

## Common flies found in Hong Kong

Flies are insects that belong to the order Diptera. A distinctive feature of Diptera is the presence of only one pair of flying wings on the thorax, whilst the hind wings have evolved into the halteres.

In general, flies usually refer to the urban dipteran species covering the common filth flies in Hong Kong, represented by the house flies, blow flies and flesh flies. Apart from their apparent nuisance, they are also pests of significant public health importance, as they could mechanically transmit pathogens to our food. Some fly species may also attack animal and human tissues intentionally or accidentally, resulting in myiasis or wound infections.

In optimal conditions with ample breeding places, high humidity and warm weather, the life cycle of the flies could be completed in a few days; thereby swarms of flies could be produced within a short period of time resulting in a relatively sudden nuisance.



Common House Fly, *Musca domestica*

### House flies

House flies belong to the family Muscidae. They are generally medium-sized flies with a greyish brown appearance, carrying four longitudinal black stripes on the thorax. These omnivorous flies usually breed in general house refuse. They are particularly attracted to sugary food, and could also feed on rotten organic matter or faeces. Their movement from faeces to our food, with pathogens carried by their excrements, their mouth parts and contaminated body surfaces, is a well-known cause of food poisoning and other diseases.

The prevalent species of house flies in Hong Kong is the Common House Fly (*Musca domestica*).

### Blow flies

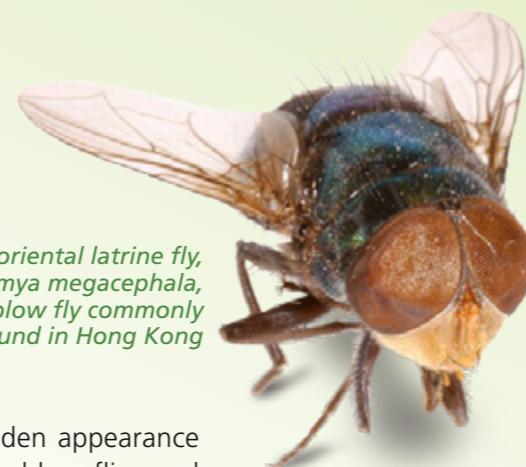
Blow flies belong to the family Calliphoridae. They are medium- to large- sized flies that usually carry a metallic green or blue appearance. Most species breed in rotten vegetables and fruits as well as animal faeces. They also breed in meats and carcasses.

Many species of blow flies are known for their facultative or obligatory parasitism, capable of breeding in wounds or even natural body openings of human and farm animals. Most of the myiasis cases in Hong Kong are the infestation results of the *Chrysomya bezziana*, also known as Old World Screwworm Fly.

### Flesh flies

Flesh flies belong to the family Sarcophagidae. They are relatively large flies with a greyish body, three longitudinal black stripes on the thorax and usually the "checkerboard" pattern on the abdomen. They also have the characteristic that they lay larvae instead of eggs. Urban species mainly breed in decaying meat, but may also feed on other decaying organic materials such as faeces and rotten plants. Depending on the species, their larvae may also be cannibalistic or parasitic.

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The oriental latrine fly, *Chrysomya megacephala*, a blow fly commonly found in Hong Kong

The sudden appearance of a few blow flies and flesh flies may sometimes indicate the presence of an unattended dead body of an animal.

### Prevention and Control

According to the World Health Organization, environmental sanitation is the fundamental measure for fly control. (Pesticides and Their Application, WHO 2006)

To prevent fly infestation, household refuse should always be properly bagged and disposed of in lidded refuse bins, and the refuse bins should then be covered tightly with the lid. Animal carcasses should be properly bagged to avoid exposure to the air, and should be transferred to refuse collection points for disposal. Handling, storage and disposal of human and animal excrements should also be conducted properly. Frequent cleansing should



A flesh fly *Parasarcophaga albiceps*



Old World Screwworm Fly, *Chrysomya bezziana*

be conducted to ensure that all food waste is promptly detected and removed. If necessary, devices such as window screens (10 mesh, i.e. 10 x 10 meshes per sq. inch), electric fans or air curtains (preferably with air velocity 8 m/s or higher), anti-fly curtains made of plastic strips or strips with beads and self-closing doors could also help to reduce the entry of flies from the outside.

For the control of existing fly infestations, special cleansing operations should be conducted with particular attention to the breeding places of the fly species identified in the vicinities of the area concerned. Properly installed glue boards, light traps or insect electrocution devices might also provide some relieve at and around premises. Under severe conditions or in case the removal of such breeding places would be impossible or impractical, application of appropriate pesticide by trained personnel could also be considered as a supplementary measure for rapid control in the short term.

### Other flies found in Hong Kong

Apart from the flies discussed above, fruit flies or melon flies could often be found on rotten fruits. Flies such as phorid flies, hover flies and the blood-feeding stable flies and horse flies also exist in rural areas in Hong Kong. Moth flies may sometimes be observed around drain holes (recently reviewed in Pest Control Newsletter Issue No. 27). Last but not least, biting midges and the more slender mosquitoes, crane flies and chironomids also belong to the order Diptera and are therefore true flies in a broader biological sense.

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## Mechanical carriers and Biological vectors: Two common roles of arthropods in diseases transmission



*Aedes albopictus* (白紋伊蚊), one of the biological vectors of Dengue Fever



*Periplaneta americana* (美洲蜚蠊), a mechanical carrier of pathogens responsible for enteric infections of humans

Arthropod pests are animals that are considered as harmful to humans. Some of the pests not only cause a nuisance or an injury through biting, but also transmit diseases to humans and animals. Those arthropod pests are called "disease carriers", which transport pathogens to susceptible individuals, their food or surroundings. They can both affect the health of people and impose heavy economic burden on society, especially in the developing countries. According to the figures from the World Health Organization, a child dies every minute from Malaria in Africa. Generally, there are two ways in which arthropods transmit pathogens, either mechanically or biologically.

### Mechanical carriers

Mechanical transmission occurs when arthropod pests pick up pathogens on their feet, body hairs, body surfaces or other body structures and finally transport the pathogens to susceptible hosts. After feeding on garbage or excrement, arthropods, especially flies and cockroaches, acquire pathogens onto their bodies. Those arthropods may then deposit the disease-causing agents onto our food, cooking utensils, dining wares etc. Body structures, like spines on cockroach's legs, and certain behaviours, like regurgitating digestive enzyme onto food by flies, facilitate the pick-up and deposition of pathogens. It has been reported that cockroaches are able to carry bacteria including *Escherichia coli*, *Salmonella* species and *Vibrio* species that cause food poisoning in humans.

### Biological Vectors

Biological transmission involves a more complex mechanism in which the arthropods also act as hosts in the pathogens' life cycles. The arthropods first acquire the pathogens from diseased hosts, for example, through blood-sucking. Inside the arthropod bodies, the disease-causing agents may undergo multiplication (e.g. Dengue viruses which cause Dengue Fever and plasmodia which

cause Malaria) or developmental changes (e.g. nematodes which cause Filariasis). Afterwards, the arthropod vectors are able to spread the pathogens to other hosts, for example, through biting and hence they become infective. The relationship between the pathogens and arthropod vectors are usually highly specific. For example, the viruses causing Dengue Fever are only transmitted by some mosquito species of the genus *Aedes* (e.g. *Aedes albopictus*) while the protozoans causing Malaria are only transmitted by certain mosquito species of the genus *Anopheles*.

In both the mechanical and biological mechanisms of disease transmission, the role of the arthropods is critical in the propagation of infections. In order to control the vector-borne diseases, it is thus vital to suppress or eliminate the arthropod vectors, if possible, which could be achieved by elimination of vectors' breeding sites and improvement on environmental hygiene. Avoiding bites by the arthropod pests can also be an effective means of prevention of vector-borne diseases. Personal protection measures, like applying insect repellents and wearing long-sleeve clothing at outdoor areas, can reduce the chances of arthropod bites.

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