

PEONIES



The peony has been a favorite flower for centuries. The Chinese chose it as the principle flower in the Imperial Palace Gardens, calling it 'Sho Yo,' meaning "most beautiful." In the eighth century, its charm captivated the Japanese, who developed more than 300 cultivars. By the early 19th century, European gardens began to feature the peony. Today, gardeners throughout Europe, Asia and North America regard the peony as one of the easiest, most rewarding plants to grow. With its long-lasting, colorful blooms, the peony is also popular as a cut flower, used in wedding bouquets and large floral arrangements.

Peonies grow from an underground crown and have either pointed or large, bulky roots. After the blooming season, stem buds—called "eyes"—form at the base of stems. These buds are the source of new stems in the spring. Flowers are terminal, with one to three lateral buds. In Kansas, peonies bloom in May and June.

There are two groups of peonies: tree peonies and herbaceous peonies. Tree peonies grow to eye level on woody stems with few branches. The stems of these peonies stay alive all winter, and they bloom early. Tree peonies are not used for cut flowers, though they are popular in gardens.

Herbaceous peonies are more commonly grown, and do well in a wide range of soil types and climates. Their bushy green, pink or red stems grow 2–4 feet tall and turn green by the time they are cut down in the fall. Each cultivar has leaves a particular shade of green and a shape ranging from broad to grasslike. Flower colors are white, yellow, cream, pink, rose and deep red. The flowers are grouped into types according to the petal shape: single, Japanese, anemone, semidouble, bomb and double.

Single peonies have five or more broad petals in one or two rows surrounding a center of golden, pollen-bearing stamens. Japanese peonies have five or more petals and a center of feathery structures called staminodes. Anemone peonies have five or more petals in several rows with broad central petals. Semidouble peonies have five or more outer petals and a center of broad petals with pollen-bearing stamens intermixed. Bomb peonies have a row of outer guard petals surrounding a pompon tuft of dense petals. Double peonies have five or more outer petals with the central stamens and carpels transformed into petals that make up the main body of the large, full flower. All types are grown as cut flowers, though the double types are the most popular.

Cultivars to Grow

For successful cut flowers, choose peonies with these characteristics:

- plant vigor and health
- ample stem production
- ability to take in water
- ability to hold up in storage
- ability to withstand shipping

Several growers across the country have suggested peonies suitable for cut flower production. This list is in Table 1. All are double flowers unless otherwise indicated.

Cultural Requirements

Soil. Peonies prefer a fertile, clay loam, with a well-drained subsoil. Optimum pH is 6.5. Good drainage is vital to avoid root rot and fungal diseases.

Table 1. Cultivars Suitable for Cut Flower Production

Red (Early)	Convoy	Raspberry Ice
	Kansas	Red Charm
	Firebelle	Red Grace
	Flame (single)	Red Red Rose
	Richard Carvel	Rosedale
(Midseason)	Big Ben	Howdy
	David Harem	Karl Rosenfield
	Felix Crousse	Lora Dexheimer
	Felix Supreme	Midnight Sun (Japanese)
	Gerry	Mt. St. Helens
	Paul M. Wild	Red Comet
Renato	Shawnee Chief	
(Late)	Old Faithful	Philippe Rivoire
Pink (Early)	Cytherea (semi-double)	June Rose
	Fairy's Petticoat	Monsieur Jules Elie
	Mister Ed	Coral Charm
	Princess Margaret	(semi-double) Edulis Superba
(Midseason)	Angel Cheeks	Nancy Nicholls
	Gay Paree	President Taft
	Largo (Japanese)	Queen of Sheba
	Mrs. F.D.R.	Raspberry Sundae
	Riene Hortense	Sea Shell (single)
	Sweet 16	Top Brass
	Walter Faxon	Mrs. Livingston Farrand
(Late)	Hansina Brand	Minuet
	Hermoine	Nick Shaylor
	James Pillow	Sarah Bernhardt
	Vivid Rose	
White (Early)	Charlie's White	Festiva Maxima
	Duchesse de Nemours	Mme de Verneville
	69A	Miss America (semi-double)
(Midseason)	Ann Cousins	Festiva Supreme
	Baroness Schroeder	Gay Paree
	Florence Nicholls	Bridal Icing
	Bridal Shower	Gardenia
	Lois Kelsey	Marshmallow Puff
	Mother's Choice	
(Late)	Elsa Sass	Lullaby
	Louise Marx (Japanese)	Mary E. Nicholls
	Mrs. Frank Beach	

Some of the most popular cultivars are:
 red—Shawnee Chief, Kansas
 pink—Monsieur Jules Elie, Sarah Bernhardt
 white—Festiva Maxima, Mme de Verneville

Plow the soil to a depth of 1–3 feet, and allow it to settle before planting. A deeper-plowed soil will facilitate root growth, with a corresponding increase in the plant size and amount of bloom. Peonies are a perennial plant, with a productive life of 25 years or more. It is, therefore, important to add as much organic matter to the soil as possible before planting. This should be done as far in advance of planting as possible to allow the soil to settle and prevent the peonies from sinking after planting.

Planting. Plant in a location with full sunlight, away from the competitive effects of tree roots. A sheltered location is preferable, where the peonies will be protected from heavy winds. Choose a permanent location, as peonies should not be harvested for three years after transplanting. *When you plant a peony, you plant it to last a lifetime.*

Plant healthy roots of the best commercial varieties, and take care not to injure the root. If buds accidentally break off, new ones will usually form, but they will be weaker. Examine roots for fungal growth and cut off rotted parts. Keep roots moist until they are planted in the ground; if roots are dry, soak them for several hours before planting. If planting is delayed, repack roots in the container, wetting the packing material thoroughly. They can be kept 1–2 weeks without damage. If roots must be kept longer, dig a trench long enough, wide enough and deep enough to hold the roots without crowding, and plant them about 6 inches apart. They will keep as long as a year without serious damage.

Peonies go dormant in late August, so plant between September 1 and the time the ground freezes. Planting in early autumn gives the soil ample time before frost to settle around the newly planted roots, making them less likely to heave during the winter. Stock dug the previous fall and kept in cold storage over winter may be planted in the spring. Such peonies will be less vigorous the first year because the root system will have had a shorter time to develop.

Plant spacing depends on cultivation method. For cross cultivation, plant spacing should be 4 feet every direction. Peonies are more commonly planted in rows, with a 24- to 36-inch spacing between plants and 4 feet between rows.

Dig each hole large enough to accommodate the root without crowding it. In heavy clay soil, plant so the buds are 1–2 inches below the soil surface. If the soil is light and friable, 2–3 inches is the proper depth. If the roots are planted too deep, a gnarly and much-branched stem develops between the roots and the shoots. These plants are predisposed to decay or develop galled overgrowth. Too-shallow planting increases the possibility of the root being displaced by frost during winter or early spring. Also, if the root is too near the surface, it may become exposed and rot rapidly or be injured by cultivation. Small divisions need extra care and should not be planted as deeply as standard divisions or 1-year roots. Plant them no deeper than 2 inches.

Do not plant the root upside down. Fill in around the roots with soil until no voids are left below the plant or among the rows. Air pockets in the soil will dry the roots, causing them to die. Firm the soil well and fill in until the soil just covers the roots and buds. Pour in about a gallon of water and let it settle, then fill in with loose soil, mounding it a few inches for winter protection and to keep the roots from heaving. Normally, the mound will sink to proper level. If it does not, level it in the spring. As the peony grows older, the crown naturally pushes upward and has to be covered with soil.

Mulching. After the ground is frozen, cover the plants with a mulch of leaves, wheat straw or other material to prevent the peonies from being heaved out of the ground through alternate freezing and thawing. This will not be necessary after the first winter, except in the case of tiny divisions or young seedlings, which should be mulched for several years. Do not use manure or the dead leaves and stems of the peony as a mulch.

Remove mulch on all peonies as soon as the shoots break through the ground in spring. In Kansas, this is early March. Young peony plants are particularly slow in shoot appearance and may be a month later than established plants. When the soil is sufficiently dry, shallow cultivate to break up the soil crust, being careful not to injure roots near the soil surface.

Disbudding. Removal of lateral flower buds growing in the leaf axis, should be done when axillary buds are barely large enough to handle. Disbudding enhances the growth of the terminal flower bud because all the plant's resources are used to develop a single flower per stem. Removal of the terminal bud to promote lateral bud development or spray types is done with certain cultivars for particular markets. If quantity is desired and smaller flowers with little stem length are acceptable, lateral buds may be allowed to develop.

Peonies grown for cut flower use may not require

staking in normal weather conditions, as the flowers are cut when in bud.

Watering. Kansas growers should not attempt to produce specialty cut flowers without providing supplemental irrigation. The dollar value of the crop and demands of the market are such that it is foolish to attempt production under natural rainfall in Kansas.

Overhead watering is not recommended. It may physically damage the flowers, cause spotting on the petals, splash soil onto the foliage and promote the spread of disease. Drip irrigation is recommended because it places water on the ground where it is needed, not on the flowers or foliage.

The amount and frequency of water required will vary with the weather and crop maturity. Base the irrigation schedule on the soil moisture status in the root zone, and irrigate to provide sufficient but not excessive moisture. Insufficient water will reduce crop production and quality, whereas a consistently saturated soil will reduce growth and promote the development of root rot.

While the peony will withstand dryness to the point of drought without succumbing, a reasonable amount of moisture is essential for the best development. Peonies should have a liberal supply of water, especially while in bloom.

Fertilization. Before initiating a fertilizer program, always test the soil for nutrient content. The increased water requirement of cut flowers creates an increased requirement for fertilization. The application of fertilizer should coincide with crop needs.

One to two pounds of actual nitrogen per 1,000 square feet of production area per year of a 1-1-1 ratio fertilizer is adequate for plant growth and flower production. There are two approaches to timing the fertilizer application. Both approaches apply one-half the annual amount of fertilizer at shoot emergence in the spring. One approach applies the second half after the plants go dormant in the fall. The second approach applies one-fourth of the annual amount just after flower harvest and the balance at dormancy in the fall.

Keep all fertilizers away from the crowns. Spread fertilizer over the area where the roots grow, 6–18 inches from the crown, and thoroughly work it into the soil around the plants. Avoid over application of nitrogen.

Weed Control. Growers must control weeds in field production of peonies, as competition with weeds reduces the quantity and quality of floral production. A bed full of weeds also increases the time required to harvest, raising labor costs. Several options are available to combat weed growth: herbicides, barriers or mulches, and hoeing and hand-weeding.

Due to limited production of many species of specialty cut flowers, only a few herbicides are labeled for use. In 1993, Acclaim (fenoxaprop-ethyl) and Dachthal (dimethyl tetrachloroterephthalate) are registered for use on peonies. Contact your county Extension agent for an update on herbicides currently labeled for peony production.

Weed barriers or mulches prevent weed growth and restrict soil splash on foliage and flowers from rain and irrigation. The greatest benefits from these materials occur in the first growing season while the peony plants are becoming established. If a mulch is used over winter, remove it as soon as peony shoots start appearing to avoid diseases.

While hoeing and hand-weeding are excellent methods for weed control, availability and cost of labor may be prohibitive in all but the smallest production situations. Peonies develop a strong system of feeder roots near the surface of the soil, so the plant must be cultivated with great care to avoid injury to the roots. Use the hoe with caution. Do not cultivate deeper than 2 inches near the crown.

Insect Control. Good cultural practices are the best insect control. A healthy, actively growing plant is more resilient to insect attack. The ideal approach is a preventive program. Control insects early, when they are first detected; do not wait until a serious infestation occurs. Less chemical can be applied to spots as they develop than would be required to spray the entire crop. While peonies are not subject to damage from major insect pests, several general feeders may require an occasional spray treatment.

Thrips may be the most common insect pest of peonies. They may go undetected because of their size— $\frac{1}{25}$ inch long. Also, the feeding damage of a few thrips may go unnoticed because of the large size and plentiful amount of tissue characterizing peony flowers. The cumulative damage of high thrip populations will be more noticeable; flowers and foliage will be covered with silvery flecks caused by the thrips' rasping, sucking mouthparts.

Rose chafers may be occasional pests of peonies. These beetles are readily visible— $\frac{1}{2}$ inch long—and identifiable. They have tan-colored bodies and reddish-brown heads and thoraxes. Rose chafers emerge from the soil in June and early July and feed on a wide range of plants including peonies. After mating, they deposit eggs in the soil, where the larvae feed and develop. The larvae are not reported to be of economic importance.

If control is needed, products containing acephate (Orthene), carbaryl (Sevin) or malathion can be used against thrips or rose chafers.

Ants are attracted to peonies because of the sweet excretion on the buds. After the excretion is gone, ants are no longer attracted to the buds.

Disease Control. Diseases often reduce the quantity and quality of peony flowers and, in some cases, cause significant plant mortality. Some diseases, such as Botrytis blight and red spot, are perennial, while others may be sporadic. Table 2 lists some of the common peony diseases, their symptoms and control. Certain plant diseases are difficult to identify by field symptoms. Be sure to consult a plant pathologist for accurate disease diagnosis before applying fungicides.

Peony diseases usually can be controlled by a combination of sound cultural management and chemicals. Use only clean, high-quality plant material. It may be advisable to treat the roots with a fungicide dust (captan or thiram) for direct planting in the field. If possible, place the transplants on a slightly raised bed, and use drip irrigation. Avoid overhead watering, and keep plants adequately spaced for good air circulation. Overcrowding may result in plant losses from red spot and other fungal and foliar blights. Water the plants early in the day to allow for good foliage drying before nightfall. Closely monitor plants for any signs of diseases or insect activity. Remember that insects may transmit virus diseases. Keep fields as weed free as possible to control insects and viruses. Rotate planting beds in the field when buildup of soilborne fungal pathogens and nematodes occurs.

Routine fungicide applications may be necessary to control red spot on susceptible varieties of peony during most years. Control is much more effective if fungicides are applied before symptoms of red spot are apparent. Other fungal diseases may be controlled by curative fungicide applications beginning as soon as symptoms develop. Don't wait until plants are severely blighted to start applying fungicides. Table 2 lists fungicides currently labeled for control of specific diseases. Be sure to diagnose a disease correctly, and follow all instructions on the fungicide label.

Propagation. The easiest and most satisfactory method of propagation is by root division. Division of young roots helps increase stock quickly and produces plants that flower more freely. Young roots are straighter, smoother and easier to cut evenly. Two-year stock is best, although three-year stock may also be divided. Roots older than 3 years also may be successfully divided

Table 2. Peony Diseases

<u>Leafspots and Blights</u>	Symptoms	Control
<i>Botrytis</i> spp.	Blight. Sudden wilting of shoots. Brown or black rot can be seen at the base of stems, below ground. Grayish fungal growth is visible on stems just above soil line. Infected flowers turn brown, and large, irregular, brown areas develop on leaves. Fungal growth may also develop on infected plant parts.	Apply mancozeb, ferbam, or fixed coppers to soil and foliage in early spring and repeat it at 7- to 14-day intervals as necessary. Shorten intervals between applications during wet weather.
<i>Pytophthora cactorum</i>	Blight. Infected stems, leaves, blossoms, and buds are brown and leathery. Black cankers form on stems and cause them to fall over.	Application of mancozeb to control Botrytis blight will also help prevent Phytophthora blight
<i>Cladosporium</i> spp.	Red spot or measles. Small, dark red, circular spots on leaves. Spots coalesce to form blotches that are dark purple on lower leaf surface.	Application of mancozeb to control Botrytis blight will also help prevent other fungal leaf spots.
Other leafspots: <i>Alternaria</i> sp. <i>Cercospora paeoniae</i> <i>Phyllosticta</i> spp. <i>Septoria paeoniae</i>		Application of mancozeb to control Botrytis blight will also help prevent other fungal leaf spots.
<u>Rots and Wilts</u>		
<i>Verticillium albo-atrum</i>	Wilt. During the bloom period, foliage and shoots may wilt, with the lower shoot remaining intact. An internal vascular discoloration may be present in the lower stem. Infected plants may be stunted or killed.	Remove infected plants. The fungus is soilborne, so replanting in the same area may result in redevelopment of wilt.
Other Root Rots and Wilts: <i>Fusarium</i> sp. <i>Rhizoctonia solani</i> <i>Schlerotinia schlerotiorum</i> <i>Thielaviopsis basicola</i>	Several soilborne fungi may damage the roots and crowns of peony. Look for stunted plants. Roots and crowns may exhibit brown to black lesions.	Avoid mechanical injury to roots and crowns during cultivation. Avoid poorly drained soils. Keep plants vigorous by proper irrigation and fertilization.
<u>Nematodes</u>		
Root nematodes <i>Meloidogyne</i> spp. <i>Rotylenchus buxophilus</i>	Plants are stunted and spindly and fail to bloom. Roots have numerous small galls.	Avoid planting in nematode infested soil, or fumigate before planting.
<u>Virus</u>		
Peony ringspot	Greenish-yellow concentric bands, occasionally small, necrotic spots. Not a serious problem.	Rogue infected plants. Do not divide any plants showing virus symptoms. No chemical control is available.

and grown; such roots ordinarily are divided in private gardens. Because older peony roots are large and intertwined,, it is difficult to divide them without much waste. A few cultivars have a way of growing in separate pieces, each piece with a small crown of its own. This may make division easier, but it prevents development of a fine, large plant.

Lift and divide the roots after the plants go dormant. Before lifting, cut off the leaves and stems to the ground. Carefully dig around and under the plants, taking care not to break off the roots. Wash off soil. Use a sharp, sterilized knife to cut the roots into divisions containing two to five strong buds and a generous portion of fleshy root. Shorten roots to 4- to 6-inch stubs, and remove smaller, threadlike roots. Scarce or valuable cultivars may be cut into smaller pieces of one or two buds each. Such divisions should be placed in a cold frame for the first year. Too minute or too frequent division causes roots to lose vigor and delays bloom.

Dig up all roots. If a fleshy piece has broken off near the crown, it will often develop buds and form a crown of its own. The chance of the lower part of a root finger making any growth is small. When dormant, peonies withstand considerable exposure and can be shipped long distances safely.

Yields

Flowers are not harvested the first 3 years after planting. During this time, the buds are merely pinched off, leaving as many leaves as possible on the plant to increase plant size. The fourth year, each plant can be expected to produce 20–30 flower stems. Only one-third of these should be harvested. The remaining flower buds should be pinched off to maximize leaf surface area and

plant development. From the fifth year on, a mature, vigorous plant should produce 36–50 flower stems, half of which should be left unharvested to maintain the plant.

Harvest

Harvest peonies beginning the fourth year after planting. Optimum productivity is reached the fifth year and may continue more than 25 years. The length of the harvest season depends on spring temperatures. Warm spring temperatures shorten peony harvest, while cool spring temperatures lengthen it. Generally, the harvest season for commercial cut flower cultivars lasts 10–12 days, although each cultivar’s harvest may be as short as 2–4 days. Late-season cultivars and full, double cultivars often fail to open under sudden hot temperatures.

It is difficult to describe the proper stage at which to cut peony flowers. The authors have visited with many experienced growers who harvest by “feel,” squeezing each bud. Doubles and reds generally are harvested at a softer stage than other types and colors. Table 3 is a guide for the beginning grower. Experience with your crop will refine your harvest skills.

The first step in harvesting is to pick at the right stage of development. Follow these guidelines:

- Harvest peonies in their bud stage.
- Harvest when stems are at least 12 inches long. For arrangements, harvest stems that are 15–18 inches long.
- Harvest when the green sepals are separated, revealing the petal color.
- Harvest when the buds are 1–1³/₄ inches in diameter, depending on the plant variety, vigor and whether the side buds were disbudded.

Table 3. Suggested Bud Diameter and Condition at Harvest for Cut Peonies

Variety	Bud Diameter		Condition of Buds ¹	
	Minimum	Maximum	Minimum diameter	Maximum diameter
<i>White</i>				
Festiva Maxima	1¼"	1½"	medium firm	soft
Baroness Schroeder	1¼"	1½"	medium firm	slightly soft
Duchesse de Nemours	1⅛"	1⅜"	medium firm	slightly soft
<i>Pink</i>				
Monsieur Jules Elle	1⅛"	1½"	medium firm	slightly firm
Sarah Bernhardt	1⅛"	1½"	medium firm	soft
Edulis Superba	1⅛"	1¾"	slightly firm	soft
<i>Red</i>				
Felix Crousse	1⅛"	1¾"	slightly firm	soft

¹The bud conditions listed here are provided under the assumption that the flowers will be moved quickly from the field to storage. If this process is delayed, the flowers should be harvested in a slightly less mature form.



- In general, harvest when the buds are marshmallow soft. This will take some practice. Depending on the cultivar, reds should be harvested when softer and more open than pinks and whites.
- Harvest during the cool part of the day—morning or late in the day—when plants and flowers are free from dew and moisture.
- Harvest at least three times a day, if not more, depending on temperatures. Temperatures of 80°F and up hasten flower development. Product will be lost if flowers are not harvested frequently.
- Use clean, disinfected cutting utensils and containers.
- Do not remove more than one-third of the total leaf surface area of the plant.
- Cut stems leaving a minimum one leaf below the cut.
- Strip leaves from the bottom one-third of the stem.
- Do not put freshly harvested stems in water immediately; let them sit at least 20 minutes. Flowers placed in water immediately may “blast,” or open prematurely.
- Let the stems sit in clean water in disinfected containers for 1–2 hours at 37°F.
- Remove from water and let dry on sorting and grading tables.

Postharvest

- Grade by industry standards for stem length and flower size (see USDA Grading Standards).
- Use rubber bands to bunch flowers in fives, tens or twelves, depending on the intended market.
- Wrap stems with waxed florist paper, cellophane or two layers of newsprint.
- Store horizontally in cold storage at 32–36°F for best results. Peonies stored this way will keep 4 weeks.
- If a refrigerator must be used, wrap bunched stems in clear plastic and seal the ends. Clear plastic is used because most refrigerators are frost free and dehumidify the air, drying the flowers. With a refrigerator temperature of 40–42°F, storage life will be shorter.
- Remove flowers from storage 8 hours before desired opening time.
- Place stems in room-temperature water with floral preservative.
- Vase life is 5–10 days after buds open when held at 70°F, depending on cultivar and whether a preservative is used.

Dried and Preserved Flowers

Peonies dried in both bud and blossom retain good color and shape. The double types are used in Victorian-style winter bouquets, and the single and semidouble types are used in contemporary arrangements. If the flowers are to be dried immediately, harvest in desired stage of development. Otherwise, harvest flowers in the bud stage, and open to the desired stage of development before drying.

Various methods are available for drying peonies. Freeze-drying flowers is becoming popular, although the equipment is expensive. Other drying methods for all flower types include hanging materials upside down and the surround and cover method.

Buds and double peonies may be dried hanging upside down. Bunching and grading can be done in the field if flowers are to be dried immediately. Strip foliage from the bottom one-third of the stem and bunch the flower heads together. Cut the stems to the longest uniform length and secure with two rubber bands, one near the cut end and one farther up the stems. Hang the bunches to dry in a dark room at 50°F or higher with 50–60 percent relative humidity.

Buds and doubles may also be dried using the surround and cover method. When using this method, double peonies should be only partly open. Single, Japanese and semidouble flowers should be dried using the surround and cover method because it preserves the flower shape

best. Hanging single peonies upside down can cause the petals to reflex inward and lose their shape.

First, remove most of the stem because the flowers dry most efficiently in shallow containers. Choose a drying substance such as white cornmeal, sand, borax, kitty litter, silica gel or a specially formulated product. Do not choose something that will soil the flower or be difficult to remove. Place the flowers with stems removed on a 1/2- to 3/4-inch layer of drying substance in a container 2–3 inches deep. Carefully pour the drying substance over, around and through the petals to cover the flowers. Instructions regarding light, temperature and timing vary with the drying material. Books describing specific handling methods for each material are available. (See References.)

There may be a market for dried foliage, although removing photosynthetic areas of the plant may not be productive for recently planted peonies. Older, established plants could provide a source of dried peony foliage, if cut green in the spring. Many shades of green are available, as each peony cultivar has a slightly different foliage color, and an individual plant's foliage may change shades many times during the season. Dry foliage by hanging it upside down or place upright in 2 inches of water.

Marketing

Identify and organize market strategies before investing in roots, plants or equipment. Knowing how and where to sell the product is crucial to the success of a business. Be flexible, and determine more than one outlet; have a backup plan. The goal is to create a successful, profitable and sustainable business.

Market outlets

Local, direct retail markets:

- farmers markets
- roadside markets
- restaurants
- caterers

Local wholesale markets:

- florists
- grocery stores
- flower brokers
- freeze-drying operations

Regional/national/international wholesale markets:

- cooperatives
- flower brokers
- craft supply markets

While peonies have traditionally been marketed for Memorial Day grave decoration, their appeal has broad-

ened to a full range of uses. The demand for peonies in wedding bouquets and general floral arrangements has revived a national wholesale market. Most wholesalers want large quantities, with an apparent preference for white peonies over red or pink. Because peonies are a perishable, high-value crop, they are usually shipped air freight to the wholesale buyer, who pays the freight charges. Whatever market is chosen, peonies should be sold in the bud stage with instructions to the buyer on how to open the flowers for the longest vase life.

Grading

The United States Department of Agriculture (USDA) has published standards for grades of cut peonies in the bud (effective April 1, 1938). These standards specify 12 stems to the bunch, although current USDA reports use five or 10 stems to the bunch. Peonies also have been graded into classes of light, medium and heavy, with 10, 8 and 6 stems per bunch, respectively. The heavy grade is composed of taller, thick-stemmed flowers, while the light grade contains shorter, thin-stemmed flowers.

USDA Standards for Cut Peonies in the Bud

Numbers and letters in parentheses following grade terms indicate where they are defined under Definitions of Terms.

The tolerances for the standards are on a container basis. However, individual packages in any lot may vary from the specified tolerances as stated below, provided the averages for the entire lot, based on sample inspection, are within the tolerances specified.

For a tolerance of 10 percent or more, individual packages in any lot may contain not more than 1½ times the tolerance specified, except that when the package contains 15 specimens or less, individual packages may contain not more than double the tolerance specified.

For a tolerance of less than 10 percent, individual packages in any lot may contain not more than double the tolerance specified, provided at least one specimen which does not meet the requirements shall be allowed in any one package.

U.S. No. 1 shall consist of peonies of similar varietal characteristics (1) which have fresh (2), strong (3), well-trimmed (1) and unbroken stems (6) which are fairly straight (7). The buds shall be well-shaped (8), fresh (2), firm (9) with calyxes normally expanded (10) but not over mature (11), free from puff balls (12), bull heads (13) and wood heads (14). The buds and stems shall be free from decay and freezing injury and from damage (15) caused by dirt or other foreign material, discoloration, moisture, disease, insects, mechanical or other means.

Each bud shall be not less than 1 inch in diameter (16) and, unless otherwise specified, the overall length of bud and stem shall be not less than 24 inches but in no case shall the overall length be less than 20 inches.

Tolerances. In order to allow for variations other than size, incident to proper grading and handling, not more than a total of 5 percent, by count, of the peonies in any container may be below the requirements of this grade but not more than 1/2 percent shall be allowed for decay. In addition not more than a total of 10 percent, by count, of the peonies in any container may not meet the specified size requirements, but not more than one-half of this amount, or 5 percent, shall be allowed for buds which are smaller than the minimum diameter required.

U.S. No. 2 shall consist of peonies of similar varietal characteristics (1), which have fresh, fairly well-trimmed (5) and unbroken stems (6) which are not badly curved or crooked. The buds shall be fresh (2), firm (9) with calyxes normally expanded (10) but not overmature (11), free from puff balls (12), bull heads (13) and wood heads (14). The buds and stems shall be free from decay and from damage (15) caused by freezing, and from serious damage (17) caused by dirt or other foreign material, discoloration, moisture, disease, insects, mechanical or other means.

Each bud shall be not less than 7/8 inch in diameter (16), and unless otherwise specified, the overall length of the bud and stem shall not be less than 20 inches but in no case shall the overall length be less than 18 inches.

Tolerances. In order to allow for variations other than size incident to proper grading and handling, not more than a total of 10 percent, by count, of the peonies in any container may be below the requirements of the grade, but of this amount not more than one-half of this tolerance, or 5 percent, may be allowed for defects causing serious damage (16) and not more than one-fifth of this amount, or 1 percent, shall be allowed for decay. In addition, not more than a total of 10 percent, by count, of the peonies in any container may not meet the specified size requirements but not more than one-half of this amount, or 5 percent, shall be allowed for buds which are smaller than the minimum diameter required.

Unclassified shall consist of peonies which have not been classified in accordance with the foregoing grades. The term "unclassified" is not a grade with the meaning of these standards but is provided as a designation to show that no definite grade has been applied to the lot.

Standards for Bunching

Cut peonies in the bud may be packed loose or bunched. When bunched, each bunch shall contain

12 peonies, having buds which are reasonably uniform in size and development and stems which are reasonably uniform in length. When bunched the peonies shall be arranged so that the buds form a flat surface across the top of the bunch. Each bunch shall be held intact by two rubber bands, one placed 5–6 inches below the base of the buds and the other 3–4 inches from the base of the stems.

It is recommended that a No. 30 rubber band doubled be used 3–4 inches from the base of the stems and a No. 18 rubber band not doubled be used 5–6 inches from the base of the buds.

In order to allow for variations incident to proper bunching, not more than 5 percent, by count, of the bunches in any container may not meet the requirements for bunching.

Definitions of terms as used in these standards

1. "Similar varietal characteristics" means that the stems, foliage and buds of the peonies have the same general character of growth and color.

2. "Fresh" means that the buds and foliage are bright, not badly wilted, limp or flabby.

3. "Strong" means that the stem is fairly stiff and sturdy enough to hold the bud in a reasonably erect position.

4. "Well-trimmed" means that all lateral or side buds, and all foliage on the lowest 6–8 inches of the stem have been neatly removed, but the foliage on the remainder of the stem has not been removed to the extent that the appearance of the peony is damaged.

5. "Fairly well-trimmed" means that all the lateral or side buds and all the foliage on the lowest 6–8 inches of the stem have been neatly removed, but the foliage on the remainder of the stem has not been removed to the extent that the appearance of the peony is seriously damaged.

6. "Stems" means the flower stalks with the attached foliage.

7. "Fairly straight" means that the stem is of normal growth and is not more than slightly curved or crooked.

8. "Well-shaped" means that the bud is symmetrical, not lopsided or otherwise deformed.

9. "Firm" means that the bud is fairly compact and yields slightly to moderate pressure of the fingers.

10. "Normally expanded" means that the calyxes have expanded to the extent that the true color of the outer petals is exposed. At this stage of development, the two large calyxes and the outer petal at the top of the bud have developed to the extent that they will yield to slight pressure of the fingers.

11. "Overmature" means that the bud is soft and the outer petals have started to unfold.

12. “Puff ball” means a bud of poor substance which usually expands prematurely. The bud is usually long, soft on one side and feels soft to very soft in comparison with a normal bud of the same variety.

13. “Bull head” or “hard head” means a bud which is hard to very hard and which will not open or expand.

14. “Wood head” means a bud which is hard, usually flat, with the petals separated at the top and forming a small opening through which the interior of the bud can be seen.

15. “Damage” means any injury or defect which materially affects the appearance or shipping quality of the cut peonies. Inconspicuous anthracnose spots shall not be considered as damage.

16. “Diameter” means the greatest diameter measured through the center of the bud at right angles to a line running from the base to the top of the bud.

17. “Serious damage” means any injury which seriously affects the appearance or shipping quality of the peonies.

Common mistakes often made by growers in marketing peonies are:

1. Selection or suitability of varieties for commercial cutting. There seems to be only a limited number of varieties that respond favorably to commercial handling. Even those respond differently under varying cultural conditions, localities and season. The essential features of a good peony are:

- It must be a flower of good color and attractive form through all stages of development.
- A double flower is preferable; desirable fragrance is important.
- A free and reliable bloomer from year to year.
- Stiff, wiry, straight stems of uniform length—20-32 inches—and low-set foliage of good color and quality.
- Varieties which produce a single bud, or with a few laterals per stem are best. Less labor is required for disbudding.
- A good shipper, tolerant to abuse, and responsive to storage and water treatments.

2. Failure to recognize the proper stage of maturity for cutting. The proper stage of maturity varies greatly with different varieties.

3. The rapidity and condition with which the peonies are cut, graded and placed in storage.

4. Proper crating. Each crate should contain one variety and one grade. All crates should be well-filled and firm, but not packed and overcrowded. Either extreme may prove expensive. Never mix different varieties or grades in the same crate if avoidable.

5. A mistake in quoting size—for example, quoting

U.S. No. 1 and crating U.S. No. 1 with unclassified without distinctly indicating same. Packing and quoting accordingly is important.

Authors’ Comment

It should be noted that the above USDA grades and standards prescribe that a bunch of peonies contain 12 flower stems. As mentioned earlier, current USDA market reports use five or ten stems to the bunch. A number of other floriculture crops are currently marketed as 10 stems to the bunch. In practice, the wholesale peony market appears to be adopting a 10-stem bunch as the standard unit of commerce.

Brand names appearing in this publication are used for product identification. No endorsement is intended, nor is criticism of similar products not mentioned.

American Peony Society

The American Peony Society was organized in 1903 to “increase the general interest in the cultivation and use of the peony, to improve the methods of its cultivation, to increase its use as a decorative flower, to properly supervise the nomenclature of the different varieties and kinds of peonies, to encourage the introduction of improved seedlings and crosses, and to hold exhibitions with all members participating in the showing of their homegrown peonies.

American Peony Society
250 Interlachen Road
Hopkins, MN 55343

References

- Graber, Debbie. Peonies, Their Culture and Care. Kansas State University—Reno County Extension Office.
- Honeywell, E. R., Gaylord, F.C. and K.J. Fawcett. 1940. Peony Studies. Indiana Agr. Exp. Sta. Bul. 444:47.
- Jacobs, Betty E.M. Flowers that Last Forever, Growing, Harvesting and Preserving. A Garden Way Publishing Book, Storey Communications, Inc., Pownal, VT.
- Moffit, Roberta. 1989. The Step-by-Step Book of Preserving Flowers, 4th ed. P.O. Box 3597, Wilmington, DE 19807.
- USDA. 1938. United States Standards for Grades of Cut Peonies in the Bud. Agricultural Marketing Service.
- USDA. 1993. Wholesale Ornamental Crops Report. Agricultural Marketing Service.
- Whitlock, Sarah, and Martha Rankin. Dried Flowers, How to Prepare Them. Dept. 23, Dover Publications, Inc., 31 East 2nd Street, Mineola, NY 11501.

Notes:

About the authors:

Susan Stevens is a horticulture research assistant; **Alan B. Stevens** is Extension Floriculture and Ornamental Horticulture Specialist; **Karen L.B. Gast** is Extension Post Harvest and Marketing Specialist; **Judith A. O'Mara** is Extension Diagnostician; **Ned A. Tisserat** is Extension Plant Pathology Specialist; and **Robert Bauernfeind** is Extension Entomology Specialist.



Cooperative Extension Service, Manhattan, Kansas

MF-1083

October 1993

Issued in furtherance of Cooperative Extension Work, acts of May 8 and June 30, 1914, as amended. Kansas State University, County Extension Councils, and United States Department of Agriculture Cooperating. Richard D. Wootton, Associate Director. All educational programs and materials available without discrimination on the basis of race, color, national origin, sex, age, or disability. File Code: Horticulture and Landscaping (Commercial) 10-93—2M; 11-94—500