Guidelines to prevent fly breeding in domestic situations in the Top End of the NT

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Introduction

These guidelines have been developed by the Medical Entomology Branch (MEB) of Territory Health Services to reduce domestic fly problems for householders in urban Darwin. Some aspects are also applicable for rural residents and residents of other communities in the wider NT. They are also applicable for business premises. More information on flies and their control can be obtained from the MEB or environmental health officers in various regions.

Information about flies

Domestic flies can occur in pest numbers throughout the year in Darwin, with a tendency for higher populations in the wet season, when suitable breeding materials are kept moist and soil can be more suitable for maggot entry and survival. Even small populations of flies can be annoying but more importantly they play a role in disease transmission.

Domestic flies carry and transmit disease-causing organisms in a number of ways.¹ Ways include:

- On their mouthparts
- Through their vomit
- On their body and legs
- On the sticky pads on their feet
- Through their intestinal tract by means of faeces

Diseases transmitted mechanically by domestic flies include typhoid, cholera, bacillary dysentery, infantile diarrhea, amoebic dysentery, giardiasis, pinworm, round worm, whip worm, hookworm and tapeworms.² Transmission of organisms such as Salmonella typhimurium³ and Shigella⁴ also occurs. Enterohaemorrhagic Escherichia coli have recently been shown to proliferate in houseflies and are excreted for at least three days after ingestion⁵.

The housefly Musca domestica and the green/blue blowfly Chrysomya megacephala are the most common problem domestic flies in Darwin.

The housefly breeds in a wide range of garbage and is the most likely species to cause a nuisance and lead to food spoilage inside a house. In Darwin it commonly breeds in wheelie bins in poorly packaged garbage. It breeds in prolific numbers in horse dung and moist chicken manure.

The blowfly tends to be less common inside houses but is more obvious because of its larger size and very active flight habits. It breeds mainly in meat products, other garbage with a high protein content, and dead animals. Common breeding places in Darwin include wheelie bins with unpackaged garbage, waste pet food, discarded bones, and dead rats.

Domestic flies lay eggs in moist warm decaying organic matter, such as meat and vegetable scraps, disused pet food, dead animals and animal faeces.

A female housefly can lay 4 to 6 batches of eggs of about 20 eggs each over a period of a few days. The eggs hatch in about 12 hours and the maggot stage takes about 5 days. The full-grown maggot migrates to a drier area or enters the soil to develop into a pupa. Pupae are often found in wheelie bins that have missed a collection. The pupa stage lasts about 4 days before the adult fly emerges. The development from egg to adult takes about 9 to 10 days in normal Darwin conditions. The adult flies feed on a great variety of materials such as faeces, meat, sugar, milk, or any other foodstuff. The fly vomits and deposits faeces on food and in this way can spread disease.

Blowflies can lay from 100 to 400 eggs in a single batch and the eggs hatch in about 8 hours. After hatching maggots can take as little as 3 days to mature and reach the wandering stage. Over 5000 mature maggots can be produced from 300 grams of food garbage in a single wheelie bin under Darwin conditions.⁶ Wandering maggots crawl out of wheelie bins at night and then enter moist soil, where they pupate and can emerge as adults 5 to 7 days later.⁷ The adult flies are attracted by smell and feed on a variety of materials such as faeces, blood, sugar, milk, or any other foodstuff.

A previous survey of wheelie bins in Darwin indicated that over 50% of bins and up to 70 % of
bins in some suburbs could be infested with maggots. As wheelie bins are collected once per week in Darwin, maggots can readily develop to the wandering stage and crawl out of a wheelie bin before the next collection.

The prevention of domestic fly breeding relies on the correct treatment, storage and disposal of household garbage by the householder. The shorter the period of exposure of the garbage to flies, the less production of flies. Adult flies can readily burrow into loosely packaged garbage.

Double bagging of garbage with plastic bags can reduce blowfly production in wheelie bins by up to 600% compared with non bagged garbage. Although double bagging can reduce blowfly production, it is important to also prevent exposure of garbage before bagging. Garbage left exposed for as little as two minutes can become full of maggots. Double bagging of 300 g of waste food, including meat scraps, can reduce blowfly production from 6000 maggots in unbagged garbage to 300 maggots after 30 minutes exposure before bagging, and to 1000 maggots after 2 minutes exposure before bagging. In practice with the use of kitchen tidies and the ability of flies to quickly enter wheelie bins it is difficult to prevent exposure of garbage to blowflies.

However control of adult flies or maggots in wheelie bins can be very effectively achieved with off the shelf products such as impregnated insecticide strips or blocks. The installation of impregnated pest strips in wheelie bins can kill adult flies in 30 minutes and maggots in a few hours. For effective use of pest strips, the bins should be in a sunny position and the lid left closed. If all the wheelie bins in Darwin were installed with pest strips there would be a dramatic reduction in domestic fly numbers.

Guidelines to prevent fly breeding

The following guidelines have been prepared for handling garbage and preventing domestic fly breeding under Darwin conditions. These include;

- Use a kitchen tidy bin with a sealable lid and a liner for temporary storage. Keep the tidy bin inside a screened house or in a screened area to prevent fly entry. Install a pest strip in the tidy.

- Wash out all food containers such as milk cartons, meat trays, pet food tins, plastic bags and other tins which contain residues of food before placing them in the kitchen tidy bin. Reduce all fluids in garbage as much as possible.

- Bury or collect and securely wrap or bag all uneaten pet food including old bones and place in a wheelie bin.

- Wrap all putrifiable food scraps securely in newspaper or seal them in plastic bags prior to depositing in a kitchen tidy bin. Alternatively, keep wrapped meat scraps in the freezer until bin collection day.

- Tie all kitchen tidy bin liners with a knot before depositing the contents in the wheelie bins. This will prevent fly entry and more importantly prevent fly or maggot exit.

- Ensure the kitchen tidy bin contents are placed in the wheelie bin daily and at least the day before wheelie bin collection.

- Do not place garbage in industrial bins.

- Ensure wheelie bins are placed out before scheduled collections. A missed collection can lead to fly breeding.

- Ensure the wheelie bin is not over full and the lid is closed at all times.

- Wash all bins out after collection and allow drying out.

- If you continue to have a maggot problem spray the bottom of a cleaned out bin and the inside of the lid with a residual insecticide such as Permethrin or Deltamethrin.

- Install a pest strip such as Binkill or Sureguard mini-strip inside a wheelie bin and replace the strips every two months.

- If you see a missed bin on collection day, alert the person responsible of the potential for fly breeding.
Alternate means of disposal of garbage

There are some alternatives for the disposal of garbage in certain locations or for high fly potential garbage. These are usually not as effective as securely bagging and placing in a wheelie bin with an impregnated pest strip. Alternative methods include;

- **Vegetable scraps**
  - Spread thinly over mulched areas.
  - Spread very thinly under mulched areas.
  - Bury beneath soil.
  - Place in a fly proof compost bin.

- **Meat scraps**
  - Bury beneath soil.
  - Take to the dump more regularly, perhaps in cooperation with neighbors.
  - Store separately in an airtight fly proof receptacle in a suitable area.
  - Wrap and store in the freezer before placing out in bin just before collection.

- **Pet and Animal Manure**
  - Pet faeces or fowl and horse manure should be spread thinly on or hosed into the ground, buried or bagged and placed in a bin.

- **Lawn clippings**
  - Spread lawn clippings thinly to allow drying.

Adult fly control

Many methods may be used to reduce adult flies in and around the home, including screening, air curtains, fly swats, knock down insecticides containing resmethrin or similar, fly traps, electrocution devices, and fly baits. Screening can be very effective in separating food and people from flies. The other devices are very useful inside the house in destroying those flies that enter but offer little in the way of controlling the outside population of flies. Fly traps, while useful for survey purposes, usually only harvest a proportion of the large population of flies. They do not clear a residential area of flies and offer little control. Electronic sound repellers do not work against insects and are completely useless as fly control devices.

Electrocution devices with attracting ultra violet light are excellent devices for killing adult flies in food preparation premises. They are best positioned close to fly entry points. They should be out of sight of flies outside the premises to prevent attracting flies inside. They must be well away from food preparation or consumption surfaces as dead fly debris can contaminate food.

Environmental considerations

There are many environmental considerations to take into account with garbage storage and disposal and they are listed below.

- Reduce the amount of garbage by recycling or using alternate means of disposal.
- Sealing and wrapping with paper is preferable to bagging in plastic.
- Reduce the need for plastic bagging by using alternate means of disposal of putrifiable garbage.
- Wash out bins on lawn areas rather than at the curbside where the garbage and water will lead to a problem in the gutter or storm drain outfall.
- Ants can be useful to assist maggot control but they are not a substitute for good garbage practice.
- Any oils or other environmentally dangerous chemicals and insecticides should not be put into the garbage. They end up contaminating the disposal site and surrounding environment.

References


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Ready for the ‘killer maggot’

A story of a fearsome pest known as the screw-worm fly and our efforts to halt it in its tracks

As an adult it looks like your average blowfly, but this particular fly comes with a history and a life-cycle that makes it a living nightmare – its maggots (larvae) feed on the living flesh of warm-blooded vertebrates. It’s called the screw-worm fly and it’s found in many of the countries immediately to Australia’s north. If it reached Australia it could wreak widespread economic havoc and misery.

Why is the screw-worm fly such a problem? What is being done to fight the screw-worm fly in countries where it occurs? How is Australia preparing for its possible (some scientists say probable) arrival? And what role does a new fly breeding facility in Malaysia have in our battle against the screw-worm fly? The answers to these and many other issues are provided in this Special Feature.

Meet the enemy

The screw-worm fly is one of the most unpleasant insect pests that humans have ever had to deal with. Not only does it attack and often kill our livestock and pets, it will also attack humans if the opportunity arises – sometimes with horrible consequences.

The screw-worm fly is an average sized, blue blowfly found throughout the tropics. What makes the screw-worm fly so damaging is that its larvae (maggots) can only survive in the healthy tissue of warm-blooded animals. In contrast, the maggots of most other blowflies, such as the Australian sheep blowfly, develop on dead animals or the diseased tissue of living hosts.

There are two species of fly involved: The Old World screw-worm fly (Chrysomya bezziana) and the New World screw-worm fly (Cochliomyia hominivorax – hominivorax is Latin for man-eater!). They’re both very similar in appearance and life-cycle but they occur in different regions of the world. The Old World screw-worm is found in Africa, India and Asia whereas the New World screw-worm is found in South America and Central America.

Cycles of life and death

To give screw-worm maggots access to living flesh, female screw-worm flies lay hundreds of eggs in a tightly cemented mass on the dry edge of wounds or body openings. The eggs hatch 12 to 20 hours later and the larvae crawl into the wound or toward the host’s soft, moist tissues.

Over the next week the maggots burrow deeply into the host’s living flesh and grow to approximately 15 mm long and 3 mm in diameter. They appear whitish to cream in colour. Bands of dark spines grow on each body segment of the tapered worm-like maggots giving them the appearance of a screw – hence their name.

However, the real damage is done by a strong pair of mouth hooks on the maggot’s head. They use these hooks to tear open tiny blood vessels (capillaries) in the flesh of the host, encouraging bleeding and feeding on the fluids produced by this wounding.

The larvae normally stay together in a tightly bunched pack while feeding – often forming a pulsating mass of hundreds or thousands of tightly packed maggots, heads down, tails up. This causes the wound, which may have been quite small to