GROWERS GUIDE

FOR LOUISIANA AND THE GULF COAST

Cut Flowers

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THE LOUISIANA FARM TO SCHOOL PROGRAM

History

Formal cut flower production began in the Netherlands in the 1600 and 1700s with the development of the greenhouse in Europe. Greenhouses allowed the forcing of outdoor plants so they could be produced out of season and the flowers sold. Lilac bushes were dug, subjected to normal seasonal cold temperatures and brought into the greenhouse using supplemental heat to induce flowering. Cut stems were then harvested and sold commercially.

As Europeans settled the United States, they brought cut flower production with them, beginning with the first greenhouses being built near cities in the mid to late 1700s. The development of air transport and refrigerated trucks allowed the industry to move further from cities to areas with the best climates for optimum production and lower production costs. Carnation and rose production moved to the front range of Colorado and then to coastal California. Gladiolas and chrysanthemums moved to Florida and California. At this time, only a few species, like gladiolus, were grown in the field. California eventually dominated the U.S. cut flower industry in both field and greenhouse production.

Cut flowers do not have roots or soil, and therefore they were not restricted by normal plant quarantine policies.

With an interest in disrupting the drug trade in South America, U.S. officials encouraged cut flowers as an alternative crop in Columbia and the first carnations were produced in Bogotá in the mid 1980s. A mild climate with high light and cheap production costs like labor and greenhouse heat made the industry boom. Ecuador soon followed. Currently the three crops that are the backbone of the florist industry (carnations, chrysanthemums and roses) are all imported from Mexico and South America.

After a difficult time, most big U.S. producers switched to potted or bedding plants and small, local producers emerged to fill the need for high-quality flowers that had not been boxed and shipped dry over long distances. Varieties, floral trends and marketing also developed beyond the highly structured, traditional floral design and sales customs. A broad range of cut flowers is now sold directly to consumers at farmers markets and to specialty florists, supermarkets and wholesalers. These are called “field grown specialty cut flowers.” Much of the production occurs in the field but also in greenhouses, limited heat hoop houses and unheated high tunnels.

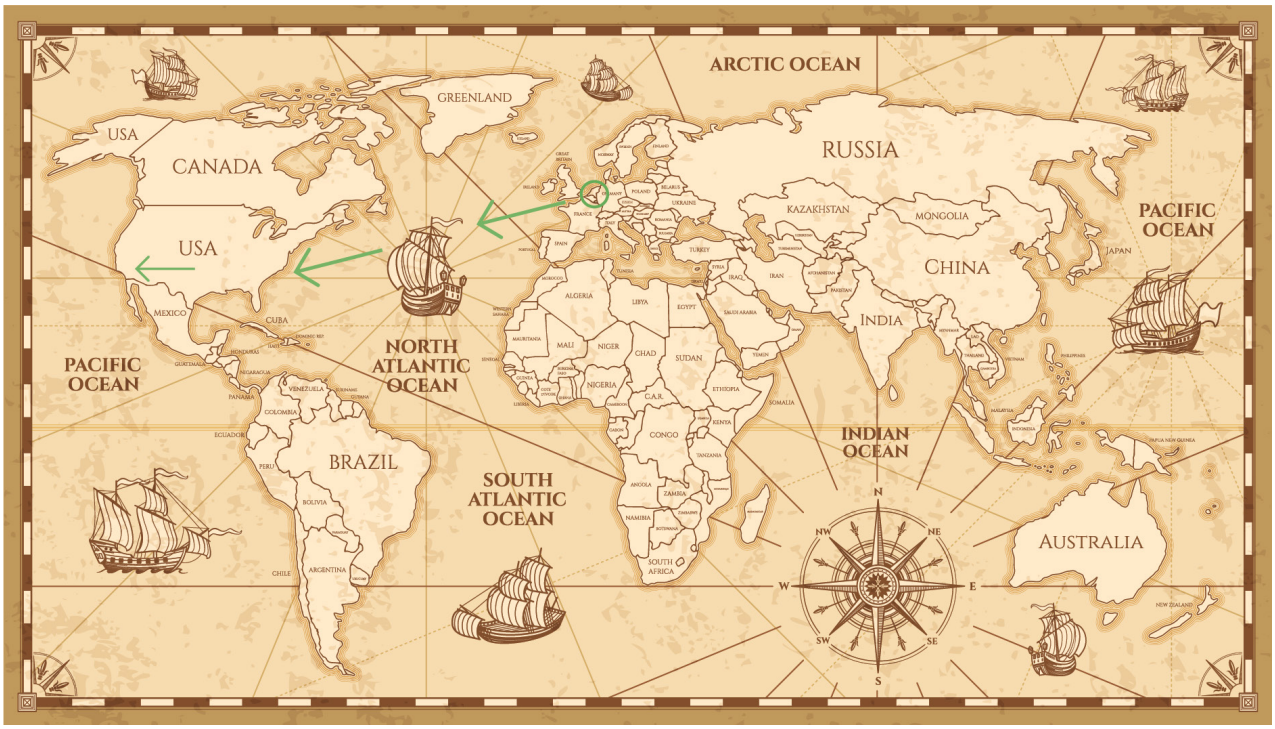

Figure 1. Map showing the movement of cut flower production from the Netherlands across the Americas.

Growing

Varieties

Over 100 varieties of flowers are grown as “specialty” cut flowers (those beyond the big three traditional crops of roses, carnations and chrysanthemums). These may be annuals, perennials, woody trees and shrubs, bulbs or native plants harvested from the wild. Annuals are the most produced and they are divided into annuals (warm season plants that grow from seed to flower in one growing season), hardy annuals (single season plants that survive low temperatures in the field) and half-hardy annuals (cannot survive a freeze but thrive in cool spring temperatures).

Flowering perennials are those plants which survive from year to year, generally increasing in size and producing more flowering stems as they mature. Bulb flowers are chosen for the most important factors that define all appropriate cut flowers: long stem length, long vase life (the number of days that a flower is attractive in a vase after being cut) and quality (the ability to retain their original appearance after being cut from the plant). Woody shrub and tree varieties are chosen for their suitability to the local climate.

When deciding what to grow, the grower should consider how flowers will be marketed. If sold to a flower wholesaler or retail florist, straight bunches (uniform bunches of identical flowers) will require large plantings of the same species. If grown for weddings, particular color schemes may be required, and space set aside for special requests. Direct-to-consumer sales, like farmers markets and grocery stores, require great variation in shapes and colors to construct attractive bouquets.

The importance of trialing and recordkeeping: Flower growers find that some varieties of each species perform better than others in the warm, moist climate of Louisiana and the Gulf Coast states. The best way to find good varieties is to talk to other flower growers and to trial several new varieties each year. Observe trialed varieties for qualities like long lasting flowers with long, straight stems and the ability to adapt to local climate. Take notes to help with variety selections for the following year. Choose varieties and species that require a minimum of chemical spraying, as flowers will be handled intimately for harvesting and processing. See the major cut flower species recommended for Louisiana in Table 1.

Figure 2. The basic forms of all flowers fall into 3 categories: line, mass and filler (left to right). Grow some of each to provide enough variation for floral arrangements.

Table 1. Recommended Cut Flower Species for Louisiana.

Species	Remarks & Spacing	How to Cut*	Bloom Time**
Hardy Annuals			
Bachelor Buttons ***Centaurea cyanus***	Direct sow in October and again in December. Cut low. Used in bouquets. Very large plant with multiple stems. 12" spacing.	Pinch out main bud when it opens. Cut remaining individual flower stems down to main stems.	Late March-April
Canterbury Bells ***Campanula medium***	Biennial grown as an annual. Fall plant to vernalize; plant transplants on 6"-8" spacing.	Cut to base of plant.	May-June
Delphinium ***Delphinium elatum***	Perennial grown as an annual. Plant plugs in fall, replanting every 4 weeks for continuous supply. 12"-18" spacing.	Cut to base, leaving a few nodes for secondaries to develop. Cut when bottom 1/3 of florets are open.	April-July
Larkspur ***Consolida ambigua***	Direct sow in October and again in early December. Produces secondary shoots. May be spring planted for smaller flowers. Imperial Giants is a good c.v. (cultivar or cultivated variety). Dries well. 6" spacing.	Cut single stems when 1/3 of florets have opened, leaving nodes for lower branches to develop as secondaries. Cut for 6 weeks. Hang inside if drying.	Late March-early May
Lisianthus ***Eustoma grandiflora***	Plant plugs in October and December. Cut entire cluster; will rebloom once. Support required. Needs good drainage. 8" spacing.	Cut entire plant to base, leaving a few inches for secondaries to emerge and bloom 12 weeks later.	Late May-late summer
Saponaria ***Saponaria vaccaria***	Direct sow in October and January. Good filler. Pink Beauty is good c.v. 6"-8" spacing.	Cut when multiple blooms have opened; bundle into 1" bunch. Blooms for 6 weeks.	April-May
Snapdragon ***Antirrhinum majus***	Start transplants in September; plant out Nov. 1. Produces secondary shoots. May spring plant for smaller flowers. Rocket and Potomac (greenhouse) are good c.v.'s. Caterpillar damage as days warm. Geotropic, support netting ensures straight stems. 6" spacing.	Cut single stems to within 2" of base when lower 1/3 of florets have opened; secondaries will emerge and are suitable for bouquet work. Do not lay flat.	Late March-May
Stock ***Matthiola incana***	Start transplants Sept. 1; plant out in November. Single stem or branched choices. Select seedlings for doubles (see video here). Cheerful and Katz are 95% double. Drainage sensitive. Fragrant. 4" spacing.	Cut entire plant to ground. Use ethylene blocker as a one-hour pulse before placing in keeping solution.	February-March
Sweet Pea ***Lathyrus odoratus***	Direct sow in October, November, February. February plant only in zone 8. Trellis. Short stems and vase life. Fragrant. 3"-4" spacing.	Bend and break flowers out of leaf axils. Do not leave flowers on vines or production will cease.	February-April
Half-Hardy Annuals			
Ageratum ***Ageratum houstonianum***	Start transplants Jan. 1; plant out mid-February. Branching plant. Needs lengthening days to bloom. 12" spacing.	See diagram for cutting branching plants (Figure 5).	Late March-June
Aster ***Callistephus chinensis***	Start transplants Jan. 1; plant out mid-February. Bouquet or single stem choices. Plant again in July for fall crop. Bright colors. 6"-12" spacing.	Cut single stems to ground; follow diagram for cutting branching varieties or cut entire plant.	May, Fall

Species	Remarks & Spacing	How to Cut*	Bloom Time**
False Queen Anne's Lace (Bishop's Weed) *Ammi majus*	Start transplants Jan. 1; plant out mid-February. May pinch out first bloom. Cut low. Plant again in July for fall crop. Filler. 8"-12" spacing.	Cut entire plant or discard large top flower and cut as branching plant (see Figure 5).	April-May, August-September
Statice *Limonium sinuatum*	Start transplants Jan. 1; plant out mid-February. Good filler and dried flower. Plant in November for high tunnel. 12" spacing.	Cut many single stems and bunch together for 1-1 ½" bundle. Blooms for months.	Late March-May
Annuals			
Aster *Callistephus chinensis*	Start transplants in July for fall plant. Single stem or bouquet. Bright colors. 6"-12" spacing.	Cut single stems to ground; follow diagram for cutting branching varieties.	September-October
Caryopteris *Caryopteris incana*	Start seeds or cuttings for transplant in mid-summer. Needs shortening days to bloom. 12" spacing.	See diagram for cutting branching plants.	September-October
Celosia *Celosia cristata, C. spicata*	Direct seed or start transplants for March planting. Tender. Produces secondary stems. Succession plant for continuous bloom. Use floating row covers to exclude moths from laying eggs. 6"-12" spacing.	Cut cock's comb when largest head size reached, feather type when first flower is mature. Leave a few inches at base for secondaries to develop. All secondary flowers will be ready at once.	Mid-June-frost
Corn (Broom or Indian) *Sorghum vulgare, Zea mays*	Direct seed in spring (60 F soil temperature). Used for dried arrangements for fall. 6"-8" spacing.	Cut when ears/plumes are fully developed. Hang to dry inside.	May-June
Cosmos *Cosmos bipinnata, C. sulfurea*	Direct seed or start transplants for better stand. Bright colors. Branching plant. 8"-12" spacing.	See branching plant cutting diagram.	May-June
Gomphrena (Globe Amaranth) *G. globose, G. pulchella*	Direct seed after frost danger has passed. Filler. Multiple colors. Fireworks is a different shape and good pink. Watch for insect damage (caterpillars). Succession plant. 8"-12" spacing.	See branching plant cutting diagram.	June-frost
Herbs *Basil* *Mint* *Lavender* *Rosemary*	Both annual and perennial, mostly cut in the warm season. Good fillers. Fragrant. Various spacings, mostly 12".	Many like basil, follow cutting for branching plants. Inspect for insect damage.	April-frost
Marigold *Tagetes spp.*	Start transplants in January, plant out in March after frost, or plant out in July for a fall crop. Choose large, African marigolds. Unpleasant foliage smell. Giant Orange, Bindi Orange, Bali Yellow and White Swan are good c.v.'s. Respond to shortening days. 10"-12" spacing.	Pinch out first flower. See branching plant cutting diagram. Removal of most foliage will reduce scent.	June-frost
Strawflower *Bracteantha bracteata*	Perennial grown as an annual. Start in January for transplant in March. Support with netting. Raspberry Red is a good c.v. 12" spacing.	Cut when half open. Dries exceptionally well. See branching plant cutting diagram	May-July

Species	Remarks & Spacing	How to Cut*	Bloom Time**
Sunflower **Helianthus annua**	Direct seed after danger of frost. Single stem, pollenless are most desirable; colored varieties have shorter vase life and branching habit. Succession plant weekly, increasing time between plantings to 2 weeks when days are longest (flowers will mature faster in long days). 10"-12" spacing; 18"-24" for branching c.v.'s.	Cut single stem, pollenless varieties to the ground. For branching varieties, cut secondaries all the way to main stem, leaving no nodes. Cut when petals have barely unstuck from disc. Cut evening before if beetles are present.	Mid-May-frost
Zinnia **Z. elegans, Z. pumila**	Direct seed after danger of frost. Succession plant every 4 weeks. Branching plant. Benary's Giant is best c.v. Oklahoma is smaller, mildew resistant. Cut for months. 12" spacing.	Cut as soon as flower is open. Discard blooms with many stamens showing. See diagram for cutting branching plants. Sensitive to cold coolers.	April-frost
Bulbs			
Anemone **Anemone coronaria**	Fall plant. St. Bridget and de Caen c.v.'s are best. Grow in high tunnel or greenhouse or mulched heavily during cold spells outside. Grow as an annual (won't survive summer), planted 5"-6" apart.	Cut down to branching point or cut entire stem to ground.	February-March
Brodiaea **Brodiaea lactea**	Fall plant. Blue corymb. Good for bouquets. 3" spacing.	Cut deep down into foliage. Leave foliage on plant to nourish bulb.	April; May in-Zone 8
Calla lily **Zantedeschia aethiopica**	Fall plant. White. Colored varieties require superior drainage, full sun. Use frost protection or grow in high tunnel. 12" spacing.	Yank up from plant, placing foot at base, for length and to prevent stem curling.	February-May, May for colored varieties
Crocosmia (Montbretia) **Crocosmia x crocosmiflora**	Bright red. Requires frequent division to maintain stem size. Fast multiplier requiring frequent division to maintain quality. Perennial corm. 12" spacing.	Cut deep down into foliage.	Late June
Drumstick allium **Allium sphaerocephalum**	Fall plant. Only allium for the Gulf coast. Blooms mid-spring over 2-3 weeks. Dries well. Will perennialize. 3" spacing.	Cut deep down into foliage.	March-April
Dutch Iris **Iris hybrids**	Fall plant. Many good c.v.'s. 2-3 flowers per stem. Will perennialize. 3" spacing.	Cut deep down into foliage when top bud emerges and just begins to unfurl. All bloom out in 2 weeks.	March-April
Freesia **Freesia x hybrida**	Fall plant. High tunnel or frost protection required for winter protection. 3" spacing.	Cut to base or to first joint if there's a market for short stems. Cut when the bottom bud opens.	February-March
Gladiola **Gladiolus hybrids**	Fall or spring planting. Full size or pixies. Problems with thrips. Tall glads do better with support. Succession plant. Geotropic. 3"-4" spacing.	Cut deep down into foliage when lowest flower opens. Do not lay flat.	June-frost
Grape Hyacinth **Muscari armeniaca**	Force in flats or pots in cooler beginning Nov. 1. Remove Feb. 1 and set in sun for Valentine's Day pot sales. Yank stems out of bulb for cut flower length. 3" spacing.	For cuts, yank stem out of bulb for longest stem. Pots are ready when foliage and flowers are fully colored (greened up).	February-March

Species	Remarks & Spacing	How to Cut*	Bloom Time**
Liatris **Liatris spicata**	Fall plant. First flower largest but will make secondaries. Spacing 5".	Cut when 1/3 of flower has opened.	June-July
Lilies **Lilium asiaticum, L. orientalis**	Only Asiatic hot colors perennialize. Use top size bulbs planted in fall. Orientals do not perennialize and blast in hot years. 4" spacing.	Cut when first flower opens or the night before opening and allow to open inside. Leave 1/3 of stem on plant to nourish bulb.	May-June
Narcissus	Fall plant. Choose c.v.'s for our area to perennialize. Carlton is good large trumpet c.v. Cut just before opening. Spacing 5"-6".	Cut when first open or in a swollen bud. Do not mix in bucket with other cuts (its sap will plug other stems).	February-March
Ranunculus **Ranunculus asiaticus**	Fall plant. Best in high tunnel or with frost protection, similar to anemones. Plant spider-like tubers with "legs" down. Excellent cut. Spacing 3"-4".	Cut entire stem or to first joint, depending on stem length desired.	February-March in high tunnel
Spanish bluebells **Hyacinthoides hispanica**	Fall plant. Spike blue bell flower for bouquets. Yank out of bulb for longest stem. Perennializes. Accepts shade. Spacing 5"-6".	Cut deep into foliage for 12" stem. Yank out of bulb for 15" stem.	Late April-May
Tuberose **Polyanthus tuberosa**	Single varieties have best vase life. May be kept in bloom for months by side dressing every 2 weeks with nitrogen. Plant clumps rather than single bulbs; divide every 4 years. Intensely fragrant. Spacing 6".	Cut to base. Band stems together and use a tall bucket for support.	June-July
Perennials			
Agastache **Agastache spp.**	Blue, red or apricot spike flower. Herbal scent. Transplants in early spring. Summer bloomer. 12" spacing.	Cut when first florets open. See diagram for cutting branching plants.	Summer
Alstroemeria **A. pulchella**	Garden flower. Good for bouquets and farmers' market. Too hot/humid for greenhouse alstro varieties in Louisiana. Invasive. Early summer bloom. Space 12".	Yank out of plant, recut stems to desired length.	May-June
Aster **Aster spp.**	Airy filler flower. Monte Casino is good cultivar. Minor spring and summer bloom, bulk of bloom in fall. 12" spacing.	Cut to 2" from base.	Fall
Balloon Flower **Platycodon grandiflorus**	Takes 3 years to produce sturdy bell-shaped flower in blue or white. 6" spacing.	Cut to 2" from base.	Summer
Black-eyed Susan **Rudbeckia fulgida**	Goldsturm is perennial, Indian Summer is large, impressive, and grown as an annual, started as 4" in fall and transplanted early March. 12" spacing.	Cut the shorter Goldsturm to base when first flower opens. See branching diagram for larger Indian Summer.	Summer
Gerbera Daisy **G. jamesonii**	100's of cut flower c.v.'s; many must be trialed to find those which perennialize. High tunnel with summer shade. Protect from freezing to keep in production year-round. 12" spacing.	Bend stem back and forth to loosen from plant. Recut and place in tall bucket with hardware cloth lid, hanging flowers down through mesh. Set at room temperature for one hour before refrigerating.	Year round with protection

Species	Remarks & Spacing	How to Cut*	Bloom Time**
Lace Veil Statice **Limonium sp.**	2 years to full production. Airy yellow/white filler. 5-10 stems per plant. Sea Lavender statice also very good. 12" spacing.	Cut many single stems and bunch together for 1"-1 ½" bundle.	Spring
Leatherleaf Fern **Rumohra adiantiformis**	Greenery. Protect from hard freezes. Clean out dead fronds in spring. Never cut all fronds in bed. 24" spacing.	Cut down deep into foliage.	Year-round with winter protection
Phlox **P. pilosa, P. paniculata**	Native *P. pilosa* is pink, 15" tall. Minnie Pearl is a white hybrid, similar size. Only a few c.v.'s of *P. paniculate* can grow here. 6"-8" spacing.	Cut to 2" from base.	May for *P. pilosa*, mid-summer for tall garden phlox
Physostegia (Obedience) **Physostegia virginiana**	Pink fall spike flower. Thin bed regularly; invasive. Cut back in June to force heavier stems in August-September. Spacing 6".	Cut to base.	Late summer
Purple coneflower **Echinacea purpurea**	Sturdy and long-lasting. Needs good drainage. 8" spacing.	Cut to base.	Late spring-summer
Red Hot Poker **Kniphofia uvaria**	Large, yellow/red spike flower. Valued for men's floral arrangements. 2 years to full production. 24" spacing.	Cut deep down into foliage.	April
Scabiosa **Scabiosa caucasica**	Blue or white with 24" stem. 6" spacing.	Cut to 2" from base.	Spring
Salvia **S. farinacea**	*S. farinacea* has good vase life and also dries well. 24" spacing.	See diagram for cutting branching plants. Constant cutting keeps in production all summer.	March-summer
Shasta Daisy **Leucanthemum x superbum**	Spring blooming member of mum family. Other fall-blooming mums with green, non-fuzzy foliage also perennialize. 12" spacing.	Cut to base.	April
Sweet William **Dianthus barbatus**	Biennial treated as a perennial (fall start, vernalize over winter). Another good dianthus is *D. Hollandia*. 5"-6" spacing.	Cut to base.	March-April
Tropicals **Zingiber,** **Alpinia, Strelitzia**	Large group of stiff, waxy flowers for south Louisiana: Bird of Paradise, Pinecone Ginger, Red Ginger, Shell Ginger. Protect from freezes. Will not bloom after severe winters. Foliage used as greenery. 2'-3' spacing.	Cut to base. Keeping solution unnecessary.	Late summer
Tansy or feverfew **Tanacetum vulgare** **Tanacetum matricaria**	Western native with 36" tall gold buttons. Tough; dries well; good filler. Herbal. 12" spacing. Sunny Ball is a good *T. matricaria* c.v.	Cut to base. Hang to dry.	Summer
Veronica **Veronica spicata**	Tall blue, white or pink spike. Can be kept in production all summer with regular cutting. 12" spacing.	Cut to base.	April-June
Yarrow **Achillea millefolium** **A. filipendulina**	Smaller *A. millefolium* may wilt after cutting. Keep in bucket at room temp. to observe for wilting before using. Larger, gold *A. filipendulina* is tough and dries well but may not be perennial in south Louisiana. 12" spacing.	Cut to base. Hang to dry.	April-June

Species	Remarks & Spacing	How to Cut*	Bloom Time**
Trees, Shrubs, Natives			
Curly Dock **Rumex crispus**	Field weed with lovely celadon seed head which turns reddish as summer progresses. Collect from natural areas.	Cut to base.	Early summer
Corkscrew Willow **Salix matsudana 'Tortuosa'**	Small tree with curly stems for south Louisiana. Will root in water.	Cut 36" long. Split stem for greater water uptake.	Year-round
Eupatorium **Eupatorium coelestinum, perfoliatum**	*E. coelestinum* (Blue mist flower) is native look-alike for ageratum. Grows at edge of shady sites in late summer/fall. Boneset is tall, fall-blooming, with large white flowers. Collect from natural areas.	Cut to base.	Late summer
Forsythia **Forsythia x intermedia**	Garden shrub blooming in February. Cut back hard when young to force extra shoots. Remove old canes from mature plants. Easy cutting propagation.	Cut entire stem.	February-March
Fruit branches **Prunus spp.**	Double peach and cherry ornamental (non-fruiting) fruit trees, or fruit trees pruned at flowering time. Excellent early spring cut flower.	Cut 30"-36" long, mostly in bud.	March
Goldenrod **Solidago spp.**	Open fields. Garden varieties are almost identical. A related intergeneric cross, *Solidaster*, is an excellent garden perennial. Collect from natural areas.	Cut to base.	August
Holly **Ilex spp.**	Winter decorating uses.	Must remain in water to retain berries.	November-December
Hydrangea **H. macrophylla**	Deciduous shrub. Pink or blue depending on soil pH. Acidify for blue with aluminum sulfate (½ oz./gallon) monthly or lime for pink. Grow 3' apart, in full sun with irrigation.	Cut when flower expands and takes on true color (all flowers begin white). To dry, leave on plant until petals appear papery; don't leave longer.	May-June

** Strip foliage from all stems of all species, leaving only top third near flower.*
*** Dates given are for south Louisiana (zone 9) unless otherwise noted; bloom dates are two to three weeks later in spring for north Louisiana (zone 8).*

When and How to Plant

Annuals may be started inside as transplants or direct seeded, depending upon the size of the seed. The smallest seeded plants are always started as transplants for a better stand. Time of planting depends upon whether crops are annuals (frost-tender and grown in the warm season, planted when soil temperature reaches 60 F), half-hardy annuals (frost-tender plants that prefer cool temperatures, planted when soil temperatures reach 50 F), or hardy annuals (cold hardy to 20-30 F or lower, planted when soil temperatures are high 40s to low 50s). In general, in Louisiana, transplants for half-hardy annuals are started Jan. 1 for transplant in mid to late February; summer annuals in late January for transplant after last frost (see Table 2 notes). Order plugs eight to 10 weeks ahead or start transplants inside under lights six weeks before planting time using a well-drained seed-starting mix and cell trays. Direct seeded plants are planted after soil has cooled in fall (late October through early December for hardy annuals) or soil has warmed in spring (Late March to April for annuals).

Annual Terminology

Annual - tender annual planted after all danger of frost has passed. Planted spring or late spring.

Half-hardy annual - annual that can survive a light frost but not a hard freeze. Planted in early spring.

Hardy annual - annual that can survive winter. Planted in fall.

Perennials are started as seeds in September in cell trays using a well-drained seed starting mix. When plants have four true leaves, they are moved to 4" pots and placed outside to grow through the winter. Plants are placed in their final position in the row or bed in early spring, usually mid-February through mid-March. Gerbera daisies should be ordered as large plugs and planted in a high tunnel or unheated greenhouse in the spring.

Figure 3. Many non-perennializing bulbs are suitable for growing in crates in a high tunnel or outside in the field. Use shallow crates for minor bulbs like freesia and deeper crates for large bulbs like lilies and tulips. Provide 3" of media below bulbs for rooting. 60 tulips may be grown per crate.

Bulbs are generally available to purchase in the fall around Oct. 1. Gladiolas and lilies are more commonly available in spring, but if obtainable in the fall, should also be planted then. Plant bulbs in the field at close spacing, with larger species of bulbs being planted deeper than small bulbs. Half-hardy bulbs like freesia, ranunculus and anemones require serious frost protection in the field and are better suited to a high tunnel or unheated greenhouse. They will not perennialize on the Gulf Coast and should be grown as annuals and discarded after cutting. They are good candidates for growing in paper-lined crates of peat on the greenhouse or high tunnel floor or bench. Non-repeating bulbs from cold climates, like tulips, may be purchased precooled, grown in crates in the field and then discarded.

Trees and shrubs are best planted in full sun in the fall in a well-drained soil. Dig a hole that is twice as wide as the root ball but no deeper, as loose soil under the root ball may later result in the tree or shrub sinking below the soil line and stressing the plant. Do not plant after April or plants will be unable to root in well enough to survive high temperatures without considerable close attention to watering. Mulch well. See the Specialty Cut Flower Planting Guide (Table 2) for specifics on planting the many types of plants grown as cut flowers in Louisiana.

Many Gulf Coast native plants and wildflowers make good cut flowers, just needing a vase-life test for suitability. They may be collected from nearby fields or fencerows on the grower's property and used in bouquet work or sold as straight bunches.

Table 2. Specialty Cut Flower Planting Guide.

Type	Planting Dates	Remarks
Hardy Annuals	October-January	Direct seed in field except snapdragons and stock (transplants).
Half-hardy Annuals	January-February	Start transplants Jan. 1, set outside mid-February.
Summer Annuals	March-Sept. 10	Sow between last frost in spring and 10 weeks before first frost in fall.*
Perennials	October-April	May be planted outside recommended dates with adequate watering.
Bulbs	Fall bulbs: October-December Summer bulbs: March-May	Plant as soon as received.
Trees and Shrubs	October-April	May be planted outside recommended dates with adequate watering.

**Average first frost dates: S LA (Zone 9) – Nov. 24*
N LA (Zone 8) – Nov. 16
Average last frost dates: S LA (Zone 9) – Feb. 25
N LA (Zone 8) – March 7

Succession Planting: Repeat sowings will provide a longer cutting season especially for summer annuals. As days get longer in the spring and summer, the period between sowings gets longer, as plants will develop more quickly. The first re-sowing should be made two weeks after the initial sowing. The second succession planting will be three weeks after the second, and a third will be four weeks later. Lengthening days and rising temperatures will speed up development, so lengthening times between sowings will prevent crops all catching up to each other and coming in at the same time. To know when to stop sowing for the summer season, count back 10 weeks (typical days to harvest for sunflower in short days) on the calendar from the first fall frost, add a week for cutting, and use that date as the cut-off date for planting tender, warm season annuals.

Some fall-planted hardy annuals, like stock, snapdragons and larkspur, may also be planted again in early spring. The spring crop will produce smaller stems that will be more susceptible to pest problems, but they will be suitable for bouquet work.

Where to Plant

All field grown specialty cut flower crops are grown in full sun (at least six hours/day) in well-drained soil with a pH of 6 to 6.8, though there is considerable variation in pH due to the many species used. Plant in raised beds or rows 8"-12" high. Because cut flowers are in production year-round, fields should be constructed for good drainage during the rainier winter months. Addition of organic matter (compost, peat moss, rotted hay or composted manures) will improve stem size and sturdiness. Apply 3"-4" and rake in before building rows. Cover cropping is also beneficial for building healthy soils for specialty cut flowers.

Plastic or landscape fabric may be used to assist with weed control and warming the soil in spring. If using plastic mulch, install drip irrigation tubing before laying plastic. Use a blower to keep the surface of fabric mulch clean to avoid the growth of weeds which may penetrate through the fabric into the soil. Some cut flowers are winter crops that require protection from hard freezes, especially in the colder, northern part of the state. Spunbonded polyester frost cloth is helpful to keep them alive and growing. Other winter crops benefit from the additional daytime heat generated by the sun in a protected structure such as a minimally heated hoop house or high tunnel. Temperatures can get warm enough to require ventilation during the day. Closing up in the afternoon before the sun goes down helps temperatures inside to stay above freezing at night. Gerbera daisies, although a hardy perennial, will freeze down, go winter dormant and stop producing flowers until spring if allowed to freeze. With minor freeze protection in an unheated hoop house, gerbera beds can produce hundreds of stems through the winter.

Half-hardy winter bulbs like freesia, ranunculus and anemones also achieve their highest production when provided with the winter protection of a high tunnel. Row cover may be added for cold periods and a small electric heater can assist high tunnel temperature maintenance on the coldest nights when a freeze is expected.

While most cut flowers have no disease problems, a few, like zinnias, may develop foliar diseases as the season progresses. Rotate disease-prone annual crops to avoid a buildup of diseases in the soil. Crops may be planted in blocks of species with similar bloom times and time to harvest to reduce steps in the field. Separate perennial areas from annual areas to avoid disturbing bulbs, shrubs, and flowering perennials with the frequent replanting and traffic in rows where annual crops are grown.

Plant Care

Watering: Soil for all crops should have adequate moisture while plants are actively growing. Consistent watering of about 1 inch per week is recommended, using a thorough soaking to promote deep root growth. It is recommended to overhead water for a few weeks after transplanting and then use drip irrigation to minimize weeds; overhead watering may cause lodging and damage blooms. Increase watering during periods of high temperatures and drying winds, or on sandy soils. Bulbs are the exception, as they only require water while bulb foliage is up and growing; natural rainfall is usually sufficient. Bulbs prefer to remain dry during their summer and fall dormant season and should be placed on the edge of the cut flower plot to avoid unnecessary irrigation.

Fertilization: Fertilize the raised bed or row before direct seeding or transplanting cut flowers. Sprinkle fertilizer materials on the top of the row and rake in before planting. Perennial crops should receive a preplant fertilization and also be side dressed in the early spring every year after planting.

Organic fertilizers such as compost, fish emulsion, composted poultry litter or manure, worm castings, and blood or bone meal originate from living organisms. They are far more environmentally sustainable and safe than traditional synthetic fertilizers. They naturally release nutrients more slowly and over a longer period of time. When applying organic fertilizer, it is important to use in unison with compost, cover crops and crop rotation, which all work together to build soil health. Learn how to convert inorganic fertilizer recommendations to organic fertilizers here.

Alternatively, a synthetic fertilizer may be used at the rate of about 1.25 pounds (2.5 cups) of 13-13-13 for every 25 feet of row or 75 square feet. Broadcast, or sprinkle evenly, over the soil and then mix in about 3-6 inches deep using a rake or tiller. With a few exceptions, cut flower crops rarely require sidedressing. A few long-blooming crops, like zinnias, veronica, salvia, gerbera daisy, delphiniums and tuberose will benefit from an application of fish emulsion or about 2 tablespoons of 13-13-13 per plant after the first flush of bloom and every three to four weeks afterwards until out of production.

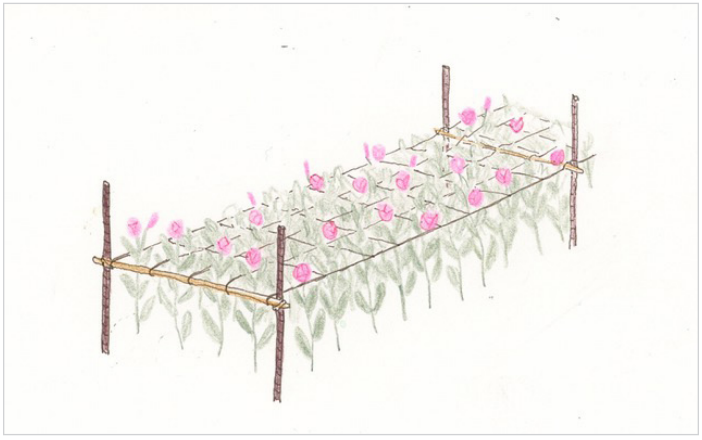

Figure 4. Support netting may be tied to t-posts or rebar. Netting, which may be nylon or plastic or constructed from cotton string, should be placed at planting time. The first layer should be raised to 12" from the ground as plants grow and subsequent layers, if needed, placed every 6".

Support: Several crops will benefit from supports. Sweet peas require a trellis of netting to climb. Gladiolas can avoid lodging (being laid flat by high winds) with the use of netting. Lodging of geotropic crops like gladiolas and snapdragons will deform stems and make them unusable. Lisianthus and marigold will also produce better stems with net support. Place support netting when plants are small, before they need it. To install netting, place 6-foot t-posts at the corners of the beds and at regular intervals (every 8-10 feet) within the bed. Place netting over the tops of the posts and move down near the ground. Secure with string or zip ties when the first layer of netting has been moved up to 12" high. Rebar, in 3'-4' lengths, may be used instead of t-posts. Place a mulch around plants at planting time, as weed control with tools is not possible with support netting in place.

Weeds: Plastic and organic mulches will control most weeds. Weeds among plants may be hand pulled. Unmulched beds can be kept weed free by hoeing before plant canopies expand to shade out weeds. Good weed control will make the difference between

Table 3. General Stages of Maturity for Harvesting Flowers.

Flower	Stage of Maturity
Roses	Main bud should be closed and just slightly loosened at the top. Very tightly closed buds will not open. When cutting sprays of roses, allow the main bud to open and other buds to show color
Spike flowers	Lowest bud should be open on gladiolas, lower 1/3 to 1/2 should be open on larkspurs, delphiniums and snapdragons.
Lilies, flowers with clusters of buds	No more than 1 bud open, with 3 or more buds to open later.
Sunflowers	At least 4/5 of petals should be open and central disc should be smooth and slick, not fuzzy. If most petals are not expanded, they will not open later.

a strong-stemmed, high quality cut flower and spindly, breakable flower stems. Pre-emergence herbicides may be used in beds where transplants are grown. Follow rate recommendations carefully, as overuse may stunt plants.

Harvesting: Cut flowers should be harvested early in the day, when water content in the plant is at its highest. When the sun comes out, plants get ready to photosynthesize and open the stomates (breathing holes on backs of leaves) for gas exchange (CO^2 in, O^2 and water vapor out) and will lose water until sundown. In early morning, the stomates have been closed all night and water content is at its peak. Flowers may also be harvested after sundown, but never in the middle of the day, as they may wilt and be unable to rehydrate.

Stage of flower maturity and stem length are critical to harvesting high quality specialty cut flowers. Flowers must be cut as soon as they reach a developmental stage which will allow the flower to be attractive and continue to open. Some general guidelines are in Table 3. See individual crops in Table 1 for proper cutting stage for each individual species.

Every day a flower is left on the plant after maturity is a day off the vase life. Vase life is the amount of time that a flower will remain attractive after being placed in a vase in the home. For peak quality, harvest every day. Do not leave spent, overly mature flowers in the field, as this may cause the crop to cease production early and make harvesting more difficult.

Flowers with long, straight, single stems (example: sunflowers) are cut all the way to the ground. When cutting bulbs, move foliage aside to cut the stem. The foliage will nourish the bulb for next season's bloom. Bulbs being discarded after the first year, like tulips, may be cut to the ground. Some species, i.e., larkspurs, snapdragons, and celosia, are cut almost to the ground but a few leaf nodes are left on the main stem to permit smaller, secondary branches to form. Still other plants will form a large, branching plant which, if cut properly, will produce fresh stems for months (see Figure 5). If cut all the way to the branching point, the plant will be reduced to the base in just a few cuts. If cut leaving a few leaf nodes above the branching point the plant will continue to produce additional flowering shoots. See the cutting diagram below for an example of proper harvesting.

Use sharp, lightweight snips for cutting and immediately place cut stems into a clean bucket with only a few inches of water. Flowers of the same species, to be sold as a straight bunch, may be evened up and stems cut even in the field. Wagons, carts or four-wheelers are helpful to move the buckets to the packing area. Cutting flowers and hauling buckets are the most common sources of aches and pains for the harvester. Wrist and elbow supports can be very helpful.

Figure 5. Diagram for cutting branching plants. Branching plants are cut with the goal of keeping them branching and producing additional flower stems. See left side of diagram for correct cutting.

Insect, Pest and Diseases: The many species of cut flowers are relatively insect and disease free but a few problems do occur, depending upon the season. Winter brings only rot to rosette-forming species like gerbera daisies and bachelor buttons in excessive rainfall years. Summer conditions cause the development of one of the few foliage diseases, anthracnose leaf spot of zinnia. Insects may be more problematic in the summer season. As temperatures warm, caterpillars begin to damage snapdragon flowers and celosia foliage. With hot weather, beetles and weevils may attack sunflowers, removing petals and rarely, entire flower heads. Good drainage, spunbonded row covers and timely cutting will solve many problems. Spraying of chemicals is discouraged, as considerable handling of cut flowers is necessary (cutting, carrying, leaf stripping, sorting, arranging in a vase). See Table 3 to aid in diagnosis and management of some common insects and diseases of cut flowers.

Table 3. Organic and Natural Management for Common Cut Flower Insect Pests and Diseases.

Symptoms	Diagnosis	Organic and Natural Management
• Yellowed, mottled foliage • Twisted foliage • Black sooty mold on lower leaves	Aphids	• Timely planting and harvesting • Reduce water stress • Weed control • Water jet to dislodge • Insecticidal soap, neem oil, pyrethrin, combination of pyrethrins and azadirachtin (Azera)
• Holes in leaves • Holes in petals	Beetles	• Early morning harvest • Harvest evening before flower opening, finish opening inside • Perimeter trap cropping • Super Light Insect Barrier
• Reddish spots on lower leaves • Spots move up plant as season progresses	Leaf spot	• Avoid overhead irrigation • Avoid working in fields when plants are wet • Do not drop stripped leaves in field • Remove plant debris • Reduce plant stress • Organic/natural fungicides
• Missing flower parts • Holes in leaves • Frass	Lepidopteran larvae	• Row covers • *Bacillus thuringiensis* (Bt) sprays • Remove damaged foliage
• Stems in rosettes darken and soften • Leaves and stems pull easily away	Rot	• Grow on high rows • Improve drainage in field
• Silvery feeding damage on leaves • Papery flower sheaths	Thrips	• Keep area around plot mowed, directing clippings away from rows • Predatory mites • Neem, pyrethrin, insecticidal soap
• Removal of sunflower heads • Missing leaves	Weevils	• If few flowers affected, do nothing • Serious infestation: Spray upper stems of flowers with registered insecticide

Postharvest and Storage

After harvesting, keep flowers in water in a cool, shady location. Bring into the processing area and strip away the bottom leaves that would be below the water level in the bucket. Leaf stripping may also be done in the field for crops that are healthy and not exhibiting disease. If not removed, leaves below the waterline cause bacteria to grow in the water as they decay. Bacterial growth inside stems is the primary reason that fresh flowers wilt. Use warm water rather than cold, as warm has better uptake by stems. Flowers that have been cut early in the day and kept cool may be arranged and expected to last in the vase for five to 14 days, depending on the species. Keep flowers out of drafts and direct sunlight and do not place on surfaces that generate heat. For greatest keeping quality, wrap in a paper cone and keep flowers in refrigeration until used or sold. Recut, removing about 1/2 inch of stem, every time flowers are handled and place flowers in a keeping solution at all times to maximize water absorption. A good simple keeping solution is:

1 gallon warm water

1/2 cup white sugar

1 teaspoon bleach or vinegar

The sugar supplies carbohydrates to the flower, since roots and leaves, which normally supply carbohydrates to flowers through photosynthesis, have been removed. The bleach suppresses bacterial growth. If vinegar is used, it suppresses bacterial growth by providing an unfriendly, acid pH. There are many commercial floral preservative solutions available, but they are all composed with the same premise in mind: carbohydrate source and bactericide.

Most flowers keep well at 35-45 F; avoid freezing temperatures. Inexpensive coolers may be restaurant refrigerators or well insulated rooms with a CoolBot unit (a device that overrides the thermostat of an ordinary room air conditioner). Note that fruit crops that produce ethylene (e.g., tomato, cantaloupe) and are kept in the same cooler as flowers may cause petal drop. Zinnias and more tropical crops may brown at lower temperatures but do better if flowers do not touch the walls of the cooler.

Marketing

It's important to have a marketing plan before beginning to plant. To observe good direct marketing opportunities, it is useful to go to farmers' markets and see what other growers are selling, and how they are pricing and displaying the flowers. Visit retail florists and floral wholesalers (if you're near a city) and ask what they are looking for or having trouble obtaining; emphasizing the difference in quality between flowers that spent a week entering from a foreign country or being trucked across the country and local flowers cut that morning. Quality and longer vase life are important selling points for locally grown product. There are many effective marketing avenues to consider:

- Wholesalers
- Retail florists
- Grocery stores
- Restaurants
- CSAs
- Online sales
- U-pick operations
- Events
- Farmers markets

Figure 6. Income generated by sales methods. Wholesalers pay the least; direct-to-consumers sales like farmers markets, the most, with all other marketing methods falling in between.

Each marketing method has its pros and cons. Selling entirely to wholesalers provides a simple life: drop off straight bunches of flowers and collect a check at the end of the month. Wholesalers pay only half what the flowers are worth on the retail market and, like grocery stores, must have high confidence in the grower's ability to produce a steady supply of product. Florists and groceries expect to pay near the same price they are paying to a wholesaler. Direct sales, like farmer's markets, CSAs and online sales pay similar to retail prices, such as what a florist charges. However, direct sales require bouquet work, which involves growing a wide variety of species, considerable extra labor, and a little design talent. Restaurants may require numerous small tabletop arrangements involving a few focal flowers and a little filler, but this marketing method succeeds best in urban areas, where many different clients may be found.

Most growers rely on a mix of marketing methods. A grower may sell the harvest from the beginning of the week to wholesalers and florists and use the Thursday and Friday harvest for a Saturday farmer's market or providing a flower share to a CSA. Farmers markets can provide contacts to develop other sales avenues like restaurant sales and special events such as weddings and Day of the Dead decoration. In areas with several flower farmers, marketing cooperatives may be formed. At the beginning, cooperatives depend heavily on member volunteers, but in time, marketers are hired, freeing the grower to simply grow flowers. New producers should not be intimidated by marketing but should actively research marketing possibilities before starting a flower farm.

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