

FLIES

Integrated Pest Management in and around the Home

Of the thousands of species of flies, only a few are common pests in and around the home. Some of the more common nuisance flies are the house fly (*Musca domestica*), the face fly (*Musca autumnalis*), the stable fly (*Stomoxys calcitrans*), the little house fly (*Fannia canicularis*), and several species of garbage fly (especially in the genus *Phaenicia*). These pests breed in animal wastes and decaying organic material from which they can pick up bacteria and viruses that may cause human diseases. In addition, adult stable flies (sometimes called "biting flies") feed on mammalian blood and can give a painful bite.

All flies undergo complete metamorphosis with egg, larva, pupa, and adult stages in their development (Fig. 1). The female fly deposits her eggs in animal waste or moist organic material where the larvae, or "maggots," complete their development, feeding on bacteria associated with their developmental site. When the maggots have completed their development and are ready to undergo the next step in their metamorphosis, they convert their last larval skin into a puparium, a hardened shell within which the pupa develops. Within the puparium, the pupa transforms into an adult fly, which pops off the end of the puparium and emerges. Body fluids pump into the fly's veins, causing the wings to unfold and expand and allowing them to dry and harden so that the adult can fly. The rate of fly development is dependent upon temperature, and under optimal summertime conditions flies may develop from egg to adult in as little as 7 days. Once the female fly has mated, she can lay several batches of eggs, typically containing over 100 eggs each.

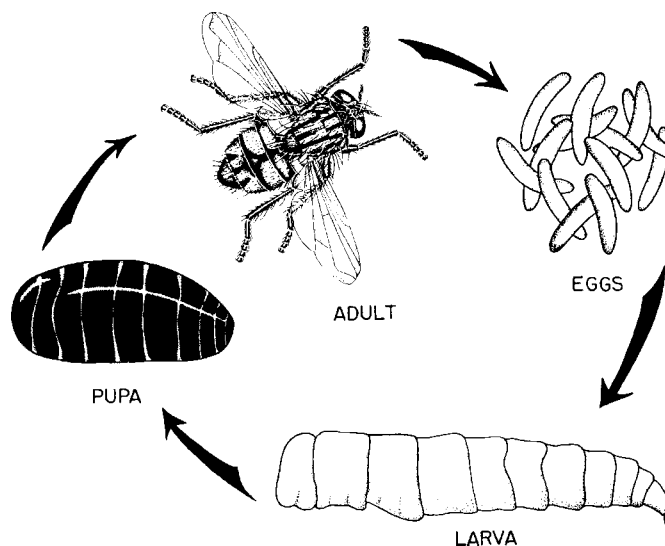


Figure 1. Life cycle of the fly.

While humans commonly find adult flies to be the most bothersome, the larval stage should be the prime target for control efforts. Elimination of larval habitat is the preferred method of pest fly suppression. By removing material in which the larvae develop, the life cycle of the fly can be broken, preventing subsequent production of adult flies. While chemical pesticides may be effective for suppressing adult fly populations in some situations, they are not a substitute for proper sanitation and aggressive elimination of nuisance fly developmental sites. Because flies can quickly develop resistance to insecticides, use them only as a last resort to obtain immediate control of adult flies.

HOUSE FLY

Identification and Life Cycle

The house fly (*Musca domestica*) is a cosmopolitan companion of humans and domestic animals. House flies are

generally found in greatest numbers during the hotter summer months. House flies are less than $\frac{3}{8}$ inch in length and have four dark stripes down the back of their thorax (Fig. 2). House flies have sponging mouthparts and eat solid food by first liquefying it with their saliva.

Under favorable conditions house flies can reproduce prodigiously because of

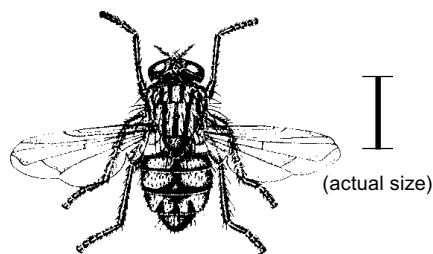


Figure 2. House fly.

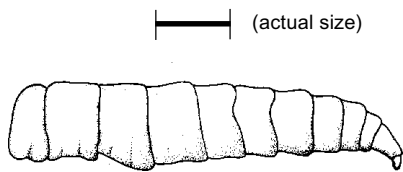


Figure 3. House fly larva.

their rapid developmental time and the large number of eggs produced by each female—several batches of about 100 to 150 eggs. Eggs are laid in warm, moist, organic materials such as manure, garbage, lawn clippings, decaying vegetables and fruits, or soils contaminated with any of these materials. Larvae of the house fly are cream colored, have a blunt posterior end and taper to a point at the head (Fig. 3). Young larvae respond negatively to light and will burrow into the organic material in which they are developing. Older larvae respond positively to light and will emerge from their organic habitat to seek drier and cooler areas to transform into pupae. Under optimal summertime conditions, house flies can complete their development from egg to adult in as little as 7 days.

Damage

Because they have sponging mouthparts, house flies cannot bite; however, they may play an important role in disease transmission to humans and animals. House flies serve as carriers of disease agents due to their predilection for feeding on animal wastes, garbage, and human foods. House flies are known to carry bacteria and viruses that cause conditions such as diarrhea, cholera, food poisoning, yaws, dysentery, and eye infections.

Management of House Flies

Flies found inside a building have entered from the outside in almost all cases. Therefore, barriers preventing access to the building are the first line of defense. Cracks around windows and doors where flies may enter should be sealed. Well-fitted screens will also limit their access to buildings. Out-

doors, regular removal (at least once a week) and disposal of organic waste, including dog feces and rotting fruit, reduces the attractiveness of the area to adult flies and limits their breeding sites. Garbage should not be allowed to accumulate and should be placed in plastic bags and held in containers with tight-fitting lids. Garbage should also be placed as far from a building entrance as is practicable. In general, poor exclusion and lack of sanitation are the major contributors to fly problems.

Sticky fly papers or ribbons are effective at eliminating a few flies in relatively confined areas, but are not effective enough to manage heavy infestations or to provide control in an outdoor setting. Inverted cone traps containing fly food attractants can be readily purchased commercially and are effective when they are not competing with nearby garbage or animal wastes. The fly food attractants used in these inverted cone traps will be quite foul smelling, so the traps should be placed at some distance from occupied structures. Fly traps using ultraviolet light may be effective when used indoors where they are not competing with daytime sunlight. For control of just a few flies, the time-tested fly swatter is appropriate. Don't use fly swatters near food preparation areas because they may result in contaminating food with insect body parts.

Selective use of insecticides against house flies is one component of a total fly management program, but should only be used after all possible non-chemical strategies have been employed. In most home situations, pesticides are not needed or recommended. Sanitation methods along with screens to keep flies out of the home should be sufficient. If sanitation efforts are not possible, a nonresidual pyrethrin aerosol may be used. Outside, a professional pest control company can be hired to apply residual insecticides to surfaces such as walls and overhangs that are being used by the flies as resting areas. Fly baits used in trash areas may be effective in reducing the number of adult flies if proper sanitation

practices are followed. However, when flies have access to garbage, baits will not control them.

LITTLE HOUSE FLY Identification and Life Cycle

Little house fly (*Fannia canicularis*) is generally most numerous during the cooler spring and fall months. As temperatures rise in summer, populations of *Fannia* diminish.

Adults are approximately two-thirds the size of the house fly and lack the house fly's distinctive thoracic stripes (Fig. 4). *Fannia* at rest hold their wings over the back more than the house fly does, creating a narrower V-shape to the wing outline. Flying clusters of male *Fannia* typically form in areas with still air such as breezeways and porch areas of residential homes, maintaining a position 5 or 6 feet above the ground. Strong air currents tend to disperse these male aggregations.

Larval *Fannia* are adapted to tolerate a wide moisture range at their developmental sites, making them a particularly difficult nuisance fly to control. Egg laying and larval development frequently occur in animal wastes (especially chicken manure), but various moist organic materials can serve as suitable substrates. Poultry manure in inland areas of southern California can have abundant coastal fly, *F. femoralis*. This fly looks much like *F. canicularis*, especially in the immature stages, but is not a pest affecting humans. Unlike house fly larvae, larvae of *Fannia* are

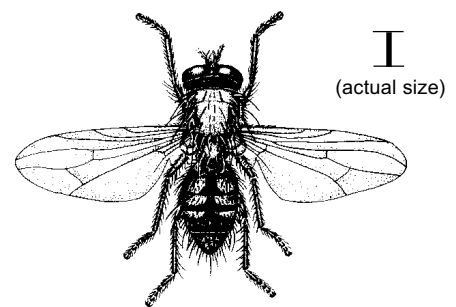


Figure 4. Little house fly.

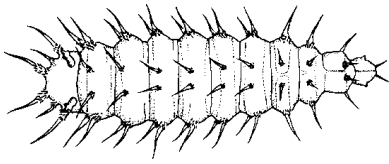


Figure 5. Little house fly larva.

brown in color, more flat than round, and have numerous fleshy spines (Fig. 5). The developmental time from egg to adult is somewhat longer for little house fly than for the house fly at all temperatures.

Damage

Little house flies are more reluctant to enter homes than are house flies; instead, they tend to congregate in outdoor areas such as patios, entryways, and garages. As temperatures decline, they seek cover in buildings or protective vegetation. They seldom land on human foods and are not considered a significant carrier of human disease agents. However, their habit of hovering at face height makes them annoying, though they move readily out of the way when approached.

Management of Little House Flies

As with all nuisance flies, eliminating breeding sites is the preferred method of controlling *Fannia*. Accumulations of manure (especially poultry) or other decaying organic matter are ideal developmental sites. These developmental sites must be removed or spread thin to fully dry. *Fannia* are not attracted to the same fly baits or traps that collect house flies. Some relief can be obtained by placing fans in areas where male *Fannia* tend to swarm, as the increased air movement will make the site less attractive to them.

FACE FLY

Identification and Life Cycle

Face flies (*Musca autumnalis*) are a problem particularly in rural areas of northern and coastal California where livestock are present. The hotter, drier weather in southern California and the southern San Joaquin Valley is not con-

ducive to their development. Face flies require fresh cattle or horse manure for development. The face fly looks virtually identical to the house fly but is somewhat larger and darker in color and male face flies have a distinctive orange-yellow-colored abdomen. Like the house fly, it also has sponging mouthparts and cannot bite. However, face fly behavior is distinctive because they are specifically attracted to the eyes, nose, and mouth of cattle and horses.

Damage

Face flies feed on the secretions of cattle and horses in the summer months. Their habit of feeding around the eyes makes them capable of transmitting pinkeye to livestock, and they are a much more successful pinkeye vector than the closely related house fly. In fall, swarms of face flies may enter buildings or similar structures to hibernate through the winter months. On warm days, these hibernating flies can become active resulting in nuisance to homeowners. When active, face flies are attracted to light, so they are frequently found flying inside homes near windows.

Management of Face Flies

To control adult face flies within the home, locate the area where the flies are hibernating and then treat them directly. Begin searching for resting sites on the southern and western sides of the building because in fall and winter these walls receive the most sun and therefore are usually the warmest parts of the building. The flies are attracted to these warm areas when searching for protective wintertime harborage. Face flies seeking shelter will often enter cracks and crevices that lead to structural voids in a building, such as crawl spaces, attics, or false ceilings. These structural voids may need to be inspected if the presence of adult face flies persists throughout the winter.

Flies can be vacuumed off the surfaces on which they are hibernating; in areas inaccessible to vacuuming, a residual insecticide such as a pyrethroid can be

applied. For application of residual insecticides, contact a reputable pest control company. To prevent future infestations, cracks on the outside of the building structure that may serve as entry points for flies should be sealed.

For most fly species, the best control is achieved by removing larval developmental sites. Because face flies develop in fresh, undisturbed cattle manure (intact manure pats), removal of larval developmental sites (i.e., removal of intact manure pats) may be very difficult and probably impractical in most circumstances. However, by increasing the density of cattle (generally accomplished by restricting their pasture area), the manure pats will be disturbed, allowing few flies to develop. Also, removal of cattle from nearby fields or pastures may help to reduce the problem.

STABLE FLY

Identification and Life Cycle

The stable fly (*Stomoxys calcitrans*), sometimes called the "biting fly," is a common fly that attacks people living in neighborhoods where livestock animals (e.g., horses, cattle, and sheep) are present or that are close to livestock facilities.

Stable flies typically appear in midspring, become severe in early summer, and decrease in numbers throughout the remaining summer months. These flies are similar in appearance to house flies, except that stable flies have a bayonetlike mouthpart (proboscis) protruding from the front of the head

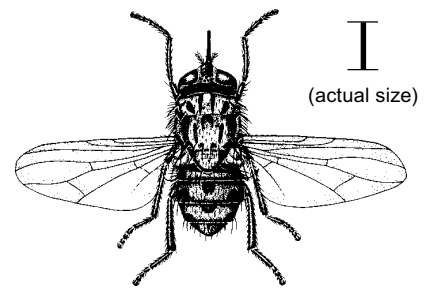


Figure 6. Stable fly.

and they lack the four dark stripes on the thorax indicative of house flies (Fig. 6).

Under optimal temperatures, the stable fly can develop from egg to adult in 12 days. Piles of moist, decaying plant material (e.g., grass clippings, hay, silage) should be considered potential sources of stable flies, especially when this material is mixed with animal manure and urine. Backyard compost and piles of grass clippings are ideal breeding sites for stable fly larvae and may serve as the production source for an entire neighborhood.

Damage

Both sexes of stable flies feed about once per day on the blood of animals (and sometimes people) and are known to give a painful bite. Although they are blood feeders and capable of transmitting some viruses, stable flies are not known to be significant carriers of disease agents in the U.S. Stable flies prefer to feed on the legs and lower body of large animals such as cattle and horses. On dogs, stable flies typically feed around the periphery of the ears. Undisturbed, the stable fly can fully engorge with blood in less than 5 minutes. Fully fed stable flies will move to a suitable resting site (e.g., a wall or fence) while the blood meal is digested.

Management of Stable Flies

The most effective and economical method for reducing stable fly numbers is to eliminate their developmental sites. To prevent larval development, moist grass clippings should be removed or incorporated into compost piles. Compost piles must be properly maintained to prevent them from becoming breeding areas for stable flies. Proper maintenance includes periodically turning the pile, which promotes rapid decomposition of heat-producing organic matter.

To protect dogs and horses that are bothered by stable flies, insect repellents containing permethrin or pyrethrins are effective, but neither provides long-term control; repeated applications every other day are necessary.

Because the stable fly season is relatively short, this chemical repellent approach may be the most economical method to control stable flies on companion animals.

GARBAGE FLIES

Identification and Life Cycle

Garbage flies are a group of fly species with similar life histories and behaviors. Adult flies in this group can be readily differentiated from other flies discussed in this publication by their coloration, which is a shiny, metallic green or blue often mixed with some copper color (Fig. 7).

Under ideal temperatures, garbage flies can develop from egg to adult in as little as 7 days. Eggs are usually laid in decaying meats (carrion), garbage, or dog feces. Similar to other nuisance flies, garbage fly larvae leave their developmental site to seek out drier and more protected areas for pupation. This behavior is responsible for the mass emergence of maggots from trash cans that have been sitting with garbage for too long. Garbage fly larvae and house fly larvae look and behave similarly, making identification difficult for the untrained.

Damage

Like house flies, garbage flies have sponging mouthparts and do not bite or feed on blood. They are, however, strongly attracted to human foods and garbage and can make cooking outdoors difficult due to the nuisance they pose. As with house flies, they may be involved in the transmission of disease agents picked up from garbage or animal feces and subsequently carried to human foods.

Management of Garbage Flies

As with the other nuisance fly species, eradication of larval developmental sites is the most efficient means of control. Household garbage and pet feces should be placed in plastic garbage bags and sealed with ties. Garbage bags should be removed from the home at least weekly and placed in a covered garbage can for pickup by a refuse collection service. Garbage cans should be

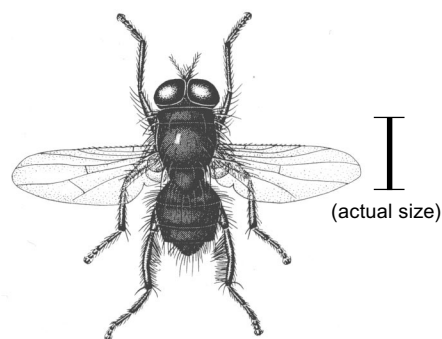


Figure 7. Garbage fly.

set out for pickup at least once each week even if they are not full because garbage that sits for more than one week allows for the development of adult garbage flies. Finally, garbage cans should be regularly washed out with soap and water to remove any garbage residues that might attract garbage flies or allow for their development.

Vertically hanging, sticky fly ribbons used to reduce adult house fly numbers will not work to control adult garbage flies; unlike house flies, garbage flies do not rest on vertical surfaces. Adult garbage flies can be controlled using inverted cone traps, as for house flies, but traps should be placed at some distance from the home or structure due to their foul odor.

Selective use of insecticides may be considered when sanitation measures fail. Fly baits used for control of house flies are not likely to provide good control of garbage flies because the attractants present in fly baits were designed to attract house flies rather than garbage flies, and therefore may not be very attractive to them. However, when placed on the ground or in containers where garbage has accumulated, some control may be obtained.

SUMMARY

Almost all nuisance fly species are best controlled by eliminating larval developmental sites and reducing adult attractants in the vicinity of buildings or

other areas of concern. Attractive material (such as garbage cans) should always be placed at some distance from a building entrance, and barriers such as screens, doors, and air curtains should be used to prevent flies from entering buildings.

Chemicals are only rarely required in residential situations. Their use generally leads only to short-term control because they target adult flies and leave the larval fly stages intact and capable of producing the next generation of adult flies.

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WARNING ON THE USE OF CHEMICALS

Pesticides are poisonous. Always read and carefully follow all precautions and safety recommendations given on the container label. Store all chemicals in the original labeled containers in a locked cabinet or shed, away from food or feeds, and out of the reach of children, unauthorized persons, pets, and livestock.

Confine chemicals to the property being treated. Avoid drift onto neighboring properties, especially gardens containing fruits or vegetables ready to be picked.

Do not place containers containing pesticide in the trash nor pour pesticides down sink or toilet. Either use the pesticide according to the label or take unwanted pesticides to a Household Hazardous Waste Collection site. Contact your county agricultural commissioner for additional information on safe container disposal and for the location of the Household Hazardous Waste Collection site nearest you. Dispose of empty containers by following label directions. Never reuse or burn the containers or dispose of them in such a manner that they may contaminate water supplies or natural waterways.

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