



Fruit Flies in Samoa

Samoa, like most Pacific Island countries and territories is free from pest fruit fly species such as oriental fruit fly (*Bactrocera dorsalis* (Hendel)), melon fly (*B. cucurbitae* (Coquillett)), banana fruit fly (*B. musae* (Tryon)) or Asian papaya fruit fly (*B. papayae* (Drew and Hancock)). The seven fruit fly species present in Samoa and some of their common hosts are presented in Table 1. The economic fruit fly species in this leaflet are those that infest edible or commercial fruit while the non-pest species have no known economic importance because they attack host fruits that are of no commercial use or wild fruit from the forest.

Activities of adult fruit flies centre around the host fruit tree where adult feeding, mating, egg laying, larval development and pupal development in the soil underneath the host plant

take place. The experiences that most people have of fruit flies, are those of the larval or maggot stages. The larval stage of fruit flies is generally considered to be the damaging life stage. However, it is the adult fly that first pierces the fruit to lay its eggs in clutches under the skin of the fruit using its egg laying organ, the ovipositor. As the eggs are inserted into the fruit, bacteria are also introduced and it is the bacteria that cause the fruit to rot. The rotting flesh of the fruit provides food for the larvae or maggot stages of the fruit fly. In the fruit, the eggs hatch into larvae, once the fruit falls to the ground the larvae exit the fruit and pupate in the soil until it emerges as an adult.

Fruit flies respond to colours, shapes of objects and odours. It is easy for fruit flies to find its host fruit through its re-



Figure 1: *Bactrocera kirki*.



Figure 2: Pacific fruit fly (*Bactrocera xanthodes*).

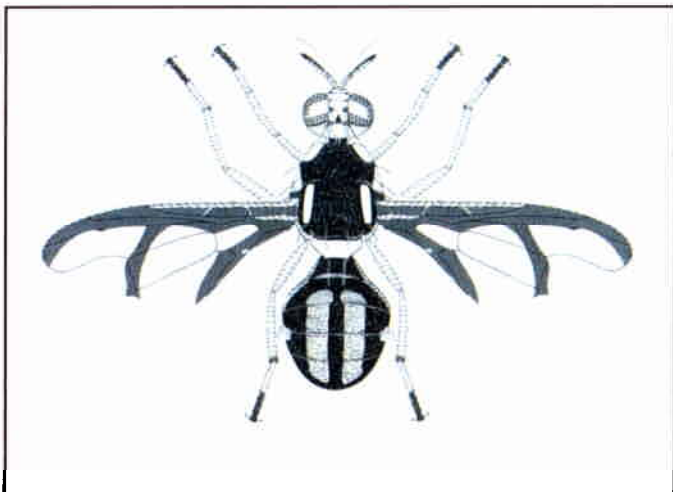


Figure 3: *Bactrocera distincta*.

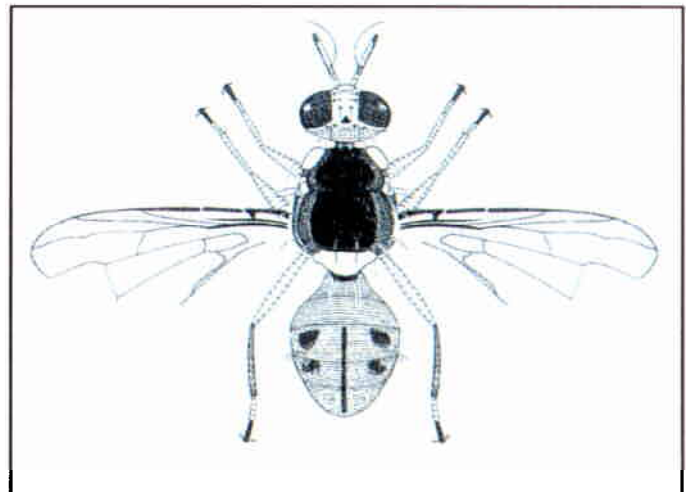


Figure 4: *Bactrocera obscura*.

sponse to sight of shape and colour of the tree and fruit. These flies detect fruit using the smell of the fruit, leaves and bacteria on the surface of the fruit and leaves. For food adult fruit flies feed on juices from fruit, nectar, flowers, honeydew, bird faeces and bacteria. Protein is required by the immature female flies to make them sexually mature and able to produce viable eggs. These are the responses and needs of the adult fruit fly that have allowed the development of some field control methods for fruit flies.

Economically Important Fruit Fly Species

Bactrocera kirki, Figure 1, is present in Tonga, American Samoa, Samoa, Niue, French Polynesia, Rotuma (Fiji) and Wallis and Futuna. *B. kirki* is a black fruit fly species with yellow markings in the areas closest to the head and wings. The lower body (abdomen) is glossy black with orange-brown longitudinal bands in the middle of the abdomen. This species has been observed to mate in late morning or early afternoon when light intensity is highest. The male flies are attracted to Cue-lure.

Pacific fruit fly (*B. xanthodes*), Figure 2, is a little larger than a housefly, is slender and almost translucent in appearance. It is light brown-orange in colour with three yellow stripes on the upper surface of the upper body (thorax). Male flies are attracted to methyl eugenol. Pacific fruit fly is not a forest species and is commonly found in the village, suburban and coastal environments. Like most of the other tropical species in the Pacific, the adult flies mate at dusk.

Pacific fruit flies are present in Cook Islands, Tonga, Fiji, Niue, American Samoa and Wallis and Futuna and since 1998, the Austral Islands of French Polynesia. This species belongs to a complex of sibling species. The three other species in the complex are *B. paraxanthodes* (Drew and Hancock) present in New Caledonia, *B. neoxanthodes* (Drew and Romig) in Vanuatu, and a yet undescribed species in Samoa.

Non-Pest Fruit Fly Species

Of the five fruit fly non-pest species, *B. distincta* (Figure 3), is medium sized fly, partially black and has distinct dark patterns on the wings. The male flies are attracted to Cue-lure. This species is found in fruit fly traps throughout the year but has been reared from a very few number of hosts, mostly from the family Sapotaceae. *B. distincta* is also present in Tonga, Fiji, American Samoa and Futuna.

B. obscura (Figure 4) occurs in Tonga, American Samoa, Rotuma (Fiji), Samoa, Niue, Wallis and Futuna. The male flies are attracted to Cue-lure. It has yellow markings on the thorax. It is dull black in colour, often with a grayish appearance. The abdomen is orange-brown, a dark band extends in the middle of the abdomen with dark markings on the lateral sides of the abdomen.

B. (Bulladacus) aenigmatica is a species found only in Upolu and Savaii, Samoa. It is not attracted to male attractants and therefore may only be confirmed through host fruit collections. This species is known to be a small species, generally

Table 1: Fruit flies (Diptera: Tephritidae) in Samoa

	Species	Host Fruit	Lure
Economic species	<i>Bactrocera kirki</i> (Froggatt)	Abiu (<i>Pouteria cainito</i>), avocado, Brazil cherry (<i>Eugenia brasiliensis</i>), <i>Elaeocarpus tonganus</i> , guava, Indian laurel (<i>Calophyllum inophyllum</i>), Malay apple (<i>Syzygium malaccense</i>), Mango, Noni (<i>Morinda citrifolia</i>), Pacific lychee (<i>Pometia pinnata</i>), passionfruit (<i>Passiflora edulis</i>), rose apple, Tahitian chestnut (<i>Inocarpus fagifer</i>), tropical almond (<i>Terminalia catappa</i>), water apple (<i>Syzygium aqueum</i>).	Cue lure
	<i>B. xanthodes</i> (Broun)	Abiu (<i>Pouteria cainito</i>), avocado, breadfruit, granadilla (<i>Passiflora quadrangularis</i>), jackfruit, papaya, Soursop, <i>Terminalia catappa</i> .	Methyl eugenol
Non pest fruit fly species	<i>B. samoae</i> Drew	<i>Calophyllum inophyllum</i> , ylang ylang (<i>Cananga odorata</i>), <i>Guettarda speciosa</i> , <i>Terminalia catappa</i> .	None
	<i>B. distincta</i> (Malloch)	Brazil cherry (<i>Eugenia brasiliensis</i>), sapodilla (<i>Manilkara zapota</i>), Star apple (<i>Chrysophyllum cainito</i>).	Cue lure
	<i>B. new species near paraxanthodes</i>	<i>Mammea glauca</i> , <i>Meryta</i> sp and <i>Ficus</i> sp.	None
	<i>B. obscura</i> (Malloch)	Not known	Cue lure
	<i>B. aenigmatica</i> (Malloch)	Not known	None

an orange-brown fly with yellow markings near the shoulder and sides and a black stripe in the centre on the thorax of the body. The abdomen is orange-brown with shiny black bands on the sides and centre of the abdomen. On the wings, this species possesses a bubble or bulla. The host fruit range of this species is not yet known.

B. samoae is found only in Samoa. This species is not attracted to male attractants and is a small species with black thorax and yellow markings on the sides and end of the thorax. It is generally black with orange brown markings in the centre of the abdomen.

B. new species near *paraxanthodes* is not attracted to male lures and has been reared from wild, non-commercial fruit such as a *Mammea glauca*, *Meryta* and *Ficus* species in Samoa. Closely related *B. paraxanthodes* Drew and Hancock (New Caledonia) breeds on *Schefflera gabriellae* and *Strobilopanax sp.*, while *B. neoxanthodes* Drew and Romig (Vanuatu) breeds on *Barringtonia edulis* and *Passiflora suberosa*. This species is very similar to the economic fruit fly species, *B. xanthodes* except that it is much lighter than the normal *B. xanthodes* and attacks wild, non-commercial fruit.

Quarantine surveillance

The fruit fly surveillance programme in Samoa consists of trapping and host fruit surveys. Trapping involves placement of modified Steiner fruit fly traps that are baited with male attractants, Cue-lure or methyl eugenol and an insecticide. These traps are cleared by either Research or Quarantine staff on a monthly basis and the male attractants are generally replenished after three months.

The fruit fly trapping and host fruit survey programs in Samoa have confirmed that the major pest fruit fly species such as melon fly, Asian papaya fruit fly, oriental fruit fly, Queensland fruit fly (*B. tryoni*) or Mediterranean fruit fly (*Ceratitis capitata*) are not present. A vigilant quarantine surveillance and public awareness programme needs to be maintained and strengthened to keep Samoa free from these species.

Further Reading

1. Allwood, A.J. 1996. Biology and ecology: Prerequisites for understanding and managing fruit flies (Diptera: Tephritidae). In: Management of fruit flies in the Pacific. Allwood and Drew (Eds.). ACIAR Proceedings No. 76: 95-101.
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4. Drew, R.A.I., Allwood, A.J. and Tau, D. 1996. *Bactrocera paraxanthodes* Drew & Hancock – an example of how host fruit records and attractant responses contribute to taxonomy. In: Management of fruit flies in the Pacific. Allwood and Drew (Eds.). ACIAR Proceedings No. 76: 131-133.

Consult the website on fruit flies in the Pacific:

<http://www.spc.int/pacifly>

This leaflet was compiled under the fruit fly management component of the Pest Management in the Pacific (PMP) project. 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.spc.int/pacifly>

This leaflet was prepared by Fa'alelei Tunupopo Laiti (Entomology Technician), Fuifatu Billy Enosa (Senior Entomologist), Soalo Albert Peters (Assistant Director Crops) Ministry of Agriculture, Fisheries, Forestry and Meteorology, Samoa, and Ema Tora Vueti, Coordinator, Fruit Fly Management- Project on Pest Management in the Pacific, Plant Protection Service. Further information can be obtained from the Plant Protection Service, Secretariat of the Pacific Community, Private Mail Bag, Suva, Fiji Islands. Photographs taken by Steve Wilson.

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