

# ORNAMENTAL SECTION

# PROBLEMS IN GLADIOLUS PRODUCTION

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In 20 years gladiolus production in Florida has grown from a few acres into a major industry. It is estimated that over 5000 acres will be planted to gladiolus this season. The major part of this acreage yields its flower harvest at a time when flower production elsewhere in the nation is practically limited to the greenhouse. Enough gladiolus cut-flowers go to market from this State to supply each person in the country with about one flower spike per year. This production of over ten million dozen spikes produces more wealth than any one of the State's vegetable crops, with the exception of tomato, beans, and celery.

The rapid growth of our gladiolus industry since the end of World War II brings up visions of the occasional glutted markets of pre-war days. Unless present efforts to advertise effectively, to expand existing markets, to develop new markets, and to improve the quality of the product are extended and backed up by all growers, this threat of over-production is real.

It is believed that Florida's gladiolus production may be expanded many times before the potential market for this flower is satisfied. The greater part of our flowers sold in the past have gone into the florists' design and funeral pieces. The gladiolus growers, by marketing pre-packaged flowers for the homemaker through the chain stores, are taking an important step forward in expanding the cut-flower market. It is not hard to imagine that many homemakers would be eager to buy attractive flowers at a reasonable price.

With the recent coming of rapid transport

in the form of refrigerated trucks and air freight, the growers are putting a fresher product on the market, often directly into the hands of the retailers rather than through centralized distributors, for which they receive a premium price. Rapid transport is extending the market area. Also, air freight makes it possible to put 2 or 3 extra days' flower cut on the distant markets for any one holiday.

Gladiolus production is reduced in volume and in quality by diseases, insects and by mal-practices. It is the purpose of our research on gladiolus to increase the quantity and quality of production and thereby lower the cost of production and the sale price of cut-flowers. A modest reduction in the consumers' price should result in a disproportionately larger market.

The production problems in this industry are many and varied. Only the critically important problems can receive attention at present. The control of certain diseases which have increased in severity in recent years is receiving major attention, since the diseases are the biggest factor in reducing the quantity and quality of the cut-flowers produced on the average acre.

The Fusarium corm rot and yellows disease is not as destructive as it was a few years ago when half of the Picardy corms were lost in 2 or 3 seasons. Practically all susceptible varieties are now treated, before planting, in a one-quarter percent solution of New Improved Ceresan. The annual loss from the Fusarium disease is now estimated to average 7 percent of the variety Picardy and its sports. These and other susceptible varieties comprise over 80 percent of the total production. Much work has been done and is being done to develop other control measures to reduce this expensive loss.

The leaf spot disease has taken an annual

toll for several years. The disease may kill the foliage before flowering, or more usually after flowering. Most of the important commercial varieties are very susceptible to the leaf spot. The disease becomes epidemic during the winter and spring months, disappearing during the summer. A fungus resembling a *Stemphylium* was isolated from the leaf spot at this laboratory early in 1944. The same type of fungus was again isolated early this year. Certain fungicides when applied as sprays each week were effective in reducing the leaf spot infections if the spray applications were begun at the first sign of infection. The most effective materials in our spray tests were Zerlate, Dithane and Parzate.

The most threatening and potentially serious disease at present is caused by a *Botrytis* fungus which attacks the leaves, florets and corms of most gladiolus varieties, if not all. There is an insidious phase of this disease in that the cut-flowers may appear healthy when packed and then become rapidly rotted in transit or in cool storage. The floret phase may appear when the disease is not readily detected in the field.

The corm rot phase is relatively new to Florida, being recognized for the first time on corms coming out of cold storage this fall. It may be that the prolonged cold wet period of last February was responsible for this flare-up of *Botrytis* corm rot. All affected stocks were in the field at that time and *Botrytis* infection became severe on the leaves in some fields during the month.

Diseased leaf and flower specimens, somewhat resembling the *Botrytis* infections, were received from most of the important production centers of Florida and Alabama this summer and fall. All of these specimens yielded a fungus which is apparently newly associated with gladiolus. The name of the fungus is *Curvularia lunata* (Wakker) Boedijn. Tests are underway to determine whether the disease is caused by this fungus or whether *Curvularia* is only a secondary fungus obscuring the casual agency.

The sudden increase in severity of the *Botrytis* disease last winter plus the appearance of an apparently new disease have given the growers cause for much alarm. In order to discover control measures against the *Botrytis* disease as quickly as possible, extra personnel and funds have been allocated to this emergency program. Test spray plots will be located in the important winter production areas of the State. Fungicidal treatments of corms and cut-flowers will be tested at the Bradenton Laboratory. The *Botrytis* disease will be studied to determine at what phase of its development it is most vulnerable to attack. It may be possible to discover a simple and inexpensive measure of control. The possibility of other plants acting as hosts of the fungus will be studied. A well-rounded control program will take years to develop.

There are many other types of problems on which research work has been initiated or planned for the future. An extensive variety testing program is under way. Along with this we are breeding new varieties among which we hope to find resistance to the major diseases. The purpose of testing these hundreds of varieties is to find better ones for Florida. We urgently need varieties which will resist the leaf spot and Fusarium diseases, as well as the *Botrytis*. The problem is to combine the resistance which we find in some varieties with the characters of Picardy which have made this variety the leading commercial for over 10 years. We propose to get these combinations of desirable Picardy characters with disease resistance by selfing existing varieties which are themselves the product of crosses between Picardy and Maid of Orleans, for instance. By inbreeding, the desired combinations of characters should show up.

Our idea of what the perfect gladiolus cut-flower variety should be will surely be changed by the use of air transport and the demands of the homemaker. No longer must our flowers undergo the terrific punishment of traveling without a drink in non-refrigerated cars for 3 or 4 days. Our commer-

cial varieties can take this punishment and give a good performance, but the premium price being paid for air-shipped glads indicates that they perform better when treated kindly. Many beautiful varieties which were not suited to commercial production because they did not ship well may prove to be good performers when shipped quickly by air. The homemaker will want the dainty, small decorative varieties as well as the large commercial varieties with which we are familiar. A well-grown spike of most commercial varieties is much too large for any vase the average home can supply. Also the smaller glads fit the average room of the home better than the large spikes. It is time that we begin to cater to this market.

Further investigation on the gladiolus

farm to see where the grower can cut down on costs of production will show us many operations that might be eliminated or reduced in cost by the use of labor-saving machinery, by using new weed-killing devices and chemicals, and, possibly, by handling the corms differently. The use of fertilizer is a matter about which much is said but little is known definitely from experimental evidence. The growers tend to blame the fertilizer when their plants look sick. There is a definite feeling with some growers that their fertilizer program is faulty.

These and other problems need investigation. Research can point out the best practices which will lower the costs of production, and equally important, improve the quality of our cut-flowers.

## DEFICIENCIES IN ORNAMENTALS

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Ornamental plantings are made for a specific purpose to produce definitely desired effects. If the plants used in the landscape are well adapted to the environment in which they are placed and make a vigorous thrifty growth, they serve the purpose for which they were planted. If, for any reason, they fail to make a thrifty growth, their desirability for ornamental purposes may be materially reduced and thus they may ultimately prove a disappointment.

The mineral soils of Florida are generally deficient in the major plant foods—nitrogen, phosphorus and potassium—and usually require the addition of these materials for normal healthy growth. Organic soils are high in nitrogen but may be deficient in phosphorus and potassium.

### MICRO-ELEMENT DEFICIENCIES

During the past 15 years much work has been done on the micro-element deficiencies of fruit, nut and vegetable plants in Florida and, to a similar but lesser degree, with certain ornamental plants. Under some conditions and in certain locations, even though nitrogen, phosphorus and potassium have been supplied in adequate amounts and other conditions are favorable for growth, some plants may still remain in an unhealthy condition.

Some of these malnutrition troubles are caused by a deficiency of certain of the micro-elements. Thus far, micro-element deficiencies due to manganese, zinc and iron are the only ones reported on ornamental plants in Florida.

### MANGANESE DEFICIENCY

A manganese deficiency of several ornamental plants has been identified in Florida (1, 2, 3). Though disorders due to this cause are common on the acid sands of the