

ing nematode which plagued that industry a few years ago. In fact, this pest no longer is a major problem to that industry. There have been a multitude of problems corrected by changing to resistance rootstocks. Are there any rootstocks tolerant to the grape borer?

There are two fungus diseases that can damage or reduce the muscadine yields. They are black rot and bitter rot. Some years damage from fungus is very minor. These diseases can readily be controlled by a minimal spray program. Some growers consider spraying an added expense that is not worth the cost. I know several muscadine growers who do not own a spray machine. One of the best ways to reduce the disease problem is to plant varieties with the greatest resistance. This is not always possible.

What is the effect of spacing? The wide spacing of 20-30 years ago is obsolete. My original rows were planted on intervals of twenty feet. Today, we are at ten foot intervals. We have other questions such as, irrigation, and liquid fertilizers. How much is adequate, what is excessive? All these questions must be considered as all farming is going to have to become more intensive. In case someone here

has missed the last few years, land in Florida is expensive. We are forced to increase our productivity per acre just to survive.

We growers have our work cut out for us. In addition to growing more fruit, we must promote Florida grapes and their many uses, as well as foster more research so that we can cope with tomorrow's challenges.

There is no doubt in my mind that locally grown muscadines in many respects are equal to California or Northern grapes. In many ways muscadines are superior. We should be grateful that we can grow muscadines here and very successfully too.

In conclusion, the Florida grown muscadine grape have made only a slight dent in its overall potential. We are fast reaching the time when a vineyard along the side of a Florida road is no longer an oddity. A winery here and there will be the order of the day. All of this will come about from new and better production practices, new varieties, and confidence in Florida grapegrowing. I am proud to be in the company of Noah, Julius Caesar, Napoleon and Thomas Jefferson, they were grapegrowers too.

Proc. Fla. State Hort. Soc. 94:352-353. 1981.

IFAS EXTENSION INFORMATIONAL DELIVERY SYSTEM FOR GRAPES

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Additional index words. Extension program, training.

Abstract. Programs of the Florida Cooperative Extension Service (FCES) to disseminate technical information to Florida grape growers will be discussed. Extension program activities conducted include field days, workshops, grower meetings, demonstrations, Extension Agent training, publications, work with grape growers and other groups, and mass media presentations.

University of Florida IFAS Extension and research personnel historically have kept close ties with Florida grape growers by disseminating information to potential producers through field days, workshops, production talks, newsletters, publications, personal correspondence and mass media communication.

The Florida Grape Grower's Association (FGGA) was founded in 1923 and since that time has been closely associated with the Lake County Extension office and the IFAS Agricultural Research Center (ARC) near Leesburg. From 1923 to 1974, the FGGA was mainly active in Central Florida where the old bunch grape plantings were once located (1, 2). In 1974 the FGGA became a statewide organization, and the state Deciduous Fruit Extension Specialist of the Fruit Crops Department was asked to help expand the membership and to serve as secretary of FGGA. The FGGA expanded to serve all of Florida during the next 3 years and meetings were held in the western, northern and central areas of the state. When the FGGA had gained sufficient strength to support an elected secretary, the state Extension Specialist continued to serve the FGGA and the grape growers of Florida as a resource person. Many Ex-

tension activities are sponsored annually to support the Florida grape industry including field days, workshops, personal visits, publications, area meetings, demonstrations, mass media communications and Extension Agent training.

Field days and demonstrations. The FCES in cooperation with the IFAS ARC's with grape responsibilities have an active program for presenting grape information to the public in a series of field days and demonstrations. Field days are held at ARC, Ft. Pierce, ARC, Leesburg, and ARC Monticello. The meetings are characterized by a structured program where production talks are presented in a lecture fashion to attending growers. This is followed by a question and answer session and a tour of the grape planting on the site. During these tours, the grape varieties are observed and discussed (and sometimes tasted). Planting and training plus trellising are demonstrated as well as the many production practices such as irrigation, fertilization and pruning. This type of program provides a "hand-on" education where the audience has a chance to observe the production problems and how to solve them.

Field days and demonstrations are also held in various counties where grape products (jellies, preserves, juices, etc.) are displayed and various production problems are demonstrated or discussed.

County talks. Many County Extension programs include afternoon or evening programs on fruit production. An Extension specialist or researcher is usually requested at these meetings to present a structured talk. Discussions of production problems usually accompanied by slide presentations so that the audience can see pictures of the various insects and diseases as well as other problems that might confront grape growers are presented. These sessions are conducted with a question and answer session.

In-service training. County extension agents with grape responsibility are given extensive training in grape production and processing problems. This training covers insect and disease identification and control, economics, varieties, fertilization, pruning, trellising, training and many other

topics associated with grape production. In addition, some agents also are instructed in the best uses for the many different grape varieties whether these be wine, juice, jellies, fresh fruit or some other products.

Workshops. The art of winemaking is especially well suited to a workshop situation. The Food Science and Human Nutrition Department of IFAS has held one such workshop where participants first received formal training in wine production by lecture and were then led through the winemaking procedure from fruit crushing to tasting of the finished product. This program was well received and more are planned in the future.

Personal visits. Many personal visits to vineyards are made by county Extension personnel. Problems are discussed and solutions suggested. If the problem faced by the agent is complex, he may request consultation from the appropriate state Extension Specialist and when a site visit is necessary, it is planned so that the grower, agent and specialist are all present. In this way both grower and agent receive training.

Publications. Many different types of Extension publications are produced and disseminated for the Florida

grape industry. A grape newsletter for growers offers production information and the latest insect and disease control recommendations. Other materials available to growers are Fact Sheets, research reports, variety releases, copies of relevant articles in the Florida State Horticultural Society Proceedings and in many magazines and trade journal articles. Such publications will continue to be used to inform growers of advances in grape production and utilization.

Mass media. This has been a very effective means of dispersing information to the public. Newspapers, radio, and T.V. programs are used to discuss the many and varied aspects of grape production. This presents information to the consuming public and helps make them aware of the grape industry.

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Proc. Fla. State Hort. Soc. 94:353-355. 1981.

PERMETHRIN AS A CONTROL FOR THE PAPAYA FRUIT FLY^{1,2}

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Additional index words. *Toxotrypana curvicauda*.

Abstract. Dipping papaya fruit fly, *Toxotrypana curvicauda* Gerstaecker, adults in 0.01 lbs a.i. permethrin/100 gal water resulted in 100% mortality in less than a day. Adults were caged on papaya fruit which had been dipped in permethrin suspensions of 0.1, 0.2, and 0.4 lbs a.i./100 gal and air dried. After 24 hours mortality was 18, 45 and 65%, respectively, and was 55, 68 and 83% after 72 hours. There was no mortality of flies after 24 hours on untreated fruit and 18% after 72 hours. In a replicated experiment, where re-infestation of treated plots (64 plants each) probably influenced results, control averaged 64%. Control ranged from good to excellent in 3 large scale experiments in commercial plantings in which applications of 0.2 lbs a.i./A were made at 10-day intervals with an orchard air sprayer.

The papaya fruit fly, *Toxotrypana curvicauda* Gerstaecker, was first reported from Florida in 1914 by Knab and Yothers (3). They described the life stages of the insect, the damage it causes, and wrote that it "... presented a serious check to commercial development" of the papaya. Mason (5) described the life history of the papaya fruit fly, its habits and factors affecting its development and spread. Several writers have made suggestions for control of the papaya fruit fly ranging from use of DDT, sanitation and covering the fruit with paper bags (1, 2, 4). The materials and programs presently used to control the papaya fruit are

not very effective or practical on a commercial level. Part of the difficulty stems from the fact that eggs are deposited and larvae develop within the fruit cavity where they are protected from insecticides. Another aspect of the problem is that the sensitivity of papayas to many insecticides, particularly phosphatic insecticides limits the choice of materials that can be used for control of the papaya fruit fly. The effectiveness of permethrin as a control for many flies gave us the idea that it might be useful as a control for the papaya fruit fly. We report on the results obtained from experiments made to explore this possibility.

Materials and Methods

Laboratory Studies: To measure acute toxicity, adult (5 male and 5 female) papaya fruit flies were dipped in suspensions of several concentrations of permethrin. Treated flies and 10 flies as an untreated check were caged and examined 24 hours later. As a measure of residual activity, mature green papaya fruit about 6" in diameter were dipped in suspensions containing permethrin at rates of 0.1, 0.2 and 0.4 lbs ai/100 gal of water and air dried. Each treatment was replicated 4 times with each replicate consisting of 5 male and 5 female adults caged on a fruit. Mortality was recorded 24, 48 and 72 hrs later.

Field Studies. Field studies included one replicated experiment, conducted at AREC Homestead, and 3 large scale tests in commercial plantings. In all experiments, permethrin was used at the rate of 0.2 lb a.i./acre and applications were made at 10-day intervals. All sprays were applied with an orchard air sprayer. The replicated experiment compared 6 replications of sprayed and unsprayed plots. Each plot measured 48' x 60' and contained 4 rows of 16 plants each. Plots were separated from each other as far as possible (ranging from 300' to 1300') in order to minimize reinfestation of plots. Permethrin applications began on October 29 after the papaya fruit fly was established in most plots. Fruits were harvested weekly beginning on

¹Florida Agricultural Experiment Stations Journal Series No. 3386.

²This work was supported in part with funds provided by USDA/SEA Cooperative Agreement No. 58-7B30-9-116.