

# *Florist Crops*

*For*

# *Mass Market Outlets*

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# FLORIST CROPS FOR MASS MARKET OUTLETS

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## PRODUCTION

Since the mid-1940's the number of cut flowers and potted plants available for sale has increased considerably. This has been due to increasing efficiencies within the greenhouse such as improved pest control methods, better fertilization practices, increased understanding of the importance of soil preparation and sterilization, and other cultural procedures. In addition, new areas of crop production have developed and certain existing areas have expanded. For example, production of spray-type chrysanthemums in Florida has increased from a few to nearly 500 acres, some acreage being cropped twice in the same season. Other cut flower crops such as lilies and roses are expanding in Florida and may assume greater importance in the near future. Production of foliage plants and potted mums has increased spectacularly in Florida and these are shipped by truck on a regular basis to the northern markets.

California, too, has expanded production, particularly in carnations, orchids, and roses which are shipped East and South as cut flowers. The development of washed-air cooling has given great emphasis to increased and year-round carnation production in Colorado.

All these factors have resulted in a great increase in production. And while sales of flowers have risen, they apparently have not done so in proportion to the expanding population or production.

Since the bulk of florist crop sales is through the traditional retail florist shops, it appeared desirable to offer cut flowers and potted plants through a mass market outlet such as a supermarket in order to evaluate the potential of such stores. In keeping with the policy of many supermarkets, it seemed necessary to offer a product that could be sold at a relatively low price in order to attract volume sales. Since the time for production of many florist crops cannot be reduced appreciably, one possibility was to make the size of the unit smaller. Thus, for example, instead of having five chrysanthemum cuttings in a 6-inch pot, one cutting could be placed in a 3½-inch pot in order to reduce the ultimate sales price even though the time involved for production would be nearly identical for both small and large specimens.

Based on this premise, research has been conducted to find the most suitable methods of producing shorter stemmed cut flowers and smaller potted plants as well as to evaluate varieties on their suitability for these purposes. Because many cultural practices are similar in the production of either a large or small item, detailed methods will not be described where this is true.

## **CUT FLOWERS**

The importance of proper soil preparation, sterilization, fertilization, pest control, and other production practices cannot be overemphasized in the culture of cut flower crops. The quality of the product must be very acceptable since buyers of floral crops in a supermarket are quick to shun poor quality stock or that which has been handled improperly at any stage.

The cut flowers in this study were placed in gusseted cellophane bags, 5" × 6" × 20", hence stems 15 inches or less in length were necessary in order to fit within the plastic material.

## **CARNATIONS**

The plants should be grown in the usual way except that stems not more than 15 inches need to be cut from the plants. Additional supports will be needed since plants may grow rather high. Any variety that has good quality and productiveness will be satisfactory.

## **CHRYSANTHEMUMS**

Fast growth with an abundance of strong shoots developing after the plants are pinched can be obtained if soil conditions are favorable, hence the desirability of additions of organic matter followed by sterilization. The cutting should be planted at a distance of 6×8 inches.

In order to provide long day conditions when vegetative growth is desired supplemental illumination from incandescent lamps should be used. Such lighting is necessary from August 15 to May 15. Short day conditions can be maintained by means of black cloth shading which should be used to cover the plants daily from 5:00 p.m. to 8:00 a.m. from March 15 to September 15.

For spray-type mums planted from March through August, two weeks of long day treatment will permit the plants to become well established and then they are soft-pinch and short day treatment started. No pruning of stems or disbudding of sprays is done—all stems and flowers are allowed to develop.

For spray-type mums planted from September through February, two weeks of long day treatment before the pinch should be followed by an additional period of 10 to 14 days of long days. This added time of long photoperiod after pinching increases the length of stem and

allows for development of more leaves to add more substance and quality to the flower during the winter when weather conditions are somewhat unfavorable. No pruning of stems or disbudding of sprays is done on these plants.

For disbuds where only one flower is allowed to develop per stem, the same lighting and pinching schedules may be followed as described above. The cuttings should be planted 6×6 inches and all but two stems removed on the larger flowered varieties and three stems may be allowed to remain on the smaller flowered types.

At the time that short day treatment is started, the night temperature must be maintained at 62° to 64° Fahrenheit to cause initiation or formation of flower buds. This temperature should be held for three weeks at which time flower buds will be formed and developed so that temperatures can be reduced to 60° or even 58° F.

There is a wide selection of spray-type varieties that can be grown, but it is essential to remember that the flowers must also look satisfactory in the cellophane package. The single or anemone type flowers have little rigidity of the ray petals and they are often pressed out of shape by the walls of the cellophane bag making the flowers look old or misshapen. Consequently these varieties should not be grown unless some method of avoiding the aforementioned packaging difficulty is found. Even many of the decorative types are flattened by the cellophane overwrap and should not be used. Consistently the pompons, which are ball-shaped, have proved to be most satisfactory in that petals are rigid and are not distorted by being pushed against the plastic film. For March through August plantings use the 8-, 9-, and 10-week varieties (those which flower in the stated number of weeks after short day treatment is started) and for September through February the 9-, 10-, and 11-week types are suggested.

For the disbuds, any flower with good substance and rigidity of petals will be satisfactory.

## **ROSES**

In the usual culture of roses, there is normally an adequate number of 9-, 12- and 15-inch stem length flowers produced without necessitating any particular methods to induce them. The cluster or sweet-heart types of roses are particularly well suited for packaging because they have shorter stems than most hybrid teas, and the numerous flowers and buds add interest and sales value to the product. The culture for these is similar to the standard greenhouse rose.

## POTTED PLANTS

Producing plants in small pots necessitates an efficient greenhouse layout and handling technique to keep labor costs from becoming unreasonably high. When possible, potted plants should be handled in units as opposed to individual pots and once plants are placed on the bench, there should be a minimum of spacing or moving if it must be done on a pot by pot basis. As yet, there is no method which can be suggested whereby the advantages of industrial mass production techniques can be utilized in the culture of potted plants; each grower will have to use his ingenuity to find methods to keep down costs of handling.

Although clay pots have been the hallmark of the florist industry, soil in them will dry rapidly especially in the smaller sizes. While peat pots are useful in some instances they are not sturdy enough to stand the handling and eventually must be dropped into another kind of pot that will withstand abuse.

The most practical container for both growing and selling appears to be the plastic pot. It is lightweight, large numbers can be carried by employees, especially important if women constitute a large proportion of the labor force, and they do not support the growth of algae on the surface which cause discoloration.

It should be emphasized that soil aeration, drainage, and watering practices must be altered when plants are grown in plastic pots because of the lack of porosity of the pot wall. The rate of drying of the soil is slower and even though it may be quite dry on the surface, moisture content in the lower regions where the roots are growing, may be quite sufficient. Watering at this stage will injure the plant by either too much water, too little air in the soil, or both, and such waterlogged soils are ideal for growth of certain fungi that can kill the plants.

Should the plastic pot become dirty, it can easily be cleaned since the foreign matter can be dislodged by light wiping or brushing with damp cloths or pads. Gaudy colors can be avoided by use of the utility grade which are mixtures of colors and are quite subdued or neutral.

The size of pot to use depends upon the ultimate size of the plant but it should be pointed out that few plants are small enough to be sold in the 2-inch sizes unless little more than rooted cuttings of foliage plants, for example, are to be offered for sale. The small soil volume in the smaller pot sizes also is a limiting factor in that watering must be quite frequent. This increases the labor cost. For a number of

the smaller potted plants, 3½-inch clay pots or round or square plastic pots were found to be quite suitable. Square pots stood upright more satisfactorily than the round pots, whether plastic or clay, because of their larger base. No difficulties in cultural procedures were experienced in using square pots as compared to the conventional round types.

Roots very often grow through the drainage holes in clay or plastic pots into the bedding material on the bottom of the bench (fine gravel, sand, soil, or mixtures of such materials). Because moisture is present in this bedding material, the plant may grow taller than desired. Also, if the root system is developed extensively into the bedding, it will be severed when the plant is removed for sale and severe wilting will occur. Therefore, it is suggested that potted plants be grown on bare benches which will result in an environment unfavorable for growth of roots other than in the soil in the pot. Should clay pots be used, the amount of objectionable algae growth, that develops on the sidewall and rim of the pot will be reduced. The frequency of watering will of necessity have to be greater because of limitations of root system. If the surface of the bench floor is smooth, water may not drain rapidly from the pots if they fit perfectly on the surface. Should this occur, broadcasting a medium to coarse sand prior to placing the pots on the bench will break the close contact and permit water to drain normally.

Because smaller plant sizes are desired, some differences in culture may be necessary from the methods used in producing the traditional larger sized specimens.

## **AZALEAS**

Azaleas as smaller potted specimens are given the same general culture as for production of larger plants. Liners or 2¼-inch size plants are obtained in May for forcing the following winter. The plants should have been pinched low and have numerous branches, otherwise they will be too tall for the smaller sized pots in which they are finished.

One of the main problems in production of good quality azaleas is getting numerous flower buds to form on such small plants. Nitrogenous fertilizer is very important in this respect since favorable nitrogen nutrition is necessary for development of a large leaf area which in turn is associated with accumulation of food materials for formation of flower buds. Hence nitrogen must be applied quite frequently but at dilute concentrations to provide uniform nutrition for optimum growth.

Because azalea culture is rather specialized it will be worth while for the average florist to purchase the smaller but heavily budded plants from a florist familiar with their production.

There are a number of azalea varieties in the trade some of which are large flowered and showy but are satisfactory only as larger specimens because they do not form many flower buds as a small plant. Satisfactory varieties were Alaska, Coral Bells, Dorothy Gish, Firelight, Fortune, Hinodegiri, Hinodegiri Crimson, Rival, Rose Pericat, Sherwood Red, and Sweetheart Supreme.

Garden, hardy, or landscape types of azaleas used outside in the North have not generally proved satisfactory because most of them grow too tall and many that do have a desirable habit do not form numerous flower buds on small plants.

### **CHRYSANTHEMUMS**

The usual type of potted specimen produced in the trade for sale through flower shops consists of five cuttings in a 6-inch azalea pot. Smaller size specimens can be produced and the florist has the option of one cutting in 3- or 3½-inch pot, two in a 4-inch pot, or three in a 5-inch azalea pot. The former two sizes are grown on the schedule described below while the latter is generally handled as the traditional 6-inch size.

When grown as a single cutting in a 3- or 3½-inch pot it is necessary that the overall height of the plant not be more than 10 inches above the pot and that a large number of shoots develop to give the plant "body" as well as numerous flowers. Thus, a well-prepared soil and optimum nutrition are imperative if the specimens are to be of good quality.

Manipulation of daylength by means of supplemental illumination and shading with black cloth is similar as stated under the section on chrysanthemums as cut flowers.

The varieties used for potted specimens grow to different heights at maturity, some being medium while others may be either quite short or tall. Those of the medium group can be planted as cuttings, one to a 3½-inch pot, immediately given short day treatment, and then soft-pinchd one week later. The harder the pinch, the fewer the breaks, so it is desirable to remove only about one-half inch of actual stem tissue at the tip. The varieties that normally are short can be handled in one of two ways. Either the cuttings can be planted, given long days for one week, pinched, and then short day treatment or they can be planted, pinched, given long days for one week, and then short



day treatment; in either case the ultimate height of the plant will be very nearly the same. Varieties which grow tall can be reduced in height by planting, giving short day treatment immediately, and then pinching 2 to 3 weeks later. However, the pinch must be made into somewhat harder stem tissue (to avoid development of shoots at an abnormally high position), and the number of shoots and flowers is reduced, making the plant undesirable in appearance.

It is suggested that a few plants be tried on a no-pinch or single-stemmed basis. The large flowered standard chrysanthemums are recommended and one cutting should be placed in a 3½-inch pot and given short day treatment immediately. The flower size may be between 3 and 4 inches which makes a striking specimen.

Night temperatures of 64° F. are desirable to promote rapid initiation of flower buds and after three weeks the plants can be moved or the temperature in the greenhouse lowered to 60° F. or somewhat less. In warm or hot weather, fading of certain pink, red, and bronze varieties can be expected even under washed-air cooling. Heat delay which is a failure of flower buds to develop to maturity in very warm weather may be troublesome on some varieties.

Spacing of the plants has a great deal to do with quality of the finished product. From October through April, weather conditions are less ideal for optimum plant development and finishing six 3½-inch pots per square foot of bench space will generally be satisfactory. From May through September four plants per square foot is suggested to allow room for the extra number of shoots that generally develop because of a more favorable environment.

Shoots may be disbudded to one flower per stem if perfection of the individual flower is desired, but it is less expensive and will provide a greater display of color if no disbudding is done at all.

The varieties that are generally grown as specimens in 6-inch pots for the florist trade will be suitable for use in 3½-inch pots providing they are of the short or medium groups with respect to growth habit. In 4- or 5-inch pots, height somewhat greater than 10 inches above the pot may be desired and the tall groups may be used. Garden or "hardy" varieties in 3½-inch pots are suggested for flowering in April and May. The customer can be advised to cut off the flowers, knock the plant out of the pot, and plant it in the garden where it will flower again in the fall.

## **COLEUS**

The wide variation in the colors and shape of the foliage makes the coleus a popular item, and it is easy to grow from seed or cuttings.

Development of the plants from rooted cuttings will take place in a matter of two or three weeks when at a minimum night temperature of 65° F. Whether the plants are sold as single stemmed or pinched specimens depends upon market preference.

### **CYCLAMEN**

Because of the poor keeping quality of cyclamen in the average warm home, this plant is not recommended unless it has been grown cool. With plants sold in 3½- to 4-inch pot sizes, seed need not be sown until November, December, or January. Adequate space in the fall is also a means of adding substance to the plants.

### **FOLIAGE PLANTS**

Foliage plants are more "permanent" than flowering types hence can be used as the basis of displays to be supplemented by flowering plants in season, or accompanied by pot mums at all times.

Most of the foliage plants can be purchased as seedlings, rooted cuttings, or established plants in small pots from sources in Florida, California, or specialists in other areas. It will no doubt be less expensive to do this than to try to propagate and grow them in one's greenhouse except perhaps for a very few items that are difficult to ship.

Since there is such a variety of plants it will be necessary to continuously test the market by varying the offerings to determine those which are in greatest demand.

Plant material shipped in should be allowed to become established in a warm temperature (minimum of 65° F.) and then cooled to 60° to 62° F. since this hardens the plants making them last longer in the store.

### **GERANIUMS**

Plants for sale out of 3- or 3½-inch pots from early May through the summer can be obtained from cuttings taken from stock plants periodically beginning in early March. During this period there are great numbers of cuttings available because of the prolific growth of stock plants.

After cuttings are rooted, they should be potted and grown at a minimum night temperature of 60° F. since this favors rapid development of flowers. The plants need not be pinched, but should be given adequate space since self branching often will occur and loss of lower leaves is prevented.

Any of the numerous varieties offered in the trade will be satisfactory although floriferousness and substance will vary with each variety. The flowers of many geranium varieties shatter or fall off readily in a supermarket particularly if the display area is away from outside windows. It is possible that gases which emanate from fresh fruits and vegetables may accelerate this process.

### **HYDRANGEAS**

Sales of small hydrangeas may be so poor that it will be unprofitable to grow them. When the larger plants are pinched in June and July, the shoot that is removed in the process of pinching can be rooted instead of discarding and the resulting plant will make an excellent small specimen. Rooting directly in pots under mist is a means of accelerating growth so the plant will develop sufficient new foliage to make food for flower bud formation which will take place in late September and early October. Several small plants can be placed in a 6- or 7-inch azalea pot during the forcing season as an unusual market item.

### **POINSETTIAS**

This plant has an exceptionally good sales appeal because of its brilliant color particularly if the spread of the bracts (colored leaves) is 8 inches or more. Plants for sale in 3½-inch pots can be propagated from September 10 until early October, although plants propagated after September 25 may not have perfectly formed bracts because of the reduced time for growth.

Since cuttings which are vegetative usually root more readily than those with flower buds, the stock plants should be lighted beginning September 25 for one hour per night near midnight. This will insure that the cuttings will not have flower buds since they form naturally on plants in central Ohio about September 27 to 29. Cuttings stuck in the propagation bench beginning September 20 should be lighted until rooted or until October 10, whichever is earlier. As soon as any cutting is rooted after September 25, it need not be lighted since cuttings become established and grow readily in small pots whether lighted or not, and lighting after potting at this stage may make them grow too tall for the size and proportion of the pot.

Since the cuttings are propagated late, the night temperature should be maintained at 65° F. At temperatures higher than 70° F. flower bud initiation may be delayed. If it is necessary to hasten development, this should not be done until 3 or 4 weeks after potting since the natural daylength at that time will be short enough to cause initiation.

## SUGGESTIONS FOR HANDLING AND PACKAGING

Cut flowers are removed from the plant at the usual stage of maturity or openness and may be packaged at once without being placed in water, providing the length of time from cutting to packaging is not unduly long. Since some time may elapse between cutting, sorting, grading, and packaging, flowers may be wilted and if so, they should be rehydrated in warm water in a refrigerator when they have regained turgidity, they may be packaged. Roses are misted lightly with a fine spray of water after being placed in the cellophane bag.

The bag may be stapled or heat sealed whichever is easier. Waxed cardboard boxes can be used for packaged flowers, but they are expensive. Such containers can also be overwrapped with cellophane by automatic machines.

Six carnation flowers of either solid or mixed colors will almost fill a bag. A more effective display within the package is created if the stems are wrapped together at the base with a "Twist-Em" or rubber band and the flowers allowed to fan out at the top.

The pompon or spray-type chrysanthemum will vary in size of spray produced so that from three to five stems can be used per package. The weight generally varies from  $2\frac{1}{2}$  to 4 ounces. Solid or mixed colors are very striking and the stems should be tied as described for carnations. The number of disbuds that can be packaged depends upon their size and may vary from three to six.

The number of roses to use per package will depend upon several factors. If the flowers are large, six to nine will be sufficient. If the flowers are small or the roses cut tight, six roses will make a skimpy package that has little sales appeal. The cluster or Sweetheart roses are generally packaged in units of 12, but tight buds are not counted. One should avoid using two large sprays to make the dozen flowers since this small number of stems may be difficult for the customer to use. From three to six stems per package is a more useful product.

If potted plants have been grown in clay containers they should be transferred to plastic or enameled clay pots since it will be virtually impossible to clean off the dirt and scum that accumulates.

The soil should be watered thoroughly to avoid the need for undue attention in the store, and this is particularly true for plants that are not packaged. Packaged plants are protected from injury more than those that are exposed, however, the choice of whether to package or not may depend upon rapidity of sales. Geraniums should not be packaged since they drop flowers quickly and leaves may turn yellow

very rapidly. Poinsettias must be protected from the cold and the cellophane bag alone is usually not sufficient to do this. Foliage plants need not be packaged.

Since many people are almost totally unaware of the basic yet simple requirements for long life for cut flowers and potted plants, brief directions can be inserted in the package, pasted to the pot, or printed wooden labels inserted before the product is sealed or stapled. Personnel in the supermarket should not be relied upon for information—they often know less about plants and flowers than the customers. Directions can be as follows:

### **THESE FRESH CUT FLOWERS**

will remain in best condition if you cut the stems when you remove them from the package and place the stems in a vase of lukewarm water. The stems should be re-cut daily and the water replenished. The cooler the air temperature around the flowers the longer they will keep.

### **FOR BEST RESULTS**

Your small flowering potted plant will require frequent watering. If very dry, the best method is to submerge the pot in water until bubbles cease rising.

Don't place the plant in drafts of hot or cold air.

Cellophane bags offer protection to the plant material, yet effectively display it and prevent drying. Gusseted bags, 5"×6"×20", made of 450 MSAD 86 cellophane or its equivalent, are ideal. Other films have not been nearly as satisfactory as cellophane in all respects. Since cellophane is a cellulose product it will absorb water and become limp in about 5 days time which detracts from the sales appeal. However, if the product doesn't sell itself in this length of time it probably should not be grown.

### **MARKETING**

The purpose of this part of the project was to determine the extent of demand for cut flowers, potted flowering and foliage plants, grown as described earlier in this report, through mass marketing outlets. Such sale was started in a small way in the fall of 1953 in two supermarkets in Columbus, Ohio, and by the fall of 1955 outlets were increased to include four supermarkets. Potted flowering and foliage plants were offered in only two because of lack of sufficient supply to maintain comparable offerings in all four stores.

These four supermarkets were located in widely separated locations of the city. Two were in higher income areas of the city and two were in medium income areas.

A report of sales during 1955, 1956 and 1957 was published in December, 1960<sup>1</sup>. Sales were continued until August, 1960, and this publication is a report of sales made during the period from January, 1955, to August, 1960. At various times when a surplus of flowers and plants was available they were sold through several other supermarkets. These sales are not included in this report.

All cut flowers were marketed in cellophane bags measuring 5" × 6" × 20". For the first two years all small potted chrysanthemums and azaleas were also enclosed in bags of the same size. From 1957 to 1960 they were sold both in bags and unbagged. The cost of about four to five cents per unit for the bags and labor for this purpose was almost offset by labor required to water the unbagged units while in the store, and extra loss in breakage of unbagged units. Little difference in "shelf-life" was observed between bagged and unbagged units.

Unit prices were set by building up from best cost data available. All store displays were entirely under the control of study personnel except that restocking the displays as necessary was handled by store personnel. Records of sales and losses were kept by weeks and calendar months.

### TOTAL SALES

A total of 159,217 units with a value of \$88,551 was sold by the four stores. These sales by month and their money value are shown in Appendix Tables 1 and 2. In all tables the value of flowers sold each month has been rounded to the nearest dollar. Therefore, total from the separate sales tables may not correspond exactly to the \$88,551 shown above.

Sales per store per month and per year are shown in Appendix Table 28. For the last three years of the study sales per store were considerably higher than the \$4,938 average for the six-year period.

The seasonal indices of units and of value differ because of size and price of units sold at various times of the year. This was accounted for mostly by sale of seasonal flowers such as lilies at Easter time and poinsettias at Christmas time.

### POTTED PLANTS

#### CHRYSANTHEMUMS

It was originally hypothesized that mass marketing channels would provide a profitable place to sell items which could be used for every-

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<sup>1</sup>A.E. 315—Potted Plant and Cut Flower Sales for 1955, 1956 and 1957 Through Four Columbus, Ohio, Supermarkets—by R. W. Sherman and H. C. Williams, Department of Agricultural Economics and Rural Sociology, Ohio Agricultural Experiment Station, Wooster, Ohio, December 1960.

day home use because of the small markup necessary in such outlets. The most important items in this classification were the 3½- and 4-inch<sup>2</sup> potted mums which could be produced and sold at unit prices well within the budget of almost any family. Tables 3 and 4 in the appendix show the sales of these two items with a total of 45,962 units for the entire period.

Later in this publication the reaction of consumers to changes in prices of 3½- and 4-inch potted mums is given special analysis.

Late in 1957, 5- and 6-inch potted mums were added to the offerings to determine their acceptance and place in the mass market. Units and value of the sales of these are shown in Appendix Table 5. During the first two years they were offered, the supply available was insufficient to fill the demand. By 1960 a full supply was available and for the eight months of that year before sales were discontinued the value of sales of the 5- and 6-inch potted mums exceeded that for the 3½- and 4-inch sizes.

No seasonal index was calculated for sales of the 5- and 6-inch potted mums since a full display was not maintained long enough to constitute a valid test for such an index. Sales were sufficient to warrant their inclusion in supermarket offerings.

## **GERANIUMS**

Geraniums in 3½- and 4-inch pots were added to the offerings through supermarkets in March 1956 and their sale indicated that such offerings should be continued. A full offering was made from December 1956 through November 1957 which resulted in the sale of 6,396 units in the 12-month period. About 1,500 of these were sold at a reduced price from August to November which accounted for higher sales than could have been expected otherwise. No seasonal index was constructed for sale of geraniums but experience gained from their sale indicated that while acceptance in March, April, May and June was good, sales could be maintained during the remainder of the year only at low volume levels.

## **FOLIAGE PLANTS**

Foliage plants were first sold in July, 1956, but it was not until October of 1957 that a large variety and number were stocked. Most of these offerings were in 3½-inch or smaller pots with low unit prices.

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<sup>2</sup>Throughout this report the term of 3½- and 4-inch or any other size referred to has reference to the size of the pot in which the plant or plants were grown or offered for sale.

Coleus sales are shown separately in Appendix Tables 6 and 7 and are not included in Appendix Tables 9, 10 and 11 where unit sales and value of foliage plants are shown.

Including coleus, a total of 48,796 units of foliage plants were sold with a value of \$14,165. This constituted 31 percent of all units sold in the study and 15.5 percent of value. By far the more important items of foliage were coleus and philodendron, coleus accounting for 44 percent of value and philodendron for 15 percent. The remaining 41 percent was represented by a wide variety of foliage plants, some of which sold well and others of which moved too slowly to be recommended for inclusion. In addition to coleus and philodendron, those which sold well enough to merit a place in such offerings were:

1. *Aglaonema commutatum*—Aglaonema
2. *Aglaonema roebelinii*—Drop Tongue
3. *Aglaonema simplex*—Chinese Evergreen
4. *Cissus rhombifolia*—Grape Ivy
5. *Crassula arborescens*—Japanese Rubber Plant or Jade Plant
6. *Ficus elastica decora*—Decorative Fig or Rubber Plant
7. *Peperomia obtusifolia*—Oval Leaf Peperomia or Pepper Face
8. *Peperomia obtusifolia variegata*—Variegated Pepper Face
9. *Peperomia sandersi argyreia*—Watermelon Leaf Peperomia
10. *Neanthe bella*—Neanthe Palm
11. *Nephtytis afzeli* Tri Leaf Wonder—Nephtytis
12. *Pilea involucrata*—Panamiga
13. *Pothos aureus (Scindapsus aureus)*—Pothos or Devil's Ivy
14. *Sansevieria hahni*—Dwarf Grandmother's Tongue
15. *Sansevieria trifasciata (S. zeylanica)*—Zebra Plant, Grandmother's Tongue
16. *Sansevieria trifasciata laurenti*—Variegated Grandmother's Tongue

Sale of coleus plants was started in 1955 and a limited supply was available until April 1956. During 1957 the price was lowered to 19 cents and a large supply was available with the resultant increase in sales. These were offered in 2½- and 3-inch pots and sales were good enough to indicate their importance in mass marketing. From experience gained from sale of small coleus plants, it is felt that this item might prove to be one of the most profitable items for the growers which



can be sold through such outlets. With extremely low production cost per unit the biggest problem is how to hold marketing costs per unit at a low level. This is always necessary in the sale of a low unit price product.

Sale of philodendron, like coleus, was important enough to deserve special mention. Units and value of sales of this plant are shown in Appendix Table 11. In total 5,406 units were sold with a retail value of \$2,104. Supply was not always adequate to maintain displays in stores at all times which no doubt held sales down appreciably. In the two stores where offerings were most nearly constant, the sales averaged about 15 units per week per store. The demand for this item seemed to be about the same at all times of the year but no seasonal index was constructed because of the somewhat erratic supply and its effect on sales.

African violets were offered along with foliage plants during 1959 and 1960. These moved rather slowly in the supermarkets and after a few days in the store dropped their flowers and then would not sell. During the time offered sales averaged only 5 or 6 plants per week per store.

Caladium plants were sold in 1956 and 1957 but their sale indicated demand to be poor except for about six or seven weeks from late April to early June.

## **SEASONAL FLOWERS AND PLANTS**

### **AZALEAS**

Azaleas were offered from January through April. Units and value of this item are shown in Appendix Table 12. Sales for 1959 and 1960 were low because of lack of supply to offer. During February and March of 1957 and 1958 when a full offering of azaleas was maintained the sales amounted to a little more than \$25 per week per store.

### **CYCLAMEN**

Cyclamen were offered through the first four months of the year. These were obtained from a commercial grower and again a full supply was available only part of the time. During those times of full offerings sales amounted to a little over \$30 per week per store. Data concerning sale of cyclamen are shown in Appendix Table 13. From 1955 to 1957 only small plants in 4-inch pots were offered but in the last three years larger ones were included and were accepted as well as the smaller ones.

## **HYDRANGEAS**

Only a limited supply of hydrangeas were available for 1955 and 1957 and were sold through two supermarkets only. During the last three years two of the stores were fully supplied and a few sold through the other two stores. Size of the plants varied from some small units with one bloom grown specifically to test demand for such units to large four and five bloom specimens. All sizes moved well enough to indicate desirability of such offering. Data concerning sales are shown in Appendix Table 14.

## **LILIES**

Lilies were not offered in volume until 1958 and then mostly through two stores. From 1958 through 1960 a full supply was available for the two stores and a few sold in the other stores. Value of lilies sold per store was approximately the same as for hydrangeas. Sales records are given in Appendix Table 15.

## **POINSETTIAS**

As with lilies and hydrangeas most of the poinsettias were sold through two stores. From 1956 through 1959 enough were available to supply these two stores almost completely. Size of plants varied from one bract grown in 3½-inch pots to pots with five bracts with prices varying accordingly. All sizes moved about equally well with supplies offered. It was felt, however, that more of the smaller units would have sold if offered. Data concerning sales are given in Appendix Table 16.

## **GLOXINIAS**

Gloxinias were added to offerings in 1958 and continued through the remainder of the study period ending in 1960. At no time were they offered in large numbers. It was not felt that the market potential was tested with the limited offering. Acceptance was good enough to merit their inclusion in offerings. Data concerning their sale are shown in Appendix Table 17.

## **CHRYSANTHEMUM PAKS**

For 1958, 1959, and 1960 hardy or garden chrysanthemum cuttings were started in market paks of four, six and eight plants for garden planting. The demand for these was limited but since no promotion, such as specimen blooming plants, was used it was felt that the test of the market was not complete. Appendix Table 18 shows sales of this item. Most of the sales occurred in May and early June.

## MISCELLANEOUS POTTED PLANTS

A variety of potted plants was sold on a trial basis throughout the six years. These are grouped together since none of the items moved in enough quantity to merit inclusion in supermarket sales. Included in this group were: begonia, aster, browallia, miniature rose bushes, cineraria, fuchsia, petunia, pelargonium, and marigold. These are grouped in Appendix Table 19.

## CUT FLOWERS

Cut flowers were sold in two stores only since assured available supply was not great enough for all stores included in the study. There were never enough available to supply holiday demands completely, and on several occasions, in January, February, March, and April, weekend demand could not be supplied fully. Very few carnations were available during summer months, and as a result, the summer demand for them was not determined.

Prior to January, 1957, roses were offered only in packages of six hybrid tea roses or 12 sweetheart roses. Beginning in January, 1957, packages of nine hybrid tea roses and of nine sweethearts were added to the offerings. Carnations were sold exclusively in units of six. Chrysanthemums were offered in units of sufficient size to approximate the flower surface of six carnations. All cut flowers were held under refrigeration in the store. Maximum stem length possible in the 20-inch bags was about 12-14 inches.

Both carnations and mums were offered in solid color and combination color packs. During a two-year period when records concerning sales of such offerings were kept the combination color packs accounted for 45 percent of carnation sales and 41 percent of cut mum sales.

A total of 26,233 units of cut flowers were sold with a retail value of \$19,911. This amounts to about \$35 per week per store. Cut chrysanthemum sales made up 41 percent of total units of cuts sold and 38 percent of value, roses made up 27 percent of units and 28 percent of value, carnations 25 percent of units and 30 percent of value. Miscellaneous items of cuts made up seven percent of units and four percent of value. Miscellaneous sales included asters, stock, snapdragons, daffodils, iris, and greens.

Data concerning cut flower sales are shown in Appendix Tables 20 to 26.

## LOSSES AT RETAIL

No special attempt was made to hold losses to a minimum in stores. As far as possible full displays were maintained regardless of losses resulting. Full display was possible with potted mums at most times but supply of cut flowers dictated that full display could be made only during last three days of the week when store traffic was heavier. Appendix Table 27 shows average losses by months.

Heavy losses occurred during summer months since as nearly as possible full displays were maintained in order to determine demand at that time. No doubt losses could have been materially reduced by reducing offerings during summer months, by sale at reduced prices during summer months, by reducing prices on items in display which had passed their peak, and by stocking sparingly during the early part of the week. Losses occurring in this study should not be construed as losses necessary in a commercial operation.

Losses of some of the items making up a high proportion of sales for the last three years of the study were as follows:

	Percent
3½" and 4" potted mum	18.9
5" and 6" potted mum	12.4
Coleus	10.5
Philodendron	1.1
Other foliage plants	5.2
Geranium	16.6
Cut Mums	15.1
Roses	31.3
Carnations	16.6
Lilies, hydrangeas, poinsettias	7.6

## SEASONALITY OF SALES

Both producers and merchandisers of flowers and potted plants are much concerned about the seasonal demand pattern which exists. The pattern of seasonal demand in sales through the four supermarkets included in this study is shown in Appendix Table 28. Sales of 1955 through 1959 were combined in calculating the seasonal pattern. From 1956 through 1959 when a good variety of items was offered throughout the year the patterns of seasonal sales were very similar. The three lowest months of sale were, almost without exception, July, August and September. For the years 1956 through 1959 the respective percentages of total yearly sales for these three months were 14.0, 13.8, 12.2 and 14.2. In the summer months of 1957 the price of 3½-inch potted mums was reduced to observe its effect on sales. Units sold increased significantly but total income was increased very little.

## COMPOSITION OF TOTAL SALES

By far the most important items in numbers and value were the 3½- and 4-inch potted mums. These, added to the 5- and 6-inch potted mums, accounted for 32 percent of retail value of all items. Since the large potted mums were not offered until October 1957 their importance in total sales is not properly represented compared to the smaller potted mums. During the time they were offered they made up approximately 15 percent of total value. The relative importance of various items is shown in Appendix Table 29.

### EFFECT OF PRICE CHANGE ON SALE OF 3½- AND 4-INCH POTTED CHRYSANTHEMUMS

As the result of the response in volume of sales to temporary price cuts made to move temporary surpluses of 3½-inch potted mums, it was decided to determine the effect of price changes on sales. Accordingly an experimental design was set up to test the demand for 3½- and 4-inch mums at prices of 40, 45, 50, and 55 cents per unit for the 3½-inch mum and 55, 60, 65, and 70 cents for the 4-inch mums. Price differences of the 3½- and 4-inch potted mums were held at 15 cents with the assumption that this would prevent substitution and at the same time give a measure of combined demand at the four price levels.

The effect of price variations was significant at a confidence level of between 90 and 95 percent. In Table 1 are shown some of the practical aspects of sales resulting from various prices used in the experimental design.

Data are presented in the table with combined figures for the 3½- and 4-inch potted mums since there is a possibility that with price changes substitution between the two unit sizes might occur. The importance of price changes in this case is its effect on combined sales.

No valid reason can be advanced for sales being slightly higher at 45 cents for the 3½-inch mum and 60 cents for the 4-inch mum than when prices were five cents lower, except that perhaps at this level of prices the demand was inelastic. Demand was shown to be elastic except between the two lowest prices.

Producers and retailers are always interested in the reaction of consumers to price changes and total dollar sales resulting from such changes. Producers will want to know which price will result in the most net profit to them. Total income to producers from the four price combinations was highest at the level of 45 cents for 3½-inch potted mums and 60 cents for the 4-inch size. Total income, however, is not a direct measure of net income. With an assumed cost of production of 21

**TABLE 1.—Sales and Income From Various Prices for  
3½- and 4-Inch Potted Mums**

Price		Units Sold	Wholesale Income	Retail Income	Wholesale Income Above Assumed <sup>2</sup> Cost of Production	Retail Margin
3½"	4"					
40¢	55¢	574	\$158.14	\$242.95	\$28.70	\$84.81
45	60	586	184.40	276.60	52.74	92.20
50	65	474	162.92	246.75	56.88	83.83
55	70	419	160.53	238.70	69.25	80.70

<sup>2</sup>Production cost assumed at 21 cents each or 3½" and 31 cents each or 4" potted mums.

cents for 3½-inch potted mums and 31 cents for the 4-inch size, the highest the income would have come from the highest set of prices. Producers cannot always select the price which will give them the highest net income because of competition between growers. The competitive price would more likely dictate one of the lower price combinations.

Retailers are interested in volume sales at a lower price when it offers total retail margins great enough to pay for added handling of the greater volume. In this test the retailer received the highest total margin from the second lowest price. Actually experimentation with price effect is pertinent only within the competitive price range.

## CONCLUSIONS

From the sale of cut flowers and potted flowering and foliage plants through supermarket outlets during the years for which the records are analyzed in this report several conclusions can be reached.

1. Based on sales in the four Columbus, Ohio, supermarkets the sales potential would be at least \$135,000,000 if offered in all supermarkets with weekly volume of \$20,000 or higher in the United States. Average yearly sales per store during the last 3 complete years of the study were approximately \$5,000 at retail.

2. Sales volume was increased by offering a variety of colors and species at the same time and also by mixing colors within cut flower bunches.

3. Seasonal flowers such as poinsettias at Christmas and lilies at Easter were found to be profitable items with heavy volume and small losses.

4. Proper offerings in the summer months can almost double sales for these months, but at best monthly summer volume will be little more than one-third of monthly sales for February, March, April and May.

5. Sales of flowers and plants offered in this study followed closely the pattern of total sales in the supermarket by day of week. However, items such as roses, with a relatively low volume of sales early in the week, could be profitably offered only from Thursday through Saturday.

6. Sales per square foot of display area were about the same as for the average of all supermarket items.

7. Bagging of potted items proved to be unnecessary in most instances.

8. Refrigeration was found to be necessary for cut flowers but not for potted plants.

## APPENDIX

**APPENDIX TABLE 1.—Units of Potted Flowering and Foliage Plants and Cut Flowers<sup>1</sup> Sold in Four Columbus, Ohio, Supermarkets.**

	Units Sold						Seasonal Index <sup>2</sup>
	1955 <sup>1</sup>	1956	1957	1958	1959	1960	
January	835	1,099	2,226	2,921	2,407	2,199	91
February	1,387	1,807	3,100	4,036	2,881	2,158	118
March	1,971	2,722	3,858	3,896	3,096	2,278	134
April	1,247	1,997	3,921	4,358	2,032	2,848	128
May	873	2,481	6,725	4,221	2,638	3,461	147
June	459	1,879	4,361	2,398	2,130	1,841	99
July	230	1,644	2,771	2,235	1,988	1,581	81
August	213	1,186	2,468	1,836	1,714	1,453	73
September	460	1,413	2,495	1,880	2,154		72
October	533	2,056	3,304	2,029	1,927		85
November	747	2,123	2,984	2,398	2,665		94
December	816	1,500	1,699	1,528	1,479		78
Holiday and Miscellaneous <sup>4</sup>	78	673	1,436	2,789	2,810	1,175	
Total	9,849	22,580	41,348	36,525	29,921	18,994	

<sup>1</sup>Cut Flowers sold in two stores only.

<sup>2</sup>Three stores only in 1955.

<sup>3</sup>September 1955 to August 1960 adjusted for effect of 3 month special on Coleus in 1957 and to 4 stores for last 4 months of 1955.

<sup>4</sup>Lilies, Poinsettias, Hydrangeas, Gloxinia, Mum Paks and miscellaneous items not included by month.

**APPENDIX TABLE 2.—Retail Value of Potted Flowering and Foliage Plants and Cut Flowers<sup>1</sup> Sold in Four Columbus, Ohio, Supermarkets.**

	Retail Value						Seasonal Index <sup>3</sup>
	1955 <sup>2</sup>	1956	1957	1958	1959	1960	
January	\$ 619	\$ 864	\$ 1,231	\$ 1,806	\$ 1,490	\$ 1,517	112
February	1,058	1,415	2,142	2,433	1,906	1,393	155
March	1,324	2,045	2,435	2,528	1,983	1,551	171
April	851	1,221	1,949	2,373	1,115	1,806	137
May	571	1,478	2,688	1,993	1,411	1,800	144
June	294	946	1,565	915	880	777	78
July	156	717	920	948	738	696	63
August	141	532	858	801	673	629	56
September	288	576	880	781	928		57
October	347	900	1,254	943	791		70
November	489	1,101	1,375	1,275	1,304		92
December	561	833	794	826	822		65
Holiday and Miscellaneous <sup>4</sup>	76	610	1,302	2,872	3,294	1,147	
Total	\$6,775	\$13,238	\$19,393	\$20,494	\$17,335	\$11,316	

<sup>1</sup>Cut Flowers sold in two stores only.

<sup>2</sup>Three stores only in 1955.

<sup>3</sup>September 1955 to August 1960 adjusted for effect of 3 month special on Coleus in 1957 and to 4 stores for last 4 months of 1955.

<sup>4</sup>Lilies, Poinsettias, Hydrangeas, Gloxinia, Mum Paks and miscellaneous items not included by month.

**APPENDIX TABLE 3.—Units of 3½- and 4-Inch Potted Chrysanthemums Sold in Four Columbus, Ohio, Supermarkets.**

	Units Sold						Seasonal Index <sup>2</sup>
	1955 <sup>1</sup>	1956	1957	1958	1959	1960	
January	353	387	496	681	542	430	70
February	561	456	572	704	543	661	81
March	563	840	796	675	865	665	106
April	656	929	1,180	1,262	458	882	131
May	518	926	1,272	1,402	599	1,529	159
June	258	298	1,556	767	673	478	105
July	102	305	961	666	736	363	84
August	113	339	816	475	619	656	81
September	224	443	1,032	526	776		85
October	280	970	1,352	673	780		115
November	452	877	1,135	615	928		115
December	443	540	574	448	310		68
Total	4,523	7,310	11,742	8,894	7,829	5,664	

<sup>1</sup>Three supermarkets only in 1955.

<sup>2</sup>September 1955 to August 1960 adjusted to 4 supermarkets for last 4 months of 1955.



**APPENDIX TABLE 4.—Retail Value of 3½- and 4-Inch Potted Chrysanthemums Sold in Four Columbus, Ohio, Supermarkets.**

	Retail Value						Seasonal Index <sup>2</sup>
	1955 <sup>1</sup>	1956	1957	1958	1959	1960	
January	\$ 207	\$ 228	\$ 293	\$ 326	\$ 254	\$ 197	73
February	331	269	337	352	278	300	87
March	332	496	454	323	427	305	113
April	387	527	658	578	222	405	135
May	305	546	710	666	282	577	213
June	152	176	623	316	230	195	87
July	60	166	375	261	231	139	66
August	67	160	318	189	203	199	60
September	132	215	402	209	278		72
October	165	471	527	268	306		101
November	267	498	554	291	421		120
December	262	319	259	212	159		73
Total	\$2,667	\$4,071	\$5,510	\$3,991	\$3,291	\$2,318	

<sup>1</sup>Three supermarkets only.

<sup>2</sup>September 1955 to August 1960 adjusted to 4 supermarkets for last 4 months of 1955.

**APPENDIX TABLE 5.—Units and Retail Value of 5- and 6-Inch Potted Chrysanthemums Sold in Four Columbus, Ohio, Supermarkets.**

	1957		1958		1959		1960	
	Units	Value	Units	Value	Units	Value	Units	Value
January		\$	61	117	184	307	209	384
February			14	26	117	170	208	383
March			136	254	268	398	364	585
April			242	418	172	239	393	619
May			1	2	201	300	288	454
June			5	6	48	70	105	157
July			115	200	24	36	132	202
August			118	168	23	39	113	199
September			94	125	84	119		
October	48	67	108	123	79	96		
November	24	54	118	158	192	337		
December	26	69	31	101	61	88		
Total	98	\$190	1,043	\$1,698	1,453	\$2,199	1,524	\$2,983

**APPENDIX TABLE 6.—Units of Coleus Plants Sold in Four Columbus, Ohio, Supermarkets.**

	Units Sold						Seasonal Index <sup>2</sup>
	1955 <sup>1</sup>	1956	1957	1958	1959	1960	
January			467	518	236	189	80
February	51	102	375	221	246	167	55
March	456	203	675	556	295	233	101
April	9	412	870	685	335	218	130
May	23	568	2,928	524	407	336	129
June	34	475	1,644	565	270	366	105
July	9	596	1,192	581	241	347	116
August		580	692	433	237	161	112
September	51	802	616	336	56		115
October	23	783	649	287	269		113
November		583	539	199	436		87
December		311	356	209	56		57
Total	656	5,415	11,003	5,114	3,084	2,017	

<sup>1</sup>Three supermarkets only.

<sup>2</sup>Index for period April 1956 to March 1959 when full supply on hand, adjusted for special sale for 3 months of 1957.

**APPENDIX TABLE 7.—Retail Value of Coleus Plants Sold in Four Columbus, Ohio, Supermarkets.**

	Retail Value						Seasonal Index <sup>2</sup>
	1955 <sup>1</sup>	1956	1957	1958	1959	1960	
January	\$	\$	\$ 135	\$ 99	\$ 45	\$ 36	78
February	20	40	109	41	47	32	55
March	177	79	193	106	56	44	99
April	4	161	213	130	64	41	140
May	9	221	612	105	77	64	137
June	13	169	336	107	51	69	106
July	4	173	227	110	46	66	110
August		168	132	82	45	31	106
September	20	233	117	64	11		115
October	9	227	123	55	35		113
November		169	102	38	59		86
December		90	68	40	9		55
Total	\$256	\$1,730	\$2,367	\$977	\$545	\$384	

<sup>1</sup>Three supermarkets only.

<sup>2</sup>Index for period April 1956 to March 1959 when full supply on hand, adjusted for special sale for 3 months of 1957.

**APPENDIX TABLE 8.—Units and Retail Value of Geraniums Sold in Four Columbus, Ohio, Supermarkets.**

	1956		1957		1958		1959		1960	
	Units	Value	Units	Value	Units	Value	Units	Value	Units	Value
January		\$	301	\$ 149	27	\$ 13	11	\$ 5	33	\$ 15
February			351	175	131	64	56	25	25	11
March	28	25	666	329	404	198	72	32	97	46
April	117	104	802	396	631	317	320	144	345	180
May	363	262	1,705	835	1,009	524	428	193	656	426
June	937	468	670	327	233	128	356	160	84	52
July	536	209	227	111	41	20	94	42	6	4
August	35	14	450	142	32	14	55	25	66	26
September			381	111	60	18	69	31		
October			469	136	97	36	104	47		
November	16	8	251	73	69	33	52	23		
December	125	61	29	14	7	3	97	44		
Total	2,157	\$1,151	6,302	\$2,798	2,741	\$1,368	1,714	\$771	1,312	\$760

**APPENDIX TABLE 9.—Units of Foliage Plants<sup>1</sup> Sold in Four Columbus, Ohio, Supermarkets.**

	Units Sold					Seasonal Index <sup>2</sup>
	1956	1957	1958	1959	1960	
January		151	511	579	704	107
February		157	1,179	529	645	141
March		211	421	545	404	82
April	16	306	635	375	555	94
May	171	293	589	512	503	96
June	11	231	544	611	569	103
July	76	145	559	607	533	102
August	96	171	598	557	343	103
September		144	579	880		131
October	35	288	538	510		80
November	113	309	657	627		95
December	77	308	327	473		66
Total		595	2,714	7,137	6,805	4,256

<sup>2</sup>Index calculated from sales of October 1957 through July 1960.

<sup>1</sup>Coleus not included.

**APPENDIX TABLE 10.—Retail Value of Foliage Plants Sold in Four Columbus, Ohio, Supermarkets.**

	Retail Value					Seasonal Index <sup>1</sup>
	1956	1957	1958	1959	1960	
January	\$	\$ 59	\$ 204	\$ 204	\$ 250	110
February		59	428	149	223	134
March		85	159	223	146	89
April	8	135	216	158	194	95
May	84	135	198	195	184	97
June	5	104	186	237	204	105
July	68	60	186	227	194	102
August	85	67	197	210	123	102
September		55	190	328		130
October	14	111	188	182		81
November	42	121	231	163		87
December	29	124	114	165		68
Total	\$335	\$1,115	\$2,497	\$2,441	\$1,518	

<sup>1</sup>Index calculated from sales of October 1957 through July 1960.

APPENDIX TABLE 11.—Units and Value of Philodendron Sold in Four Columbus, Ohio, Supermarkets.

	1956		1957		1958		1959		1960	
	Units	Value	Units	Value	Units	Value	Units	Value	Units	Value
January		\$	151	\$ 59	255	\$ 99	186	\$ 73	95	\$ 37
February			101	39	385	129	176	69	77	30
March			166	65	15	6	79	31	44	18
April			137	53	170	66	22	9	67	26
May			82	32	182	71	87	34	68	27
June			75	29	118	46	36	14	119	46
July			109	43	89	35	177	69	73	29
August			161	63	59	23	106	52	44	17
September			124	48	99	39	191	78		
October	35	14	217	85	104	41	68	26		
November	84	33	148	58	145	56	97	38		
December	68	26	117	46	92	36	106	41		
Total	187	\$73	1,588	\$620	1,713	\$647	1,331	\$534	587	\$230

**APPENDIX TABLE 12.—Units and Value of Azaleas Sold in Four Columbus, Ohio, Supermarkets.**

	1955 <sup>1</sup>		1956		1957		1958		1959		1960	
	Units	Value	Units	Value	Units	Value	Units	Value	Units	Value	Units	Value
January	89	\$106	175	\$208	19	\$ 22	36	\$ 68		\$		\$
February	232	276	169	201	236	307	284	393	4	5	13	18
March	157	187	135	161	379	505	445	499	176	218	135	163
April	15	18	7	8	18	21	78	116	25	27	123	139
Total	493	\$587	486	\$578	652	\$855	843	\$1,076	205	\$250	271	\$320

<sup>1</sup>Three supermarkets only.

**APPENDIX TABLE 13.—Units and Value of Cyclamen Sold in Four Columbus, Ohio, Supermarkets.**

	1955 <sup>1</sup>		1956		1957		1958		1959		1960	
	Units	Value	Units	Value	Units	Value	Units	Value	Units	Value	Units	Value
January		\$	49	\$ 43	49	\$ 43	252	\$428	66	\$158	148	\$295
February	98	87	483	430	527	493	328	361	508	648	177	264
March	126	112	774	689	246	224	195	163	62	65		
April					5	4						
Total	224	\$199	1,306	\$1,162	827	\$764	775	\$952	636	\$871	325	\$559

<sup>1</sup>Three supermarkets only.

**APPENDIX TABLE 14.—Units and Value of Hydrangeas Sold in Four Columbus, Ohio, Supermarkets.<sup>1</sup>**

	Units Sold	Retail Value
1955	40	\$ 39.20
1957	71	139.28
1958	222	634.05
1959	221	552.09
1960	288	707.55

<sup>1</sup>About 80 percent of sales were through two stores which sold Hydrangeas supplied through this study exclusively.

**APPENDIX TABLE 15.—Units and Value of Lilies Sold in Four Columbus, Ohio, Supermarkets.<sup>1</sup>**

	Units Sold	Retail Value
1956	40	\$ 48.38
1957	17	27.72
1958	324	678.98
1959	260	654.87
1960	309	577.48

<sup>1</sup>About 80 percent of sales were through two stores which sold Lilies supplied through this study exclusively.

**APPENDIX TABLE 16.—Units and Value of Poinsettias Sold in Four Columbus, Ohio, Supermarkets.**

	Units Sold	Retail Value
1955 <sup>1</sup>	.78	\$ 76.44
1956	528	475.18
1957	647	876.03
1958	604	1,004.62
1959	823	1,340.93

<sup>1</sup>Sold in two supermarkets only in 1955.

**APPENDIX TABLE 17.—Units and Value of Gloxinia Sold in  
Four Columbus, Ohio, Supermarkets.**

	Units Sold	Retail Value
1958	72	\$ 83.07
1959	212	252.28
1960	165	196.35

**APPENDIX TABLE 18.—Units and Value of Hardy Chrysanthemum  
Paks Sold in Four Columbus, Ohio, Supermarkets.**

	Units Sold	Retail Value
1958	330	\$320.94
1959	275	233.78
1960	172	192.99

**APPENDIX TABLE 19.—Units and Value of Other Potted Plants Sold  
in Four Columbus, Ohio, Supermarkets.**

	Units Sold	Retail Value
1955 <sup>1</sup>	49	\$ 33.81
1956	76	66.15
1957	624	261.16
1958	618	299.51
1959	65	31.45
1960	65	37.34

<sup>1</sup>Two supermarkets only.



**APPENDIX TABLE 20.—Units of Cut Chrysanthemums Sold in Two Columbus, Ohio, Supermarkets.**

	Units						Seasonal Index <sup>1</sup>
	1955	1956	1957	1958	1959	1960	
January	218	250	248	253	387	190	139
February	222	283	270	264	431	157	149
March	345	326	181	372	502	165	174
April	244	230	271	190	148	59	134
May	186	184	94	124	126	33	85
June	99	86	55	83	8		47
July	64	76	48	114	4		43
August	55	82	66	90			42
September	120	108	114	127			67
October	132	133	179	105			79
November	162	247	409	227	122		150
December	132	141	173	189	102		91
Total	1,979	2,146	2,108	2,138	1,830	604	

<sup>1</sup>Seasonal index calculated for 1955 through 1958.

**APPENDIX TABLE 21.—Retail Value of Cut Chrysanthemums Sold in Two Columbus, Ohio, Supermarkets.**

	Retail Value					
	1955	1956	1957	1958	1959	1960
January	\$ 151	\$ 173	\$ 171	\$ 174	\$ 267	\$131
February	153	195	186	182	297	108
March	238	225	125	257	346	114
April	169	159	187	133	102	41
May	128	127	65	98	77	23
June	68	59	38	57	6	
July	44	52	33	79	3	
August	38	57	46	62		
September	83	75	79	88		
October	91	92	124	134		
November	112	170	282	157	84	
December	91	97	119	130	70	
Total	\$1,366	\$1,481	\$1,455	\$1,551	\$1,252	\$417

**APPENDIX TABLE 22.—Units of Roses Sold in Two Columbus, Ohio, Supermarkets.**

	Units						Seasonal Index <sup>1</sup>
	1955	1956	1957	1958	1959	1960	
January	76	89	89	134	130	83	101
February	94	105	134	127	176	7	124
March	105	176	169	158	155	109	149
April	81	152	112	166	109	160	121
May	20	146	95	149	154	27	110
June	31	52	98	51	98	43	64
July	37	55	89	70	105	127	69
August	44	54	112	31	117	70	70
September	57	60	83	59	98		70
October	63	89	93	96	102		86
November	68	104	165	234	155		142
December	102	43	77	97	164		94
Total	778	1,125	1,316	1,422	1,563	626	

<sup>1</sup>Index calculated for 1955 to 1959 inclusive.

**APPENDIX TABLE 23.—Retail Value of Roses Sold in Two Columbus, Ohio, Supermarkets.**

	Retail Value					
	1955	1956	1957	1958	1959	1960
January	\$ 68	\$ 79	\$ 73	\$ 106	\$ 101	\$ 67
February	76	94	102	102	133	5
March	82	157	127	121	119	80
April	63	135	86	133	90	120
May	18	129	71	114	144	21
June	27	51	80	43	85	23
July	31	49	71	57	84	62
August	36	48	90	66	99	34
September	46	53	67	48	83	
October	51	72	73	79	86	
November	57	93	127	192	129	
December	89	38	60	76	148	
Total	\$644	\$998	\$1,027	\$1,137	\$1,301	\$412

**APPENDIX TABLE 24.—Units of Carnations Sold in Two Columbus, Ohio, Supermarkets.**

	Units <sup>1</sup>					
	1955	1956	1957	1958	1959	1960
January	99	149	255	193	86	118
February	182	209	377	399	95	21
March	166	240	369	519	77	62
April	164	134	220	299	68	46
May	115	123	256	241	124	21
June	37	20	32	32	30	77
July	18					
August	1					
September	8		1			
October	35	11	9	21	15	
November	65	99	4	134	56	
December	139	195	39	128	110	
Total	1,029	1,180	1,562	1,966	661	345

<sup>1</sup>No seasonal index calculated since no flowers were available in summer months.

**APPENDIX TABLE 25.—Retail Value of Carnations Sold in Two Columbus, Ohio, Supermarkets.**

	Retail Value					
	1955	1956	1957	1958	1959	1960
January	\$ 88	\$ 133	\$ 227	\$ 172	\$ 76	\$105
February	162	186	335	355	85	19
March	148	213	328	442	68	50
April	146	119	196	266	60	41
May	102	109	228	215	109	24
June	33	18	28	26	27	31
July	16					
August	1					
September	7		1			
October	30	10	8	19	13	
November	54	88	4	119	50	
December	120	173	35	114	98	
Total	\$907	\$1,049	\$1,390	\$1,728	\$586	\$270

**APPENDIX TABLE 26.—Units and Retail Value of Miscellaneous Cut Flowers and Greenery Sold in Two Columbus, Ohio, Supermarkets.**

	Units Sold	Retail Value
1956	29	\$ 22
1957	77	33
1958	619	252
1959	954	537
1960	176	74
Total	1,855	\$918

**APPENDIX TABLE 27.—Units Delivered and Losses of Potted Flowering and Foliage Plants and Cut Flowers in Four Columbus, Ohio, Supermarkets 1955 to August 1960.**

	Potted Flowering and Foliage Plants			Cut Flowers		
	Delivered	Loss	Percent Loss	Delivered	Loss	Percent Loss
January	8,036	1,301	16.2	3,745	518	13.8
February	8,438	989	11.7	4,211	373	8.9
March	11,046	1,129	10.2	4,998	529	10.6
April	13,718	1,015	7.4	3,871	707	18.2
May	18,751	1,534	8.2	3,113	844	27.1
June	12,830	1,728	13.5	1,712	810	47.3
July	10,904	2,028	18.9	1,374	620	45.1
August	9,168	2,116	23.1	1,406	584	41.5
September	8,065	1,360	16.9	1,367	539	39.4
October	9,412	1,015	10.8	1,732	523	30.2
November	9,763	1,262	12.9	2,686	437	16.3
December	6,255	1,367	21.8	2,577	631	24.5
Total	126,386	16,844	13.3	32,792	7,112	21.7

**APPENDIX TABLE 28.—Value of Sales Per Store Per Month of Cut Flowers and Potted Flowering and Foliage Plants in Four Columbus, Ohio, Supermarkets 1955-1959.**

	Cut Flowers <sup>1</sup>	Potted Flowering and Foliage <sup>2</sup>	Total	Percent of Value
January	\$ 258	\$ 175	\$ 433	8.8
February	272	274	546	11.0
March	316	462	778	15.7
April	216	360	576	11.7
May	183	360	543	11.0
June	70	217	287	5.8
July	59	150	209	4.2
August	56	136	192	3.9
September	69	142	211	4.3
October	97	169	266	5.4
November	185	192	377	7.7
December	153	367	520	10.5
Total	\$1,934	\$3,004	\$4,938	100.0

<sup>1</sup>Two stores.

<sup>2</sup>Three stores in 1955, four stores 1956-1959.

**APPENDIX TABLE 29.—Percentage of Units and Value Represented By Each Item Sold Through Four Columbus, Ohio, Supermarkets January 1955-August 1960.**

	Percent of Units Sold	Percent of Retail Value
Potted Items		
3 1/2" and 4" potted chrysanthemums	28.8	24.2
Foliage plants (other than coleus and philodendron)	13.6	8.8
5" and 6" potted chrysanthemums	2.6	7.8
Geraniums	9.0	7.5
Coleus	17.2	7.0
Cyclamen	2.5	5.0
Poinsettias	1.7	4.3
Azaleas	1.9	4.1
Philodendron	3.3	2.3
Hydrangeas	.5	2.3
Lilies	.6	2.2
Chrysanthemums paks	.5	.9
Gloxinia	.3	.6
Other potted plants	1.0	.9
Cut Flowers		
Cut chrysanthemums	6.8	8.3
Carnations	4.2	6.6
Roses	4.3	6.1
Other cut items	1.2	1.1
Total potted items	83.5	77.9
Total cut items	16.5	22.1

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