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INSECT CONTROL ON ORNAMENTAL PLANTS OF THE HOME GARDEN

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Introduction

The present interest in ornamentals has resulted in a growing demand for information on the control of the insects and other pests attacking them. Requests for this information come from nurseries, custom spray operators and home gardeners. Very little research work has been done in the field of pest control on ornamentals. Although the Florida State Plant Board carries on an intensive inspection and quarantine program covering nurseries this organization does not attempt to do any research work. About two years ago the Florida Agricultural Experiment Station established a project on the control of pests of ornamentals and this is a report of some of the results obtained.

Until recently no one paid much attention to the problems of the nurseryman or the home gardener because there was no satisfactory method of estimating monetary losses of ornamentals due to insect depredations and the magnitude of these losses was not fully appreciated. We still do not have a satisfactory method of estimating these losses but we are beginning to realize that the depredations caused by insects and mites have a definite assess-

able value depending on the ornamental and its location.

Just a few years ago gardeners found all there was to know about pest control tucked away in a few pages of most any book on gardening. All of the insects were lumped into two categories—sucking insects and chewing insects. The recommended control measures were just as simple—nicotine sulfate for the sucking insects and lead arsenate for the chewing insects. I suspect that those days are gone. Nurserymen, florists and home gardeners are now entering a new era of insect control which will require more specific knowledge about insect pests and the application of insecticides for their control.

Insect Pests

Tests have been made to control the major insect pests of many of our favorite ornamentals. Treatments have been made under variable conditions with sufficient frequency to justify making new recommendations for the control of the common pests of azaleas, camellias, crotons, gardenias, hollies, hibiscus, oleander, and roses. Insecticides have also been tested for the control of some pests of a number of other ornamentals although it is felt that further testing is desirable before making any recommendations for their control. The plants in this category include arbor vitae, cedar, slash pine, boxwood, hydrangea, magnolia, several varieties

of palms, purple plum, privet, spirea, and viburnum. Limited tests have also been made on such succulent plants as african violets, coleus, ferns, ivy, and orchids.

The main groups of insects attacking ornamentals are the armored and soft scales, mealybugs, whiteflies, aphids, thrips, lace bugs, and leaf miners.

Sprays and Spraying Equipment

On the basis of these tests the two general types of spray materials recommended are parathion wettable powders and oil emulsions. The wettable powders form suspensions when mixed with water. They should be thoroughly mixed and continually agitated while being applied. When using concentrated wettable powder it is best to make a thin paste of the portion to be used with a small amount of water and then add this to the water in the spray tank. The oil emulsions form tiny globules in the water with which they are mixed and require constant agitation while being applied. Spreaders and stickers can be used with the insecticide but they are not essential.

Hand operated sprayers can be used with good results for applying these sprays. Most compressed air sprayers do not contain an agitator. When using this type of sprayer it is necessary to shake the tank frequently to keep the materials mixed well and the sprayer should be pumped up frequently to maintain a good pressure. Most knapsack sprayers are equipped with suitable agitators which keep the materials stirred. Power sprayers are more effective than hand sprayers and should be used if available. Do not use the quart size household hand sprayers to control scale insect infestations as it is impossible to get good coverage of the undersides of leaves.

To obtain effective control of armored

scales it is essential that infested plants be treated in such a manner as to wet all of the scales. Best results are obtained by directing the spray upward so that the undersides of the leaves and twigs, as well as the upper surfaces, will be thoroughly covered. Check the plants after spraying to see that all parts are wet. To check plants treated with parathion use a stick to turn back the branches or wear rubber gloves to make the examination. Keep in mind that the armored and soft scales do not move except in the crawler stage making it necessary that the insecticide be applied so as to come in contact with these insects to be effective. Also remember that to kill the armored scales sufficient amounts of the toxic material must be deposited on the scale covering to permit it to penetrate through this protective covering. In the over-all insect control program for pests of ornamentals, parathion should supplement the usual oil emulsion sprays rather than replace them. Parathion applications should be made when scale insects and other insect populations are building up and conditions do not warrant the application of oil emulsions.

Insecticides

Since most nurserymen and home gardeners are already more or less familiar with the oil emulsions only a few general comments will be made on their use for controlling pests of ornamentals. The oil emulsions should be used at a concentration of about 1 to 1.5 percent. They should be used in at least a 1 percent concentration to be effective against the insect pests but not more than 1.5 percent to avoid plant injury. Most of us are probably well aware of the limitations of the oil emulsions. They should not be used if there is any probability of freezing temperatures within the next week or

10 days, nor should they be used when the daytime temperatures may exceed 85° F. Also, oil emulsions should not be used on plants having considerable new tender growth as such growth is easily injured by oil emulsions. The "mayonnaise type" oil emulsion sprays are preferred to the liquid types.

Parathion, one of the new phosphatic insecticides surpasses the oil emulsions in effectiveness in many instances and in addition has the following advantages: it can be used during the summer or winter without danger of foliage burning; it can be applied to tender foliage without danger of plant injury. To appreciate the implications of these advantages it should be pointed out that in most instances scale insects, whiteflies, and other insect populations are building up at times when oil applications cannot safely be used.

Parathion 15 percent wettable powder used at the rate of one pound in 100 gallons of water is extremely effective against whiteflies, cottony cushion scales, mealybugs, flower thrips, and aphids. At this concentration it is also effective against red spiders (mites). However, it does not kill mite eggs so a second application should be made within 12 to 15 days. Enough time should elapse between applications to allow most of the eggs to hatch but the second application must be made before the newly hatched mites have time to become adults and lay eggs to start a new infestation. Tests indicate that parathion has practically no residual effect.

Parathion 15 percent wettable powder used at the rate of two pounds in 100 gallons of water gives effective control of most armored scales. In some cases it was found that a single application did not give complete control. In checking some of these cases it was found that many young scales were completely

covered by older scales and that this protection enabled these scales to survive the insecticide treatment.

In many of the scale control tests with parathion it is difficult to make a precise evaluation of the results. Low concentrations are effective against crawlers, immature males and immature female scales while higher concentrations are required for effective control of adult female scales. Evaluation of results of the tests are based on kills of adult females. Also it was quite evident that parathion has considerable value as an ovicide as the eggs of Florida red scales and tea scales were repeatedly found affected after treatment. In several tests it was observed that even though the parathion application was not effective in killing Florida red scales directly it so weakened the scales as to make them more susceptible to attack by entomophagus fungi.

Phytotoxicity

Only a few cases of plant injury by parathion have been observed. Papaya and *Podocarpus nigi* are apparently highly susceptible to parathion spray injury. Hibiscus, gardenias, and elaeagnus (Russian olive) have shown injury at times from parathion sprays. There is considerable evidence that plants growing in dry soil are more susceptible to spray injury and that the turgid condition of the plant foliage correlated well with the amount of plant injury observed. Be sure that plants to be treated with parathion have ample soil moisture available several days prior to treatment.

Precautions

All insecticides are poisons and should be handled with extreme care. The organic phosphates (parathion, HETP, TEPP) are more dangerous than most others in that they may be absorbed through the skin as well as being inhaled

or swallowed. In applying insecticides avoid breathing of spray or dust particles by standing to windward while making application. Concentrates of parathion are more dangerous than more dilute mixtures and they must be handled with extreme care to avoid inhalation or getting the material on the skin through which absorption may occur. Although parathion is very toxic it should also be pointed out that comparatively small quantities of the concentrate are present in the finished spray.

Home gardeners, nurserymen, and custom spray operators should familiarize themselves with parathion before using it. Nurserymen and custom spray operators should give their workmen information on handling parathion before asking their workers to handle this material. They should be thoroughly instructed regarding the toxicity of the material, the symptoms resulting from poisoning, and the treatment prescribed if poison

symptoms appear. The operators should make respirators and other safety facilities available and insist that the workers use the provided facilities to prevent bodily contact and contamination of clothing. All prescribed precautions given on the packages of insecticides should be observed.

The relatively short exposures at infrequent intervals required of the home gardener are well within the limits of safety if the following precautions are observed. 1. Any spray material which comes in contact with the skin should be washed off immediately with clean water. 2. A no-smoking rule should be observed when handling insecticides, especially the organic phosphate materials. 3. Spray operator must stand to windward while making application of the spray. 4. Never use the organic phosphate materials in closed or confined places. 5. Store all insecticides in places inaccessible to children and pets.

Krome Memorial Institute

FAIRCHILD TROPICAL GARDEN

CHARLES H. CRANDON
Fairchild Tropical Garden
Coconut Grove

There is an area of land located on Old Cutler Road, twelve miles south of Miami, Florida, adjacent to Dade County's Matheson Hammock Park, where, only a few years ago there was nothing but Caribbean Pine and Palmetto. Here, within a few short years there has developed, as if by magic, the Fairchild Tropical Garden, which is now one of the finest and best landscaped

tropical gardens in the world, and an educational and cultural contribution to this state and nation.

Colonel Robert H. Montgomery, who is recognized as one of the country's leading citizens by virtue of a distinguished career in business and his efforts as a patron of Horticulture, came to Miami about seventeen years ago, for rest and recreation, and for our wonderful climate. He had been attracted to this region by an old plant-loving friend, George P. Brett, President of the Macmillan Company. He built a charming