

Flies

Pesticide Safety Technical Note

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Flies

Flies are insects in the Order Diptera. Diptera means two-wings, with the original hind wings replaced by two small clubs that are used for balancing. The fly's amazing ability to avoid being swatted comes largely from the advantages of their two wings.

Worldwide, there are over 150,000 species of flies, ranging from the tiny moth flies, that are true to their name with their moth-like appearance; to the larger blowflies and flesh flies, conspicuous in their appearance and activities. In Australia, there are over 7700 species of flies, dispersing across the nation due to favoured climatic conditions by different species.



Figure 1 Order Diptera

Flies have become a very successful worldwide, as they have the capacity to exploit a vast range of food sources. Most flies must liquefy their food, and depending on the fly, this can be through external 'puddling' of

the food source with a spongy mouthpart, or in predatory flies, through the injection of a piercing mouthpart into the food source.

Flies can be found in a wide variety of breeding grounds including vegetation, soil, decaying organic matter, water, on other animals and most concerning to public health, in foods for human consumption. Flies are considered a pest due to their ability to transmit diseases such as salmonella, dysentery and hepatitis through their hairy bodies and because of their mobility between waste (human or organic) and food preparation areas and utensils. Another widespread factor that contributes to the pest status of flies is their annoyance to humans, shown through the enormous sales of household insecticides, however their threat to public health through disease transmission is paramount.

Life Cycle

During their development, all flies undergo a complete metamorphosis. Female flies lay their eggs, or sometimes live young, in moist areas that will serve to feed their larvae. When available, larvae often consume great amounts of food, thus contributing to their development. The temperature of where the larvae commence their development also influences how quickly they feed and in turn how many moults (4 on average) the larvae will undergo before pupating.

Pupating will commence once the larvae are satisfactorily fed. The majority of terrestrial species (e.g. house flies) will move away from their original developmental ground, to a much drier location where they are less likely to be consumed by those around them. The pupal stage of development can last from a few days up to a number of months depending on the climatic conditions.

Adult flies emerge once the pupating stage is complete and male flies disperse by air to find a mate. Most adult females will disperse by air to find an appropriate egg-laying site to begin the life cycle over again.

Common Flies

House Fly

The house fly is the most widespread fly in Australia. These flies are likely to harbour disease organisms on their bodies as they often frequent between foods for human consumption and waste materials (e.g. animal excrement). An abundance of house flies in a particular rural or urban area can be seen as an indicator of inefficient waste disposal, as this is where house flies prefer to breed.



The adult house fly is between 4 and 8mm long. The thorax and abdomen of the house fly are a grey colour, with the inclusion of four, darker longitudinal stripes also on the thorax. The house fly has a sponging mouthpart to take in liquid food sources. As with all flies, the house fly has two balancers in the place of hindwings. *Figure 2 Housefly*

Blowflies & Flesh Flies



Figure 3 Blowfly

Aside from the noticeable 'buzzing' noise emitted by blowflies, the reason for their namesake is the attraction of female blowflies to exposed meat, including wounds of livestock. The female blowfly prefer to lay the eggs in these areas, thus the area being 'blown'. This poses a serious threat to human health as the spread of disease from meat sources can often be transferred onto other items that the blowflies frequent, for example, cooking utensils.

Adult blowflies may range from 8 to 12mm in length. Their larger size also contributes to the conspicuous buzzing noise attributed to this type of fly. The general appearance of blowflies differs between species, however the most common colours on the thorax and abdomen of blowflies are metallic green, plain brown or brown and blue.

Similar to blowflies are flesh flies. These flies are quite noticeable, with their size ranging from 6 to 14mm. Flesh flies grey in colour, with the three noticeably darker longitudinal stripes on the thorax. Dark patches found on the abdomen of the flesh fly give the appearance of a checkerboard.

Vinegar Flies & The Cheese Skipper

Vinegar flies are commonly known as fruit flies or ferment flies. Vinegar flies have a strong attraction to organic matter such as fruit and vegetables, especially if the matter is spoiled in any way. They are particularly troublesome in food-handling premises and domestic kitchens as the frequency of organic waste being left exposed is quite high. This poses a serious threat to human health as the risk of vinegar fly contamination is increased due to their small size and ability to enter through normal preventative screening.

The adult vinegar fly is between 2.5 and 4mm in length. Vinegar flies can be either brown and yellow or brown and black. Vinegar flies are strong fliers and prefer to be more active around dawn and dusk, unlike other flies that are most active throughout the day. At rest, the wings of the vinegar fly are folded on top of each other.

Similar to the vinegar fly, the cheese skipper is a widespread pest of the food-production industry. The adult female cheese skipper is instrumental in the spread of disease through the medium it chooses to lay its eggs upon; often being cheese and cured meats. The larvae infected food sources can readily be consumed by humans, and this has the possibility of leading to mild - severe irritation in humans.

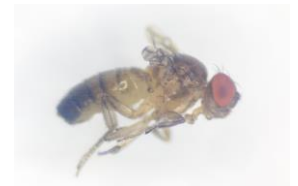


Figure 4 Vinegar Fly

The adult cheese skipper is between 2.5 and 4mm in length. It has a metallic bronze thorax with the remainder of its body black in colour. The complete life cycle of a cheese skipper is between 2 and 6 weeks, however the fully developed cheese skipper only lives for approximately a week.

Moth Flies

Moth flies are commonly found around areas where moisture is present; including bathrooms, open drains and septic run-off. If moth flies are found in large enough numbers, this may pose a threat to human health as the inhalation of the flies may cause an allergic reaction.

The moth fly is between 2 and 4mm long, being dark grey in colour, with its body covered densely with fine hairs but the most obvious feature are the moth-like shaped wings and the hairy fringe on the wings.



Figure 5 Moth Fly

Fly Control

In urban areas, it is imperative that access to food is prevented. Bins must be kept closed and the disposal of waste must be regular, quick and efficient in order to control the presence of flies. Implementing general standards of sanitation and hygiene will reduce the likelihood of breeding sites being available for flies, therefore reducing the number of adult flies present.

A thorough survey and inspection of the location is important before executing any fly control methods as both the adult fly and consequent larvae must be considered. This inspection should include trying to locate, if possible, the location of larval breeding sites. If the larval breeding site is located within close proximity to the

area requiring adult fly control, it is often likely that an improvement in general sanitation is required in conjunction with pest control methods.

Chemical and non-chemical methods of fly control can be employed, but adult flies will keep arriving, so physical exclusion should be applied wherever possible. The more prevalent pest fly species breed quite rapidly in warm weather. The resistance to regularly applied pesticides is possible and where suspected, should be managed by swapping to a different mode of action group product.

Non-chemical methods of fly control

Adult flies can be controlled by employing the following non-chemical methods:

- Using fly swatters
- Trapping devices such as adhesive paper or devices that attract flies using scented baits
- Exclusion methods such as screens on windows and doors, air curtains and fast-closing doors are effective in food handling premises
- Removing attractive odours and ensuring suitable ventilation

General housekeeping – cleaning up soon after handling food

- Fly larvae can be controlled through:
- Decreasing the availability of breeding grounds – flies successfully exploit household waste before it is made unavailable through waste removal
- Keeping garbage bins clean and dry – flies prefer moist breeding grounds; this will reduce their attraction to garbage bins
- Avoiding the accumulation of household pet excrement or lawn clippings reduces the amount of potential breeding sites and larval feeding grounds

Chemical methods of fly control

Pyrethroid (Group 3A) and Imidacloprid (Group 4A) based insecticides are commonly used to control flies. The actions of these insecticides in fly control may include killing larvae, repelling or killing adult flies and as a toxin in a bait mix.

Using larvicides include:

- Utilising water-based surface sprays that will wet the larvae and their feeding sites; ensuring that the spray will not drift away from the target site or impact on drains
- Thoroughly treating the feeding site; ensuring that the site is also probed for hidden feeding sites

Space sprays are the most common form of insecticide used to control flies. The constituents in space sprays include natural pyrethrins or synthetic pyrethroids and can provide a very fast knockdown and kill of flies. Space sprays are commonly used in commercial premises, where the location can be vacated and the space spray delivered in the form of a fog or mist, however caution must be taken not to apply to food handling or similar surfaces.

Baits are also used in fly control; however, the effectiveness reduces significantly when there are competing odours, such as waste materials or other food sources attracting the adult flies.

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