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PACKINGHOUSE NEWSLETTER

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MEDITERRANEAN FRUIT FLY, FUMIGATION AND QUARANTINE: PART I

On August 4, 1981, 3 Mediterranean fruit flies (Medfly) (*Ceratitis capitata*) were trapped in Hillsborough County, Florida. Since that date, one Medfly has been trapped at each of 2 other locations, approximately 2 miles from the original site. The area involved is on the north end of Hillsborough Bay. A regulated (quarantined) area of approximately 60 sq. miles has been established from which movement of host fruit and soil is restricted. The original find, and approximately 1-1/2 miles in every direction from that find, was sprayed on Tuesday, August 10. As each additional catch was made, the area was extended to include approximately 1-1/2 miles from the center of that new infestation. The last Medfly catch was on August 14. Plans are to apply bait sprays at 7-day intervals for 56 days following the last fly find. The quarantine will be in effect for 90 days after eradication treatments are completed.

The most important part of any eradication program is survey for the purpose of delimiting the infestation and measuring the efficacy of the treatment. With Medfly, we have a very good tool for this purpose. Trimedlure is a sex lure (pheromone) that attracts the male fly. It has been in use since the Medfly campaign of 1957 and has proven itself to be very effective. The day following the Tampa find, efforts were begun to increase trap densities in Hillsborough and the surrounding counties. For example, the number of traps in Hillsborough County has been increased from 1,346 traps when the first fly was found to 8,689 traps by August 31, 1981. In addition to increasing the number of traps, the frequency of inspection was increased from once every 3 weeks to an inspection schedule of 1 day to 2 week intervals depending on the proximity to the infested area.

Prior to the Medfly discovery in Hillsborough County, more than 12,000 traps were already employed in Florida. Trap densities were based on several factors, including:

1. Proximity to an introduction point such as ports of entry, produce warehouses, farmers markets, etc.
2. Prevalence of host plants in the area. For example, many hosts in Dade County are not found in Orange County. Abundance of fruiting host plants increases the chance of survival when an introduction occurs.
3. Type of residency in a given area. For example, upper middle-class areas and areas where ship and aircraft crews reside, would be more frequently subjected to host importation than areas where people live who may not have the income to travel abroad, or a job that requires foreign travel.

4. It was also evident during past Medfly campaigns that infestations seemed to be spread along main highway routes branching out from infested areas. For this reason, all primary and secondary roads are trapped at 1 trap per 2 linear miles. All interstate highways are trapped at exchanges and rest stops.

The eradication treatment now being applied is a malathion bait spray. Its extreme effectiveness lies in the ability of the protein hydrolyzate bait to attract Medfly adults. The natural food of the adult Medfly is "honeydew" secreted by aphids, scale insects, whitefly, and other insects. The protein hydrolyzate simulates this natural food. The bait formulation is 2.4 liquid ounces of technical malathion and 9.6 ounces of protein hydrolyzate per acre.

Florida's Medfly program is based on early detection through a good trapping program and through rapid action following detection. Early detection allows control and eradication measures to be implemented before the introduced pest has time to become more widely spread. The success of this program is borne out by the history of Medfly eradication campaigns in Florida.

Florida agriculture has weathered 4 successful Mediterranean fruit fly infestations: 1929, 1956-57, 1962-63, and 1963. Eradication was successful and substantial savings of funds and effort were realized when the pest was detected early. The 1929 infestation involved 20 counties and was eradicated by late 1930--at a cost of \$7,500,000. The 1956 infestation included south and central Florida (28 counties) and was eradicated at a cost of approximately \$11 million. The third Medfly infestation was discovered in Miami--June 8, 1962. The eradication campaign which involved 3 counties (Dade, Broward, and Palm Beach) required 11 months and cost of nearly \$1 million.

Methods used in the 1962-63 and 1963 campaigns were basically identical to those employed in the successful 1956 campaign. The main effort in this program was aerial spraying over infested areas with 1.2 lbs of 25% malathion and 1 pint of "sauce bait" (protein hydrolosate) with enough water to make 1 gallon applied at a rate of 1 gallon per acre at 7-day intervals for a minimum of 56 fly-free days.

The Florida Department of Agriculture and Consumer Services, Division of Plant Industry, believes the present effort to eradicate the Medfly will be as successful as those in the past. We can see no reason to believe otherwise.

Ethylene Dibromide (EDB) is the fumigant used to treat citrus fruit to meet quarantine requirements for fruit flies.

1. Properties. EDB ($\text{CH}_2\text{BrCH}_2\text{Br}$) is a colorless, heavy liquid, with a chloroform-like odor. EDB is only slightly soluble in water, boils at 269°F, (131.6°C) is nonflammable, and is chemically stable. At 77°F (25°C), 1 lb of EDB has a volume of 209 ml. When cooled below 50°F (10°C) crystals (freezing) may develop. Should crystals develop, the EDB should be warmed, but gradually under low heat to prevent volatilization. The maximum concentration as a vapor at 68°F (20°C) is 7 lbs per 1,000 cu. ft (112 grams per cu. meter). For quarantine fumigation treatments a purity of at least 97% is required. The specific gravity of 97-100% EDB ranges from 2.15-2.10 at temperatures near 75-79°F (23.9-26.1°C) and is determined by a hydrometer.

2. Safety. EDB is readily absorbed via the lungs, through the skin, and the gastrointestinal tract. Irritation to eyes and respiratory tract, central nervous system depression, headache, excitement, severe vomiting, marked weakness, tinnitus, pallor, and vertigo are symptoms of exposure.

- a. Emergency aid. Artificial respiration, oxygen if available.
- b. Medical treatment. Symptomatic - oxygen, watch for pulmonary edema, lavage if swallowed.

3. Leak detection. The halide leak detector is used to detect low concentrations of EDB during and after fumigations. Detector tubes are used, especially afterwards, to determine freedom from EDB desorbing from exposed surfaces. Special units are available for determining concentrations and distribution of EDB within enclosures, although they are not presently recommended for field use.

4. Fumigation application. Since EDB is a liquid at fumigation temperatures, heat must be applied to induce volatilization. The proper dose is dispensed through a closed system into the vaporization chamber. Volatilization is monitored through a gastight window and is complete within 15-30 minutes from initiation of boiling. The 2 hour exposure period begins from the time vaporization is complete. Circulation equipment must be in operation prior to start of vaporization and must continue throughout the exposure and aeration periods. Aeration is for at least 1 hour.

5. Residual effect. EDB desorbs slowly over a long period. Following fumigation, storage of commodities in a well ventilated area (or in a well ventilated truck) is essential before refrigeration. Citrus fruit may be severely injured if placed under refrigeration before fumigation or before desorption is essentially completed.

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Part II of the above article will be featured in Packinghouse Newsletter No. 122

Editor

EXPORT SEMINAR

The Florida State Horticultural Society is sponsoring a symposium

"Citrus Exports from Florida"

November 5, 1981--1:10 PM, The Dutch Inn, Lake Buena Vista Florida

The symposium will cover the following topics:

- Exports and Grower Returns--Dan Gunter
- Exports to the Pacific Basin--Don Lins
- Harvesting for Export--W. Grierson
- Innovations in Waxing--David Hall
- Shipping Grapefruit to Distant Markets--Phil Hale
- Exports to Europe--Howard Connolly
- Competition from Brazil--Jim Ellis
- Packinghouse Operations--W. Wardowski
- Fumigation for Export--Mohamed Ismail

AVAILABLE PUBLICATIONS

Available from Dr. W. Wardowski, AREC, 700 Expt. Stn. Rd., Lake Alfred, FL 33850

"The Mediterranean Fruit Fly" by J. L. Knapp. Univ. of Florida, Cooperative Extension Service, ENT-54. 4 pages.

"Disposition and Air Dispersal of Ethylene Dibromide from Fumigated Citrus" by W. M. Miller, M. A. Ismail, and J. O. Craig. TRANSACTIONS ASAE, 24(4):1050-1053, 1057. 1981.

"Twentieth Annual Citrus Packinghouse Day" by W. F. Wardowski (ed.). (Program)

"Retail Trade in Florida Grapefruit in Japan" by H. Kitagawa, T. Kubo, T. Kusanagi, and K. Kawada. Proc. Fla. State Hort. Soc. 93:327-331. 1980.

Available from Dr. Mark Sherman, Vegetable Crops Dept., 1217 HS/PP Building, Univ. of Florida, Gainesville, FL 32611

"Handling Florida Vegetables" by M. Sherman (ed.). Special issue devoted exclusively to Mediterranean Fruit Fly. Handling Florida Vegetables 81-3. Sept. 9, 1981.

"Water Chlorination for Vegetable Packinghouses" by J. R. Hicks and R. H. Segall. Florida Cooperative Extension Service. Vegetable Crops Fact Sheet VC-1. 2 pages.

"Tomato Packinghouse Dump Tank Sanitation" by M. Sherman, R. K. Showalter, J. R. Bartz, and G. W. Simone. Florida Cooperative Extension Service. Vegetable Crops Fact Sheet VC-31. 4 pages.

Available from David J. Hall, Agri-Chem, Inc., P.O. Box 17477, Orlando, FL 32860

"Comparative Fungicidal Activity of Benomyl and Its Breakdown Product Methyl 2-Benzimidazolecarbamate (MBC) on Citrus" by D.J. Hall. Proc. Fla. State Hort. Soc. 93:341-344. 1980.

Available from Dr. Robert Kasmire, Extension Vegetable Marketing Specialist, Department of Vegetable Crops, Mann Laboratory, University of California, Davis, CA 95616

"Little Difference in Sizes, Big Difference in Benefits...Modular vs. Present Shipping Containers" by R. F. Kasmire. United Newswire (ISSN: 0194-763X), May 18, 1981.

Available from Dr. Gilbert Sindelar, Horticultural & Tropical Products Division, Foreign Agricultural Service, USDA, Washington, DC 20250

"Citrus in Mexico" by E. Missiaen. USDA, Foreign Agricultural Service FAS-M-299.

This newsletter is published at a cost of \$110.67 or 9 cents per copy, to give the latest news to the packinghouse industry.

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