TEST WORK ON SOME SUB-TROPICAL FRUITS AND ORNAMENTAL PLANTS IN CONNECTION WITH THE MEDITERRANEAN FRUIT FLY

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Eradication of the second infestation of the Mediterranean fruit fly, *Ceratitis capitata* Wied., in Florida appears headed toward a successful conclusion. In view of a third or later infestation a record is made of some observations and tests that pertain to the fly. A brief summary is also given of some observations made on the fly infestations and secondary effects of poison bait sprays. It should be recorded, however, that no actual experiment was conducted by the Sub-Tropical Experiment Station using the fly. The objective of experimental work done was to develop measures or procedures whereby fruits and plants or plant stock might be moved from quarantined areas.

Fruit Fly Infestations. — A characteristic of the second Med-Fly infestation was the tendency of the pest for living in the urban or more heavily populated areas. The significance of this is not apparent, although one explanation might be that the fruit growing in these areas was more favorable to fly breeding than elsewhere. Fly larvae were found in many fruit although no attempt is made here to list the species nor to evaluate the different hosts. Discovery of the fly was made in grapefruit but oranges on an adjoining tree were not found infested. Infestations were common in the calamondin, *Citrus reticulata* Blanco x *Fortunella* sp. and Surinam-cherry, *Eugenia uniflora* L. Infestations in fruit in south Florida appeared to reach a peak of abundance, however, in ripening peaches. This occurred about two months after discovery of the fly and preceding the intensive poison bait spray applications. Peaches were so commonly infested in south Florida that but few of the late fruits escaped. Based on the infested fruit brought to the Sub-Tropical Experiment Station more peach trees exist and more people use their fruit than had been realized. Fly infestations in peaches extended the areas of known distribution to widespread areas. These infestations appeared to have occurred within but few days.

In consideration of the sudden and extensive infestations in peaches there were fears that continued and severe infestations of the Med-Fly would be found in mangos, guavas and other fruit that ripened later. Intensive eradication measures were started at about the time ripe peaches were no longer available. Owing to the eradication measures or other factors the fly population dropped rapidly; few Med-Fly larvae were found in mangos or guavas.

Secondary Effects of Poison Bait Sprays. — Honey bee colony weight changes were found unrelated to the poison sprays by Robinson and Kelsheimer (1957) and Wolfenbarger and Robinson (1957).

Severe infestations of the coconut scale, *Aspidiotus destructor* Sign., and Florida red scale, *Chrysomphalus aonidium* (Linn.)., on the coconut palm, *Cocos nucifera* L., along the lower southeastern Florida coast caused yellowing, browning, and death of fronds and received widespread notoriety. These infestations accompanied and followed the poison bait spray applications. Many people promptly blamed the Med-Fly sprays for causing these infestations. No tree, however, is known to have died from these scale infestations. Coconut palm fronds on Nassau, Bahamas, were seen to be about equal in appearance to those in Florida and since they had not received the poison bait sprays, the scale infestations were attributed to factors other than malathion bait sprays.

One beneficial effect of the spray was felt by south Florida residents. There are data which confirm the observations that mosquito bites were reduced by the widespread malathion sprays. A New Jersey-type mosquito light trap was run at the Sub-Tropical Experiment Station in cooperation with the Bureau of Entomology, Florida State Board of Health. Identifications and counts of the black salt-marsh mosquito, *Aedes taeniorhynchus* (Wied.), were made by the Bureau of Entomology and

these are gratefully acknowledged. Reductions in the numbers of the mosquito following each of three spray applications are summarized as follows:

Days after spray application	1	2	3	4	5	6	7	8	9
Av. No. mosquitoes/trap day	5	42	21	14	193	182	170	698	323

Sprays were applied to avocado trees to determine control of the avocado red mite, *Oligonychus yothersi* (McG.), infestations as affected by the malathion bait sprays. Three spray applications of the standard bait materials were made to trees of the Hickson variety at ten-day intervals as required for movement of fruit from the quarantined area. These applications were made November 30, December 10 and 20, during the period in which the mite usually becomes most abundant. Data taken January 7 showed significantly fewer mites on the sprayed than on the unsprayed leaves, showing mite control and at the same time showing no deleterious effect to the avocado leaves.

Avocado fruit were sprayed with malathion and parathion at different dilutions to determine residues. Actual amounts of 1, 6, and 13 pounds of parathion and of 2, 6, and 12 pounds of malathion were used, based on per acre units. Samples of fruit were picked 4, 24, and 72 hours after treatment and processed for analyzing the toxicant on the peel and in the flesh. The four-hour samples were analyzed by Dr. C. H. Van Middelem of the Florida Agricultural Experiment Stations. Except for the 1.42 p.p.m. from 13 pounds of parathion per acre results of all other analyses were 0.81 or less. Official FDA tolerances are 8 and 1 p.p.m., of malathion and parathion, respectively. Samples from the 24 and 72 hour periods, according to Dr. Van Middelem, ". . . . were not analyzed since the residues were so low in the 4 hour samples."

Fumigation of Avocados, Mangos, Papayas, and Pineapples. — Ten ounces (avoir.) of ethylene dibromide per 1000 cubic feet for an exposure of two hours was approved for treating mangos and pineapples for movement from the quarantined areas. Previous test work, however, had not shown the efficacy of such fumigation for avocados and papayas.

Experimental work was conducted with fumigation of avocados. This work showed differences were usually observed among large numbers of fumigated and unfumigated fruit—ferences were recognized only in the apparent but not between individual fruit. These diffrate of ripening as exhibited by softening, browning, blackening and final break-down of the fruit. Small, brownish colored spots developed on the fruit, blackened, enlarged, deepened and eventually the entire fruit was decayed. Wider differences between fumigated and unfumigated fruit appeared in a shorter length of time in warmer than in cooler temperatures. This may explain more apparent susceptibilty of early varieties of the avocado to injury from fumigation than late varieties. Further studies are needed, however, on varietal susceptibility and other factors. No evidence was obtained from tasting fumigated avocados that any off-flavor occurred. Fumigation of avocados with the above mentioned treatment is not generally recommended.

Reports were received from growers who fumigated and shipped papayas. According to these reports many fumigated fruit ripened and deteriorated much more rapidly than is usually experienced with unfumigated fruit.

Ethylene Dibromide Emulsion Dips for Avocados. — Avocado fruit of the Booth 7 and Lula varieties were used in ethylene dibromide emulsion dip treatments. These dip emulsions were 1:5000, 1:15,000 and 1:25,000 ethylene dibromide:water. There were 29 to 33 fruit in each lot and immersions were 1, 5, and 25 minutes of each concentration. Temperatures of the dips ranged between 22 and 23 degrees C. Storage of dipped and undipped fruit was at room temperature. Examinations of the fruit 6, 9, 13, and 16 days after dipping showed no important difference between the different treatments nor varieties. Dipped and undipped fruit ripened and began decomposition at the same rates. No off-flavor was detected in the dipped fruit. Although dipping of avocados may offer some promise from the viewpoint of practical application it is not known whether such treatments would or would not be toxic to fly larvae within the fruit.

Ethylene Dibromide Emulsion Dips for Nursery and Greenhouse Plants . — Ethylene dibromide is known as an effective soil fumigant and as a material that is very toxic to plant life. Methods of treating the soil in and

about the roots of nursery and greenhouse plants were tested, however, to determine the possible approval for the movement of such plants from the Med-fly quarantined areas. Emulsion formulations of ethylene dibromide were used as dips at concentrations of 1:15,000, 1:20,000 and 1:25,000. Tests showed that most kinds of plants could be treated at 1:15,000 without injury. Severe injuries and in some cases death occurred in grape ivy, *Cissus sp.*, lantana, *Lantana camara* L., and Mexican flame vine, *Senecio confusus* Britten at 1:15,000. A long list of plants (not given here) commonly grown in nurseries and greenhouses were uninjured by the emulsion at 1:15,000 and weaker.

A REPORT OF THE FLORIDA MANGO FORUM ACTIVITIES FOR 1957

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That the mango is becoming an increasingly important crop for South Florida was shown by George M. Talbott of the Florida Fruit and Vegetable Association at the Florida Mango Forum annual meeting. The number of trees planted between 1949 and 1954 increased in commercial plantings from 73,524 to 193,144, the latter figure representing about 4,800 acres. Many of the trees have come into production in the last few years and Mr. Talbott pointed out that commercial shipments of mango showed an increase approximately 200,000 pounds per year from 1953 through 1956. In 1957 it was two and a half times the average increase, from 1,422,400 pounds in 1956 to 1,973,600 pounds in 1957, an increase of over half a million pounds.

This increase in 1957 was a result of (1) heavy yields, especially on the trees of the lower east coast, (2) improved marketing conditions, and (3) lack of competition from Cuba. The conditions in southeastern Florida necessary for producing a good mango bloom and a good initial fruit set were experienced. The mango bloom was one of the heaviest ever experienced, and the percentage of perfect flowers in most varieties was unusually high. Initial fruit set was also high and although the crop was somewhat reduced by spring winds, nevertheless the crop that was harvested was very heavy. Fortunately this year we had no trouble with cold weather, the Mediterranean fruit fly, nor with extremely high spring winds. Unusual warm weather in the winter months and adequate rainfall from February on were not only factors favorable for heavy fruit set, but they also caused the crop to mature two to four weeks early.

The Florida Mango Forum had its beginning in 1938 and it was formally organized in 1946. The objectives of the Forum are "the advancement and development of the mango in Florida." To meet these objectives, the Mango Forum carried on a number of activities this year. The most important one was the 17th Annual Mango Festival. This was held in Homestead, June 11 and 12, and it was the first time the Show was held in South Dade County. Field trips were made to the University of Miami Experimental Farm and the University of Florida Sub-Tropical Experiment Station to see the work being done by these institutions on mango and other tropical fruits. The Fellowship dinner was well attended; Mr. George Cooper served as toastmaster and Dr. Paul Harding talked on marketing. During the Festival, held in the Homestead Armory, talks were given by Dr. G. D. Ruehle on control of diseases, Dr. D. O. Wolfenbarger on control of insects; Dr. R. B. Ledin on mango varieties, Roy Nelson on grafting, William Carmichael on marketing for the small grower, Douglas Knapp on growing mangos in the backyard, and C. E. Shepherd on the Mediterranean fruit fly.

The Variety Committee displayed over 100 varieties of mangos, many of them new seedlings. The Educational Committee set up exhibits featuring grafting techniques, insects and fungus diseases, equipment used for testing mango maturity, mango products, and