PEST ADVISORY LEAFLET NO. 39

Plant Protection Service
Secretariat of the Pacific Community

2001

Fruit Flies in American Samoa, Niue, Tokelau, Tuvalu and Wallis and Futuna

Six fruit fly species have been recorded from trapping and host fruit surveys in American Samoa, Niue, Wallis and Futuna, Tuvalu and Tokelau (Table 1). These include three economic species (*Bactrocera kirki*, *B. xanthodes* and *B. passiflorae*) and three non-economic species (*B. distincta*, *B. obscura* and *B.* new species near *passiflorae*).

Fruit flies are economically important because they cause damage to fruits and vegetables that are of commercial value or are edible, and hinder international and domestic trade of fruits and fleshy vegetables. They center their activities on the host plant, which provide sites for adult feeding, mating, egg laying, larval development and pupae development in the soil underneath the plant. The adult female lays its eggs in clutches under the skin of the fruit, using a needle-like structure at the end of the abdomen, called an ovipositor. During egg laying, bacteria are also introduced into the fruit. The bacteria cause the fruit to break down, with decaying flesh providing food for the larvae or maggots that hatch from the eggs.

The presence of *B. kirki* and *B. xanthodes* (Pacific fruit fly) in American Samoa, Niue, Wallis and Futuna and other countries and the presence of *B.* new species near *passiflorae* in Tokelau, Tuvalu, Fiji Islands and possibly in the Niua's of Tonga shows that the movement of these species is directly related to the cultural ties that these countries have with each other. *B. passiflorae* does not occur in American Samoa and *B. distincta* does not occur on Niue or Wallis. The three non-economic fruit fly species, *B. distincta*, *B. obscura* and *B.* new species near *passiflorae*, attack non-edible, wild or forest fruits and vegetables.

Little information is available on the range of host plants infested by fruit flies in the country and territories covered in this leaflet. Total number of economic and wild hosts cited in Table 1 are based on intensive host fruit surveying carried out since 1991 under the Regional Fruit Fly Project in Cook Islands, Tonga, Samoa, Fiji Islands, and since 1997 as part of the Oriental fruit fly eradication programme in French Polynesia. Host records cited under species profiles for *B. xanthodes*, *B. kirki* and *B. passiflorae* provide an indication of what the most common hosts may be in the countries and territories covered here.

ECONOMICALLY IMPORTANT SPECIES

Pacific fruit fly - *Bactrocera xanthodes* (Broun)

This translucent, orange-brown, slender fly is present in Fiji Islands, Wallis and Futuna, Tonga, Niue, American Samoa, Samoa, Cook Islands and French Polynesia (on Rurutu and Raivavae only, where it is undergoing an eradication program). Pacific fruit fly (Figure 1) infests 62% of ripe breadfruit in American Samoa. Major host fruits recorded in Fiji Islands, Tonga, and Cook Islands are breadfruit and papaya. It was eradicated from Nauru by a combination of male annihilation and protein bait spraying in early 2000. Males of this fruit fly species are attracted to methyl eugenol.

Table 1: Distribution, lure responses and number of known host plants of fruit flies.

Species	Lure	American Samoa	Niue	Wallis	Futuna	Tuvalu	Tokelau	Number of edible hosts	Number of wild hosts
B. xanthodes	Methyl eugenol	■	■	■	■			24	10
B. kirki	Cure-lure	■	■	■	■			32	14
B. passiflorae	Cure-lure		■	■	■			37	22
B. distincta	Cure-lure	■			■			3	3
B. obscura	Cure-lure	■	■	■	■			0	1
B. near passiflorae	Cure-lure					■	■	12	7

Figure 1: Pacific fruit fly (*Bactrocera xanthodes*)

Figure 2: *Bactrocera kirki*.

Bactrocera kirki (Froggatt)

B. kirki (Figure 2), a medium-sized fly, is mostly black with yellow markings on either sides of the thorax (upper body); the lower body (abdomen) is glossy black with orange-brown longitudinal bands in the middle. The main host fruits for *B. kirki* are tropical almond (*Terminalia catappa*), mango, avocado, Tahitian chestnut (*Inocarpus fagifer*), guava, rose apple (*Syzygium jambos*), mountain apple (*S. malaccense*), mandarin, orange, Pacific lychee (*Pometia pinnata*) and starfruit (*Averrhoa carambola*). *B. kirki* is present in French Polynesia (but not in the Marquesas), Tonga, Samoa, American Samoa, Niue, Wallis and Futuna and Fiji Islands (on Rotuma only). Males are attracted to Cue-lure.

Bactrocera passiflorae (Froggatt)

B. passiflorae, a small-sized, predominantly black species (Figure 3), is present in Fiji Islands (excluding Rotuma), Niue and Wallis and Futuna. In Fiji Islands, this species attacks guava, mango, cashew, avocado, granadilla (*Passiflora quadrangularis*), orange, kumquat, mandarin, *Syzygium* apples, tropical almond, and *Ochrosia oppositifolia*. *B. passiflorae* male flies come to the attractant Cue-lure.

NON-ECONOMIC SPECIES

Bactrocera distincta (Malloch)

B. distincta is a medium-large fly and is partially black (Figure 4). The wings have a distinctive dark transverse crossband pattern. This fly has been reared from at least six host fruit species, most of which are from the plant family Sapotaceae, including sapodilla (*Manilkara zapota*) and star apple (*Chrysophyllum cainito*). It occurs in Fiji Islands, including Rotuma, on Futuna, in Tonga, Samoa and American Samoa. It is attracted to fruit fly traps baited with Cue-lure.

Bactrocera obscura (Malloch)

B. obscura (Figure 5) is present in American Samoa, Niue, Samoa, Tonga and Wallis and Futuna and Rotuma (in Fiji Islands). It is a medium-sized species with yellow patches on the area of the shoulder and rear end of the thorax. The abdomen, which is orange-brown, has a medial longitudinal dark band and four lateral dark markings. The wings are clear except for broad dark areas on the foremargin and at the rear of the wing. Males are attracted to Cue-lure.

Figure 3: *Bactrocera passiflorae*.

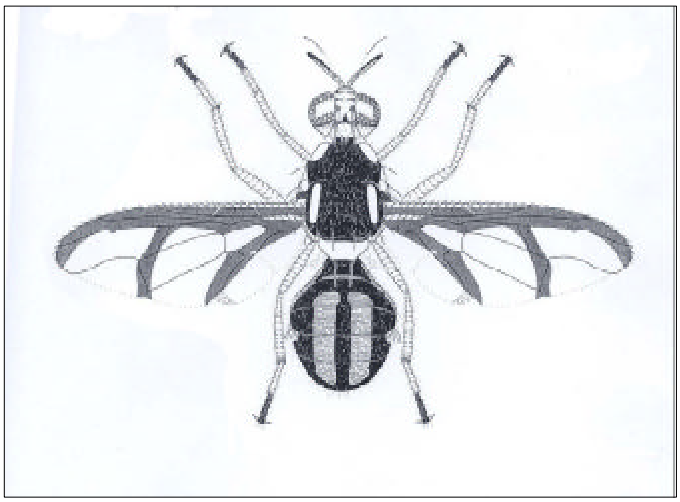

Figure 4: *Bactrocera distincta*.

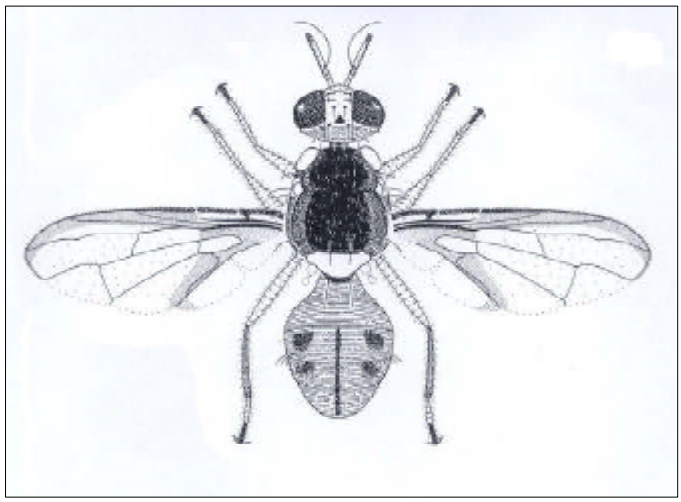

Figure 5: *Bactrocera obscura*.

Bactrocera new species near *passiflorae*

As its name suggests, it is an undescribed new species similar to *B. passiflorae*, but smaller in size and with light coloured markings on the abdomen. An illustration of the species may be found in Drew and Hancock (1995). It occurs in the northern interior and in the southern part of Viti Levu, and Lau group in Fiji Islands, on Tuvalu, Tokelau, and the Niua's group in Tonga. This species was reared from *Ochrosia oppositifolia* in Fiji and from a number of commercial/edible hosts in Tonga, such as orange and mandarin, although its economic impact has not been clearly assessed. Its pest status in Tuvalu and Tokelau is yet to be determined. Males are attracted to Cue-lure.

QUARANTINE SURVEILLANCE

Fruit fly trapping and host fruit surveys are techniques used to confirm the presence of existing fruit fly species and detect new introductions of exotic species to a country or an island. Modified Steiner traps, baited with chemical lures that attract male fruit flies mixed with an insecticide, are used to trap the flies. Cue-lure and methyl eugenol are two commonly used attractants in the Pacific. A third lure, trimedlure, is used to trap the Mediterranean fruit fly (*Ceratitis capitata*), which is not present in the Pacific region, except in Hawaii. Trimedlure traps need to be maintained in American Samoa, which has direct airline contact with Hawaii. These traps are placed in backyards and education institutions in towns and cities, dumps, farms, villages, hotels and resorts, research stations and at ports of entry. Traps are placed on host or potential host fruit trees, at a height of about two metres in a shady position. They are suspended from wires that are coated with a non-drying adhesive, such as Tanglefoot. Care is taken to ensure that leaves or branches do not touch the trap and also that cross contamination between lures does not take place. Traps located in ports of entry and on farms that are producing fruit for export should be cleared every two weeks. The traps are re-charged with lure every three months and are replaced when they are damaged.

Host fruit surveys are carried out to confirm the presence of fruit flies that are not attracted to the male lures and to monitor the levels of damage, presence of parasitoids, seasonal abundance and geographical distribution of fruit flies. Collected fruit samples are incubated for two to three weeks in containers over moist sawdust to determine whether flies emerge from the fruits. Data generated are used for pest risk assessments for trade negotiations on fresh fruit and vegetables.

Maintenance of quarantine surveillance is important particularly in small countries, where an introduction of serious exotic fruit flies may jeopardize food security and incomes.

FURTHER READING

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This leaflet was compiled under the fruit fly projects in the Pacific. The FAO/AusAID/UNDP/SPC Project on Regional Management of Fruit Flies in the Pacific (RMFFP) commenced in 1990 and Phase 1 initially operated in Fiji Islands, Cook Islands, Tonga and Samoa. Phase 2 (1994-1997) included, besides the four original countries, Federated States of Micronesia (FSM), Solomon Islands and Vanuatu. The third phase (1997-2000) included all 22 Pacific Island countries and territories (PICTs). The RMFFP is funded by AusAID, UNDP and New Zealand Government (NZODA), implemented by FAO and executed by the Secretariat of the Pacific Community (SPC). The Australian Centre for International Agricultural Research (ACIAR) has also run a parallel fruit fly project in the seven countries during Phases 1 and 2, and in Papua New Guinea since 1998. Since January 2001, fruit fly activities have become Component 2, "Fruit Fly Management", of the Project on "Pest Management in the Pacific", executed by SPC and funded by the Australian (AusAID) and New Zealand (NZODA) governments. For more information on the Fruit Fly Project, consult the Web site: **http://www.pacifly.org**.

NZODA

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