

FIELD GROWN CUT FLOWERS

The culture of field grown flowers is an area of floriculture that is generating a lot of interest and is enjoying a steady growth rate. It provides a way to enter the floriculture industry without the \$100 to \$150 per square metre capital costs that are involved in some greenhouse crops. Recently, the largest area of growth has been in the specialty cut flowers as opposed to the more traditional field grown crops like statice, dahlias and gypsophila. As gardening increases in popularity, home consumers are becoming familiar with the many new and different flower species. In turn, consumers are starting to look for and demand these flowers in floral design work.



Site Selection

Whether you plan to lease or own the land there are some basic, yet important, site considerations. It is easier if you start with a suitable site rather than trying to modify it later. Table 1 (See Pg. 2) discusses some considerations for site selection.

Crop Selection

An important concept to keep in mind with field grown cut flowers is that your crop selection and yield must be market driven, not production driven. Unless you are near a large population centre, like the Fraser Valley, most cut flowers are sold through niche markets, and therefore have a limited demand. Excess volumes will only serve to lower prices. Determine a flower's end-use to decide whether it's an industry staple or a specialty-niche market item. For example, is it used as a filler, or is it only used as a focal point in wedding work? Another consideration is whether you want to sell your crop as fresh or as dried flowers, or a combination of both. These factors will help in your plans to settle on a crop mix, marketing venue, and on the volumes the market might bear. There are many market options available: the United Flower Growers' Co-op, farmer's markets, supermarkets, garden centres, roadside or city stands, hotels, restaurants, craft stores, florists, or as a pick-your-own. Depending upon your location and crop choice, you may sell your product through one or more market outlets.

When deciding your crop mix, don't overlook some of the more common money makers. Novelty and specialty flowers are great, but the crop mix should include some traditional items, even if they're predominantly used as fillers. Traditional crops and named cultivars are often easier to grow because there is more production information available. On the other hand, if a flower is found in most home gardens there may not be a high demand for it in the regular growing season. Always be on the lookout for new and unusual flowers. Spend your winters reading North American, European, and Japanese seed catalogues and books on gardening and perennials. Remember to

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introduce new species gradually to the market place. Just because you think it's the perfect flower don't expect Joe and Josephine Consumer to want it in large volumes. Evaluate varieties not just by their appearance, but also for other important criteria like vase life, fragrance, hardiness and drought tolerance.

Production factors to consider include:

- cost of production
- production per square metre
- the length and ease of extending the production season
- resistance to pests
- stem length
- ease of harvesting

One final important consideration; be sure that you can manage the cultural requirements of a new crop. Local climate, the length of the growing season, the number of frost-free days, and rainfall

will constrain your crop choice. Crops must not only be able to grow in your climate, but they must also suit your production techniques and anticipated selling window. By growing a combination of annuals, biennials, perennials, bulbs, woody cuts, and ornamental grasses many growers try to achieve staggered production and cash-flow. Table 2 examines some of the advantages and disadvantages of the various crop types and provides a partial list of plants that can be used as cut flowers. More than one botanical name appears for some plants due to reclassification. If you plan to market the cuts as fresh cut flower bouquets, there should be a broad selection of species to provide a good mix of colour, forms, and shapes throughout your marketing period. But don't overextend yourself by trying to grow too many species. Start off slow and as your knowledge and expertise expands, you can then increase your crop selection.

Table 1. Site Considerations

soil	It should be fertile and well drained. Soil tests are a basic management tool. Even if you are familiar with the soil in the area, it must be tested to determine pH, organic matter, and nutrient levels. A pH of 6.0–6.5 is suitable for most cuts. You may want to add organic matter, for example compost, composted manure, or peat moss. Know the requirements of your crop before you make any major changes.
water	Good quality water must be available in sufficient quantities. Have the water source tested to determine essentials like pH and EC (salinity).
terrain	Flat land is easier to work. Watch out for low lying pockets that might be prone to early and late frosts, or flooding during the wet months.
shade	Most cut flowers will need full sun all day. Sites that are by nearby mountains or neighbouring trees will have reduced production capabilities. However, some partly shaded areas on the site will allow for increased cropping diversity.
drainage	Good drainage plays an important role in disease control, plant growth, and in over-wintering. Poorly drained areas will need to be corrected.
size	Field grown cut flowers don't require a huge land base, but make sure that the site is large enough to accommodate any future expansion plans.
winds	If you are in a windy area, you might want to consider windbreaks. Windbreaks help to reduce water stress and mechanical damage to plants. When selecting plants to use as a windbreak, consider the shading effect on crops, if any, and the competition of tree roots for nutrients.
fencing	A good fence not only keeps out foraging wildlife but also anyone who wants free samples.
access	The site must allow for easy access for production equipment, for harvesting, and for removal of the crop. If you plan to sell the product through a road side stand or pick-your-own, parking, access, and visibility are also important considerations.

Table 2. A Partial List of Cut Flower Species

ANNUALS

(Biennials-B)

- ☑ seeds are usually inexpensive and easy to germinate
- ☑ direct seeding - lower costs
- ☑ staggered seeding, multiple plantings possible
- ☒ weeding and harvesting are labour intensive
- ☒ low market price on species commonly found in home gardens

Ageratum houstonianum

Agrostemma githago

Amaranthus caudatus, *A. cruentus*,

A. hypochondriacus, *A. tricolour*

Ambrosia mexicana

Amethystea caerulea

Ammi majus (Queen Anne's Lace)

Ammobium alatum

Anethum graveolens (flowering dill)

Antirrhinum majus (snapdragons)

Arctotis stoechadifolia

Argyranthemum frutescens

(*Chrysanthemum frutescens*) (marguerite daisy)

Asclepias curassavica

Atriplex hortensis

Bupleurum griffithii, *B. rotundifolium*

Calendula officinalis

Callistephus chinensis (asters)

Campanula medium (B)

Carthamus tinctorius (safflower)

Caryopteris incana (blue spirea)

Celosia argentea var. *cristata*, *plumosa*, *spicata*

Centaurea cyanus (cornflower, bachelor's button),

C. americana, *C. moschata*

Chrysanthemum Parthenium (*Matricaria*)

Cirsium japonicum

Consolida cultivars (larkspur)

Cosmos bipinnatus

Craspedia globosa (drumstick)

Dianthus barbatus (sweet william-B)

Didiscus coeruleus (*Trachymene coerulea*)

(blue lace flower)

Emilia javanica (*Cacalia*), *E. sonchifolia*

(tassel flower)

Eupatorium maculatum, *E. purpureum*

Euphorbia marginata

Eustoma grandiflorum (*Lisianthus*)

Fibigia clypeata (B-seedpods for drying)



Ageratum



Celosia

Godetia amoena

Gomphrena globosa

Gypsophila elegans

Helianthus annuus (sunflowers)

Helichrysum bracteatum (strawflowers)

Helipterum Manglesii (*Rhodanthe*)



Helianthus

Iberis amara, *I. umbellata* (candy tuft)

Lathyrus odoratus (sweet pea)

Lavatera trimestris

Lepidium ruderale, *L. sativum* (for drying)

Leucanthemum maximum (shasta daisy)

Limonium caspium, *L. perezii*, *L. sinuatum*

(common statice), *L. suworowii*,

L. sinense (confetti)

Lobelia speciosa

Lunaria annua (money plant-B)

Lupinus cultivars



Nigella

Matthiola incana (stocks)

Moluccella laevis (bells of Ireland)

Nicandra physalodes

Nigella damascena, *N. hispanica*, *N. orientalis*

Papaver somniferum (pods for drying)

Physalis alkekengi (Chinese lantern)

Physalis

Rudbeckia hirta (cone flower)

Saponaria vaccaria (*Vaccaria pyramidata*)

Scabiosa atropurpurea,

S. stellata - (seed head)

Trachelium caeruleum

Xeranthemum annuum

Zinnia elegans



Zinnia

(Cont'd pg 4)

PERENNIALS

- ☑ harvested for several years - no annual replanting costs
- ☑ many unusual species that consumers are not familiar with
- ☑ yields can be high in later years
- ☑ yields may be low in first years
- ☑ seeds may be difficult to germinate - stratification & scarification requirements vary with each species
- ☑ bought plugs can be expensive
- ☑ difficult to control and extend the harvest window
- ☑ harvesting may be labour intensive
- ☑ weed control is difficult
- ☑ varying vigour and overwintering capabilities
- ☑ many species need to be dug-up and divided every 3 to 5 years

A*chillea filipendulina*, *A. millefolium*

Aconitum carmichaelii, *A. napellus*

Agastache rugosa, *A. scrophulariifolia*

Alchemilla mollis

Alyssoides utriculata (for drying)

Anaphalis margaritacea (pearly everlasting)

Aquilegia caerulea (columbine)

Armeria pseudarmeria

Asclepias incarnata, *A. tuberosa* (butterfly weed)

Aster ericoides, *N. novae-angliae*, *N. novi-belgii*
(Michaelmas daisy),

Astilbe X arendsii

Astrantia major



Achillea

H*elenium autumnale*, *H. Hoopesii*

Heliopsis helianthoides var. *scabra*

Heuchera sanguinea

Hypericum androsaemum

K*niphofia uvaria* (red hot poker)



Kniphofia

L*avandula angustifolia*, *L. latifolia*

Limonium gmelinii, *L. latifolium*,
L. tataricum (German statice)

Lunaria rediviva

Lupinus polyphyllus

Lychnis chalcedonica, *L. viscaria*

Lysimachia clethroides, *L. punctata*

M*alva moschata*

Monarda citriodora, *M. didyma* (Bergamot)

P*aeonia* cultivars

Pardancanda X norrisii (seed heads for drying)

Phlox paniculata

Physalis alkekengi var. *franchetii*
(Chinese lantern)

Physostegia virginiana (obedient plant)

Platycodon grandiflorus (balloon flower)

R*udbeckia fulgida*, *R. laciniata*

S*cabiosa caucasica*, *S. ochroleuca*

Sedum spectabile

Sidalcea malviflora

Solidago canadensis

X Solidaster luteus

T*ricyrtis hirta*, *T. macropoda*

Trollus chinensis, *T. X cultorum*, *T. europaeus*

V*erben*a *bonariensis*, *V. hastata*

Veronica longifolia, *V. spicata*

Veronicastrum virginicum var. *album* (Cont'd pg 5)

C*ampanula glomerata*, *C. latifolia*, *C. persicifolia*,

C. pyramidalis

Catananche caerulea

Centaurea dealbata, *C. macrocephala*,

C. montana

Centranthus ruber

Cephalaria alpina, *C. gigantea*

Chelone obliqua

Chrysanthemum coccineum (painted daisy),

C. X superbum (*Leucanthemum maximum*)

(shasta daisy)

Cimicifuga racemosa

D*elphinium* cultivars, *D. X belladonna*,

D. cardinale, *D. nudicaule*, *D. semibarbatum*

E*chinacea purpurea* (purple cone flower)

Echinops bannaticus, *E. ritro*, *E. sphaerocephalus*

Erigeron speciosus

Eryngium amethystinum, *E. bourgatti*, *E. planum*

G*entiana asclepiadea*, *G. Makinoi* cultivars

G. triflora var. *japonica*

Gypsophila paniculata



Rudbeckia

BULBS

- ☑ multiple planting; some species may be interplanted or planted over top of others
- ☑ bulbs can be left in and harvested every year (some species)
- ☑ both cut flower and bulb can be marketed (some species)
- ☒ bulbs can be expensive
- ☒ specialized equipment is required

A*cidanthera bicolor*

Allium caeruleum, *A. fistulosum*, *A. flavum*,
A. giganteum, *A. sphaerocephalon*

Alstroemeria cultivars

Anemone coronaria 'De Caen'

C*onvallaria majalis* (lily of the valley)

Crocsmia X *crocsmiiflora*

D*ahlia* cultivars

F*reesia* X *hybrida*

G*ladiolus* spp.

Iris cultivars



Dahlia

L*iatrus spicata*

Lilium cultivars

N*arcissus* cultivars

Nerine sarniensis

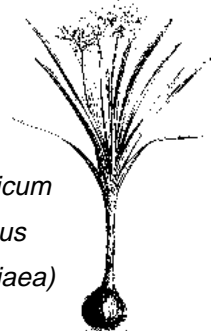
O*rnithogalum arabicum*

R*anunculus asiaticus*

T*riteleia laxa* (*Brodiaea*)

Tulipa cultivars

B*uddleia davidii*



Ornithogalum

WOODY CUTS

- ☑ room for market growth
- ☑ plant on "extra" or marginal land
- ☑ provide off-season revenue (winter or early spring cuts)
- ☑ double as windbreaks
- ☒ little post-harvest or production research work done

C*allicarpa americana*

Celastrus orbiculatus, *C. scandens*

Corylus avellana 'Contorta'

Cotinus coggygria (smoke bush)

Cytisus spp. (broom)

E*rica* spp. (heather)

F*orsythia* spp.

H*amamelis* spp. (witch hazel)

Hydrangea spp.



Syringa

I*lex Aquifolium* (English holly),
I. decidua, *I. verticillata*

P*runus* spp.

S*alix discolor* (pussy willow),

S. Matsudana, *S. sachalinensis*
'Sekka'

Skimmia japonica, *S. Reevesiana*

Spiraea spp.

Syringa spp. (lilac)

V*iburnum* spp.

ORNAMENTAL GRASSES

- ☑ low costs, high production
- ☑ broadleaved weeds are easily controlled with lawn-type herbicides
- ☒ easy to flood the market

A*grostis nebulosa*

B*riza maxima*, *B. media*, *B. minor*

C*arex Grayi* (morning star sedge)

H*ordeum jubatum*

Hystrix patula

L*agurus ovatus*

Luzula nivea

P*anicum virgatum*



Pennisetum alopecuroides,
P. flaccidum, *P. orientale*,
P. setaceum (*Ruppelii*)

Phalaris canariensis

S*etaria macrostachya*,

S. pumila, *S. viridis*

Sorghastrum sadlerana

U*niola latifolia*

(*Chasmanthium latifolium*)

Cultivation

Bed size and Preparation

Flower beds should be aligned north to south to maximize the light penetration of the leaf and flower canopy. The average worker has about a 60 centimetre reach, so beds shouldn't be much wider than one metre. Wider beds can result in missed flowers or damage to the outside of the bed from reaching for flower spikes in the center. Beds shouldn't be much longer than 30 to 35 metres (100 feet), any longer and they become difficult and awkward to walk around. A final step is to determine the aisle space between the rows. Wide aisles allow for greater flexibility with equipment and an increased ease of harvesting, but they decrease the returns per square metre. Plant height and width must be taken into account, or one crop could end up shading or smothering another. Again, the bottom line is space utilization; the yield per square metre is important, but it is off-set by equipment and cultural requirements. If you plan to sell through a pick-your-own, beds should be narrower and shorter to minimize picking damage. The aisles should be covered in grass or bark to help keep people's shoes clean while they pick.

Consider installing raised beds. They may not always be suitable for a commercial setting, but their better drainage allows for earlier planting and harvesting and a reduced incidence of root rot diseases caused by poor drainage. Beds need to be raised 10 to 15 centimetres. If you choose to go with raised beds, make sure that you leave enough room between them to move your equipment.

Good soil preparation is essential for long-term perennials. Sites for beds should be ploughed to a depth of 35 to 45 centimetres to loosen the soil prior to bed formation. The next step is to disc or rotovate to break-up large soil clumps and to produce a more uniform bed. Depending upon your soil test results, any soil amendments should be worked in at this time. Additions of organic matter should be worked in to a depth of 20 centimetres. The soil can be fumigated for weed, disease, and insect control. Be sure to follow label instructions concerning safety, minimum and maximum soil temperatures, time to planting, and potential crop phytotoxicity.

Scheduling



Planting time varies with your climate, the plant type (annual, biennial or perennial), cropping

system, and desired harvest time. Keep records of your planting dates, weather, harvest times, and yields. They can be valuable for planning future production. Try to time part of the production so that it is ready for the market before or after it appears in home gardens. Prices are generally higher for the harvest "shoulder-seasons". The more you can extend your growing season and have flowers ready for the "off-seasons" the better. It allows you to capture the higher prices and it helps to spread the cash flow. Stagger plantings throughout the spring and early summer to ensure a continuous supply. Keep in mind that the later plantings will have a shorter time to harvest and may also have shorter and thinner flower stems because of the higher temperatures and longer day length. Production may also be lower.

Annuals should be planted when there is no longer any frost danger. Seeds can be started 4 to 6 weeks before the expected planting date by sowing them in trays in a greenhouse or cold frame and then planting them outside when frost danger is over. Another option is purchasing plugs instead of seeds; they cost more, but they will be in flower earlier than those crops that are directly seeded in the field, and they avoid the expense of operating a propagation greenhouse. Early plantings can be covered with plastic hoop tunnels to provide frost protection and increase temperatures for an earlier harvest. Don't hesitate to do some small-scale experimentation. Maybe some of the more hardy annual species can overwinter in your area with minimal protection to allow for an earlier start the following spring. Biennials like sweet william and bells of Ireland should be planted in late summer or early fall. This gives them a good growing period before winter, resulting in more uniform flowering the following spring.

If you have access to a cooler, it can be used to extend the flowering season for some perennials. Bare root stocks or plugs can be placed in a cooler with lights for 4 to 6 weeks at 5 to 7°C to achieve the cold period. Keeping the plants in the cooler and staggering the planting dates allows for an extended harvest period.

Planting Density

The number of plants to grow per square metre, or the planting density, is a trade-off between increased yield and decreased quality. While close spacing produces increased yields per square metre it results in smaller flowers and lower quality. Stems are generally weaker and longer due to the decreased light levels. The incidence of disease can

be higher due to the decrease in air movement caused by the crowding. Increased space between plants results in better quality, but lower yields per square metre.

Planting density varies with plant size, the number of years between replanting, the sensitivity of the crop to disease, the method of harvest and the staking requirements. It also varies with each plant species; most seed catalogues or supplier's guides give recommended spacings. Some spacing principles are common to most crops. For example, the larger the size of the mature plant the more room that will be needed between plants. *Gypsophila* will need much more room than a smaller plant like zinnia. In general, perennials are planted less dense than annuals to allow for the several years of growth between digging up and splitting. Plants that are prone to foliar diseases, for example snapdragons, which are susceptible to powdery and downy mildew, will benefit from a wider spacing due to the increased air circulation. Perennials which need staking may benefit from an increased density where the flower stems tend to support each other.

Supports

Some plants will need a support system to prevent lodging and to keep flower stems off the soil. When stems fall over they are often unmarketable because of dirt, crooked growth, or uneven flower display. There are several methods to choose from: wire or plastic mesh, strings or sticks. The crop type and your harvesting method will affect the choice. Most growers choose to use a mesh system. It's important to install the mesh system before the plants actually need it; once plants require support they are too big to install the mesh without damaging the plants. If you want to avoid having to install a support system, choose naturally dwarf plants. Keep in mind that to be used for the fresh cut flower market, flower stems need to be a minimum of 30 centimetres in length. The exceptions are those flowers which are used in dry flower work.

Irrigation



The two main types of irrigation systems are overhead and trickle. Overhead watering is cheaper and easier to install than trickle systems, but overhead is an inefficient use of water. Trickle systems have less run-off and more water reaches

the roots because less is lost through evaporation and contact with leaves and flowers. As a result, plants irrigated via a trickle system tend to have lower incidence of disease and lodging because the leaves and flowers don't get soaked with every irrigation. Trickle watering is best suited for longer term crops.

Plants should never be irrigated close to dusk; wet foliage combined with the cooler night temperatures are perfect conditions for disease inoculation and spread. It's best to start irrigation in the early morning to allow foliage to dry before nightfall. Irrigation frequency depends upon the temperature and the crop requirements. Irrigation must be done often enough to prevent water stress. Wilting should not be your indicator of when to water because the resulting stress can decrease production. A general rule of thumb is 2.5 centimetres of water per week, but the amount required is affected by the crop, irrigation system, rainfall, temperature and soil structure. These factors will determine whether it is more practical to soak the soil and apply a certain volume per week or to apply small, frequent irrigations throughout the week.

Fertilizer



Before adding any fertilizer or organic matter have the soil tested to determine its nutrient level. Unless your soil is very fertile, or you have incorporated a well composted manure before planting, the plants will need supplemental nutrition. A complete fertilizer should be used, for example 8-8-8 or 10-10-10, at a rate of 7 to 10 kilograms per 100 square metres. It should be incorporated into the soil during the preliminary bed preparations. This can be done each time before planting annuals and perennials. Established perennials also need some fertilizer. It can be applied as a side dress in early spring when plants are actively growing and after harvest to promote root and leaf growth. Good post-harvest growth provides plants with an improved overwintering ability and also acts to improve next year's harvest. Whether fertilizer is applied in spring or after harvest, it's important to keep the fertilizer away from the stems and leaves to minimize the chances of burning tender growth. If you have a trickle irrigation system you can use liquid feeding through the irrigation system. Again, a complete fertilizer should be used at a concentration of about 200 to 300 ppm nitrogen, with weekly feedings.

Pests and Diseases

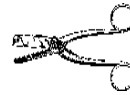


Weeds are a serious problem in field grown cut flower crops. They compete for nutrients, water, space, and light. Fumigating the soil before planting helps to control weed seeds, insects, and some diseases. Pre-emergent herbicides are also available; check for phytotoxicity problems on your crops before applying. If herbicides are used, they must be applied accurately, at the right time, and at the right stage of weed growth for maximum effect. Always check the label for safety factors, target weeds and possible phytotoxicity problems. **Never use the same sprayer for herbicides and any other type of spraying.** Chemical weed control should be only a part of a full weed control program. Although it is time consuming and expensive, hoeing and hand weeding are also part of a weed control program. Organic mulching of the crop is another option; it acts to keep the weeds down, it retards soil drying, and as it breaks down it adds organic matter to the soil. Weed barriers are another possibility, many different types are available on the market. Usually they're either plastic or paper. They have the added benefits of reducing soil splashes on flowers and leaves and reducing evaporation from the soil surface.

You should be able to identify insects and know their life cycles so that effective measures are used at the right time to control the pest. Make a habit of checking each bed several times a week to try and catch insect outbreaks early. Make integrated pest management (IPM) a central part of your pest control strategy. The goal is to attain an acceptable level of insect control with the minimum use of pesticides. Monitoring and record keeping are essential parts of IPM.

One of the most important factors in controlling disease is to start with healthy plants. Practice good sanitation. Your fields should be free of weeds and crop debris. Water early in the day so that any germinating fungal sports will be killed by the sun. Use a plant spacing that allows for adequate air movement in and between plants. Dry foliage reduces the incidence of leaf spots and *Botrytis*. When harvesting, disinfect your tools frequently, particularly when working between different crops or production areas. If it can be avoided, never move from a diseased section to a healthy section. Boots and clothing can trap spores and weed seeds and then move them to new areas. Be familiar with the diseases that crops are the most susceptible to; know when outbreaks are most likely to occur and recognize early disease symptoms.

Harvest



The stage of harvest varies with each species. The proper stage of openness is a critical factor in vase life. Flowers cut at an advanced stage of development will have a shorter vase life. Alternatively, flowers harvested too tight may never open. Either problem will not attract repeat customers. Table 3 lists the stage of harvest for many crops. Several other factors, such as the plant species, cultivar, weather conditions, distance to the market place, and end use, play a role in when flowers are harvested.

Generally, harvesting should be done early in the morning after the dew has dried. The stems are still filled with water and the cooler morning temperatures prevent heat building up within the bunches. When harvesting, keep in mind that a high-quality product is essential for success and grade accordingly. A clean, sharp knife or clippers should be used for cutting. Once stems are cut, they should quickly be placed in a clean bucket filled with tepid, clean water and preferably a floral preservative. Full buckets should be placed in a cool, shady spot, or even better, in a cooler until they are marketed. Freshly cut flowers should be left in the floral preservative solution for a minimum of 2 to 3 hours before they are sold.

Post Harvest

Sleeves, either clear or decorated, are an important part of post-harvest care. They minimize mechanical damage and tissue water loss. If properly used, sleeves can give the perceived image of higher quality product. Look for sleeves which have air ventilation holes and are easy to use.

Floral preservatives help to maintain the quality of flowers and help to extend their vase life. With some species, they're critical in flower development. Preservatives contain a combination of ingredients which extend vase life by supplying a food source, reducing pH, and reducing bacterial action. It is the combination of the proper stage of harvest, high quality water, floral preservatives, and cooling which all interact to prolong vase life and consumer satisfaction. One final note, cut flowers must never be stored with fruits or vegetables. Most release ethylene gas which causes accelerated ripening and flower petal drop.

Table 3. Stage of Harvest

Product	Stage of Development
<p><i>Achillea</i> <i>Aconitum</i> <i>Ageratum</i> <i>Agrostemma</i> <i>Allium</i> <i>Alstroemeria</i> <i>Amaranthus</i> <i>Ammi</i> <i>Anaphalis</i> <i>Anemone</i></p>	<p>leading cluster open, showing pollen several flowers open, up to 1/2 of the flowers flowers just opening one to two flowers open 1/3 to 1/2 of the flowers open, showing colour one to two flowers per bract open 1/2 to 3/4 of the flowers open 2/3 to 3/4 of the flowers open 1/3 of the flowers open after the bud is fully developed, allow to open & close, cut the following day</p>
<p><i>Anethum</i> <i>Antirrhinum</i> <i>Aquilegia</i> <i>Asclepias</i> <i>Aster novi-belgii</i> <i>Astilbe</i> <i>Astrantia</i> <i>Buddleia</i> <i>Bupleurum</i> <i>Calendula</i> <i>Callistephus</i> <i>Campanula</i> <i>Carthamus</i> <i>Celosia</i></p>	<p>2/3 of the crown open 1/3 of the spike open several flowers open, up to 1/2 of the flowers 2/3 of the crown open several flowers open 1/2 to 2/3 of the flowers open main flowers open 1/2 flowers are open, but before fading 1/3 of the flowers open flower petals opening to fully open flower petals opening to fully open 1/2 of the flowers open flower head open 1/2 to fully open</p>
<p><i>Centaurea cyanus</i> <i>Centaurea macro.</i> <i>Centranthus</i> <i>Chelone</i> <i>Chrysanthemum leuc.</i> <i>Chrysanthemum parth.</i> <i>Cirsium</i> <i>Consolida</i> (larkspur) <i>Convallaria</i> <i>Cosmos</i> <i>Craspedia</i> <i>Crocsmia</i> <i>Dahlia</i> <i>Delphinium</i> (perennial) <i>Dianthus barbatus</i> <i>Echinacea</i> <i>Echinops</i> <i>Emilia</i> <i>Erica</i> <i>Erigeron</i> <i>Eryngium</i> <i>Eustoma</i> <i>Freesia</i> <i>Gentiana</i> <i>Gladiolus</i></p>	<p>well developed colour, flowers beginning to open flowers 1/3 to 1/2 open first flowers fully open several flowers well advanced almost fully open 2/3 of the flowers open main flowers open several flowers open, up to 1/3 of the spike 1/2 of the flowers open leading flower open, but not yet flattened completely open several flowers showing colour with 1/2 open leading flower 3/4 to fully open 1/3 to 1/2 of the spike open 1/3 to 1/2 of the flowers open petals expanding, full colour 1/2 open, showing full colour first flowers fully open 1/2 of the flowers open lead flower open 1/3 to all of the flowers showing colour several flowers open first bud almost open, several buds showing colour several buds open one to five buds showing colour</p>



(Cont'd pg 10)

Product	Stage of Development
<p><i>Godetia</i> <i>Gomphrena</i> <i>Gypsophila</i> <i>Helenium</i> <i>Helianthus</i> <i>Helichrysum</i> <i>Heliopsis</i> <i>Helipterum</i> <i>Hydrangea</i> <i>Ilex</i> <i>Iris</i> <i>Kniphofia</i> <i>Lathyrus</i> <i>Lavatera</i> <i>Liatrus</i> <i>Lilium</i> <i>Limonium</i> <i>Lobelia</i> <i>Lunaria</i> <i>Lupinus</i> <i>Lychnis</i> <i>Lysimachia</i> <i>Malva</i> <i>Matthiola</i> <i>Monarda</i> <i>Narcissus</i> <i>Nerine</i> <i>Nigella</i> <i>Ornithogalum</i> <i>Paeonia</i> <i>Phlox</i> <i>Physalis</i> <i>Physostegia</i> <i>Platycodon</i> <i>Ranunculus</i> <i>Rudbeckia</i> <i>Saponaria</i> <i>Scabiosa</i> <i>Sedum</i> <i>Sidalcea</i> <i>Solidago</i> <i>X Solidaster</i> <i>Trachelium</i> <i>Triteleia</i> <i>Trollius</i> <i>Tulipa</i> <i>Verbena</i> <i>Veronica</i> <i>Xeranthemum</i> <i>Zinnia</i></p>	<p>several flowers open showing colour, but not fully open 1/3 to 1/2 of the flowers open, but not over-mature and brown several flowers open leading flower half open to fully open flower half open, hat-shaped leading flower open several flowers open 1/2 of the flowers open before fruit reaches maturity buds coloured, petals closed several flowers open, plus most showing colour several flowers open, up to 1/2 flowers uncurling or just beginning to open 1/3 of the flowers open or top 3 to 5 cm buds coloured and swollen, but not open 3/4 to fully open white flowers 1/3 of the flowers open pods fully developed 1/3 to 1/2 of the flowers open several flowers open 1/3 to 1/2 of the flowers open single flower open 1/3 to 1/2 of the flowers open almost open flowers pencil to goose neck stage oldest buds almost open several flowers open - pods purple-bronze several buds with colour bud loose, swollen, coloured 1/3 to 1/2 of the flowers open fruit fully coloured several flowers open two to three flowers open buds beginning to open fully open flowers several flowers open fully open flowers fully open flowers one flower open 1/2 of the flowers open 1/3 of the flowers open 1/2 to 2/3 of the flowers open several flowers open half-open flowers buds half coloured, but not open main crown with full colour one spike 1/2 open several flowers open fully open flowers</p>



Narcissus



Phlox

Labour

Outdoor cut flower production is management and labour intensive. The major components of production, for example planting, weeding and harvesting, all require trained labour. The larger the area you have in production the more labour you'll require. If you have a crop which flushes, such as daffodils or tulips, you must have a large, instant labour force available. Decide whether you want to have full-time workers for the duration of the production season or if you want to do most of the work yourself, supplemented with occasional contract or casual labour during extra busy times.

Conclusion

Field grown cut flowers offer an almost endless variety of crop choices and alternatives. Before starting a commercial operation it's essential to thoroughly investigate crop and market alternatives. Knowing your area's climate, combined with good crop and market knowledge, will help you to narrow down your crop alternatives. The final crop mix may be a combination of annuals, biennials, perennials, woody cuts, bulbs and ornamental grasses. The key to a long cash-flow period is staggered production. A thorough knowledge of weed control, plant diseases, and insect pests is needed to produce a clean, damage-free crop for the market. The crop's selling price and returns must at least cover the expenses of the field preparation, cuttings, seeds, plugs, planting, harvesting, labour and your own wages. It would also be nice if there was some additional profit. If your operation doesn't cover these, you should re-examine your crop mix and production methods. Maybe a change in crops or market focus will improve the returns.

Further Reading

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