

Fruit Fly War May Be Long

Entomology

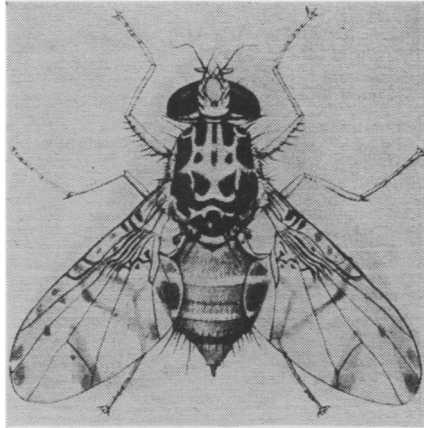
War to the knife is to be looked for in the area in Florida where the Mediterranean fruit fly has recently been discovered. Unless surveys now under way show the insect's distribution to be already too wide to make it practicable, the pest will be combated by the method used successfully a few years ago against the citrus canker in the same state—radical and ruthless destruction of every fruit and vegetable the fly can breed on, resulting in sheer race starvation. This method of protection against pests and diseases from abroad is practicable only where the infected area is not too great and where strict precautions can be maintained against new introductions. The defensive war against hoof and mouth disease in cattle has made the principle of the method familiar to the public.

The area on which the insects are known to be present comprises only about 40 square miles, but four counties and a part of a fifth have been placed under quarantine. The quarantine applies not only to citrus fruits but to all other products capable of harboring the Mediterranean fruit fly. Possible host plants make up a list of over fifty items, but Dr. Rohwer pointed out that not all of these are likely to be involved in shipments from the three counties at the present time.

The total number of bearing citrus trees of all kinds in Seminole County, according to the Florida state department of agriculture, is 314,398. In Orange County the total is 1,638,487, and in Lake County 1,251,890. For the entire state the total approaches 18 millions. Last year's value of the 14-million-box pack is over \$33,000,000. A preliminary estimate sets this year's Florida citrus-fruit crop at 20,000,000 boxes.

The Mediterranean fruit fly is not content with an exclusive diet of citrus fruit, but feeds on and breeds in a large number of other fruits and many vegetable crops. Florida's annual total of fruit and truck crops, including citrus fruits, now runs well over \$125,000,000. Vigorous measures for the saving of an industry of this magnitude are therefore regarded as well justified.

The Mediterranean fruit fly is a most cosmopolitan pest, and is known and hated in many lands. Though this is its first invasion of the continental



THE MEDITERRANEAN FRUIT FLY, as drawn by a U. S. Department of Agriculture artist, enlarged about six times. The insect is about the size of an ordinary house fly

United States, it has raided fruit under the American flag before, for it has been a serious liability to Hawaiian horticulturists ever since 1910.

It has been known to science for about 100 years, according to workers of the U. S. Department of Agriculture. It first attracted attention in London, where oranges arriving from the Azores were found to be badly decayed and wormy. It was recorded as a pest in Spain in 1842, in Algeria in 1858, in Italy in 1863, in Sicily in 1878, and in Tunis in 1885. In 1889 it was first reported from South Africa, Western Australia became acquainted with it in 1897, eastern Australia a year later. At the turn of the century it was found near Paris, in New Zealand and in Brazil. During the next fifteen years it spread into Africa and Madagascar. The United States has escaped a visitation thus far partly by virtue of our good fortune of isolation but mostly because of the unceasing vigilance of Bureau of Entomology inspectors.

The insect is a fly, about the size and shape of an ordinary housefly but differently marked. As a matter of fact, if it were not so extraordinarily destructive, it would be regarded as a rather attractive-looking creature. It is cleanly in its habits, living solely on plant juices and on the "honeydew" secreted by certain other insects.

It is the fruit fly's larva, or grub, that is the mischief maker. The adult bores a hole in the skin of a fruit or vegetable with its egg-laying ap-

paratus, and in this pocket deposits from one to six eggs. Sometimes several flies will lay their eggs in the same hole, accumulating as many as a hundred of the tiny white objects. Since a single fruit may be punctured in many places, the damage done is considerable.

On hatching, the larvae eat greedily and grow rapidly. At first hardly visible to the naked eye, they increase in size until the ruined fruit is obviously and disgustingly "maggoty." After resting for a time as pupae, the insects emerge full grown and ready to repeat the cycle. The generation of a Mediterranean fruit-fly, from egg to adult, is a span of from about half a month to a little over a month, depending on the weather.

The weak point in the fly's life-cycle, at which it can be most successfully attacked, is its adult stage, especially the few days it spends flying about and feeding before it settles down to egg laying. It is susceptible to poison dusts, like calcium arsenate, such as are used against the cotton boll weevil and many other insect pests. One difficulty arises, however, in using such dusts against the fly on citrus fruits. For some obscure physiological reason, citrus fruits are hampered in their sugar-storing processes by arsenic dusts, and fruit so protected arouses complaint that it is not sweet enough. If the Mediterranean fruit fly becomes established in spite of all efforts against it, some other chemical warfare method will have to be used against it by the orange and grape-fruit growers.

Like almost all insects, the fly has its natural enemies. Four minute wasp-like insects that parasitize it have been introduced in Hawaii, and although they are not expected to wipe it out they are recognized as useful auxiliaries in man's warfare against the pest.

The Mediterranean fruit fly that has invaded the Florida fruit and truck country is an undesirable alien and all good Americans stand and applaud the efforts of U. S. Department of Agriculture and Florida State scientists and officers to oust him. But according to Dr. A. L. Quaintance of the Bureau of Entomology, we have some 100 per cent. American fruit flies of our own, of whose activities we have no right to be a bit proud. As a matter of (Turn to next page)

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fact, federal and state entomological workers combat them as furiously as though they were outside a quota and were trying to slip past the gate.

There is a cherry fruit fly and an apple fruit fly, a fruit fly that plagues currants and gooseberries, and a whole ill cousinship of them. The apple fruit fly is at present making a good deal of a nuisance of itself in commercial blueberry plantations, and is having to be fought with arsenate dusts spread by the most approved chemical warfare methods. It does not do much damage to commercial apple orchards, because the sprayings they regularly receive against the much worst pest, the codling moth, wipes out the fruit fly as an incident of the battle.

A Rio Grande patrol, not by soldiers but by entomologists, guards the United States against an enemy more to be dreaded than any number of dusky bandits or insurrectos. For the Mexican fruit fly, a close relative of the Mediterranean fruit fly, is quite as evil a customer as its old-world relative and quite as little to be desired as an immigrant.

The corps of American entomologists who maintain this "Wacht am Rio Grande" have one advantage over the Army. There is no objection to their crossing the border; on the contrary they are welcomed by the Mexican authorities, and they maintain a laboratory in the Mexican capital.

The principal center of the border guard against the Mexican fruit fly is at Brownsville, but the entomological scouts range the whole border. In addition to the U. S. Federal workers, the very much interested state of California annually sends an entomologist into Mexico to look over the fruit fly situation.

This Watch on the Rio Grande is nowhere as costly as a military guard, though it probably prevents a great deal more damage. The annual appropriation for entomological investigation is usually between \$20,000 and \$25,000, and the cost of maintaining the quarantine runs about \$100,000 a year.

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Florida and U. S. Cooperate

Entomology

The State of Florida and the U. S. Department of Agriculture, through its bureau of entomology, will be close allies in the impending war of eradication against the Mediterranean fruit fly, the destructive alien pest that



DR. C. L. MARLATT, chief of the Bureau of Entomology, U. S. Department of Agriculture, field-marshal over the scientific army that holds invading insect pests at bay

has invaded Florida citrus groves in the vicinity of Orlando. This was announced to Science Service by Dr. C. L. Marlatt, chief of the bureau of entomology.

The alliance is like the association of the defending armies in the late war, in that a single officer has been appointed to the command of the joint forces. This is Dr. Wilmon Newell, of Gainesville, plant commissioner of the Florida State Plant Board, dean of the state agricultural college and director of the state experiment station.

The war is to be one of absolute eradication, Dr. Marlatt emphasized. It will involve the complete destruction of all fruit in the area known to be infested, though the trees themselves will not have to be destroyed. Useless trees, however, such as grow in neglected back yards or straggle in real estate subdivisions that were once orchards but are not now cultivated, will be given to the ax.

As yet no estimate has been prepared of either the cost of the campaign or of the amount of fruit that will have to be destroyed. The fight is in its first emergency stages, and funds on hand for emergency purposes are being used by both state and federal authorities. Many members of congress have expressed an anxious

interest in the situation, and a special appropriation will probably be proposed. Its amount, however, has not yet been determined.

"We all have a full appreciation of the gravity of the situation, but there is no occasion for or evidence of panic."

Thus J. H. Montgomery, assistant plant commissioner of the Florida State Plant Board, summed up the Mediterranean fruit fly situation as seen by Florida scientists and agricultural administrators.

"The fly was discovered in Orlando," Mr. Montgomery said. "It is still confined to the vicinity of that city, and at no place is more than six miles away. The state quarantine covers a much wider territory, however. It applies to all fruits and vegetables which might harbor the fly's eggs and thereby increase its spread.

"This state quarantine is designed to safeguard not only the rest of Florida but other states as well.

"There are now fifty state and ten federal inspectors at work, and the joint state and federal funds now available take care of the immediate situation. There is no thought in the minds of either the officials or the public except complete eradication of the pest."

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Strange Changelings

Entomology

E. G. REINHARDT, in *The Witchery of Wasps* (Century):

There is a curious belief common in China and India concerning a species of mud-wasp which builds its clay nests in houses and stores the cells with caterpillars. The early observers never suspected that the caterpillars were placed there as food for a larva which would hatch from an egg deposited in the cell by the mother wasp. With characteristic Oriental mysticism they thought that the wasp had adopted a caterpillar for its child, which by appropriate incantations it would magically transform into a wasp. The story goes that the foster-parent would select a caterpillar, carefully install it in a clay nest, and, while plastering up the opening, would hum a mysterious chant over it. This song would start a slow transformation in the caterpillar. In the silent grave throughout the winter the marvelous transformation would continue, and in the spring a perfect winged wasp would emerge!

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