

FLORIDA AGRICULTURAL EXTENSION SERVICE

INSTITUTE OF FOOD AND AGRICULTURAL SCIENCES, UNIVERSITY OF FLORIDA, GAINESVILLE

Florida Flower Grower



Vol. 7, No. 4
April 1970

GERBERA PRODUCTION

C. A. Conover

Gerberas or Transvaal daisies, as they are sometimes called, make an excellent cut flower crop if handled properly, but their commercial potential in Florida has yet to be determined. Costs of production and consumer demand should be evaluated before any major planting is made. Gerbera is presently a minor cut flower crop in Florida with less than ten acres in production. The two major problems limiting gerbera production are diseases and suitable cut flower strains that have consumer appeal and satisfactory keeping quality.

Gerberas can be grown outdoors in predominately frost free locations on the lower east and west coasts of Florida. They may also be grown in other areas of the state under glass or plastic where they can be protected from frost. Plants will withstand light frosts that will injure flowers and since highest production occurs during winter months plantings in areas where frost is common will not be profitable unless protection is provided. Most production at present is in ground beds, but disease control in raised benches is easier and, with selection of good varieties, should be profitable.

Planting Stock

Selection of planting stock is one of the most important factors to be considered in commercial plantings. Gerberas can be grown from seed, but flowering characteristics are variable. Work in California has shown that keeping quality and night-openness are two factors of importance, and they vary considerably between seedlings. Research indicated that about 80 percent of seedlings closed at night, which is undesirable for a commercial cut flower. Therefore, establishment of a good gerbera cut flower operation depends on selection of clones that have characteristics desired by consumers and high yields.

A number of better clones have been selected by propagators and are available commercially. Another method of obtaining good clones is to plant your own seed and select plants with desired colors, night-openness and keeping quality.

The most attractive feature of gerberas is the wide range of colors and types. Generally, clear bright colors are desired rather than dull, which frequently make up one-half of many seed mixes. Most desired colors include reds, maroons, pinks, yellows and oranges while white, lavender and other shades are in less demand. Flowers vary from singles to doubles with flat or quilled petals. Generally, single flower types with flat or quilled petals are most desirable for commercial cut flowers since stems do not always have the strength to support double, heavy flowers.

Propagation and Spacing

Seed should be planted during January to produce plants of flowering size by the following fall. Seed usually require about 4 to 6 weeks to germinate at night temperatures of 65° F. Young plants grow slowly and should be planted in 3 to 4 inch pots for growing until planted in benches or the field.

Division of selected high quality clones is the desired method of propagation once they are available. June or early summer is the best time for division as plants will be large enough to provide high production during late fall and winter. August or September division of plants should be avoided as this will depress flower production. Divisions should have two or more growing points since potential yield depends on number of growing terminals produced by the time flowering starts. When divisions are planted in the bench or field they should be set with crowns slightly above soil level, because deep planting encourages crown rot and high plant mortality. Plants should be spaced on 12 inch centers which will produce about 40 flowers per sq. ft. per year. Smaller single division or rhizome divisions may be made, but such plants should be planted on 8 inch centers or closer to obtain comparable production.

Soil Preparation

Field Soils and Ground Beds.- When ground beds are used planting areas must be ditched and tile drained so excess water can be removed rapidly unless good internal and surface drainage is present. Gerberas will not tolerate saturated soil and beds should be elevated 4 to 6 inches above aisles to further aid drainage and be no wider than 4 feet to aid in maintenance and help prevent injury to flowers as they are cut. Addition of two inches of an organic material such as sphagnum peat and rototilling to a depth of 4 to 6 inches is helpful in improving fertilizer retention and water holding capacity in sandy soils.

Calcium, magnesium and phosphorus should be added when soil amendments are incorporated by rototilling. Most Florida soils need at least 2,000 pounds of dolomite and 1,100 pounds of superphosphate per acre or about 5 lbs. dolomite and 3 lbs. superphosphate per 100 sq. ft. Soil pH for gerberas should be between 5.5 to 6.5 and, therefore, to assure addition of proper levels of dolomite and superphosphate soil samples should be taken.

Greenhouse Soils and Raised Benches.- These soils are usually more intensively cropped than field soils, therefore, additional organic soil amendments should be incorporated to increase water and nutrient holding capacities. Native Florida sands amended with 1/3 to 1/2 sphagnum peat moss by volume have proved acceptable for production of good quality flowers. Where drainage or aeration is a problem, perlite or calcined clay should be included as part of the mixture.

When bench soils are mixed 5 pounds dolomite, 3 pounds superphosphate and a small amount of a microelement mixture such as 1 lb. Perk or 1/2 lb. Fritted Trace Elements should be added per cubic yard of soil, or added in the normal fertilization program.

Fumigation of Soils.- Soil fumigation is necessary prior to planting gerberas due to *Phytophthora* (crown rot) and other soil-borne diseases common on this crop. Since soil-borne diseases are troublesome and difficult to control in established ground beds, some California growers have switched to raised benches outdoors or inside greenhouses. However, ground-bed production seems to be acceptable in Florida provided soil fumigation is carried out prior to planting and spot treatment made when diseased plants are found.

Soil fumigants are used primarily for disease control in soils, but are also effective against nematodes, weeds and soil insects. Materials listed in Table 1 provide good disease control when label directions are followed.

Fertilization

Growers in California have found that gerbera response to fertilization is similar to chrysanthemums, but they are more sensitive to high soluble salts. Therefore, fertilizer programs must be adjusted to the growing medium, irrigation level and salt accumulation. The same fertilization program cannot be used in greenhouse and field production since more leaching occurs under field conditions, especially during rainy seasons. With either type production, application of soluble, inorganic sources of fertilizer such as ammonium nitrate and potassium nitrate are recommended on a biweekly basis. These sources of nitrogen and potassium have a low salt index and aid in control of salt levels. Fertilizer ratios of approximately 1:1 nitrogen to potassium are recommended. Keeping quality will be severely reduced if high nitrogen fertilization is practiced and plant susceptibility to *Botrytis* and *Alternaria* diseases increased.

Field Production.- Application of 50 to 70 pounds nitrogen and potassium per acre per month is adequate for field grown gerberas. Higher levels should be used during periods of high rainfall and/or rapid growth and lower levels during period of low rainfall and/or cool weather. Additions of phosphorus, magnesium and calcium made during preplant soil preparation are usually adequate for the first year's growth. If plants are not lifted and divided each year, additional phosphorus and magnesium should be added the second year to adjust to original levels. Inclusion of 10 to 20 pounds of phosphorus (P_2O_5) per month in the fertilizer program may be necessary to maintain proper levels if pH is below 6.0. In some areas it will be necessary to use fertilizers containing microelements, or a micro element

Table 1. Soil fumigants for gerberas

Material	Rate per acre	Rate per 1000 sq. ft.	Cover required	Remarks
Steam	180° F. for 30 min.	180° F. for 30 min.	Yes	Check soil temperature 6 inches below surface - may be planted as soon as cool.
Methyl bromide	600 to 872 lbs.	10 to 20 lbs.	Yes	Cover for 48 hours then wait 7 to 10 days before planting depending on temperature.
Brozone	525 to 750 lbs.	12 to 17 lbs.	Yes	Same as above.
Vorlex - 201	35 to 45 gal.	3/4 to 1 gal.	No	More effective if covered for 5 days. Two weeks waiting period before planting during warm weather and 3 weeks during cool or wet weather.
Chloropicrin and Methyl bromide	650 to 870 lbs.	15 to 20 lbs.	Yes	Provides good Fusarium control - cover for 48 hours and wait 2 weeks before planting.

mixture may be incorporated into field soils prior to planting. Where soil pH is 6.5 or higher microelements should be applied as a foliar spray if needed, while in areas with lower pH levels soil application will be most efficient. Continual use of microelements where not needed is not recommended due to increased cost and possible build up to toxic levels in the soil. Growers should remember that microelements such as iron, manganese and zinc may be included in fungicidal sprays and adjust their microelement fertilization accordingly.

Greenhouse Production.- Application of 30 to 40 pounds of nitrogen and potassium per month per acre ($3/4$ to 1 pound per 1000 sq. ft.) is adequate for greenhouse grown gerberas. After about 9 to 12 months 10 to 15 pounds of phosphorus (P_2O_5) may be included in the monthly program, or if superphosphate was left out during soil preparation then this level should be applied monthly from the beginning. Magnesium, calcium and microelements are normally maintained by pre-plant applications if plants are lifted and divided every two years.

Culture

Gerbera flower production is highest when plants are grown in full sun, but longer more salable stems are obtained under 20 to 40 percent shade. Therefore, both greenhouse and field grown crops should be grown with light shading to provide stem length desired by consumers.

The gerbera has no photoperiodic response, but does respond to light intensity and, therefore, will have highest production during those times when high light levels exist and temperatures are optimum for maximum growth. Most desirable temperature range is between 60 degrees F. at night and up to 90 during the day. Florida temperatures although not ideal provide good growing conditions during periods of highest potential production.

A definite timetable for lifting and dividing gerbera plantings cannot be established based on present information. Where disease is not a problem plants probably can be grown for two years without the necessity of dividing due to size. If disease is a problem, healthy plants should be lifted and divided and diseased plants destroyed at the end of a normal production season.

Harvesting and Handling

Gerbera flowers should not be harvested until the first outer row of flowers shows pollen. Early harvesting increases the possibility of flowers closing at night and also frequently causes wilted flowers and stems.

Keeping quality of gerberas is less than chrysanthemums and they must be handled properly to provide the greatest possible longevity. Preservatives are beneficial and will increase keeping quality by an average of 3 to 5 days. Flowers should be placed in containers containing preservative solutions such as Everbloom or Roselife when harvested. Holding containers also should be cleaned with a bactericide such as chlorox prior to use and water changed frequently during flower storage.

Research at the University of California has shown that vase life and quality of gerberas are reduced by cold storage. Flowers should be shipped as soon as possible after harvesting.

Stems in each bunch should be cut to the same length prior to packaging. Normally, flowers with longest stems bring best prices. Flowers should be bunched

12 to the bunch and a paper or polyethylene sleeve placed around each bunch to protect flowers and reduce water loss. Flowers should be shipped upright in preservative to prevent crooked stems and to increase vase life.

Insect Control

Control of insects and mites in commercial gerbera production areas is usually more effective and satisfactory when insecticides and miticides are applied in a regular preventive program rather than allowing populations to build up before applying control measures. This is especially true of spider mites. Table 2 provides a guide to control of major pests of gerberas.

Table 2. Gerbera insect control guide.¹

Pest	Insecticide	Concentration	Amount per 100 gallons of water
Aphids, leafhoppers	Meta Systox R	25% E.C.	1½ pints
	Malathion	57% E.C.	2 pints
Leaf miners	Dimethoate	25% E.C.	2 pints
	Guthion	25% E.C.	2 pints
Caterpillars	Dimethoate	25% E.C.	2 pints
	Sevin	50% W.P.	2 pounds
Spider mites	Meta Systox R	25% E.C.	1½ pints
	Kelthane	18.5% E.C.	2 pints
	Tedion	25% W.P.	1 pound
Thrips	Dimethoate	25% E.C.	2 pints
	Malathion	57% E.C.	2 pints
	Lindane	25% W.P.	1 pound
	Meta Systox R	25% E.C.	1½ pints

¹Materials and rates are given as suggestions only, as research information on gerberas is incomplete in Florida.

Table 3. Gerbera disease control guide.¹

Disease	Fungicide	Concentration	Amount per 100 gallons of water	Frequently of Application
Soil-borne Diseases				
Pythium and Phythophthora	Dithane M-45 or Manzate 200	80% W.P.	2 pounds	Drench every 1 to 2 months
	Dexon	70% W.P.	½ pound	"
Rhizoctonia	Dithane M-45 or Manzate 200	80% W.P.	2 pounds	"
	Controlled partially by soil fumigation (see fumigation section)			
Fusarium and Verticillium				
Foliage Diseases				
Mildew	Acti-dione PM	.027% W.P.	3 pounds	Drench every 1 to 2 months
	Karathane	25% W.P.	½ pound	"
Botrytis	Botran	50% W.P.	1½ pounds	As needed
	Parzate or Dithane Z-78	80% W.P.	1½ pounds	"
	Manzate or Dithane M-22 Spec	80% W.P.	¾-1½ pound	"
	(Same as for Botrytis, some additional materials are:)			
Alternaria and others	Manzate 200 or Dithane M-45	80% W.P.	1½ pounds	As needed
	Ferbam	76% W.P.	1½ pounds	"
	Manzate D or Dithane M-22 Spec	80% W.P.	¾-1½ pounds	"

¹Materials and rates are given as suggestions only, as research information on gerberas is incomplete in Florida.

Disease Control

Control of soil-borne diseases is considered a limiting factor in gerbera production in Florida. Disease pathogens such as Verticillium, Fusarium, Pythium, Phytophthora and Rhizoctonia are the primarily soil-borne and may cause serious losses. Disease organisms affecting foliage are not as serious as soil-borne ones and can be controlled with normal spray programs.

Initial control of soil-borne diseases is through soil sterilization, while subsequent control is maintained primarily by sanitation through use of clean stock, roguing infected plants, use of clean tools and by use of soil drenches. Since gerberas may occupy a site for up to two years before lifting and dividing the control of soil-borne diseases is difficult when ground beds are used. An alternative to this method of production is the use of raised benches or containers, but this increases production costs.

Complete control of soil-borne diseases of gerberas in Florida is improbable, but losses can be held to a minimum with materials listed in Table 3.