They can then be planted directly to the garden or potted in soil for later planting when well rooted.

Seed propagation. Seeds are rarely used for propagation. Except for the single types, seed is seldom produced naturally. Seedlings are not true to type; that is, they will all differ from the parents in color, growth habit, and flowering time. The ease with which chrysanthemums may be propagated by cuttings or by division also discourages propagation by seed.

Chrysanthemum seed is seldom offered for sale and is much inferior to named varieties propagated by cuttings or by division. The production of seed involves careful trimming of the flowers at the right time and hand-pollination. Usually only a few seeds are produced. To the plant breeder and hobbyist, the development of seed by hand-pollination offers the most important way of obtaining new and improved varieties. Those who are interested in breeding chrysanthemums may wish to secure a copy of Circular 817, “Plant Breeding as a Hobby,” from a county farm adviser or from the Information Office, College of Agriculture, Urbana. Methods of breeding chrysanthemums and other plants are described in this circular. Those wishing further information about breeding chrysanthemums may write to the authors of this circular.

Gardeners who do obtain seed of chrysanthemums can get information about seed germination in Circular 796, “Germinating Flower Seeds,” also obtainable from a county adviser or the College of Agriculture.
Breaking out the cutting.

Cutting ready to insert in propagation medium.

The rooted cutting.
MAJOR INSECT PESTS

**Aphids**
Green or black fat-bodied lice suck sap from shoot tips or the underside of leaves, causing distortion.

**Caterpillars and worms**
Chew holes in leaves or may even consume entire leaves.

**Mites**
Mites appear as minute specks moving about and feeding on the underside of leaves, causing mottling of the leaves. When numerous, fine silken webs will be present. If you suspect there are mites, shake the plant over white paper. In bright light you will see the mites as moving specks.

**Thrips**
These small insects rasp the underside of leaves, causing distortion. They may feed on the flowers and cause distortion and browning.

**Tarnished plant bug**
Feeds on tip of plant or buds, stopping growth and causing distortion of leaves and flowers.

**Leaf miner**
Tiny larvae feed between surfaces of leaves, causing irregular dead areas. May be serious in some localities.

**Description**

**Control**
Spray or dust with malathion, lindane, or Diazinon.

Dust or spray with sevin or DDT.

Spray or dust the underside of the leaves with malathion, aramite, or Diazinon.

Dust lindane, malathion, or DDT on the underside of leaves and over the flowers as they open.

Spray plants with DDT.

Spray with malathion or Diazinon.

Examine plants regularly and treat immediately when an insect is noticed.
MAJOR DISEASES

Leaf spot
Description: Yellow to dark-brown areas develop on lower leaves, which usually drop if severely infected. More severe in wet weather.
Control: Spray or dust with ferbam, captan, or zineb. Keep plant foliage dry. Remove badly infected leaves.

Powdery mildew
Description: White powdery material develops on surfaces of leaves.
Control: Keep foliage dry. Dust with karathane or sulfur, or spray with Actidione P.M.

Verticillium wilt
Description: This fungus is carried in the soil and invades the water-conducting vessels in the plant, causing slow wilting, yellowing of leaves, poor flowers, and finally death of the plant.
Control: Remove and burn infected plants. Do not replant in infected soil.

Stunt
Description: Infected plants are severely stunted and bloom quite early with inferior flowers. The virus is easily transmitted to other plants by handling.
Control: Remove and burn infected plants immediately. Wash your hands thoroughly before handling healthy plants. Buy only stunt-free plants.

Examine plants regularly and treat immediately when a disease is noticed.
SUGGESTED PESTICIDE MATERIALS

**Acti-dione P. M.** For powdery mildew. Use as a spray. Follow manufacturer's directions.

**Aramite.** For spider mites. Use as a spray, 1½ tablespoons of 15% wettable powder in 1 gallon of water.

**Captan.** For leaf spot. Use 1 tablespoon 50% wettable powder per gallon, or dust with 7.5% material.

**DDT.** Use for caterpillars, thrips, or tarnished plant bug. Spray 1 tablespoon of 50% wettable powder or 2 tablespoons of 25% emulsifiable concentrate per gallon, or dust with 5% or 10% material.

**Diazinon.** For aphids, mites, or leaf miners. Use 1 tablespoon of 25% material per gallon of spray, or use 2% dust.

**Ferbam.** For leaf spot. Dust with 10% material or spray 1 tablespoon of 76% wettable powder per gallon.

**Karathane.** For mildew. Use 1 teaspoon of 25% wettable powder per gallon of spray.

**Lindane.** For aphids or thrips. Use ½ tablespoon per gallon of spray, either 25% wettable powder or 20% emulsifiable concentrate.

**Malathion.** For aphids, mites, thrips, and leaf miners. Use 1 tablespoon of 50% emulsifiable concentrate or 2 tablespoons of 25% wettable powder per gallon.

**Sevin.** For caterpillars. Use 1 to 2 tablespoons of 50% wettable powder per gallon of spray. Or use 3%, 5%, and 10% dusts.

**Sulfur.** For mildew. Use as a dust or use 2 tablespoons of wettable sulfur per gallon of spray.

**Zineb.** For leaf spots. Use 5% or 10% dusts, or spray 1 tablespoon of 75% wettable powder per gallon. Leaves less residue than ferbam.

**CAUTION:** Insecticides are deadly poisons, not only to insects but to man. Wear long rubber gloves — not plastic — when mixing insecticides. Wear protective clothing and preferably a respirator when applying. Follow instructions for use carefully. Keep insecticides from cuts and avoid inhaling fumes, sprays, or dusts. Do not smoke while spraying or dusting. Never remove label nor store in any other container. Keep insecticides out of reach of children and pets, preferably in a locked cabinet. Pour excess mixed materials on soil in the garden; do not store for later use. Wash hands and exposed parts of body thoroughly when finished. Fungicides are generally less toxic to man but should be treated with the same careful respect as insecticides.

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