

the capillary movement upward into the dry layer will be negligible.

The same experiment can be repeated using larger quantities of water, for example, equivalents of $\frac{1}{2}$ " and 1" applications. The greater the amount added, the deeper it will penetrate the soil before the free and gravitational water is taken up by the soil capillaries, but after $\frac{1}{2}$ " has reached the 3" depth it will cease moving, and after the 1" application has reached depths of 6" or 7" it will do likewise. Even these applications do not represent a watering treatment which would reach the major proportion of the roots of a properly grown plant. If the soil is partly moist in the first place, the added water will penetrate more deeply. However, a 2" application may be no more than sufficient to moisten the root zone for many plants. This represents about 55,000 gallons of water per acre, which would cost upwards of \$15 at city water prices. In one month this could run up a sizeable water bill. Maybe it is fortunate that most of us don't own an acre which must be watered. The point which should be emphasized here is the fact that regardless of the amount of water applied at one time, the depth to which it will moisten the soil is definitely limited, unless of course enough is applied to reach the ground water table. Therefore, the depth of the moist soil layer is very much under control of the gardener.

Water generally is applied by means of sprinklers which cover a large area with a gentle spray, and must operate a long time in one place. The water then penetrates as fast as it is applied, with no evidence of it running off to lower places. However, if the application of water is very heavy in one place, and if the soil is not exactly level, penetration will be anything but uniform. This can be demonstrated by means of a long glass container so arranged that water may run on

the soil from one end to the other when the soil is lower. If $\frac{1}{2}$ inch is applied at once, the effect obtained is exactly as though one end of the container had about $\frac{1}{2}$ " of water added to it and the other had 1 $\frac{1}{2}$ or 2 inches. The situation is often encountered in heavy rains, so that plants on high spots are on much drier soil.

This clearly indicates that there is only one way to get water to penetrate to lower depths in the soil and that is to *add more water at the surface*. Applying 1" of water on Monday and another inch on Thursday or Friday is not the same thing as applying 2 inches Monday. This system is complicated, if only $\frac{1}{4}$ to as much as 1" of rain falls near the time which watering should be done. Such rain may be very welcome but obviously if it is to be most helpful, it should be forced down in the soil farther than it normally would penetrate. The only way to get it down to where it should go is to add more water at the surface. Hence irrigation immediately after a moderate rain, if the soil below was on the dry side, may be the only way to get maximum benefit from both rain and irrigation. The combination would be better than either alone or both if spaced differently.

No doubt much of the difficulty encountered from not knowing when to apply water and when not to do so comes from too superficial examination of the soil for moisture. Examination of the top inch or two tells little about the root zone; the top soil dries out rapidly anyway. Examination should always be made to depths of 6 to 8 inches, using a spade, and watering should not be done until soil at that depth is becoming dry. Generally watering oftener than once a week will not be justified, and if good advantage is taken of the natural rain, it may not be necessary to water that often during the cooler parts of the year.

FLORIDA CUT FLOWER TRENDS

ED H. PRICE, JR., *Manager*

Florida Gladiolus Growers Association

Bradenton

The Agricultural Agents of the 67 counties of Florida have advised me that some 10,202 acres are presently being cultivated for the

commercial production of cut flowers. The acreage figure presented by each Agricultural Agent represented an estimation and it is my firm belief that the true figure would be closer to 12,000 acres.

Disregarding the multitudes of backyard growers that produce every type of cut flower

known to man, in the fertile and productive soil of Florida, we find various types of cut flowers being produced commercially for sale to the buying public. These types include carnations, chrysanthemum pompons, asters, easter lilies, iris, dahlias, gladiolus, statice, snapdragons, sweet peas, and zinnias. Of these various types, at least 85% of the acreage involved is used for the production of gladiolus cut flowers and gladiolus bulbs, with chrysanthemum pompons coming along at a very fast pace in the last two producing seasons. Most of the other cut flowers mentioned are grown on a rather limited scale; however, plans are now being made by many producers to increase the production of these various types for sale to the buying public.

The history of commercial cut flower production in Florida is reflected in the history of the Florida gladiolus industry, whose commercial producers have carved a niche for themselves in the ever expanding agricultural economy of the State of Florida. The Florida gladiolus industry is a very young one, as industries go, as it saw its birth some 27 short years ago, however: it has been only in the last 14 years that this growing and expanding industry has taken a very large place in the tremendous picture that is Florida agriculture. During the time that gladiolus producers were experimenting and growing ever larger quantities of gladiolus cut flowers, the production of other cut flowers was limited mainly to backyard growers and to a few small commercial producers who used their cut flower production as a diversification from some other more lucrative crop. Immediately prior to World War II, and during the war years, more and more acres of Florida soil were cultivated to produce cut gladiolus until the annual production reached the staggering total of 12,000,000 dozen gladiolus produced on Florida farms. The success evidenced by Florida gladiolus growers in combating the problems of outdoor growing, fertilization, diseases, and other tests of a farmer's skill, slowly brought a realization to potential producers of other cut flowers that Florida had the type of climate, soil, and other resources that would make it possible to grow almost any cut flower, on outdoor fields, that were then being produced only under glass.

The history of Florida's virile gladiolus industry, which is also its cut flower history, is spaced through the years with a path of rug-

ged individualists trying to solve the problems of marketing, transportation, credit, and other problems as individual farmer-operators of a completely new type business. Naturally, these years were lined with hardship and failure but, for the most part, the gladiolus industry has been successful to the extreme and producers of these beautiful cut flowers have taken their place among the largest individual farmers in the State. During the early days, practically all of the product was shipped by railway express to wholesale commission consignees in other parts of the country, mostly east of the Mississippi River, where their merchandise was sold on a consignment basis and the producers received the proceeds from these consignment sales only after transportation charges, advertising charges, and the Wholesale Florists commission was deducted from the sale. Transportation was a vital factor and one that caused a great deal of discomfort and loss to the shipper, due to the lack of refrigeration during the times of hot weather in Florida and because of the lack of any coordination between the shippers and the transportation agencies. All of the problems of a growing industry beset this small group of pioneer gladiolus growers until, in 1941, they banded together to form what is now the strongest association of its type in the State of Florida, the Florida Gladiolus Growers Association. A complete outline of the services and activities of this aggressive industry organization appears on page 289 of the published proceedings of the Florida State Horticultural Society for the year 1952.

In the past 5 years the greatest problem of the Florida gladiolus industry and of the up and coming chrysanthemum pompon industry, has been the method of marketing and merchandising of their crops. Because of the relative rapidity by which these various cut flower industries have reached their present position of worth to the Florida agricultural scheme, the need for agricultural economic research has been practically overlooked and the stabilizing of marketing practices has been a continuing problem, due to the lack of coordinated opinion and action, to solve these various problems. One of the most progressive moves that has been undertaken since the beginning of the Florida cut flower industry is the present project in agricultural economics, being conducted by the Florida Agricultural Experiment Station, under the leadership

of Mr. Cecil N. Smith and Mr. Donald L. Brooke. This project, "Expanding the Market for Florida Floricultural and Ornamental Horticultural Crops," could have a great and valuable effect on the future marketing practices of all Florida cut flowers. This project, when complete, will advise the various cut flower producers as to the possibility of expanding their markets, and subsequently increasing their net income from the production of floricultural and ornamental horticultural crops. This project will also be able to advise the producer of Florida floricultural and ornamental horticultural products as to the need for quantity, quality, colors, and sizes of various types, and the types of containers that should be used to ship these cut flowers to market. Further information will be available, on completion of the project, concerning the type of marketing that is most valuable; consignment versus F.O.B. selling, pricing of cut flower products and other mass merchandising methods to put the Florida cut flower in the hands of the direct consumer. Finally, this project should be able to tell the producer of Florida cut flowers which floricultural and ornamental horticultural products the ultimate consumer prefers, how much he will pay and in what quantities he will buy.

Today the methods of marketing Florida gladiolus and chrysanthemum pompons have changed. Many of these cut flowers are sold direct to retail florists throughout the country, through the channels of direct mail, periodical advertising, and salesmen. Many of the old Florida gladiolus producing farms have now gone heavily into the business of selling direct to the retail florist and, in order to compete, have as high as 10 salesmen on the road covering all points of the United States, to sell Florida's most beautiful product. The merchandising and marketing methods of all Florida cut flowers are in a state of constant change and the method of selling that is proper today may be completely obsolete in several months. It is the considered opinion of many producers in the business that Florida's cut flower products should be sold on an F.O.B. basis only and the practice of shipping on consignment should be discontinued. Thus far, there has been no unanimity of opinion between the many cut flower growers and indications are, that there will continue to be as many different types of marketing and mer-

chandising practices as there are members of the industry, for at least the immediate future.

Another problem that has beset the producers of Florida cut flowers is that of transportation, due to the fact that practically all of the cut flowers produced in Florida are shipped out of the State. As in the case of other industry stabilizing efforts, the Florida gladiolus industry has led the way to reliable, fast, and efficient transportation through the corporate effort of the members of its State association. 80% of the movement of Florida gladiolus to other states still moves by Railway Express rail cars, however, the big difference has been added by pool car movements and the addition of refrigerated car service to practically all of Florida's gladiolus shippers, on a daily basis. This refrigerated car service is sponsored and operated by the Florida Gladiolus Growers Association, on a non-profit basis, for its members and has provided excellent refrigerated service to all points in the country. 15% of Florida's gladiolus movement is transported in modern drop-frame refrigerated trucks, which are also operated by the Florida Gladiolus Growers Association, and are the direct result of cut flower operators cooperating for the good of their industry to solve a serious problem. The producers of Florida's chrysanthemum pompons and other cut flowers are also utilizing iced car rail movement and have slowly turned to refrigerated truck on an individual farm-to-market basis. The remainder of Florida's cut flower movement is carried to market by air cargo shipment. This movement is very sporadic and, even though the need is great, the existing routes do not supply distribution needed by producers nor do existing rates compete with the rates of other carriers. It is a practical certainty, however, that the movement of Florida's cut flowers will be handled on a much larger scale by air cargo carriers in the future and, with the addition of destination service points and more competitive rates, the bulk of Florida's cut flower movement could turn to this type of carrier.

Green-house producers of cut flowers in other parts of the United States, and other outdoor cut flower producers, are becoming more aware daily of the unlimited possibilities of cut flower growing in the State of Florida. The surface has barely been scratched on the types of cut flowers that can be produced in Florida and, the fact that these cut flowers

can be produced outdoors, exactly the same as other agricultural products in Florida, provides an almost unlimited potential as to volume of production.

The continued growth and future success of Florida's various cut flower industries can only be stopped, in my opinion, by the unwillingness of the various individuals, participating in these industries, to pool their resources and coordinate their activities to overcome the problems of marketing, merchandising, research, transportation, credit, and other problems that specifically will affect the production of Florida's cut flowers. As stated before, the possibility of volume production of cut flowers is unlimited in Florida, due to the amount of fertile soil available and because of the good water and wonderful weather conditions that are so valuable to the perishable cut flower producer. However, unless all cut flower producers band together as a cooperative unit for the purpose of improving quality, finding better ways of growing, establishing

new avenues of corporate transportation mediums, finding the best possible method of selling their product to the direct consumer and finally, devising honest and honorable procedures of business operation and a voluntary code of sales ethics, then the future could indeed be disastrous and unproductive.

In closing, let me say that I think the years to come will see the combined industries of Florida cut flower producers established as one of the largest factors in the economic picture of the State of Florida. New types of cut flowers will be produced on a commercial scale each year and the acres involved in cut flower production, exclusive of gladiolus, will continue to expand annually for years to come. However, I would again like to point out that the greatest need for the producers of all types of Florida cut flowers is a central, non-profit agency, to act as a coordinator for the growing, transportation, selling, credit, and research which would be voluntarily participated in by its members.

SNAPDRAGON CULTURE IN FLORIDA

ORRIS R. EVERS, *Horticulturist*

Evers Flower Farm

Lakeland

Snapdragons (*Antirrhinum majus* L.) are one of the most popular perennials grown as annuals here in Florida for cut-flower production and garden use. Their wide color range, good keeping qualities and graceful spikes lend themselves to almost any type of floral artistry. As a garden flower they are excellent in both formal and informal plantings, combining well with many other annual or perennial species.

Under Florida conditions snapdragons do especially well out of doors during the late fall, winter and spring months. Requiring somewhat cool day and night temperatures and high light intensity for best development, they reach their peak of perfection during the months of February, March and April. Yet good blooms can be had as early as Thanksgiving and as late as Mother's Day, with careful attention to varieties and dates of seed sowing.

There are two general classifications of snapdragons; the winter-flowering greenhouse types and the summer-flowering garden types, which include several horticultural species. From these two classes we get a multitude of varieties and colors, each having its own characteristics. In the last few years great strides have been made in breeding, selection and chemical treatment to produce finer varieties for almost any purpose. Perhaps the most promising work along these lines is in the production of F_1 hybrids. At present most progress has been made in the so-called greenhouse varieties. The production of the tetraploid types by doubling the chromosomes by the use of colchicine has created a new class which holds promise. Their main disadvantage is lack of production of uniform flower spikes.

All of these types can be grown under garden conditions in Florida. The greenhouse varieties, including the F_1 hybrids, produce an abundance of well-shaped flowers during the winter and early spring, but high temperature and their susceptibility to rust disease make them unsuitable for late spring and early summer. The summer-flowering garden types are