

production methods  
and new markets for  
*Texas Florist Crops*



TEXAS AGRICULTURAL EXPERIMENT STATION

R. D. Lewis, Director, College Station, Texas



## *Summary*

There is no established custom in the United States of using plants and flowers in the average home. Such customs take a long period of development.

The florist industry is especially interested in the possibility of expanding the market for plants and flowers through (1) expanding promotional programs, (2) improving merchandising practices of retail florists and (3) developing sales in mass market outlets such as grocery supermarkets, variety and department stores.

Studies conducted in Bryan and Austin, Texas, during 1955-56 showed that cut flowers and potted plants can be marketed profitably in volume market outlets.

Flowering and foliage potted plants offer greater possibilities than cut flowers when marketed through mass or volume outlets.

A "new" or basically different plant must be produced for mass market outlets.

Several basic steps should be followed for the production and sale of flowers and plants for everyday home use.

1. The unit price must be low and producers must have accurate knowledge of production and handling costs.

2. There must be a minimum amount of servicing necessary at the wholesale and retail level.

3. The items must be prepared so that ease of handling is assured both by the retail outlet and the customer.

4. Volume production at low cost is essential, to allow the principle of low markup applying to mass marketing to be used.

5. The flowers or plants must remain in good condition for a "reasonable" sales period each week in the retail outlet.

6. Accurate timing, competent management of production areas and proper scheduling of quantity and quality are required to reduce losses.

7. High quality is essential. These plants and flowers are not for special occasions but for everyday home use; long service and satisfaction must be a prime consideration.

8. Plants and flowers must be produced and sold in sizes most widely adaptable to use in the average home. The longer flowers and plants are offered in a mass market outlet, the greater the increase in sales. The value of sales per square foot of display space in mass market outlets is above the average for other perishable products.

Pilot studies indicate that consumers buying in mass market outlets were overwhelmingly in favor of continuing the sale of potted plants in such outlets. Convenience of purchase and prices below those of high service outlets were the main factors in consumer preference.

# Production Methods and New Markets for *Texas Florist Crops*

H. B. SORENSEN, A. F. DEWERTH AND E. R. JENSEN\*

THE FLORIST INDUSTRY IN THE UNITED STATES has developed from a limited number of small greenhouse establishments to a highly specialized industry. In its early development most of the florist business was limited to the large metropolitan areas, but today the industry serves practically every community in the nation.

This rapid economic expansion has not progressed in an organized manner. This unplanned growth has been inefficient and lacking in sound economic principles of business organization.

During World War II, high levels of consumer income and curtailed production of other consumer goods increased the demand for florist crops.

Since 1946 flower producers have found less profitable market conditions for their products and have become increasingly concerned with the problem of expanding this market. Florist crops have never been subjected to price controls or production area allotments.

Until 1950 there was little emphasis on collecting, assembling and analyzing information concerning the economics of production and distribution of floricultural products. Most of the research in this field had been directed toward the problems of production. Proper analysis of problem areas was difficult because the industry lacked economic data.

Expanded coverage of the industry by the U. S. Census Bureau in the 1950 Census Report included the most extensive inventory ever compiled for floricultural endeavors.

This information concerning the florist industry has helped provide the foundation for research on the economic problems of the industry and has stimulated floricultural research on more efficient techniques in producing, handling and marketing florist crops.

Floricultural crops require a high degree of specialization in both production and marketing. They follow distinct marketing systems from the producer to the consumer, with separate wholesale markets and highly specialized retail outlets. This is in striking contrast with the marketing process of many other agricultural products and partly explains some of the marketing problems peculiar to this industry.

The present demand for florist products may be divided into two categories. The first includes flowers for special occasions such as weddings, birthdays, funerals, illnesses and special holidays. The use of flowers on these occasions is dictated by social customs of long standing. Most of this demand is based on floral designing rather than flowers alone and is relatively independent of price.

The second category includes flowers and plants for everyday home use. From the economic viewpoint this may be considered a luxury item. The consumer purchasing plants and flowers for everyday home use is less likely to be willing to pay for

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\*Respectively, associate professor, Department of Agricultural Economics and Sociology; and head and assistant professor, Department of Floriculture and Landscape Architecture.

the customary services included in the other category, such as floral designing, credit and delivery.

This luxury demand will need to be developed on a cash-and-carry basis with low price and minimum service. In the initial stages of development, it is felt that such sales will depend largely on impulse buying where the decision is made at the point of purchase. As people acquire the habit of buying more flowers for home use such purchases will become less a luxury and more of a necessity.

## *Description of Project*

Research on the economics and marketing of florist products at the Texas Agricultural Experiment Station received added emphasis with the establishment of a regional marketing project for the Southern Region in 1954.

A survey of the industry and its activities in Texas was made to determine which phase of the overall marketing problem might be most practical for initial study.

Since surveys in Texas and elsewhere indicated that there was no appreciable market for flowers for use in the home and little industry effort was being directed toward developing the market, this project was designed to study the potential market for flowers for home use.

When the project was initiated, it was the feeling of all concerned that mass marketing of flowers and plants for home use might sell flowers to people who do not buy them now, and more flowers to people who do. Studies to date have proved the assumption to be true with very few exceptions.

Properly produced flowers and plants can contribute much to our standard of living. The use of flowers in everyday living in the home can be a market with a great potential with a steady daily or weekly demand.

A pilot study was made for 1 year in two outlets: a supermarket which had never handled flowers or plants of any kind; and a variety store with an established plant department selling foliage plants and planters at all times and flowering plants during holiday periods.

To avoid too much overlapping and repetition of work being done by other states, a wide range of material was used to determine the consumer reaction to mass market selling. Consumer preference was sought for the type, kind, price and size of product best adapted to use in the home.

When some specific answers were obtained from this pilot study, the project was expanded later to include a larger number of outlets in a community of greater size and market potential.

Soon after the project was started, it was determined that shorter stemmed flowers and smaller sized potted plants than those being grown for the present market were needed to supply mass market outlets adequately.

High quality also was essential for continued ready sales in mass market outlets. High quality in the size and form needed was not readily available from any location in the country to supply these two outlets adequately for any length of time.

Plants were purchased in 2½, 3, 3½ and 4-inch pots shipped in from the West Coast, Pacific Northwest, Midwest, East and Florida, as well as from local growers.

In some cases the first shipments were of good quality and moved well, but subsequent shipments were of lower quality or smaller sized plants and failed to move as well.

Every effort indicated that a specific kind of product was needed for mass market sales. In the variety store especially, the packaged pot plants sold out before unpackaged plants in the existing plant displays moved.

Packages presented another sizeable obstacle which is still impeding progress in mass market development. The largest size package available for potted plants is a cellophane bag 5" x 6" x 20", and this quickly set the size limitation of plants for this market. The supply of bags has been erratic and undependable to date.

The potted plant items should not be over 15 inches high and should be stocky, compact, well grown, high-quality plants. Cut flowers should be high-quality flowers on strong stems not over 15 inches in length.

Since the types of plants and flowers needed to supply these outlets were extremely difficult to obtain, the next phase of the project was developed to explore the requirements for the production of the proper type "new" plants for mass market outlets. Preliminary production trials have indicated that flower growers can easily convert their ability to produce large, high-quality plants to production procedures for small, high-quality plants for this market.

Mass market outlets that will absorb these new type plants designed for mass production can be especially important to flower growers.

A large part of greenhouse operational costs is fixed and can be placed on a square-foot-per-year basis. The part of the costs that is variable or increases with the number of flowers or plants produced is relatively small. The major expenses of the flower grower in Texas are labor, greenhouse maintenance, heating and cooling, taxes and insurance. These costs are about the same whether 2,000 or 6,000 plants are grown on the same bench space. An increase in the number of plants grown on the same space and sold at a lower price will increase profits within certain limits.

An established mass market for home use flowers does not exist but the indicated potential can be developed if the industry desires.

Exploratory work in mass market development indicates that when flowers or plants are placed where people can see them, they buy them if they are properly displayed, priced at a reasonable level, are high-quality plants and in a size readily adapted for use in the average home.

Flowers or plants sold to certain type customers for a specific use should be produced for that purpose. The purpose in the past has been special occasion flowers and the growers' customer has been the retail florist. Mass market production and selling require that "new" plants and flowers be produced for "new" customers for a different use.

Plants and flowers produced to date for other purposes are too large for window sills, narrow mantels, coffee tables, end tables, bathroom ledges and other home locations.

It may take some time to establish the custom of buying flowers for home use; the sooner such a market is established, the sooner the habit will be formed.

Several basic steps have been developed which can be used to produce and sell flowers and plants for everyday home use:

1. Produce an adequate supply of quality flowers and plants best suited for home use.
2. Display them in good condition and in locations where they can be seen by the most people during their routine shopping.
3. Prepackage the products so that they can be picked up conveniently and taken home by the customer and require no maintenance while on display.

## *Experimental Procedures*

### PRODUCTION COSTS

The unplanned development of greenhouse expansion during the last 50 years has made it difficult to obtain adequate data on greenhouse production costs. Some method of determining accurate production costs was needed to determine precise production schedules from the standpoint of rapid turnover, accurate timing, high quality and low cost.

Since pilot studies indicated that potted plants were more highly desirable for this market than cut flowers, 26 varieties of potted plants which had shown the greatest market acceptance during the preliminary marketing surveys were selected for these trials.

Sufficient quantities of each crop were produced in the Station greenhouses to determine the feasibility of these production procedures on a commercial scale.

Previous investigations during the past 5 years with larger sized potted plants for the conventional florist markets, established the annual cost per square foot of producing greenhouse bench area for greenhouse production of potted plants in Texas at approximately \$2.

To allow for added costs due to the research nature of this project and the wide variation in growing operations of individual growers, an average cost of \$2.60 per square foot was adopted.

The basis for determination of production costs in these trials was the square foot of bench area used during the production of the crop. This cost includes such items as overhead, heating, lighting and cooling.

This method of computing costs is shown in the following example for garden variety chrysanthemums which require a greenhouse production period of 7 weeks from planting to sale.

Cost per square foot of bench space per year,  
\$2.60.

Cost per square foot of bench space per week,  
 $\$2.60 \div 52 = 5$  cents per week.

Plants potted in 3-inch pots and placed on bench,  
pot to pot for 4 weeks = 12 pots per square  
foot.

5 cents x 4 weeks = 20 cents.

20 cents  $\div$  12 = 1.66 cents per plant.

At the end of the fourth week, plants were spaced four to the square foot for the remaining 3 weeks.

$3 \times 5 \text{ cents} = 15 \text{ cents.}$

$15 \text{ cents} \div 4 = 3.75 \text{ cents per plant.}$

|                                   |       |
|-----------------------------------|-------|
| Total bench space cost per plant, | Cents |
| 1.66 + 3.75                       | 5.41  |
| Cost of rooted cutting            | 6.00  |
| Cost of 3-inch plastic pot        | 3.46  |
| Production cost of finished plant | 14.87 |

Production costs for all types of plants included in these studies were computed by this method and are shown in "Production Schedules for Small Pot Plants." Costs of seed, bulbs, cuttings or plants used are not included because such costs vary from time to time and in different areas and are readily available to the grower for his own operations.

### PRODUCTION PRACTICES

Detailed production schedules have been prepared for all crops included in these trials, but several general production practices apply to all crops grown. The following general practices were used for all crops produced in these studies unless otherwise specified in the individual schedules.

The main production requirement for these crops is to produce the highest quality plant in the shortest period of time, at the lowest cost. All procedures outlined have been developed with this in mind.

#### Soil

Good physical structure is the principal soil requirement for small pot plant production. An open well-aerated soil with good moisture retention and good drainage must be maintained during the growth of the crop.

The following soil mixture, developed to meet these requirements, was used for the production of all crops included in these studies: two parts soil, two parts coarse peat moss, one part one-eighth inch to one-fourth inch aggregate charcoal or coarse aggregate perlite. The ingredients in this compost were mixed thoroughly until all component parts were equally distributed throughout the mixture.

This mixture was then sterilized with steam at 180° F. for at least 30 minutes. No fertilizer was added until after the mixture was sterilized. Two ounces of treble superphosphate and 2 ounces of

calcium sulphate were then added to each 3 bushels of the mixture.

#### Potting Procedures

Except for certain check plants, all crops were grown in 3½ or 4-inch plastic azalea pots. Check plants were grown in clay pots of the same size. To reduce production cost, no potting was done at the potting bench.

The pots were placed pot to pot on the floor, filled with a shovel or loader and leveled off with a stick to the top of the pot.

Pots were then placed at finished spacing on the growing bench where seedlings or cuttings were planted in the pots. These potting procedures reduced normal potting labor cost approximately 60 percent.

As cuttings or seedlings were potted, they were watered with a starter solution comprised of equal parts by weight of monopotassium phosphate and diammonium phosphate at the rate of 1 ounce to 2 gallons of water until the soil in the pots was entirely moistened. Cheesecloth was then placed directly on the cuttings or seedlings and misted each hour with fog nozzles. This cloth was left on the plants for 5 days and fogged at hourly intervals. The cloth was removed each afternoon and placed back on the plants each morning. At the end of the fifth day the cloth was removed entirely.

Seedlings or cuttings were planted directly in finish pots, while small potted plants purchased from other sources were shifted to finish pots upon arrival. All plants were watered with the starter solution when the second watering was required. This will vary from 3 days to 1 week from the time of potting, depending on the season or the weather.

#### Fertilizers

All plants in these studies were fertilized on a regular schedule. A complete water soluble fertilizer with a 15-30-15 ratio was used and applied in liquid form at the rate of 1 ounce to 4 gallons of water.

This mixture was applied weekly beginning at the time the crop required a third watering. Every fourth week an application of 12 percent iron chelate was added to this mixture at the rate of 1 ounce to 25 gallons of water.

This liquid fertilizer was applied to the plants in the same amount as a normal watering.

## Watering

The production practice most difficult to standardize is watering. In these trials, every effort was made to keep the soil uniformly moist. The critical periods are from the time of potting until a satisfactory root system is established, and during the latter stages of crop development just before the plants begin to flower.

Plastic pots can be overwatered easily before roots are established. Since these pots are not porous, the soil may be dry on the surface but be moist lower in the pot where the roots are growing. Root

distribution in plastic pots—using the recommended soil mixture mentioned earlier—is more uniform throughout the soil ball than in clay pots where the root distribution almost entirely surrounds the exterior of the soil ball. This uniform root distribution prevents serious root loss during the growing period due to drying out in small pots.

The plants were grown on benches covered with coarse gravel, charcoal or perlite which prevented the roots from developing extensively into the bench material below the pots.

## Production Schedules for Small Pot Plants

*The following production procedures, schedules and production cost analysis for specific crops are for environmental conditions that prevail in Texas and are presented as they were developed by several replications in the studies. Minor adjustments may have to be made for individual situations.*

*A forcing structure such as a greenhouse in which environmental factors can be controlled is necessary for this type of production, and should be equipped with heating and cooling equipment for profitable year-round production. The high quality required cannot be produced and the necessary timing schedules cannot be accomplished under conditions prevailing out-of-doors.*

**NAME OF CROP:** African Violet (St. Paulia).

**PRODUCTION AND MARKETING PERIOD:** Entire year.

**METHOD OF PROPAGATION:** Petiole cuttings: division of small plants. Root petiole cuttings in flats; divide when suitable size.

### CULTURAL PROCEDURES:

**Potting:** Plant divisions or rooted petiole cuttings directly into 3" plastic pans or azalea pots or stick petiole cuttings directly in 3" pans or pots. Use 1 part of very fine sand or very fine perlite and 1 part coarse peat.

**Pinching:** None.

**Timing:** Requires approximately 4 months to produce a blooming plant from a petiole cutting.

**Temperature:** 65 degrees minimum.

**Spacing:** 5 plants per square foot.

**Other Considerations:** Keep in light intensity of 800-foot candles for propagation and young plants. Increase light intensity to 1,000 to 1,200-foot candles as soon as small plants are established.

**VARIETIES:** Choose short-petioled varieties.

### COST OF PRODUCTION:

20 weeks at 5¢ = \$1.00.

$\$1.00 \div 5 = 20\text{¢}$  per plant.

Add cost of cutting or small plant and pot.

**MARKET ACCEPTANCE:** Excellent.

*African Violets.*





*Ageratum Riverside.*

**NAME OF CROP:** Ageratum (*Ageratum houstonianum*).

**PRODUCTION AND MARKETING PERIOD:** Entire year.

**METHOD OF PROPAGATION:** Seed or cuttings.

**CULTURAL PROCEDURES:**

**Potting:** Pot rooted cuttings or seedlings direct to 3½" plastic pots.

**Pinching:** Pinch twice, as soon as plants produce 3 sets of leaves after pinching. Pinch out tips only.

**Timing:** Saleable plants can be produced in 6 to 8 weeks with two pinches.

**Temperature:** 60 degrees.

**Spacing:** 3 plants per square foot in 3½" pots.

**Other Considerations:** Do not overwater. Watch for red-spider during hot weather.

**VARIETIES:**

Improved Riverside.

Blue Mink.

Pink.

White.

Masterpiece.

**COST OF PRODUCTION:**

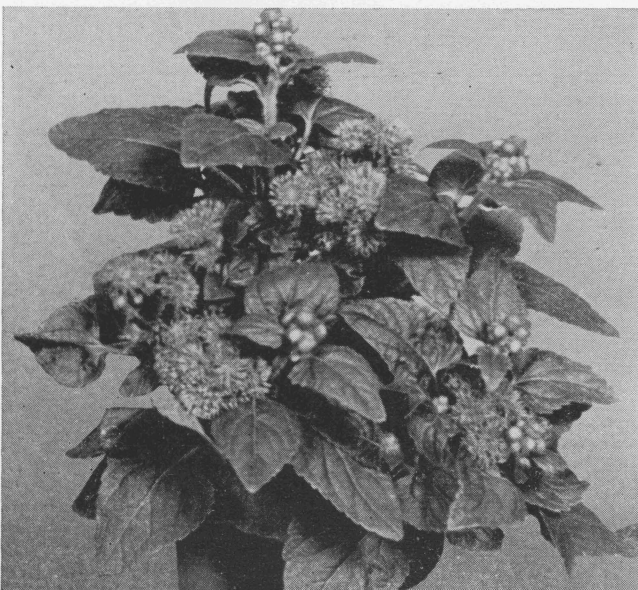
7 weeks at 5¢ = 35¢.

35 ÷ 3 = 12¢ per plant.

Add cost of seedling or cutting and pot.

**MARKET ACCEPTANCE:** Good.

*Ageratum Masterpiece.*



**NAME OF CROP:** Azalea (*Rhododendron species*).

**PRODUCTION AND MARKETING PERIOD:** Christmas through Mother's Day.

**METHOD OF PROPAGATION:** Buy small budded plants in October.

**CULTURAL PROCEDURES:**

**Potting:** Pot plants in 4" plastic azalea pots in pure peat on arrival and place in cold storage of 40 degrees. Do not allow storage temperatures to go above 40 degrees in unlighted storage.

**Timing:** Allow 4 weeks of cold storage and 6 weeks at 65 degrees for early forcing at Christmas, January and February. For plants forced later, allow 2 to 4 weeks depending on the time of forcing and varieties.

**Temperature:** 40 degrees storage.  
65 degrees forcing.

**Spacing:** 5 plants per square foot.

**Other Considerations:** Do not allow peat to dry out but avoid overwatering. Keep peat moist but not wet in storage.

**VARIETIES:**

Hinodegiri.

Coral Bells.

Sweetheart Supreme.

Alaska.

**COST OF PRODUCTION:**

Storage space cost = 6¢ per week.

9 plants per square foot in storage.

Storage cost = 4 weeks at 6¢ = 24¢.

24¢ ÷ 9 = 2.66¢ per plant.

Greenhouse forcing: 4 weeks at 5¢ = 20¢.

20¢ ÷ 5 = 4¢ per plant.

Total cost = 6½¢ per plant.

Add cost of small plant and pot.

**MARKET ACCEPTANCE:** Excellent.

**NAME OF CROP:** Baby Primrose (*Primula malacoides*).

**PRODUCTION AND MARKETING PERIOD:** Winter and early spring.

**METHOD OF PROPAGATION:** Seed.

**CULTURAL PROCEDURES:**

**Potting:** Plant seedlings direct to 3½" plastic azalea pots. Standard soil mixture.

**Pinching:** None.

**Timing:** Sow seed August 15 and later. Seed sowing to finish pots, 4 weeks. Finish pots to bloom, 12 weeks.

**Temperature:** 55 degrees.

**Spacing:** 7 plants per square foot.

**Other Considerations:** Full sunlight.

**VARIETIES:**

Brightness.

Glory of Riverside Improved.

White Giant No. 41.

**COST OF PRODUCTION:**

12 weeks at 5¢ = 60¢.

60¢ ÷ 5 = 12¢ per plant.

Add cost of seedling and pot.

**MARKET ACCEPTANCE:** Good.



**NAME OF CROP:** China-aster (*Callistephus chinensis*).

**PRODUCTION AND MARKETING PERIOD:** Entire year with additional day length.

**METHOD OF PROPAGATION:** Seed.

**CULTURAL PROCEDURES:**

**Potting:** Plant seedlings direct into 4" plastic azalea pots.

**Pinching:** None.

**Timing:** From seed sowing to potting 2 to 4 weeks, from planting to bloom 8 to 12 weeks.

**Temperature:** 55 degrees, as near as possible.

**Spacing:** 5 per square foot.

**Other Considerations:** Four hours additional light, from time seed is sown except from June to August. Cut off lights when plants are large enough to flower.

**VARIETIES:**

Kirkwell.

**COST OF PRODUCTION:**

12 weeks at 5¢ = 60¢.

60¢ ÷ 5 = 12¢ per plant.

Add cost of seedling and pot.

**MARKET ACCEPTANCE:** Good



*Gloxinia.*

**NAME OF CROP:** Gloxinia (*Sinningia speciosa*).

**PRODUCTION AND MARKETING PERIOD:** Entire year.

**METHOD OF PROPAGATION:** Seed.

**CULTURAL PROCEDURES:**

**Potting:** Plant seedlings direct to 4" plastic azalea pots. Standard soil mixture.

**Pinching:** Pinch tips when plants have 4 sets of leaves.

**Timing:** Seed sowing to potting in finish pots, 6 weeks. Finish pots to bloom, 12 weeks.

**Temperature:** 60 degrees.

**Spacing:** 4 plants per square foot.

**Other Considerations:** Light intensity of 2,000-foot candles.

**VARIETIES:**

Panzer's Scarlet.

**COST OF PRODUCTION:**

12 weeks at 5¢ = 60¢.

60¢ ÷ 4 = 15¢ per plant.

Add cost of seedling and pot.

**MARKET ACCEPTANCE:** Excellent.

**NAME OF CROP:** Celosia (*Celosia species*).

**PRODUCTION AND MARKETING PERIOD:** Entire year.

**METHOD OF PROPAGATION:** Seed.

**CULTURAL PROCEDURES:**

**Potting:** Plant seedlings direct to 3½" plastic pots.

**Pinching:** Do not pinch.

**Timing:** Three weeks from seed sowing to potting, 8 weeks from potting to flowering plants.

**Temperature:** 60 degrees.

**Spacing:** 5½ plants per square foot.

**Other considerations:** Do not overwater. Stop fertilizer when buds appear.

**VARIETIES:**

Comb type: Kardinal.

Plume type: Dwarf Fiery Feather.

**COST OF PRODUCTION:**

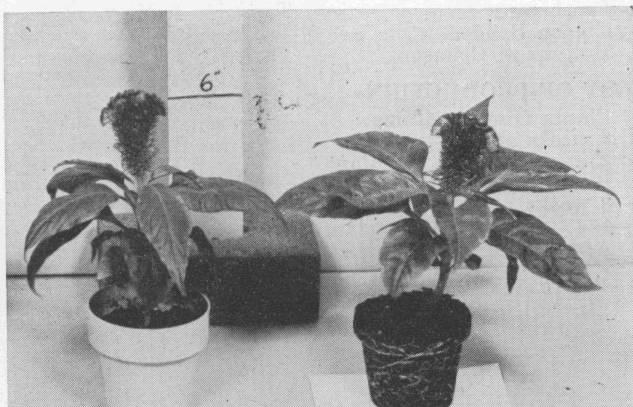
8 weeks at 5¢ = 40¢.

40¢ ÷ 5.33 = approximately 7½¢ per plant.

Add cost of seedling and pot.

**MARKET ACCEPTANCE:** Good

*Celosia.*



**NAME OF CROP:** Cyclamen (*Cyclamen indicum*).

**PRODUCTION AND MARKETING PERIOD:** January, February, March.

**METHODS OF PROPAGATION:** Buy small 2¼" plants for planting in October.

**CULTURAL PROCEDURES:**

**Potting:** Plant 2¼" plants in 4" plastic azalea pots in October.

**Timing:** Use well established 2¼" or 2½" plants for potting in 4" pots in September and October. Plants will begin blooming in January and will be saleable through March and April.

**Temperature:** As close to 55 degrees as possible.

**Spacing:** 4 plants per square foot.

**Other Considerations:** Do not overwater. Ventilate houses well. Cooled greenhouses are essential.

**VARIETIES:** Any available in small pots.

**COST OF PRODUCTION:**

12 weeks at 5¢ = 60¢.

60¢ ÷ 4 = 15¢ each for early blooming plants.

20¢ for later blooming plants.

Add cost of small plant and pot.

**MARKET ACCEPTANCE:** Fair

**NAME OF CROP:** Chrysanthemum (Chrysanthemum hortorum).

**PRODUCTION AND MARKETING PERIOD:** Entire year with proper day length control.

**METHOD OF PROPAGATION:** Rooted cuttings.

**CULTURAL PROCEDURES:**

**Potting:** Pot directly into 3½" plastic pots or 4" plastic azalea pots. Use 3½" pots for garden varieties, 4" azalea pots for large-flowering disbudded varieties.

**Pinching:** Pinch tip out of cutting 7 days after planting. For disbudded varieties, second pinch can be made later if market demands do not require disbudded plants.

**Timing:** Give short days on planting date. Pinch tip out on short-growing varieties on day cuttings are planted. Delay pinch 7 days on taller varieties. Seven and 8-week garden varieties flower in 7 to 8 weeks. Ten-week response group flowers in 10 weeks.

**Temperature:** 60 degrees.

**Spacing:** Garden varieties, 6 per square foot. Large-flowered disbudded varieties, 4 per square foot.

**Other Considerations:** See illustration for type of plant desired for specific markets. Use only lighted cuttings for these close schedules. Plants should not be over 15 inches high.

**VARIETIES:**

**Large-flowered varieties (9 and 10-week response)**

|                 |                  |
|-----------------|------------------|
| Barbara Fuller. | Oregon.          |
| Blue Ribbon.    | Pacesetter.      |
| Bronze Calypso. | Personality.     |
| Delaware.       | Sunburst.        |
| Georgia.        | Wilson's White.  |
| Luna.           | Yellow Calypso.  |
| Monty.          | Yellow Delaware. |

**Garden varieties (7 and 8-week response)**

|           |                |
|-----------|----------------|
| Aglow.    | Dolliette.     |
| Alert.    | Fuchsia Fairy. |
| Chiquita. | Mischief.      |
|           | Morocco.       |

**COST OF PRODUCTION:**

Garden varieties

7 weeks at 5¢ = 35¢.

35¢ ÷ 6 = about 6¢ per plant.

Large-flowered varieties

10 week at 5¢ = 50¢.

50¢ ÷ 4 = 12½¢ per plant.

Add cost of cutting and pot in each case.

**MARKET ACCEPTANCE:** Excellent.

*Chrysanthemum.*



*Coleus.*

**NAME OF CROP:** Coleus (Coleus blumei).

**PRODUCTION AND MARKETING PERIOD:** Entire year.

**METHOD OF PROPAGATION:** Seed or cuttings.

**CULTURAL PROCEDURES:**

**Potting:** Pot seedlings from seed flats direct to finish 3½ or 4" plastic azalea pots. Cuttings can be potted direct in finish pots either rooted or unrooted. Standard soil mixture.

**Pinching:** When grown from seed, pinch tips out of seedlings after potting as soon as 4 sets of leaves develop. When grown from cuttings pinch tips out of cuttings on day they are potted.

**Timing:** From seed sowing to potting, 6 to 7 weeks. Rooting cuttings, 1 to 2 weeks. From potting to sale in finished pots, seedlings 4 to 5 weeks. From cuttings to sale in finish pots, 3 weeks in spring and summer, 4 to 5 weeks in fall and winter.

**Temperature:** 60 degrees.

**Spacing:** 6 plants per square foot.

**Other Considerations:** When unrooted cuttings are planted directly in finish pots, apply cheesecloth treatment for 5 days. Apply starter solution as soon as roots appear through soil ball but not on potting date. For cutting propagation, use named varieties.

**VARIETIES RECOMMENDED:**

|                    |                    |
|--------------------|--------------------|
| Anna Pfitzer.      | Lincoln.           |
| Brilliance.        | Purdue.            |
| Climax.            | Spokane.           |
| L. V. Pearson.     | Setting Sun.       |
| Freshman.          | Texas A. & M.      |
| Golden Banded.     | Triple.            |
| Hollywood Crimson. | Variigated Turner. |

**COST OF PRODUCTION:**

Plants from seedlings:

5 weeks at 5¢ = 25¢.

25¢ ÷ 6 = 4.5¢ per plant.

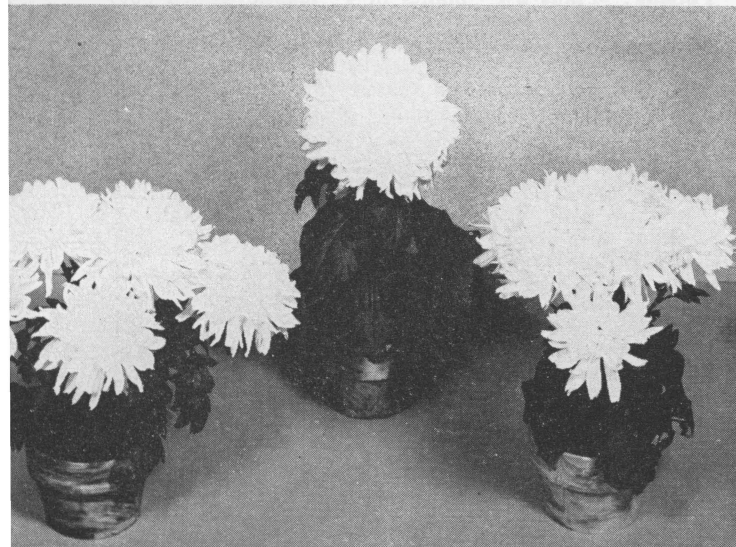
Plants from cuttings:

3 weeks at 5¢ = 15¢.

15¢ ÷ 6 = 2.5¢ per plant.

Add cost of seedling or cutting and pot.

**MARKET ACCEPTANCE:** Excellent.



**NAME OF CROP:** Grape Hyacinth (*Muscari botryoides*).

**PRODUCTION AND MARKETING PERIOD:** Late winter and spring.

**METHOD OF PROPAGATION:** Bulbs.

**CULTURAL PROCEDURES:**

**Potting:** Plant three bulbs in 3" plastic azalea pot. Standard soil mixture.

**Pinching:** None.

**Timing:** Pot bulb in October and place in cold storage at 40 degrees. Remove pots from storage after 6 to 8 weeks or when roots are established. Place in greenhouse and force into flower as needed. Requires about 21 days in winter and 10 to 14 days in spring.

**Temperature:** Storage 40 degrees. Forcing 60 degrees.

**Spacing:** 6 plants per square foot.

**Other Considerations:** Do not allow to dry out.

**VARIETIES:**

Heavenly Blue.  
Album.

**COST OF PRODUCTION:**

Storage cost: 6 weeks at 6¢ = 36¢.

$36 \div 16 = 2.25\text{¢}$  per pot.

Forcing cost: 3 weeks at 5¢ = 15¢.

$15\text{¢} \div 6 = 2.5\text{¢}$  per plant.

Total cost =  $2\frac{3}{4}\text{¢}$  per plant.

Add cost of bulb and pot.

**MARKET ACCEPTANCE:** Good.

**NAME OF CROP:** Foliage Plants, Cacti and Succulents.

**PRODUCTION AND MARKETING PERIOD:** Entire year.

**METHOD OF PROPAGATION:** Rooted cuttings or small plants.

**CULTURAL PROCEDURES:**

**Potting:** Plant foliage plants directly into finish pots, 3½" or 4" plastic azalea pots or ceramic containers or dishes. Use straight coarse peat for foliage plants; 3 parts sand and 1 part peat for cacti and succulents.

**Pinching:** None.

**Timing:** Varies with plant and selling schedules.

**Temperature:** 60 to 65 degrees for foliage plants with 50 percent shade. Full sun for cacti and succulents.

**Spacing:** Cacti and succulents pot to pot. Foliage plants so tips of leaves touch.

**Other Considerations:** In preparing peat for potting, be sure coarse peat is saturated with water, squeeze dry with hands when potting. Do not apply water to newly potted plants for 2 or 3 weeks, depending on the season of year.

**VARIETIES:** Write for MP-134 "Foliage Plants in the Home," for list of adapted varieties.

**COST OF PRODUCTION:** Figure costs for your operations in similar manner to that used for any flowering crops.

**PRODUCTION CONSIDERATIONS:** Watch light requirements on foliage plants. Too much shade can be detrimental. Measure light intensities with light meter. Examples:

1,500-foot candles

Philodendrons, scindapsus, syngoniums.

2,000-foot candles

Dracaenas, sansevierias, peperomias (keep on dry side).

2,500-foot candles

Crotons, pandanus.

Full sun

Cacti, succulents.

**MARKET ACCEPTANCE:** Excellent.

**NAME OF CROP:** Pansy (*Viola tricolor hortensis*).

**PRODUCTION AND MARKETING PERIOD:** Spring.

**METHOD OF PROPAGATION:** Seed.

**CULTURAL PROCEDURES:**

**Potting:** Plant 12 seedlings to market-pak.

**Timing:** Seed sown October 15. Transplanted November 15. Saleable January on.

**Temperature:** 50 degrees.

**Spacing:** Place market-paks pak to pak.

**Other Considerations:** Plants were grown in cold frames.

**VARIETIES:** Use large-flower strains.

**COST OF PRODUCTION:**

6 weeks at 5¢ = 30¢.

$30\text{¢} \div 4 = 7.5\text{¢}$  per market-pak.

Add cost of seedlings and market-pak.

**MARKET ACCEPTANCE:** Excellent.

**NAME OF CROP:** Heliotrope (*Heliotropium arborescens*).

**PRODUCTION AND MARKETING PERIOD:** Spring months.

**METHOD OF PROPAGATION:** Cuttings or seed.

**CULTURAL PROCEDURES:**

**Potting:** Plant rooted cutting or seedlings directly in 3½" plastic pots.

**Pinching:** Pinch twice by removing tips as soon as they are large enough.

**Timing:** From seed sowing to potting, 6 weeks; from potting to bloom, cuttings or seedlings 12 weeks.

**Temperature:** 60 degrees.

**Spacing:** 4 plants per square foot.

**Other Considerations:** Grow in high-light intensities to produce short bushy plants.

**VARIETIES:**

First Snow (white).

Marine (violet).

Dwarf Regale Mixture.

**COST OF PRODUCTION:**

12 weeks at 5¢ per week = 60¢.

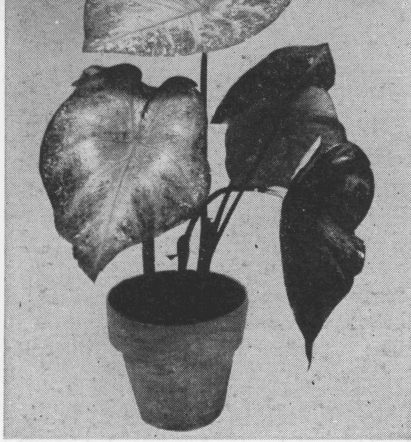
$60\text{¢} \div 4 = 15\text{¢}$  per plant.

Add cost of seedlings or cuttings and pot.

**MARKET ACCEPTANCE:** Fair.

*Devil's Ivy.*





*Caladium,  
standard  
varieties.*

**NAME OF CROP:** Fancy-leaved Caladium (*Caladium bicolor*).

**PRODUCTION AND MARKETING PERIOD:** April to October.

**METHOD OF PROPAGATION:** Rhizomes.

**CULTURAL PROCEDURES:**

**Potting:** Plant No. 2 rhizome in 3½" or 4" plastic azalea pans. Use 4" for standard varieties, 3½" for strap-leaf varieties. Standard soil mixture.

**Pinching:** None.

**Timing:** Will require 5 to 6 weeks from dry bulb to sale for March and April plantings, 3 weeks for plantings made from May through August.

**Temperatures:** 70 degrees minimum.

**Spacing:** 4" pots, 7 per square foot.  
3½" pots, 8 per square foot.

**Other Considerations:** Center bud can be removed from rhizomes to produce bushy short plants. Will require additional 1 or 2 weeks to produce saleable plants if this practice is followed.

**VARIETIES:**

**Standard varieties**

- Candidum.
- Fannie Munson.
- Tom Thumb.
- Redskin.
- Texas Wonder.

**Strap-leaf varieties**

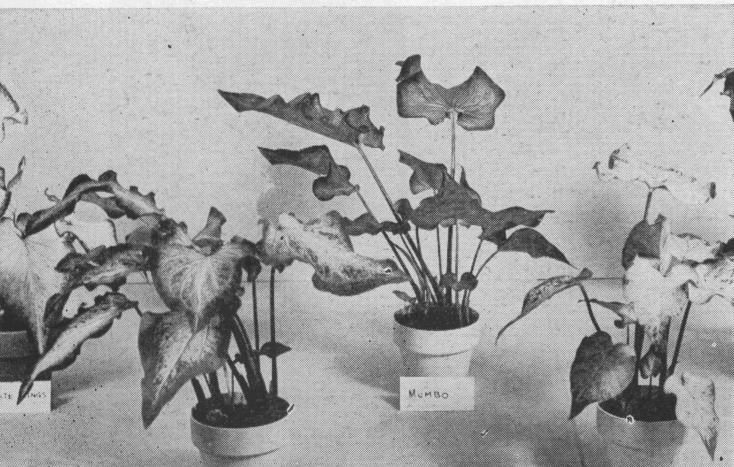
- Mumbo.
- White Wings.
- Rosalee.
- Pink Calla.
- Ripples.

**COST OF PRODUCTION:**

5 weeks at 5¢ = 25¢.  
25¢ ÷ 7 = 3.5¢ per plant.  
Add cost of bulb and pot.

**MARKET ACCEPTANCE:** Excellent.

*Caladiums, strap-leaf varieties.*



**NAME OF CROP:** Wax Begonia (*Begonia semperflorens*).  
**PRODUCTION AND MARKETING PERIOD:** Entire year.

**METHOD OF PROPAGATION:** Seed or cuttings.

**CULTURAL PROCEDURES:**

**Potting:** Plant seedlings or rooted cuttings direct to 3½" plastic azalea pots.

**Pinching:** Pinch every 2 weeks until plants are ready for sale.

**Timing:** Seed to potting, 4 to 6 weeks. Potting to sale, 12 weeks. Purchase of plants in 2¼" pots, 8 weeks.

**Temperature:** 60 degrees.

**Spacing:** 5 plants per square foot.

**Other Considerations:** Keep on dry side until well established. Pinch on schedule. Grow in shaded greenhouse. About 1,500-foot candles. Give more light before sale but not direct sunlight.

**VARIETIES:**

From seed or seedlings

- Ball Red.
- Ball Deep Rose.
- Snowbank.
- Luminosa compacta.
- From rooted cuttings
- Double Geneva varieties.

**COST OF PRODUCTION:**

12 weeks at 5¢ = 60¢.  
60¢ ÷ 5 = 12¢ per plant.  
Add cost of seedling or rooted cutting and pot.

**MARKET ACCEPTANCE:** Good.

**NAME OF CROP:** Rex Begonia (*Begonia rex*).

**PRODUCTION AND MARKETING PERIOD:** Entire year.

**METHOD OF PROPAGATION:** Small plants purchased in 2½" pots.

**CULTURAL PROCEDURES:**

**Potting:** Shifted to 4" plastic azalea pots.

**Timing:** Well-shaped plants ready for sale in 6 to 8 weeks by this method.

**Temperature:** 60 degrees.

**Spacing:** 4 plants per square foot.

**Other Considerations:** Do not overwater. Grown in 2,000-foot candlelight intensity for high color.

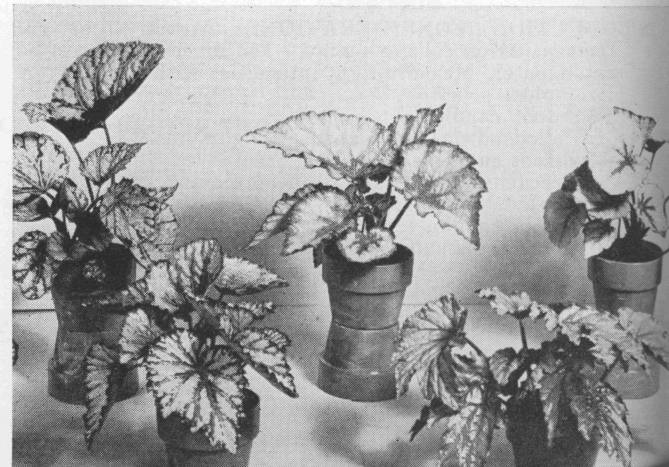
**VARIETIES:** Any hybrids.

**COST OF PRODUCTION:**

8 weeks at 5¢ = 40¢.  
40¢ ÷ 4 = 10¢ per plant.  
Add cost of small plant or cutting and pot.

**MARKET ACCEPTANCE:** Excellent.

*Rex Begonia.*



**NAME OF CROP:** Isoloma (*Isoloma hirsutum*).

**PRODUCTION AND MARKETING PERIOD:** October to June.

**METHOD OF PROPAGATION:** Seed.

**CULTURAL PROCEDURES:**

**Potting:** Plant seedlings direct to 4" plastic azalea pots. Handle in same manner as gloxinias.

**Pinching:** Pinch tips as soon as plants are established.

**Timing:** From seed sowing to potting, 8 weeks. From potting to bloom, 20 weeks.

**Temperature:** 60 degrees.

**Spacing:** 5 per square foot.

**Other Considerations:** Grow on dry side. Increase light intensity as crop matures.

**VARIETIES:** Cardinal.

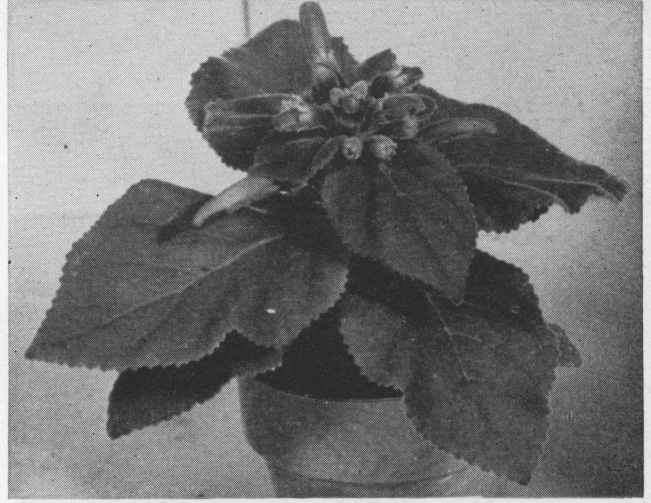
**COST OF PRODUCTION:**

20 weeks at 5¢ = \$1.

$\$1 \div 4 = 25\text{¢}$  per plant.

Add cost of seedling and pot.

**MARKET ACCEPTANCE:** Excellent.



*Isoloma.*

**NAME OF CROP:** Yellow Calla Lily (*Calla elliotiana*).

**PRODUCTION AND MARKETING PERIOD:** Spring months.

**METHOD OF PROPAGATION:** Dry rhizomes.

**CULTURAL PROCEDURES:**

**Potting:** Plant small size dry rhizomes (1½" to 2") in 4" plastic azalea pots. Cover tops of pots with moist sphagnum moss until rhizomes sprout and then remove moss. Drench soil with 1 pound terrachlor to 100 gallons water.

**Pinching:** No pinching.

**Timing:** 15 weeks from potting to sale at 70 degrees. Plant in late December or early January.

**Temperature:** 65 to 70 degrees.

**Spacing:** 5 plants per square foot.

**Other Considerations:** Never allow to dry out after roots are established and tops have started to grow. Use terrachlor drench to reduce root rot.

**COST OF PRODUCTION:**

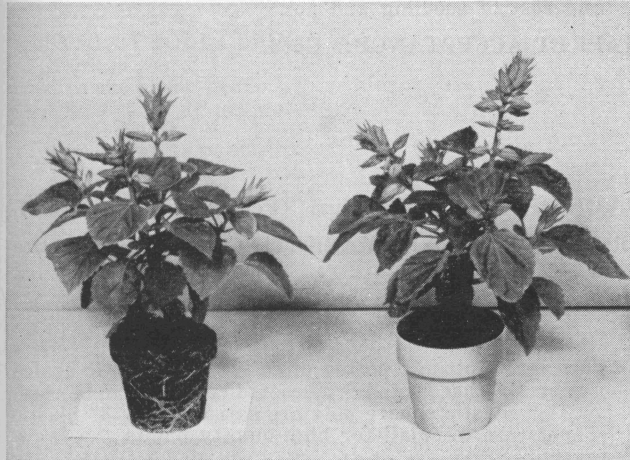
15 weeks at 5¢ = 75¢.

$75\text{¢} \div 5 = 15\text{c}$  per plant.

Add cost of dry rhizomes and pot.

**MARKET ACCEPTANCE:** Excellent.

*Yellow Calla Lily.*



*Salvia.*

**NAME OF CROP:** Salvia (*Salvia splendens*).

**PRODUCTION AND MARKETING PERIOD:** Entire year.

**METHOD OF PROPAGATION:** Seed.

**CULTURAL PROCEDURES:**

**Potting:** Pot seedlings directly into 3½" plastic azalea pots.

**Pinching:** Pinch out tips 14 days after potting.

**Timing:** 8 weeks from transplanting seedlings to flower in winter months. About 6 weeks in spring and fall.

**Temperature:** 60 degrees.

**Spacing:** 5½ plants per square foot.

**Other Considerations:** Do not allow to dry out and keep feeding schedule on time.

**VARIETIES:** For Christmas flowering: Fireball.

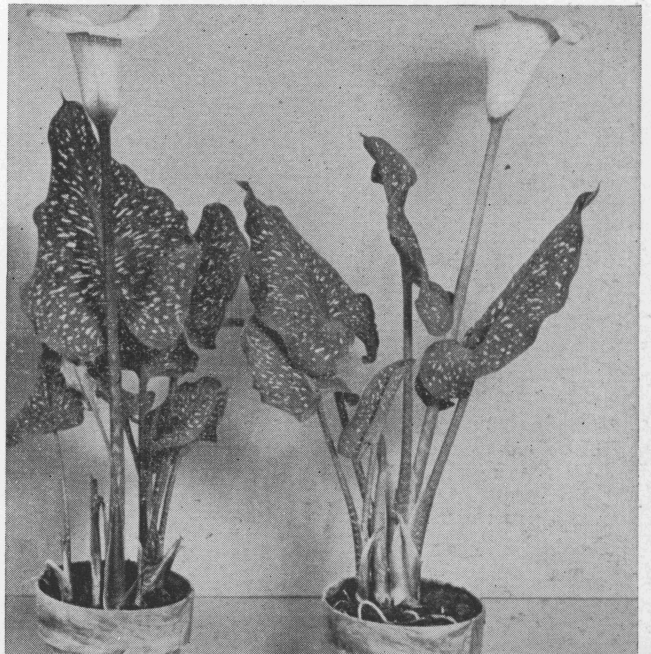
**COST OF PRODUCTION:**

8 weeks at 5¢ = 40¢.

$40\text{¢} \div 5.33 =$  approximately  $7\frac{1}{2}\text{¢}$  per plant.

Add cost of seedling and pot.

**MARKET ACCEPTANCE:** Fair.





*Ornamental Pepper.*

**NAME OF CROP:** Ornamental Pepper (*Capsicum frutescens*).

**PRODUCTION AND MARKETING PERIOD:** August through February.

**METHOD OF PROPAGATION:** Seed.

**CULTURAL PROCEDURES:**

**Potting:** Plant seedlings directly in 4" plastic azalea pots.

**Pinching:** While larger plants do not need to be pinched, one pinch on small plants as soon as they have become established in pots will produce bushier plants with more fruit.

**Timing:** For Texas conditions, sow seed in early August and pot in September.

**Temperature:** 60 degrees.

**Spacing:** 4 plants per square foot.

**Other Considerations:** Do not allow plants to dry out. Grow in full sunlight.

**VARIETIES:**

Fangs.  
Christmas Candle.

**COST OF PRODUCTION:**

10 weeks at 5¢ = 50¢.

50¢ ÷ 4 = 12.5¢ per plant.

Add cost of seedling and pot.

**MARKET ACCEPTANCE:** Good.

*Geranium.*

**NAME OF CROP:** Geranium (*Pelargonium hortorum*).

**PRODUCTION AND MARKETING PERIOD:** Entire year.

**METHOD OF PROPAGATION:** Cuttings.

**CULTURAL PROCEDURES:**

**Potting:** Cuttings potted directly to 4" plastic azalea pots. Either rooted or unrooted cuttings can be used. 3½" plastic square pots are satisfactory. 3" plastic pots are too small for high-quality plants.

**Pinching:** Do not pinch. Give plants adequate space to induce natural branching.

**Timing:** Unrooted cuttings require approximately 3 to 4 weeks to establish good root system in 4" pots. After rooting, saleable plants can be produced in bloom in 8 to 10 weeks, depending on the season of year.

**Temperature:** 60 degrees.

**Spacing:** 3½" square plastic pots, 3 pots per square foot. 4" plastic azalea pots, 2.5 pots per square foot.

**Other Considerations:** Keep potash level at 20 to 30 parts per million.

**VARIETIES:**

**For Texas conditions:**

|                   |                  |
|-------------------|------------------|
| Irene.            | Snowball.        |
| Penny.            | Imp. Red Fiat.   |
| Edna.             | Olympic Red.     |
| Better Times.     | Firechief.       |
| Enchantress Fiat. | Improved Ricard. |

**COST OF PRODUCTION:**

Unrooted cuttings planted direct:

12 weeks at 5¢ = 60¢.

60¢ ÷ 2.5 = 24¢ per plant.

Rooted cuttings planted direct:

8 weeks at 5¢ = 40¢.

40¢ ÷ 2.5 = 16¢ per plant.

Add cost of cutting and pot.

**MARKET ACCEPTANCE:** Excellent.



**NAME OF CROP:** Tulip (*Tulipa gesneriana*).

**PRODUCTION AND MARKETING PERIOD:** Spring months.

**METHOD OF PROPAGATION:** Dry bulb.

**CULTURAL PROCEDURES:**

**Potting:** Plant 3 bulbs to 4" plastic azalea pan. Place flat side of bulb next to pot rim. Place plants in cold storage when potted.

**Pinching:** None.

**Timing:** Use precooled bulbs. Keep in cold storage at 41 degrees until good root system develops.

**Temperature:** 41 degrees cold storage. 60 degrees for forcing.

**Spacing:** Pot to pot in cold storage. 4 pans per square foot of bench for forcing.

**Other Considerations:** Do not allow pots to dry out in storage but do not overwater in plastic pots. Make every effort to keep soil uniformly moist but not wet.

**VARIETIES:**

For Texas conditions:

Prunus.

Golden Herald.

Carrara.

Edith Eddy.

City of Haarlem.

Red Emperor.

**COST OF PRODUCTION:**

Storage cost:

6 weeks at 6¢ = 36¢.

$36¢ \div 9 = 4¢$  per pot.

Forcing cost:

6 weeks at 5¢ = 30¢.

$30¢ \div 4 = 7.5¢$  per pot.

Add cost of bulb and pot.

**MARKET ACCEPTANCE:** Excellent.

**NAME OF CROP:** Calceolaria (*Calceolaria herbeohybrida*).

**PRODUCTION AND MARKETING PERIOD:** Late winter and early spring.

**METHOD OF PROPAGATION:** Seed. For southern conditions the best method is to purchase plants from 2¼" or 2½" pots.

**CULTURAL PROCEDURES:**

**Potting:** Shift small plants to same size "jiffy pots" on arrival in October and transplant pot and all to 4" plastic azalea pots as soon as new roots penetrate pots, or if seedlings are grown, plant directly to 4" pots as soon as large enough to handle.

**Pinching:** Do not pinch.

**Timing:** Apply 4 hours additional light as soon as root action starts in 4" pots. Keep lights on until flower heads start to show color. Flowering plants were saleable in trials beginning December 17 on plants lighted on October 6.

**Temperature:** Keep night temperatures as close to 55 degrees as possible.

**Spacing:** 3 pots per square foot.

**Other Considerations:** Grow on dry side and avoid overwatering, especially when grown in plastic pots.

**VARIETIES:**

Gilberts F<sub>1</sub> Hybrids.

Berlin Giant.

Wehrles Gem.

**COST OF PRODUCTION:**

12 weeks at 5¢ = 60¢.

$60¢ \div 3 = 30¢$  per plant.

Add cost of seedling or small plant and pot.

**MARKET ACCEPTANCE:** Excellent.

*Poinsettia.*



**NAME OF CROP:** Poinsettia (*Euphorbia pulcherrima*).

**PRODUCTION AND MARKETING PERIOD:** Christmas Season.

**METHOD OF PROPAGATION:** Cuttings taken and rooted in September and no later than October 5 under Texas conditions.

**CULTURAL PROCEDURES:**

**Potting:** Pot rooted cuttings directly to 4" plastic azalea pots. 3½" plastic azalea pots were used also but blooming poinsettias are too top-heavy for 3 to 3½" pots when well grown.

**Pinching:** No pinch for large flowers.

**Timing:** Keep temperatures at 60 degrees at all times and do not allow small pots to dry out.

**Temperature:** 60 to 62 degrees constantly.

**Spacing:** Space 4" plastic pots 4" between pot rims or 2.41 plants per square foot.

**Other Considerations:** Do not expose to additional light at night. Do not feed after November 15.

**VARIETIES:**

Indianapolis Red.

Ecke's White.

**COST OF PRODUCTION:**

10 weeks at 5¢ = 50¢.

$50¢ \div 2.41 = 20.7¢$  each.

Add cost of rooted cutting and pot.

**MARKET ACCEPTANCE:** Excellent.

*Calceolaria.*



## MARKETING PRACTICES AND TECHNIQUES

The testing of marketing procedures was conducted primarily in a grocery store and a variety store located in Bryan, Texas, from February 1955 to February 1956. Additional information was obtained from a commercial operation in Austin, Texas. The data obtained covered 3 months in six locations.

The plants were arranged on a work bench prior to the packaging operation. The material was assembled close together to reduce all unnecessary steps and motion. The material required for preparation of plants and flowers for mass market outlets is shown in the following illustration.

### **Plant Classification**

The plants were classified into various types. The following plants are examples of plants used in each classification:

*Flowering plants:* Ageratum, Geranium, Chrysanthemum, Calceolaria, African Violet, Azalea, Wax Begonia and Gardenia.

*Foliage plants:* Nephthytis, Chinese Evergreen, Caladium, Coleus, Boston Fern, Grape Ivy, Jade Plant, Leatherleaf Fern, Sansevieria, Philodendron, Croton and Scindapsus.

*Novelty planters and dish gardens:* These were pottery and plastic planter dishes planted with foliage plants or cacti and succulents.

*Cut flowers:* Carnations, Roses and Chrysanthemums.

### **Packaging Procedures**

All plants offered for sale were placed in sealed transparent bags for ease in handling in self-service outlets and to maintain the plants and flowers in good condition.



*Materials needed for packaging cut flowers and potted plants.*



*Leatherleaf ferns in 4-inch plastic azalea pots.*

For most of the studies 450 MSAT cellophane bags were used. These bags were gusseted and were 5" x 6" x 20" with an approximate cost of 3 cents each.

The strength and tear resistance of this material have been satisfactory, and the plants and flowers remain in good condition in these bags for a reasonable time. Cut flowers can be kept in satisfactory condition 3 to 5 days in a refrigerated case and potted plants 5 to 7 days on display shelves. When exposed to moisture for short periods, however, the bags tend to become limp and sag which detracts from the appearance of the flowers and plants.

Other films were used for this purpose in these trials and some appear to have better qualities in some respects, but to date a highly satisfactory material in suitable sizes for all plants has not been obtainable in sufficient quantities for commercial application.

The packaging operation is simple. The plants or flowers are placed in the cellophane bag, the top folded over and sealed with a package sealer and a care and price tag attached.

### **Care Tags**

Customer purchasing of potted plants is based largely on impulse buying. Early in the experiment, numerous requests were made by customers for information on the identity and care of the plants. Therefore, instruction tags were placed on each sealed bag giving the name of the plant and telling how to care for it.

Examples of information on the instruction tags for foliage and flowering plants follow:



## CULTURAL DIRECTIONS FLOWERING PLANTS

**Common Name:** Chrysanthemum **Variety:** Delaware  
**Scientific Name:** Chrysanthemum hortorum

Chrysanthemums are natives of China and have been in cultivation for over 3,000 years. When the flowers have faded on your plant, it can be planted in the garden and it will flower again in the fall of the same year. Keep the plant well watered and do not let it dry out until the flowers have withered. Then follow the procedure outline below:

1. Tap the plant out of the pot, cut the tips of the stems off to about 2 inches above the soil line and plant it in the garden.

2. When new shoots begin to grow, pinch off the tip of each shoot as soon as it reaches about 4 inches in length. Pinch each shoot that grows in this manner until August 1.

3. Apply a 5-10-5 fertilizer, 1 teaspoon per plant once each month until September 1. Keep plants well watered.

4. If insects attack the plants, dust them with any all-purpose rose dust.

5. Any variety of chrysanthemum is an excellent plant for Texas gardens, and flowers also can be cut for long-lasting colorful bouquets in the house.

## CULTURAL DIRECTIONS FOLIAGE PLANTS

**Common Name:** Devil's Ivy **Variety:** Wilcox  
**Scientific Name:** Scindapsus aureus wilcox

This plant is a native of the East Indies.

The requirements for growing foliage plants in the home are simple and easy and these plants will respond readily to your care.

Keep the soil uniformly moist and water only when the soil feels dry to the touch and then water only enough to moisten the entire amount of soil in the container.

Keep them in a light corner or part of the room or under artificial light for 8 hours a day. Do not keep them in direct sunlight nor in direct drafts from doorways or windows.

For best results, keep the foliage washed off with a fine atomizer about once each week.

Do not fertilize foliage plants in the home oftener than once a year.

### **Retail Sales Procedures**

The plants were sold from Thursday afternoon through Saturday or Sunday, depending on the store hours. The plants not sold were picked up Monday morning and returned to the greenhouse. The plants were removed from the package and placed on a greenhouse bench until they were assembled and packaged for the next sales period, or were disposed of.

Various types of displays were tried with the potted plants. A mass display with all types of plants readily accessible to the customer produced the best results.

Packaged cut flowers must be sold from a refrigerated produce case. Carnations and chrysanthemums



*Display rack used for small pot plant sales in mass market sales outlet.*

keep in excellent condition for 3 days without shortening the life of the flowers after they are removed from the packages.

Some flower colors, such as red and bronze, look "dead" under the usual daylight fluorescent lighting in supermarkets. When yellow or incandescent lighting cannot be provided, these colors should be avoided.

Cut flowers were packaged in uneven numbers, such as 5, 7 or 9 per package, rather than the conventional 6 or 12 flowers as they now are sold. Uneven numbers are easier to use in arranging cut flowers.



*Display of cut flowers in refrigerated case.*

No sales or promotional campaign was conducted. Cut flowers were sold only in the supermarket since a refrigerated case was not available in the variety store. All sales were consignment selling. This procedure permitted perfect control and manipulation of the products when desired. The ultimate goal was the purchasing of the product.

Since early trials indicated that potted flowering and foliage plants offered more possibilities than cut flowers through mass market outlets in this area, cut flowers were discontinued rather early in the studies.

## RESULTS OF MASS MARKET SALES

### Sales Data

Sales for all types of merchandise occur in cycles that are caused by seasons, special holidays and such occasions. Flower sales are no exception.

The largest number of sales was made during the months with special holidays, such as Christmas, Easter and Mother's Day. Sales were up during the fall, possibly due to entertainment for football games in this area, increase in assortment of plants available, replacement of plants lost or damaged outdoors during summer heat and the increased number of store customers caused by the opening of the college fall semester. The large percentage for July may be accounted for by a special sale of caladiums, Table 1. Caladium plants were sold at 39 cents from the middle of May to the first weekend in July. Sales dropped the last 3 weeks to an average of about 10 per week. The price was reduced to 19 cents per plant (about advertised prices in Houston and Dallas at that time) to determine the effect of price on sales. Sales increased from 10 to 160 plants the first week, and 60 plants were sold the first day of the second week when supplies were exhausted.

The first week of the month seems to be the best for sales, with the percentage of sales decreasing

TABLE 1. TOTAL SALES OF POTTED PLANTS AT GROCERY STORES, BY MONTHS

| Month     | Percent |
|-----------|---------|
| January   | 7.4     |
| February  | 4.9     |
| March     | 7.7     |
| April     | 9.4     |
| May       | 11.4    |
| June      | 3.4     |
| July      | 14.4    |
| August    | 3.6     |
| September | 7.0     |
| October   | 9.9     |
| November  | 8.6     |
| December  | 12.3    |

TABLE 2. PERCENT OF VALUE SALES OF POTTED PLANTS SOLD IN GROCERY STORES BY WEEKS, MARCH-AUGUST, 1955

| Month  | First week | Second week       | Third week        | Fourth week | Fifth week |
|--------|------------|-------------------|-------------------|-------------|------------|
|        | Percent    |                   |                   |             |            |
| March  | 20.0       | 42.7 <sup>1</sup> | 23.1              | 14.2        |            |
| April  | 36.1       | 29.7              | 18.2              | 10.2        | 5.8        |
| May    | 30.1       | 10.4              | 38.8 <sup>1</sup> | 20.7        |            |
| June   | 54.8       | 12.1              | 25.0 <sup>1</sup> | 8.1         |            |
| July   | 17.3       | 31.5 <sup>1</sup> | 21.1              | 19.0        | 11.1       |
| August | 31.4       | 20.7              | 25.3 <sup>1</sup> | 22.6        |            |

<sup>1</sup>Special holidays, or special plants, or special price.

ing with each succeeding week. There were exceptions, such as the occurrence of a special occasion or holiday, which caused the change shown in Table 2.

The areas in which the studies were conducted are primarily those with monthly payrolls, which may account for the best sales around the first of the month and the decrease with each succeeding week. This proves that flowers are purchased readily when money is available.

The amount of stock on display had a marked influence on the amount sold. Table 3 shows the increase in sales as the size of the display was increased. However, the percentage sold decreased

TABLE 3. SALES OF POTTED PLANTS IN RELATION TO SIZE OF DISPLAY, ONE GROCERY STORE, FEBRUARY-AUGUST, 1955

| Size of stock | Potted plants sold, percent |
|---------------|-----------------------------|
| 60 or less    | 53.8                        |
| 60 to 100     | 57.4                        |
| 100-119       | 62.3                        |
| 120-129       | 68.8                        |
| 130-149       | 71.6                        |
| 150 plus      | 72.4                        |

as the size of display was increased, indicating that there would be a limit to the desirable size of the display. The customer apparently likes to make a selection from a large number of plants, even if the purchase is made on an impulse.

Flowering plants had 58 percent of total sales, Table 4. Novelty plants were made up mainly as dish gardens or pottery planters. Some foliage plants could be thought of as seasonal or special purchases, because a large amount of such types as caladiums and coleus were used for outdoor planting.

The sale experiment was conducted for 1 year in Bryan, while the sale period in Austin was only during February, March and April. The differences in the percentage of plant types sold between the

**TABLE 4. DISTRIBUTION OF MASS MARKET POTTED PLANT SALES FOR TWO OUTLET AREAS**

| Type of plants                    | Outlet  |        | Total |
|-----------------------------------|---------|--------|-------|
|                                   | Bryan   | Austin |       |
|                                   | Percent |        |       |
| Flowering plants                  | 46.8    | 72.8   | 58.4  |
| Foliage plants                    | 41.9    | 14.9   | 29.9  |
| Novelty planters and dish gardens | 11.3    | 12.3   | 11.7  |

two areas may be caused by the season and length of sale period.

A distribution of total sales for cut flowers and potted plants at retail prices, ranging from 19 cents to \$1.49, is shown in Table 5. The most popular retail price for potted plants was from 39 to 69 cents. The retail price of 49 cents seemed to be the most popular for cut flowers, with sales ranging from 49 to 98 cents. This indicates that when customers have a selection to choose from, they normally do not select the least expensive.

**TABLE 5. DISTRIBUTION OF TOTAL SALES, CUT FLOWERS AND POTTED PLANTS, BY RETAIL PRICES**

| Price   | Cut flowers | Potted plants |
|---------|-------------|---------------|
|         | Percent     |               |
| Dollars |             |               |
| .19     |             | 6.9           |
| .29     |             | 3.1           |
| .39     |             | 17.3          |
| .49     | 38.7        | 17.9          |
| .59     | 17.2        | 17.2          |
| .69     | 6.7         | 7.7           |
| .79     | 9.9         | 6.6           |
| .89     | 16.2        | 6.7           |
| .98     | 6.7         | 7.1           |
| 1.19    |             | 3.7           |
| 1.29    | 4.6         | 3.4           |
| 1.39    |             | 1.3           |
| 1.49    |             | 1.1           |

### When Purchases Were Made

The store was checked each morning and afternoon during the sales period to determine the replacements needed. This provided an opportunity to determine when the sales were made during the weekend. Apparently, some of the customers anticipated the purchasing of flowers because 26 percent of the sales were made Thursday afternoon, Table 6.

More than 50 percent of the plants were sold by Saturday noon. An additional 21 percent were sold between Saturday noon and Monday.

The effect of price on the sales of potted plants is shown in Table 7. The most popular price range for potted plants was 39 to 69 cents.

Tables 6 and 7 indicate that the sales of potted plants were impulse or possibly anticipated pur-

chases along with the weekend shopping period. Some of the store customers asked the clerks if the flowers would be on sale again during the weekend. Because there was no advertising, it was felt that the sales were made as an impulse purchase. The customers usually were unaware that the plants were on sale in the store until after they entered the store.

**TABLE 6. SALES OF POTTED PLANTS BY DAY OF WEEK IN A MASS MARKET OUTLET AT VARIOUS CHECK TIMES DURING PART OF A 3-MONTH PERIOD, BRYAN, 1955-56**

| Type of plants <sup>1</sup> | Thurs-<br>day<br>pm <sup>2</sup>      | Fri-<br>day<br>am | Fri-<br>day<br>pm | Satur-<br>day<br>am | Satur-<br>day<br>pm | Time of<br>pick up <sup>3</sup> |
|-----------------------------|---------------------------------------|-------------------|-------------------|---------------------|---------------------|---------------------------------|
|                             | Cumulative percentages of plants sold |                   |                   |                     |                     |                                 |
| Flowering plants            | 37                                    | 49                | 57                | 64                  | 76                  | 85                              |
| Foliage plants              | 18                                    | 26                | 33                | 45                  | 53                  | 64                              |
| Novelty                     | 13                                    | 20                | 25                | 35                  | 42                  | 57                              |
| All plants                  | 26                                    | 36                | 43                | 52                  | 61                  | 73                              |

<sup>1</sup>Check period varied from 8 to 13 weeks.

<sup>2</sup>Plants delivered to store by Thursday noon.

<sup>3</sup>Unsold plants were picked up Monday morning.

Late in the week (Saturday and Sunday) with the week's shopping completed, it appears that the customer purchased plants entirely on impulse. Usually the low-priced plants were sold out during the weekend sale period. The higher priced plants were slower to sell.

### Marketing Costs

The average cost distribution for marketing potted plants through mass market outlets, Table 8, was determined on the year's operation. It covered the wholesale cost of the plant, including transportation; the cost of the cellophane bag into which the plant was placed and sealed; and the cost of the packaging, which was determined on time studies

**TABLE 7. SALES OF POTTED PLANTS AT VARIOUS PRICES IN A MASS MARKET OUTLET AT VARIOUS CHECK TIMES DURING PART OF A 3-MONTH PERIOD, BRYAN, 1955-56**

| Price, dollars <sup>1</sup> | Thurs-<br>day<br>pm <sup>2</sup>      | Fri-<br>day<br>am | Fri-<br>day<br>pm | Satur-<br>day<br>am | Satur-<br>day<br>pm | Time of<br>pick up <sup>3</sup> |
|-----------------------------|---------------------------------------|-------------------|-------------------|---------------------|---------------------|---------------------------------|
|                             | Cumulative percentages of plants sold |                   |                   |                     |                     |                                 |
| .19                         | 0                                     | 29                | 57                | 57                  | 72                  | 100                             |
| .29                         | 42                                    | 54                | 58                | 69                  | 74                  | 93                              |
| .39                         | 24                                    | 27                | 33                | 45                  | 50                  | 50                              |
| .49                         | 19                                    | 28                | 40                | 51                  | 69                  | 75                              |
| .59                         | 36                                    | 49                | 54                | 62                  | 69                  | 81                              |
| .69                         | 18                                    | 27                | 34                | 43                  | 55                  | 75                              |
| .79                         | 0                                     | 29                | 36                | 43                  | 43                  | 64                              |
| .89                         | 8                                     | 12                | 26                | 49                  | 63                  | 67                              |
| .98                         | 20                                    | 40                | 53                | 53                  | 60                  | 60                              |
| 1.29                        | 0                                     | 0                 | 9                 | 27                  | 27                  | 55                              |
| All prices                  | 25                                    | 34                | 41                | 53                  | 63                  | 71                              |

<sup>1</sup>Check period varied from 8 to 13 weeks.

<sup>2</sup>Plants delivered to store by Thursday noon.

<sup>3</sup>Unsold plants were picked up Monday morning.

**TABLE 8. AVERAGE COST DISTRIBUTION OF THE SELLING PRICE OF POTTED PLANTS IN A MASS MARKET OUTLET GROCERY STORE IN BRYAN, 1955-56**

| Item                   | Percent |
|------------------------|---------|
| Plant                  | 39.4    |
| Container              | 4.0     |
| Packaging <sup>1</sup> | 8.3     |
| Commission             | 20.0    |
| Profit                 | 28.3    |

<sup>1</sup>Packaging cost determined by 27 weeks of study with the labor cost per hour at \$1.

conducted for 27 weeks after the packaging technique was developed, but with inexperienced personnel during the study period. The commission based on the selling price was agreed upon with the outlets before the experiment started. The commission approach allowed the research worker the opportunity to regulate price and volume. The stores were well pleased with the commission received and the arrangement for the study. The profits were variable because the selling price was changed at times during the experiment to see the effect of price on the sales.

**TABLE 9. CONSUMERS' REACTION TO THE MASS MARKETING OF FLOWERS IN BRYAN AND AUSTIN, 1956**

| Question   | Austin <sup>1</sup> | Bryan <sup>2</sup> | Total |
|--|---------------------|--------------------|-------|
|  | Percent             |                    |       |
| Male purchasers interviewed  | 5.0                 | 21.5               | 11.5  |
| Female purchasers interviewed                                      | 95.0                | 78.5               | 88.5  |
| Did you notice the plants on sale?                                 |                     |                    |       |
| Yes  | 82.5                | 100.0              | 89.1  |
| No   | 17.5                |                    | 10.9  |
| Did you buy any of the plants?                                     |                     |                    |       |
| Yes  | 43.7                | 72.5               | 56.3  |
| No   | 56.3                | 27.5               | 43.7  |
| How did you make purchases?  |                     |                    |       |
| Frequent   | 10.5                | 32.1               | 19.7  |
| Occasional   | 21.0                | 35.7               | 27.3  |
| Single   | 68.5                | 32.2               | 53.0  |
| What type plants did you purchase?                                 |                     |                    |       |
| Flowering  | 86.3                | 42.5               | 63.8  |
| Foliage  | 11.3                | 40.4               | 26.3  |
| Dish garden  | 2.4                 | 17.1               | 9.9   |
| What did you use plants for?                                       |                     |                    |       |
| Gifts  | 27.9                | 25.7               | 26.7  |
| Home   | 72.1                | 74.3               | 73.3  |
| Would you like to see flowers sold in grocery stores all the time? |                     |                    |       |
| Yes  | 98.7                | 100.0              | 99.2  |
| No   | 1.3                 |                    | .8    |

<sup>1</sup>Three outlets.

<sup>2</sup>One outlet.

The marketing of potted plants through mass market outlets can be profitable. It could be conducted in connection with a retail shop that has very reliable sources of supply available or the supplier has greenhouses for producing his own plants. This period varies with the condition and size of the plant on arrival from the wholesale grower, the size of stock required to market the plants for a given period of time and the number of plants returned after a weekend sale period to be held until the next sale period.

In these studies, except on special sales, an effort was made to price both potted plants and cut flowers so that the return to the grower would yield a reasonable profit. It should not be assumed that the prices or markups used in these studies are the correct ones. Different approaches, conditions or situations to these problems could result in entirely different prices and margins.

### Customer Reaction

The mass marketing of cut flowers and potted plants is fairly new. Two hundred people were interviewed in the stores to find the consumers' reaction to the purchasing of items. These people were selected as they stopped to examine the display. It was apparent that the display attracted attention because about 90 percent of the people interviewed stated that they had previously noticed the plants on sale, Table 9. More than 56 percent of the people interviewed stated that they had made purchases. The Bryan study, which was conducted for 1 year, shows that more than 67 percent of the people interviewed made more than one purchase. The Austin study was not conducted long enough to adequately evaluate repeat sales. Flowering plants were the most popular, followed by foliage plants and then novelties. About 73 percent of the people stated that they had purchased the plants for use in the home.

Almost everyone favored the continuation of plant sales in grocery stores. They apparently like the convenience of making all their purchases in one place, if possible, and the significantly lower price than is found in flower shops conducting a service type operation.