

INFESTATIONS OF *ANASTREPHA SUSPENS*A¹
IN FRUIT ON KEY WEST, FLORIDA
AND ADJACENT ISLANDS²

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ABSTRACT

Random samples of fresh fallen or ripe-picked fruits in the lower Florida keys were collected weekly and held to determine the presence of larvae of the Caribbean fruit fly, *Anastrepha suspensa* (Loew). Of the 37 species of fruit sampled during a 12-month period (1970-71), 20 were found infested. A total of 32,215 fruits produced 45,286 larvae. The 2 hosts that contributed most to the fly population were *Psidium guajava* L. (mean of 165 larvae/kg) and *Terminalia catappa* L. (90 larvae/kg). *Eriobotrya japonica* (Thunb.) Lindl, *Eugenia uniflora* L., and *Achras zapota* L. were the next most important hosts.

For 1 year prior to and including the early months of a sterile fly release experiment on Key West, Fla. and adjacent islands in 1970 and 1971, we sampled fruit-bearing vegetation to determine the number of larvae of the Caribbean fruit fly, *Anastrepha suspensa* (Loew), in host fruits, the rates of infestation, and the seasonal variation in infestations. Previous surveys by Stone (1942) and a cooperative survey by the USDA, PPD, and Fla. Dep. of Agr., Division of Plant Industry (1967) had listed infestations in field-occurring and experimental plants, but no attempt was made to determine seasonal variations in the population of this species within its natural hosts or the capability of the specific hosts to support the insect.

During the period of our study, we took weekly samples of bearing plants that were either known hosts or considered by us as potential hosts to determine whether they contained larvae of *A. suspensa* and, if so, how many. Because of the subtropical climate of the area, some of the species are capable of producing fruit all year; other types fruit for only a short time. Thus some fruits were collected in greater quantity and frequency than others.

MATERIALS AND METHODS

Key West is an irregularly shaped island ca. 1 mile wide and 5 miles long. Fruit collections were made on Key West, Stock Island, Raccoon Key, and Sigsbee Park. Since there are no commercial fruit plantings on these islands, we made all collections from "dooryard", ornamental, or shade-type vegetation. A sample was taken at random from ripe fruit on the plant or on the ground or from both.

The number of fruit in a sample was limited by the number of fruit available, by the size of the holding tray, and by the need to avoid a depth of more than 2 fruit. Hence, collections could range from 3 or 4 papaya to several

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hundred governor's plums. We did not attempt to dissect or to hold fruit individually since our previous examinations of individual fruit showed that uninfested and heavily infested fruits occur on the same trees; thus, large numbers are required to obtain reliable estimates of infestations.

The containers used to hold the fruit were fiberglass boxes (45 × 30 × 15 cm) with lids. Three 6-cm holes were bored in opposing sides of the boxes to provide ventilation; these were covered with a 32-mesh Saran™ screening. The fruit was held 5 cm above the base of the box on a 1/4-in. mesh hardware-cloth platform. The bottom of the box was covered to a depth of 1 cm with sand sieved to a 12-mesh screen size. Emerging larvae dropped from the fruit through the hardware cloth onto the sand. There, the larvae pupated on or in the sand. Once a week, the sand was removed from the box and washed through a 12-mesh sieve (the pupae and larvae were retained by the sieve). Clean sand was added to the box, and the fruit replaced. The fruit samples were discarded after 2 successive negative sievings, after the fruit became too liquified or too dry (in our opinion) to produce more larvae, or after examination of each fruit revealed no larvae.

The pupae and larvae collected in the sieve were counted, placed in plastic vials (3 × 5 cm) containing damp vermiculite, and covered with a cheesecloth lid. The vials were retained until adult eclosion was complete. Then the species were verified, and the sex was recorded.

RESULTS AND DISCUSSION

Thirty-seven species of fruit-bearing plants were examined for *A. suspensa* infestation. Of these, 20 species were found to support immature stages of the fruit fly. A total of 32, 215 fruits, weighing 563 kg, yielded 45,286 *A. suspensa* larvae. Those hosts which supported a mean infestation of more than 15 larvae/kg fruit are listed in Table 1. There were another 10 minor hosts of infrequent and low infestation. These were egg fruit, *Pouteria campechiana* (HBK) Baehni; natal plum, *Carissa grandiflora* (E. Mufr.) A. DC.; peach, *Prunus persica* L. (Batsch); cocoa plum, *Chrysobalanus icaco* L.; satin leaf, *Chrysophyllum oliviforme* L.; lime, *Citrus aurantifolia* (Christm.) Swingle; mango, *Mangifera indica* L.; sea grape, *Coccoloba uvifera* (L.) L.; date palm, *Phoenix dactylifera* L., and sugar apple, *Annona squamosa* L.

The fruit-bearing plants sampled but negative for fruit fly infestation were: *Annona reticulata* L., *Bourreria revoluta* (HBK) O. E. Schulz, *Cap-sicum frutescens* L., var. *grossum* Sendt., *Carica papaya* L., *Cestrum nocturnum* L., *Citrus aurantium* L., *Citrus sinensis* (L.) Osbeck, *Cordia lutea* Lam., *Cordia sebestena* L., *Eugenia cumini* (L.) Druce, *Ficus lyrata* Warb., *Ficus glomerata* Roxb., *Ixora coccinea* L., *Mimusops emarginata* (L.) Britt., *Muntingia calabura* L., *Ochrosia eliptica* Labill., and *Triphasia trifolia* (Burm. f.) P. Wils.

Because guava produced fruit year-round and tropical almond had fruit most of the year, it is difficult to see any movement of the fly population from host to host as fruiting ends in one host and begins in another. The main population is apparently maintained in guava and tropical almond, and the infestation of other fruits occurs as they become available. Two other host fruits, saponilla and calamondin, appear to be available often enough to allow a year-round population of *A. suspensa* to exist even if guava and tropical almond were not present. Both loquat and surinam cherry are heavily infested

TABLE 1. INFESTATIONS OF CARIBBEAN FRUIT FLY LARVAE IN HOST FRUITS, AND KG FRUIT COLLECTED.

Host Plant	Month											
	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
<i>Guava, Psidium guajava</i> L.												
Mean no. larvae/kg fruit	78.2	123.8	209.9	61.7	209.7	321.8	154.2	186.0	189.5	394.9	124.9	58.7
kg fruit collected	24.0	26.9	5.0	1.6	22.6	14.8	14.4	10.1	4.8	2.0	1.6	7.6
Tropical almond, <i>Terminalia catappa</i> , L.												
Mean no. larvae/kg fruit	39.4	42.8	48.4	30.8	92.1	223.6	169.0	26.2	29.3	—	—	12.7
kg fruit collected	22.9	19.4	81.2	67.1	31.6	24.5	15.2	3.1	1.0	—	—	—
Loquat, <i>Eriobotrya japonica</i> (Thunb.) Lindl.												
Mean no. larvae/kg fruit	—*	—	—	—	—	—	71.4	289.0	117.4	—	—	—
kg fruit collected	—	—	—	—	—	—	0.1	1.3	0.2	—	—	—
Surinam cherry, <i>Eugenia uniflora</i> L.												
Mean no. larvae/kg fruit	—	—	—	—	—	—	—	—	—	45.3	194.8	186.1
kg fruit collected	—	—	—	—	—	—	—	—	—	3.3	5.2	1.9
Sapodilla, <i>Achras zapota</i> L.												
Mean no. larvae/kg fruit	—	7.7	—	0	0	4.9	9.3	48.7	115.6	33.5	6.2	31.0
kg fruit collected	—	1.8	—	0.2	0.3	6.9	5.9	4.5	2.2	2.2	5.1	1.9
Calamondin, <i>Citrus mitis</i> Blco												
Mean no. larvae/kg fruit	—	0	0	—	—	33.7	37.0	23.7	22.4	20.0	24.2	0
kg fruit collected	—	0.2	1.2	—	—	1.8	8.9	10.1	5.3	5.3	0.9	0.2

TABLE 1. (cont'd.) INFESTATIONS OF CARIBBEAN FRUIT FLY LARVAE IN HOST FRUITS, AND KG FRUIT COLLECTED.

Host Plant	Month											
	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Barbados cherry, <i>Malpighia glabra</i> L.												
Mean no. larvae/kg fruit	—	26.8	1.8	—	—	—	—	—	10.2	64.7	8.6	19.4
kg fruit collected	—	2.9	2.2	—	—	—	—	—	1.9	1.5	9.0	4.1
Governor's plum, <i>Flacourtia indica</i> (Burm. f.) Merr.												
Mean no. larvae/kg fruit	0.3	43.6	1.9	1.9	0	—	—	0	—	—	0	0
kg fruit collected	5.9	2.0	0.5	0.5	0.1	—	—	0.7	—	—	0.9	1.6
Spondias, <i>Spondias</i> sp.												
Mean no. larvae/kg fruit	—	33.6	—	0	0	—	—	—	—	—	0	—
kg fruit collected	—	3.5	—	1.6	2.6	—	—	—	—	—	2.3	—
Kumquat, <i>Fortunella margarita</i> (Lour) Swingle												
Mean no. larvae/kg fruit	—	—	—	—	15.6	—	—	0	0	—	—	—
kg fruit collected	—	—	—	0.3	0.1	—	—	0.1	0.1	—	—	—

*Indicates no fruit available from host that month.

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when fruit is present, but both have a moderately short fruiting season in Key West. The infestation in the remaining fruits listed in Table 1 is apparently highly variable.

LITERATURE CITED

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