



# Pest Facts

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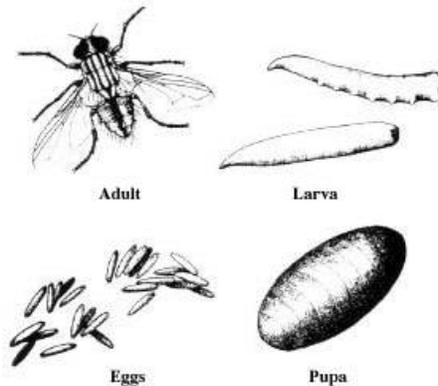
## Filth Flies

Filth flies (house fly, little house fly, blow fly, bottle fly, flesh fly), as a group, are not only a nuisance by their presence, but are also important public health pests. For example, the house flies may vector diseases such as conjunctivitis, poliomyelitis, typhoid fever, tuberculosis, anthrax, leprosy, cholera, diarrhea and dysentery. They may also serve as intermediate hosts for tapeworms or roundworms. Certain larvae of blow flies, bottle flies, screwworm flies and flesh flies may feed on dead as well as living tissue of mammals, causing blood poisoning and even death, especially in sheep. Stable flies inflict a painful bite. False stable flies do not bite, but spread certain diseases.

### IDENTIFICATION AND LIFE HISTORY

#### House Fly (*Musca domestica*)

Adults are about 1/6 to 1/4" long with reddish-brown eyes. Females are usually larger than the males and have wider spacing between the eyes. They have two membranous wings; sponging or non-biting mouthparts; a dull gray body; and four narrow, black lengthwise stripes on the thorax. Each female, during a three to four week period, lays five to six batches of 75 to 100 small, white, oval eggs, largely in decaying organic materials, that hatch in 12 to 24 hours into creamy white larvae (maggots). Larvae grow and pupate in four to seven days, and the last larval skin, which is hard and dark brown, is called a puparium. This stage lasts from seven to ten days, and may be the overwintering

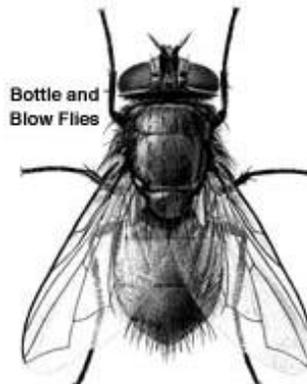


stage in temperate climates. The life cycle from egg to adult may be from 8-12 days in warm weather. A pair of flies (if all offspring survived) could produce 200 quintillion flies in about 5 months. Allowing 1/8 cubic inch to a fly, this number would cover the earth 47 feet deep!

When feeding, house flies regurgitate some of their stomach contents on the food, which dissolves it. Then they suck it back into their stomach. They leave fecal deposits where they have walked. While walking and feeding on garbage, fecal material and food, flies may transfer disease organisms from both inside and outside their bodies. They are very strong fliers with a range of 2 to 20 miles/day.

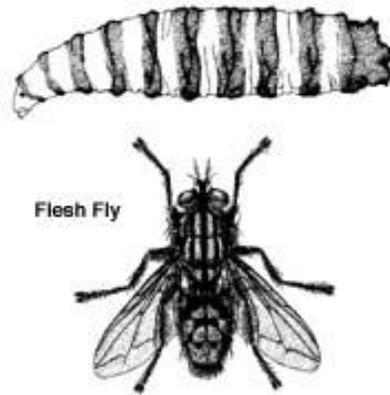
#### Bottle and Blow Flies (Family Calliphoridae)

Blow flies, sometimes known as green or blue bottle flies, are larger than common house flies. Some are characterized by metallic colors such as black (*Phormia* spp.), blue (*Calliphora* spp.) and green or copper (*Phaenicia* spp.). Adults produce a loud, droning buzzing sound while flying. Females lay eggs primarily on confined garbage. These flies are often attracted to dead animals, animal wounds, and feces-caked hair or wool on pets or farm animals. During warm autumn days, adults may gather on door and window screens and later enter homes for overwintering. Larvae are commonly found in garbage wastes and pet droppings. Larval development is completed in less than a week for green or copper blow flies and 10-20 days for blue or black blow flies. Screwworm fly larvae may infest living flesh, especially at wound sites. Green bottle flies are seen on dog feces. All species are strong fliers and the average flight range is 3-10 miles.



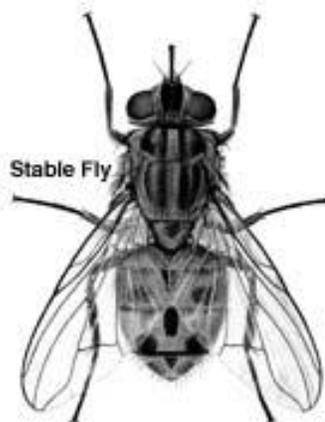
### Flesh Fly (Family Sarcophagidae)

Flesh flies, or sarcophagid flies, are much larger than house flies, usually about 1/3" long or slightly longer. They are grayish in color, with three distinct dark stripes on the thorax and a gray and black checkerboard pattern on the abdomen. Females will often deposit living larvae (maggots) rather than eggs in the decaying flesh of dead animals and excrement, especially dog stools. The life cycle (egg to adult) is about 8 days.



### Stable Fly (*Stomoxys calcitrans*)

Adults resemble house flies except for the slender, pointed, sharp beak used to create a wound, subsequently feeding on blood. Bites are often painful. These flies may vector anthrax and possibly infantile paralysis, leprosy, surra and swamp fever. Normally an outdoor fly, it attacks any warm blooded animal. Females lay four to five batches of eggs, each containing 100 to 150, in rotting straw, stable manure, and piles of decaying vegetation. The life cycle is about three weeks; both males and females feed on blood.



## **MANAGEMENT**

A four step integrated pest management program should include the following: (1) cultural methods; (2) exclusion; (3) mechanical measures, and if necessary, (4) chemical methods. Furthermore, extensive training and education programs should be developed.

**Cultural Measures:** Activities around facilities should be initially designed or altered to minimize potential fly breeding and aggregation sites. For example, a schedule of regular cleaning and general sanitation is most effective in reducing fly numbers in the area, both by eliminating breeding sites and by attracting fewer flies.

**Garbage (Food Refuse) Disposal:** Food disposed in trash cans or dumpsters are attractive to flies and should be emptied (twice or more per week) frequently. Container lids should be closed tightly when not in use and the container and surrounding areas should be cleaned periodically (steam clean pavement if necessary). Because filth flies are strong fliers, monitor dumpsters and other waste disposal sites for compliance to sanitation standards (i.e., tight fitting lids in place when not in use, area free of refuse, emptied on a regular basis, etc.).

**Trash Disposal System:** Dumpsters located next to a loading dock or back door entrance will attract flies allowing them to gain access to the facility when a door or window (if any) is opened. Dumpsters should be placed at least 100 feet from any entrance on an impermeable surface. Accumulations of rotting material that forms a layer of sludge provides an ideal fly breeding source.

**Exclusion:** Despite the best sanitation efforts, flies are attracted to buildings because they are often an ideal harborage area (temperature, humidity, safety from predators, and potential food source). Therefore, to prevent fly access, all outside exists should be equipped with self-closing devices and when practical, supplementary screen doors. Screens on doors should not have tears or holes and the weather stripping around door and window casings should be intact, sealing tightly. Cracks and other openings to the exterior that could allow flies access should be sealed.

### **Mechanical:**

**Air doors (fly fans):** Install air doors or fly fans above all exterior entrances. These devices must remain on when the door is open, directing the air current down and out of the facility. Check the operation of each unit periodically to ensure proper adjustment.

**Air Current:** Simply creating an air current (with fans) in spaces where flies congregate and rest will tend to disperse individuals. This is particularly effective in directing flies away from entrances.

**Devices for electrocuting flying insects (DEFLI):** DEFLIs may be considered as part of IPM programs to manage filth flies. As such, they must be integrated with other methods of management. DEFLIs alone will not solve serious fly problems. Some important measures necessary for minimizing fly problems include:

- Locate garbage containers as far from buildings as practical (stated above)
- Steam clean garbage containers weekly during warm weather (stated above)

-Maintain excellent sanitation, especially in potential breeding sites (loading, storage and service areas) (stated above).

-Whenever feasible, identify and eliminate breeding sites (may require weed control and general cleanup) (stated above)

-Ensure that screens, air curtains and self-closing doors are frequently inspected and properly maintained (stated above)

-When selecting outside lighting, consider the use of mercury vapor lamps on poles away from buildings

-Reduce vegetation and loading dock clutter. Surplus equipment should be cleaned thoroughly and stored indoors or turned into DRMO. Decorative vegetation should be located away from the building, particularly exterior entrances, and decaying vegetation (yard waste) removed immediately.

#### Use of DEFLIs:

*General-* There is no “cookbook” explanation of how to determine the optimum density, unit size or exact locations. Manufacturers generally provide consultation upon request. However, some “rules of thumb” are provided for assistance. If glue boards are used in conjunction with DEFLIs, they must be monitored and replaced regularly.

*Models-* DEFLIs are available primarily as rectangular units of varying sizes and shapes. The most common units are designed for two four-foot 40 watt lamps or two two-foot 20 watt lamps. **THEY SHOULD NEVER BE INSTALLED NEAR FOOD PREPARATION AREAS.**

*Height-* For optimum capture, units should be placed approximately 2 feet above the floor. When this is impractical, units can be raised but placement should not exceed 5 feet above the floor. **THEY SHOULD NEVER BE PLACED OUTDOORS OR NEAR WINDOWS. PLACEMENT IN THIS MANNER WILL ATTRACT ADDITIONAL INSECTS.**

*Competition with other light sources-* Units should be placed to minimize competition from natural and artificial light sources and to ensure insects are not attracted from outdoors. DEFLIs should be run continuously.

*Planning a layout-* Units should be located along insect pathways leading to sensitive areas. The first unit encountered by flies entering a building should be near an entry point where the temperature is over 50F

*Density-* As a compromise between optimum attraction and cost-effectiveness, 50 foot spacing (of units with two 40 watt lamps) may be used as a baseline for determining density.

#### **Chemical:**

Insecticide treatments should only be performed after using all other methods in an integrated program. In most cases, insecticide applications will be limited to specific sites

where adult flies tend to rest. The two major types of insecticide formulations which are most effective include water based residuals and baits.

*Water-based Residual Insecticides:* Wettable powder and microencapsulated insecticides are ideally suited for control of adult flies on exposed surfaces. Such treatments are largely applied to fly resting sites including: (1) on walls around entrance doors, especially those on the sunny side of the structure where flies tend to congregate, including upper walls, door jambs, high resting areas, windows and skylights and food preparation area drains and cracks; (2) around window frames; and (3) on all surfaces of the trash dumpster.

Resistance has been found to many compounds in filth flies when populations are inordinately large and repeated chemical applications are made over extended periods. If insecticide resistance becomes an issue, rotate different classes of insecticides. For example, alternate a pyrethroid with an organophosphate (OP). Recommendations include: Tempo 20WP (active compound= cyfluthrin which is a pyrethroid), Demon WP (active compound= cypermethrin which is a pyrethroid) and Empire 20 (active compound= chlorpyrifos which is an OP). All insecticides must be applied by a certified applicator according to label instructions.

**Baits:** Quickstrike Fly Abatement Strip: Quickstrike is a self-contained fly abatement strip manufactured by the Zoecon Professional Product Division of Wellmark International. Quickstrike offers a number of advantages for fly control over other fly baits, pesticides and traps. It is ready to use; comes in convenient packaging; contains feeding attractants and the sex attractant pheromone that make the station immediately attractive to flies; is lightweight and not bulky, provides a month of control per station; and contains a new active ingredient, nithiazine. It is an effective tool for IPM control of filth flies and is an excellent alternative to conventional fly baits. The station must be protected from direct sunlight and moisture.

#### **Surveillance and Review:**

Once a plan has been designed, it must be evaluated on a regular basis. This includes estimating fly numbers before and after plan implementation. Use sticky boards beneath DEFLIs, identify high population density areas and monitor fly numbers, customer complaints, etc. Determine what components of the program are effective and which are not. This may include trap placement, adjusting sanitation practices, etc. Alter the program as necessary.

#### **Program Summary**

-Identify active or potential breeding areas: Remember, larvae require moist, decaying organic matter to survive. Anywhere moisture, warmth and poor sanitation exist is a potential problem site.

-Eliminate breeding areas: Ensure that breeding areas are made less attractive to the flies. Clean away organic matter, reduce the amount of moisture. Practice good housekeeping methods.

-Prevent access to buildings: Reduce breeding opportunities outdoors. Make sure garbage (organic) is placed safely away from the facility (about 100 ft from any entrance).

Make sure all windows and doors are in good repair, screens fit properly, air screens over doors are properly adjusted and working at all times. Remove vegetation from locations next to the building.

-Educate employees: Warehouse/food service workers and supervisors are your first line of defense. Inform workers about the problem and how they can contribute to the solution. Workers are often your best source of information and their participation is vital to prevention.

-Chemical: Pesticide application is generally unnecessary and may provide only temporary relief. Space treatments or fogs are used periodically to reduce the adult fly population **AFTER** breeding sites have been eliminated. Remember that space treatments only kill those flies which contact the chemical. They are not residuals with long lasting action. Spraying insecticides on breeding sites rather than eliminating them is not effective and should not be considered.

-Review: Continue surveillance for breeding areas after the flies are gone. This will reduce the risk for future infestations.

For additional information, please contact the Entomology Department at the Defense Supply Center Philadelphia-West Coast Support Office, Alameda, California at DSN 686-8122, commercial 510-337-8122 or email paa5245@exmail.dscp.dla.mil

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