



FRUIT FLIES IN SOLOMON ISLANDS

Solomon Islands has a very diversified fruit fly fauna (Diptera: Tephritidae). There are 48 species in Solomon Islands, made up of four economic species (Figures 1 to 4) that cause considerable damage to edible fruits and cucurbits, 35 other described species with little or no economic importance, many of which also occur in neighbouring Bougainville province of Papua New Guinea, and 9 undescribed new species. Fruit flies are pest insects whose larvae or maggots live in and feed on the flesh of fruits and fleshy vegetables. They cause extensive damage and limit the export of fruits to other countries. They may be sampled and monitored by setting up lure traps that attract male flies (using Cue-lure or methyl eugenol) and by collecting and holding suspected host fruits in plastic containers over moist sawdust for about two weeks.



Figure 1. Mango fly (*Bactrocera frauenfeldi*).



Figure 2. Melon fly (*Bactrocera cucurbitae*).



Figure 3. *Dacus solomonensis*.



Figure 4. Breadfruit fly (*Bactrocera umbrosa*).



NZODA

ECONOMICALLY IMPORTANT SPECIES

***Bactrocera frauenfeldi* (Schiner) (mango fly)** (Figure 1) is the most common species in Solomon Islands. It also occurs in Irian Jaya, Papua New Guinea, Palau, Federated States of Micronesia, Marshall Islands, the Gilbert Islands of Kiribati, and Nauru. Around 1974, it was also introduced into the Cairns area of northern Queensland.

Mango fly is a polyphagous pest species that has been recorded from 72 host fruits, in 45 genera and 29 plant families. Edible hosts in Solomon Islands include avocado, black sapote (*Diospyros digyna*), breadfruit, carambola, golden apple (*Spondias cytherea*), grapefruit, guava, jackfruit, kumquat, mangoes (*Mangifera indica* and *M. minor*), Malay apple (*Syzygium malaccense*), papaya, paper mulberry (*Broussonetia papyrifera*), pomelo, sapodilla, snake gourd (*Trichosanthes cucumerina*), sour orange (*Citrus aurantium*), soursop, Tahitian chestnut (*Inocarpus fagifer*), tropical almond (*Terminalia catappa*), and cut nut (*Barringtonia edulis*). Wild hosts are Indian laurel (*Calophyllum inophyllum*), *Calophyllum kajewskii*, *Cerbera manghas*, *Diospyros hebecarpa*, *Ficus* sp., *Guettarda speciosa*, *Neonauclea forsteri*, *Scaveola tacadda*, and *Terminalia whitmoreae*.

Adult flies mate any time during the day. Females start laying eggs when they are two weeks old. One female can lay an average of at least 25 eggs in 24 hours. Eggs hatch in about two days. Larvae feed on and damage fruit flesh that has started to rot due to bacteria. Larval development takes 10.5 days in pawpaw. The pupal stage lasts 11 days. This species prefers to attack commercial and edible fruits rather than wild fruits. It is uncommon in rainforests. Male flies are attracted to Cue-lure. Mango fly can be immediately recognized by the dark stripe across its wing.

***Bactrocera cucurbitae* (Coquillett) (melon fly)** (Figure 2) is a very destructive pest species, widespread in tropical Asia, as far east as Pakistan, all over Papua New Guinea (except Manus) and all Solomon Islands Provinces except Makira, Rennell-Bellona and Temotu. It occurs in Hawaii (first detected in 1895), Guam (1936), Commonwealth of Northern Mariana Islands (1943), and Nauru (detected in 1982 and eradicated in early 1999 by male annihilation). It was eradicated from CNMI by sterile insect release method in 1963 but was re-introduced from neighbouring Guam in 1981. It is also present in some parts of Africa (Kenya, Tanzania, Mauritius, Réunion). Melon fly has spread into Solomon Islands from PNG. It was detected on Shortland in September 1984, in Western Province and northern Choiseul in June 1985, on Isabel in 1988, and on Guadalcanal and Malaita in 1995.

Over 125 species of hosts have been recorded for this species, based on extensive host surveys in Asia and Hawaii. Plants in the family Cucurbitaceae are, however, the usual hosts. In Solomon Islands, it attacks watermelon, cucumber, pumpkin (*Cucurbita pepo*), snake gourd (*Trichosanthes cucumerina*), bitter melon (*Momordica charantia*) and ivy gourd (*Coccinia grandis*). It may damage 60-87% of ripe pumpkins, and over 90% of snake gourds are infested by *B. cucurbitae* and/or *D. solomonensis*. Not only will female flies lay eggs in ripe and green fruits, but also in flower buds and stems of host plants.

Melon fly has a very rapid life cycle. Adults mate at dusk. Females start laying eggs 11-12 days after their emergence from pupae. One female may lay over 1000 eggs during her life time. Eggs hatch after 24 hours. Development from egg to pupa takes five days in zucchini. The pupal period lasts seven days. Adult females normally live for five months in the tropics, and up to 15 months in cool climate. Male flies may be trapped using Cue-lure. It can be separated from other species by its light brown colour, the three parallel yellow stripes on the thorax and the characteristic wing marking pattern (see Figure 2).

***Dacus (Callantra) solomonensis* (Malloch)** (Figure 3) is a large wasp-like fruit fly present in Bougainville and all Solomon Islands Provinces, except Rennell-Bellona and Temotu. It is a pest of cucumber, pumpkin and particularly snake gourd.

Mating starts about 16 days after adult emergence. Eggs start hatching 46 hours after laying. Larval development takes an average of 12 days in pumpkin and snake gourd. The pupal period takes nine days. Male flies are attracted to Cue-lure.

***Bactrocera umbrosa* (Fabricius) (breadfruit fly)** (Figure 4) is a common species in South-east Asia, Palau, Papua New Guinea, Solomon Islands, Vanuatu and New Caledonia. Its usual hosts are breadfruit and jakfruit, though it was once reared from *Polyscias* sp. (Araliaceae). Adults mate at dusk. Males come to methyl eugenol traps. The species is immediately recognised by the three large transverse bands on its wings.

NON-PEST SPECIES

There are 35 additional described species that have no economic importance.

The non-pest species most commonly collected by Cue-lure traps are *B. moluccensis* (Perkins), that infests Polynesian chestnut and whose larvae feed on the kernel, in contrast to other fruit fly species that feed on the flesh around the nut only; *B. simulata* (Malloch) (reared from *Coccinia grandis*); *B. redunca* (Drew); and *B. decumana* (Drew).

Species less commonly or rarely collected at Cue-lure traps are *B. abdoangusta* (Drew), *B. amoena* (Drew), *B. aterrima* (Drew), *B. curta* (Drew), *B. enochra* (Drew), *B. epicharis* (Hardy), *B. furvescens* (Drew), *B. longicornis* Macquart, *B. minuta* (Drew), *B. morula* (Drew), *B. nigrescentis* (Drew), *B. phaea* (Drew), *B. pseudodistincta* (Drew), *B. strigifinis* (Walker), *B. turneri* (Drew), *B. unifasciata* (Malloch) and *B. univittata* (Drew).

The non-pest species most commonly collected by methyl eugenol traps are *B. froggatti* (Bezzi) and *B. pepisalae* (Froggatt).

Less common or rare species attracted to methyl eugenol are *B. bancrofti* (Tryon), *B. biarcuata* (Walker), *B. confluens* (Drew), *B. melanogaster* (Drew), *B. picea* (Drew) and *B. reclinata* (Drew).

Non-pest species not known to be attracted to male lures are *B. aithogaster* (Drew), *B. calophylli* (Perkins and May) (breeds on *Calophyllum inophyllum* and *C. kajewskii*), *B. pagdeni* (Malloch), *B. penefurva* (Drew), and *B. quadrisetosa* (Bezzi) (reared from *Pometia pinnata*), and *B. unipunctata* (Malloch).

FURTHER READING

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