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Bureau of Entomology and Plant Quarantine

University of California

Hawaii Agricultural Experiment Station

Territorial Board of Agriculture and Forestry

Pineapple Research Institute

Hawaiian Sugar Planters' Association Experiment Station

ORIENTAL FRUIT FLY INVESTIGATIONS

QUARTERLY REPORT

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ORIENTAL FRUIT FLY INVESTIGATIONS

COOPERATIVE QUARTERLY REPORT

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The third quarterly report of the Cooperative Oriental Fruit Fly Investigations is presented herewith, and following the procedure of the last quarterly report includes the reports of all the cooperating agencies. Material progress can be recorded in all fields.

Biological Control: The reports from the foreign explorers show how thoroughly the tropical areas are being covered. The records of research of material from these explorations give some indication of the enormous number of fruit fly puparia and individual parasites which have been handled for the period. In addition to reception and quarantine approximately 153 breeding tests have been made with these introductions. The staff of the Territorial Board has conducted the propagations for release and is at present actively propagating 8 separate species colonies. Particular attention should be called to the detailed studies on the mass production of fruit flies being undertaken by the University of California and to the comprehensive data on parasite establishment and spread from the Hawaii Agricultural Experiment Station. Progress on the development of techniques for the study of the evaluation of the effectiveness of natural enemies is also recorded in the section from the H.A.E.S.

Chemical Control records progress for the development of soil toxicants with lindane at 10 lbs. (toxicant) per acre appearing promising. Some materials tried were selective in their action, killing parasitized larvae. The finding that diet (MRT) renders flies resistant to DDT when compared with flies fed on other diets is one which will be of general interest. The final report on the comparative tests of hand and automatic aerosol equipment is included in this report. The work with male lures has continued to be of great interest. More than 2,000,000 male flies were trapped during the quarter with methyl eugenol and related compounds in approximately 30 glass and 50 box traps. A native shrub, mokihana (Pelea anisata) appears to contain a very powerful male lure which is apparently not methyl eugenol. The use of methyl eugenol should increase the effectiveness of California trapping operations at least ten times. An olfactometer for Dacus dorsalis has been designed and proved to be highly efficient in testing lures.

Area Control: Airplane application of DDT emulsion over narrow gulches are only partially effective, but in spite of many adverse factors there was a reduction of 87% in both gravid females and larvae, attributable to the DDT treatments applied during the guava ripening period. DDT fog sprays showed considerable promise, although improvements will have to be made both in insecticides and formulations used. Treatment of a village on the windward side of Oahu with DDT dilute sprays resulted in a 98% control during the first week of treatment and 98.4 during the second. Fly movement studies have involved the marking of 41,100 flies and showed that marked flies moved in all directions, although of the flies released 1.84 percent were recovered in the areas of liberation and 0.1 percent were recovered outside. Parathion is an excellent space spray against the adult fly and if public health considerations could be satisfied would undoubtedly prove of very great importance in the gross overall treatment of infested areas.

Ecology-Biology: The effect of the prolonged rainy weather over a greater part of the islands during the quarter may be considerable since it is indicated from the studies on Maui and Hawaii that protection from wind and rain are important factors in reducing mortality in outdoor cages. Temperatures between 60-80° F. appear to be optimum, but below 40° F. mortality is very high. The pupal period appears to be very susceptible to temperature changes. Low temperature greatly increases the mortality and the adult emergence span, but some emergence occurs up to 60 days. It seems very likely that the fly could carry over in many areas on a very much reduced scale of activity until more favorable conditions occurred. In the testing of fruit as fruit fly food, great variation has been found, i.e., flies die rapidly if kept on avocado, but will live for considerable time on apple. Of the California fruit tested Rhapiolepsis surpassed all others as a food for the fruit fly. 1074 separate lots of fruit have been used in this test. At the end of March the host list had risen to 124. There is still a great deal to be done in the evaluation of these hosts, but one important study on the Vanda Joaquim flower has demonstrated conclusively that the commercial flower is not a host in a critical definition of the word, and the treatment required for Vandas has therefore been lifted. This incident has clearly pointed to the great desirability of research and quarantine activities being closely coordinated, and it has also shown that quarantine officials will act quickly and effectively on the basis of adequate research data.

Commodity Treatments: Thermocouples are indicated as more desirable for the taking of temperatures in treated commodities than resistant thermometers, and it is going to be highly desirable to have vapor heat rooms equipped with recording devices. If mixed commodities are handled in the same room at the same time, it is essential that temperatures be taken in each commodity. The methods of packing and stacking fruits in vapor heat rooms are important factors in the rate of heat transfer. A good beginning has been made with low-temperature studies and for commodities that will tolerate fairly long periods of low temperature there is considerable promise in this method. Methyl bromide fumigation of a number of commodities now treated with vapor heat gives promise of substitution of this first-named method if it is confirmed and indicated from

the standpoint of tolerance. Radiation with gamma rays gives some very interesting results, but these are expressed as aborted adults. The development of this method would, therefore, be expected to pose some difficult quarantine problems. Attention is directed to the detailed reports from the University of California Division of Truck Crops and Division of Deciduous Fruits dealing with the studies of tolerance of various California commodities to commodity treatments.

Walter Carter, Director
Oriental Fruit Fly Investigations

Honolulu, T. H.
June 1, 1950

PERSONNEL CHART
ORIENTAL FRUIT FLY INVESTIGATIONS
March 1950

HEADQUARTERS, HONOLULU

Walter Carter	Director	Unallocc.
W. S. Edwards	Adm. Assist.	GS 11
E. C. Olsen	Adm. Assist.	GS 7
L.M. Dietz	Secretary	GS 5
K. Oshikata	Stenographer	GS 3
S. Higa	Stenographer	GS 2
S. Yonamine	Messenger	CPC 3
H. T. Sugawara L/A	Laborer	$1.00 hr.

COMMODITY TREATMENTS PROJECT

HONOLULU

J. W. Balock	Proj. Lead.	GS 12
H. Nakata	Biol. Aide	" 4
H. I. Sakamoto	Biol. Aide	" 3
C. Y. L. Lee	Biol. Aide	" 1
A. Miyashita	Sc. Aide	" 1
T. T. Kozuma	Sc. Aide	" 1
F. Hatanaka	Sc. Aide	" 1
F.N. Wilkinson L/A	Sc. Aide	" 1
R. T. Kiyona	" Laborer	$1.00 hr.
R. Y. Okamoto	" "	"

AREA CONTROL PROJECT

HONOLULU

C. F. Henderson	Proj. Lead.	GS 12
C. Gammon	Entomologist	" 11
L. S. C. Kang	Sc. Aide	" 3
J. K. Ajifu	Biol. Aide	" 1
K. Tomei L/A	Sc. Aide	" 1
R. K. Kawabata	Sc. Aide	" 1
R. B. Tomas L/A	Laborer	$1.00 hr
4 Laborers	WAE	"

LANAI

K. Keiser	Entomologist	GS 9
R. K. S. Lee	Sc. Aide	" 1
M. Fukushi L/A	Sc. Aide	" 1

ECOLOGY-BIOLOGY PROJECT

MAUI

K. L. Maehler	Proj. Lead.	GS 12
R. Y. Miyabara	Sc. Aide	" 1
W. M. Tavares	Sc. Aide	" 1
G. Furtado	Sc. Aide	" 1

HILO, HAWAII

C. J. Davis	Entomologist	" 9
S. Nakagawa	Sc. Aide	" 3
G. S. Farias L/A	Sc. Aide	" 1
E. A. Vieira L/A	Sc. Aide	" 1

HONOLULU

N. E. Flitters	Entomologist	" 11
M. C. Wagner	Biol. Aide	" 3
G. K. Sadoyama	Biol. Aide	" 3
H. H. Feikert, Jr.	Sc. Aide	" 1

CHEMICAL CONTROL PROJECT

HONOLULU

L. F. Steiner	Proj. Lead	GS 12
F. G. Hinman	Entomologist	" 11
P. L. Gow	Chemist	" 9
O. O. Stout	Plt. Quar. Insp.	" 9
A. F. Tanada	Chemist	" 5
J. R. Holloway	Biol. Aide	" 2
R. C. Nakamura	Sc. Aide	" 1
E. Craddock	Sc. Aide	" 1
D. H. Hayashi	Sc. Aide	" 1
I. Tomikawa L/A	Sc. Aide WAE	" 1
D. E. P. Goo L/A	Laborer	$1.00 hr.

BIOLOGICAL CONTROL PROJECT

HONOLULU

D. W. Clancy	Project Lead.	GS 12
P. E. Marucci	Entomologist	" 9
E. Dresner	Entomologist	" 7
B. L. Pelot	Taxonomist	" 5
S. Shimono	Sc. Aide	" 3