This test proved conclusively that nematodes capable of producing root-knot could be carried over on or in the corms. This test indicates that Hopman's Glory corms with a well developed abscission layer would carry a minimum amount of infestation.

1951, 1952, 1953 Tests

In 1952, a quantity of Crimson Wave caladium from a known nematode-infested field at Sebring were available for study.

Six lots of bulbs were treated on December 16, 1952 at time of storage with the following materials:

1. Parathion 15%W
2. Malathion 25%W
3. Heptachlor 25%W
4. Dieldrin 25%W
5. Chlordane 25%W
6. Check (no treatment)

The bulbs and insecticidal dusts were shaken in a paper sack, so that a thorough coating of the bulb was obtained. The contents of the sack was then poured over a screen to remove the excess insecticide.

On March 7, 1953 another sample from the same bulb lot from the same field was treated with insecticides in like manner. Both lots of treated bulbs were planted in sterile soil in 1 foot square flats that were not in contact with the ground. Another lot of the same bulbs was planted untreated to note the nematode populations.

All untreated caladium bulbs produced root-knot nematode symptoms, proving that the pest could be carried over on caladium as well as on gladiolus. There was no difference noted between treatment made at time of storage and at time of planting. The results of the test are given in Table II.

### TABLE II. TREATMENTS FOR NEMATODE-INFESTED CALADIUM BULBS

<table>
<thead>
<tr>
<th></th>
<th>No. of bulbs infested at harvest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parathion</td>
<td>1</td>
</tr>
<tr>
<td>Malathion</td>
<td>5</td>
</tr>
<tr>
<td>Heptachlor</td>
<td>12</td>
</tr>
<tr>
<td>Dieldrin</td>
<td>15</td>
</tr>
<tr>
<td>Chlordane</td>
<td>18</td>
</tr>
<tr>
<td>Check</td>
<td>20</td>
</tr>
<tr>
<td>L.S.D. 5%</td>
<td></td>
</tr>
</tbody>
</table>

Parathion and malathion gave the best control of nematodes on the bulbs. Heptachlor and dieldrin were next in order of effectiveness. Chlordane gave very little control while the untreated check was 100 percent infected.

The roots of the malathion and parathion treated bulbs were luxuriant, white and healthy looking in every respect. Bulbs treated with chlorinated insecticides had a large proportion of brown but viable roots.

It is a moot question whether field treatment pays. Only further experimentation can answer this question.

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**A FLORIDA ROSE GARDEN**

*Mrs. G. F. Lampkin*

*American Rose Society Consulting Rosarian*

*Bradenton*

When growing roses out of doors in colder climates nature supplies a season of dormancy for the plants, but here in Florida there is no rest for either the plant or gardener. At least this is true in the central west coast section where my experiments and observations have been made. In return for this year round care, however, a Florida rose garden gives almost continuous bloom, of quality approaching any obtained in climates reputedly more amenable to rose culture.

Possibly, the most important phase of Florida rose culture is disease control. Diseases which most concern us are blackspot and mildew. Mildew is usually troublesome only in spring and fall. It needs high humidity for germination but water on the leaf actually retards growth of the spores, thus making it of little concern during the rainy season. When prevalent it rarely contributes to death of the bush but is very unsightly and can, if severe, slow down growth processes.

Although there can be several causes of defoliation, the most usual is blackspot. Repeated loss of foliage from this malady weakens the bush, causing decline and eventual death of the plant. Since blackspot spores are spread by splashing water, and germinate when the leaf is wet for as long as six hours, it is readily understood why this disease is epidemic in summer months. Our summer rains often
come in late afternoon, leaving foliage wet for fourteen hours or longer. Beating rains wash fungicides from the foliage so that frequent applications are desirable, yet because of wind, spraying or dusting on a set schedule is, at times, impossible. These factors make it mandatory that the disease be kept at a minimum in favorable weather so there will not be enough inoculum present, at the start of a wet period, to build up to hazardous proportions. We try to have a fungicide on the foliage when rain occurs, and renew the application as soon as possible after it has been washed away.

A leaf spot known as Cercospora gives concern in some sections of the state but good culture and regular applications of fungicides for other diseases seem to prevent serious infestations.

Cankers occasionally occur but are seldom severe. Most brown and dead canes are caused by a normally weak fungus called Diplodia, which gains entry in cut canes or wounds and makes headway only in plants weakened by other causes.

Whether one dusts or sprays is a personal matter. Dusting is usually easier, and has the advantage of being ready for use on a moment's notice, when there are a few minutes of spare time, or during a period of favorable calm atmosphere. However, there are times when spraying is preferable. Sprays stick better, can be applied when it is too windy for dusting, and do a better job controlling mildew, spider mites, and certain scale insects. Good equipment contributes much toward ease of application and good results. All parts of the plant surfaces must be covered with spray or dust, including undersides of the leaves, yet care exercised to keep the deposit uniform and light in order to avoid foliage injury.

Recommendations for specific fungicides or insecticides could soon become out of date. Such preparations are being constantly superseded by materials more efficient but at the same time safer to foliage and to user. Many older preparations cause severe foliage injury under certain conditions. Copper injures foliage in cold damp weather while sulphur burns in high temperatures. Both are good fungicides when used with care and understanding. Ferbam (Fermate) is much safer in any weather and has given satisfactory control of blackspot when used faithfully. Discoloration of flowers—especially light colors—is its main fault. Sulfur must be added when mildew occurs, and insecticides as needed. Fermate and sulfur are available separately in either dust or spray form, and are combined in many ready-mixed formulas.

A newer product known as Captan, or Orthocide, is showing promise for blackspot and does not stain blooms. It is on the market as a spray, not readily available in dust form; but it is contained in some all-purpose dust mixtures. Sulfur can be added to the spray for control of mildew.

Malathion has taken care of all insects invading my garden and is compatible with fungicides.

A spreading agent added to sprays will help to give better coverage on young foliage, penetrate mildew spores more thoroughly, and control insects more efficiently. One third teaspoonful of a detergent (Vel or Dreft) to a gallon of spray, or a few drops of commercial spreader-sticker will do the trick. Manufacturer's directions for mixing and applying all spray constituents should be followed carefully.

Roses enjoy a well prepared bed with generous addition of organic matter, situated where drainage is good, with no competition from roots of rank growing shrubs or trees, and where they get full sun at least six hours daily. If drainage is poor the beds must be built up several inches above surrounding level, while if it is excessive the bed surface should be lower. A complete commercial fertilizer, of a formula similar to 5-10-5 or 4-7-5 (about four pounds per hundred square feet), should be worked into the soil and the bed allowed to stand for several weeks. No fertilizer should be added when planting. Soil should be slightly acid in reaction and if beach shell or lime rock are present a soil test should be made. Your local county agricultural agent will do the test. The best range of pH value for roses is considered to be from 5.5 to 6.5, and it usually takes about one pound of sulfur per hundred square feet to lower the pH one unit. If the original reaction of the soil was alkaline (7.0 or above) similar applications of sulfur are going to be needed yearly.

Feeding established plants is an individual problem. I have seen rose bushes in my area
towering head high in a year's time with no fertilizer other than that present in the prepared bed. This is not always possible. Some soils leach more readily than others, and some lack—or have in excess—certain minerals or constituents affecting the availability of nutrients. One learns to correct faults of his own garden. Rare is the naturally perfect spot for roses in our, or any, climate. Normally, applications of all major elements (nitrogen, phosphorus, potassium) are needed three or four times a year. It is convenient to select a complete commercial product with minerals added. Those having formulas approximating 4-7-5, 5-10-5, 4-8-8, have been satisfactory and are used at the rate of one heaping tablespoon per bush, or about three pounds per hundred square feet. If soil is very light with leaching a problem, extra additions of nitrogen may be needed but unless one understands the use of inorganic sources it is advisable to stick to organic forms such as cottonseed meal, or manures. It is desirable just to maintain good growth and bloom without forcing. Beds should always be heavily mulched, using any easily procurable materials such as leaves, pine straw, peat moss, grass clippings or sawdust.

Light pruning has proven best for mild climates and in Florida is done during winter months. It consists mainly of removing dead wood, twiggy stems, crossing or rubbing branches, and old canes which have ceased to put out good lateral growth. On strong, healthy canes no more than one-third to one-half is removed—just enough to make a well shaped bush. Indiscriminate whacking, regardless of the condition of the canes or consideration of plant habit, is one of the practices which contributes to short life of Florida roses.

In my own tests, rootstocks have made a decided difference in vigor, productivity, and life span of many varieties. Multiflora is the rootstock in most common usage, but it has proved inferior in my locality. Odorata has been excellent, as would be expected since it is so closely related to many of our old varieties which have come to be known as Florida roses. A newer understock known as Dr. Huey (also as Shafter, and Shafter Robin) is proving very satisfactory, especially where drainage is good. I believe Odorata is superior in wet soil. Most of the popular modern roses are available on these two understocks, from California nurseries.

Growing and studying roses can be a very satisfying hobby. Possibilities for their uses are unlimited and in Florida we are privileged to enjoy, every day in the year, fine specimens of the world's most beautiful and best-loved flower.

CHRYSANTHEMUM INDUSTRY IN FLORIDA

Stanley Smith
Stuart

First experiments with commercial varieties of chrysanthemums were planted in Florida about 1942. Plantings used then were of greenhouse varieties of the short response group that respond easily to artificial lighting during the winter months, and black cloth shading during the spring months of longer day-length. Plantings then were measured in hundred square foot areas. Since then there has been a gradual increase in acreage in the State with the big increase the last three years, plantings will be approximately one hundred acres this current season.

Florida plantings are divided about 50% in the Stuart area, 25% Ft. Myers area, 10% Miami area and balance scattered over south Florida.

The shipping season has been lengthened from a few spring months to about eight months commercial production. Small crops have been produced twelve consecutive months in the Stuart area.

Distribution has spread from a few local markets to all major flower markets east of the Rocky Mountains, Canada, Cuba and Puerto Rico.

Transportation to markets has increased to solid plane loads, full refrigerated express cars, and refrigerated truck loads—the largest volume shipped by non-refrigerated Railway Express.

Culture is about the same as northern greenhouse or cloth house crops. Florida growing areas are divided between low ground with