INSECTICIDE DOSAGE ON CITRUS

J. T. GRiffITHS

In 1953, I delivered a presidential address entitled, "Where Do We Go From Here?" Since that time, I have continued to ponder the end result of citrus spray programs. Today I want to present some thoughts which I hope may change our approach to this grove operation. Although I am feeling my way at this time, I hope this may serve as a starting place for reconsideration of spray methods.

A spray program for citrus is supposed to produce the best quality fruit possible at the lowest practicable cost. This means that proper insecticides must be used, they must be sprayed at the proper time, and they must be efficiently applied. However, there is no justification for applying more than enough material to produce control, and it need be applied only thoroughly enough to attain that control. It is therefore essential that there be a good criterion of dosage. Today growers apply from 250 to 2500 gallons per acre depending upon the material and who is running the operation. Five hundred gallons per acre is the amount most commonly used.

More and more growers are using concentrated sprays in some form. This method of spraying needs some refinement, but it offers a major means of reducing spray costs. The advent of concentrated sprays offers an excellent opportunity to think in terms of pounds of insecticide per acre rather than pounds per 100 gallons and gallons per tree. I would like to see insecticide recommendations expressed as pounds per acre and based upon average tree height. This is an easy figure to find, and it is not subject to the variation that arises when a production figure (i.e.: a 6 box orange tree) is used.

Problems associated with the use of sulphur may be somewhat different from those presented by other insecticidal materials, but sulphur offers an excellent example of the problems faced by the production manager today. Although the use of sulphur increases other insect problems, many growers are using more sulphur today than ever before.

In the operation under my control, sprayers are usually set to spray four rows across a 40 acre block. Thus, where rows are thirty feet apart, each row represents a trifle more than one acre. The setting of the nozzles, the speed of the spray machine and the gallons per acre are constant, whether the machine is in young trees or in an old grove. The amount of material is changed from block to block and represents the only variable in the entire application. Nozzles may be adjusted up or down to accommodate to tree height, but the foreman is primarily concerned with one variable, the number of bags per tank.

There are three questions concerning sulphur sprays for which we need answers: (1) What size rust mite infestation should be treated; (2) How much sulphur is required; (3) How thorough an application should

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2 Eloise Groves Association, Winter Haven, Florida.
be made? These three questions should be considered in the light of how the use of sulphur may be minimized.

Rust mite infestations do not behave in the same manner at all times of the year. During the summer, increases are extremely rapid and injury can result almost over night. During the fall and winter, populations increase slowly and injury is much less apt to occur. This means that control is less urgent in the fall and winter than in the summer. In the fall, a moderate infestation may be allowed to drift for a month or longer with no danger involved; whereas, such a situation in June would result in severe injury. Complications with dry weather and/or mesophyll collapse sometimes occur in the fall, but these instances may be considered unusual.

The grower needs some more definite means of determining when an application for rust mite control should be made. In my own operation, I am inclined to apply sulphur within ten days to two weeks after finding twenty to thirty per cent of the fruit infested in the summertime, whereas such populations in the fall would be checked again within two weeks and a reappraisal made of the situation.

It has been my experience, that an actual sulphur application can often be saved in the fall of the year by careful checking and by delaying sulphur until the population has increased to a relatively high level (50 to 60% of the fruit infested).

After it has been decided to apply sulphur, the next question is how much to use. I am coming to one of two conclusions; either sulphur need not be varied a great deal in proportion to tree size, or we are using more than is needed in most applications. Thus, during the past two years, in the groves under my care about 50 pounds per acre has been a fairly standard dosage on orange trees and 75 pounds per acre on mature grapefruit. However, when amounts were reduced to as little as 40 pounds per acre on both oranges and grapefruit, no differences were found. I know of growers who go as low as 25 pounds per acre in mature groves with apparent success. How much sulphur is really needed?

The methods for applying sulphur must also be considered. In my own experience, coverage is not a major consideration so far as sulphur is concerned. Within certain wide limits, the thoroughness of application is probably of little or no consequence, although it may be that if minimum amounts were used, coverage would become more important. For the past three years, we have been using a double-head speed sprayer and driving at 2½ miles per hour. This has been most satisfactory. We have used sulphur dust on numerous occasions and it has been applied at speeds in excess of 3 miles per hour, but at about the same rate of sulphur per acre as with sprayers. For practical purposes, results with dust have been as good as with spray applications.

These experiences lead me to suggest that our sulphur application may be considerably reduced in cost by having definite answers on the minimum dosage and minimum coverage required. Sulphur reduction will yield gratifying results in other insect and mite problems. We are a long way from knowing how much to use and how well it should be applied.

Other insecticides, fungicides, nutritional and physiological sprays present individual problems and these are as complex as those for sulphur. The grower who is trying to reduce spray program costs must do so either
by reducing the number of applications, by reducing the amount of material, or by finding cheaper means of application. The use of concentrated sprays and the knowledge of effective minimum dosage and coverage offer excellent opportunities for improvement in the cost picture.

We must get a clear picture of minimum dosage and minimum coverage. The slogan, “More Insecticides, Better Applied”, has no merit if the extra material and the better coverage are unnecessary.

CARL F. LADERBURG

Entomology lost a true friend and scientist in the death of Carl F. Ladeburg October 16, 1956 at Veteran's Hospital, Coral Gables, Florida.

Not only was he responsible for many developments in the pesticide field within his own firm, but this interest, knowledge, and thoroughness extended to many related problems of technical and practical nature in a wide range of crops and enterprises.

Carl Ladeburg was an outstanding industry representative in systematizing and enumerating pesticide developments, particularly since and during World War II, including valuable contributions to such endeavors as the first “Handbook on Pesticides and their Uses in Florida”.

At the time of his death, he worked closely with many agencies on such factors as pesticide residue, tolerances, laws and usages. All of his efforts were marked by carefully detailed work in the interest of the industry which he so ably represented.

Carl Ladeburg was born November 26, 1897, in Magdeburg, Germany and attended schools in that country. On coming to the United States he did post graduate work at the University of California at Los Angeles. He was then employed by the firm of McLaughlin, Gormely & King, Inc., Minneapolis, Minnesota. Later in March, 1940, he came to Florida on the staff of the Kilgore Seed Company as an entomologist, and subsequently became manager of the Insecticide Division of that firm.

His service record includes the U. S. Army from July 18, 1942, to March 6, 1948, at which time he returned to his position with the Kilgore Seed Company. He served in the Coast Guard Reserve and was honorably discharged.


WILLIAM P. HUNTER