FLIES

Integrated Pest Management In and Around the Home

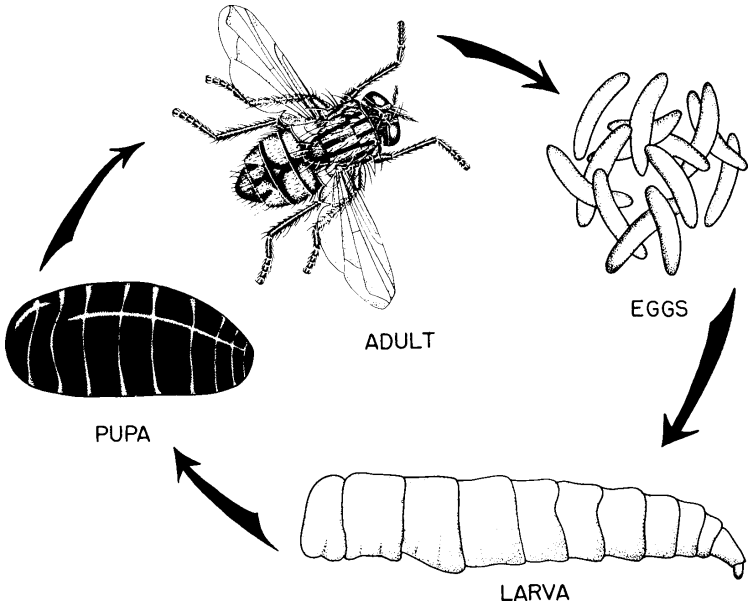

Figure 1. Life cycle of the fly.

Of the thousands of species of flies, only a few are common pests in and around the home. Four of the more frequent pests are the house fly (*Musca domestica*), the face fly (*Musca autumnalis)*, the stable fly (*Stomoxys calcitrans)*, and the little house fly (*Fannia* spp.). These pests breed in filthy locations from which they can contaminate food and transmit diseases; stable flies feed on mammalian blood.

All flies undergo complete metamorphosis with egg, larva, pupa, and adult stages in their development (Fig. 1). The female fly deposits her eggs in moist organic material where the larvae, or "maggots," complete their development. 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 the puparium, a hardened shell within which the pupa develops. The pupa then transforms into the adult fly, which pops off the end of the puparium and emerges. By pumping body fluids into the veins, the fly unfolds and expands its wings, allowing them to dry and harden before it can fly. Under optimal conditions the egg-to-adult development may require as little as 7 to 10 days. Once the female fly has mated, she can lay several batches of eggs, typically containing over 100 eggs each.

While humans are most commonly bothered by the adult stage, the larval stage should be the prime target for control. Elimination of larval habitat is the preferred method of pest fly suppression. By removing the material in which larvae develop, the life cycle of the fly can be broken, preventing subsequent production of the adult pests. While chemical pesticides may be necessary for suppressing adult fly populations in some situations, they are not a substitute for prevention through the elimination of breeding sites. Because flies can quickly develop resistance to insecticides in a few generations, use them only as a last resort to obtain immediate control.

HOUSE FLY

Identification and Life Cycle

The house fly *(Musca domestica*) is a cosmopolitan companion of humans and domestic animals. House flies are less than one-half inch in length. They are gray, with four dark stripes down the dorsum of the thorax (Fig. 2). House flies have sponging mouthparts and can ingest only liquids. However, they can eat solid food (e.g., sugar, flour, pollen) by first liquefying it with their saliva.

Under favorable conditions the house fly can reproduce prodigiously because of its short generation time and

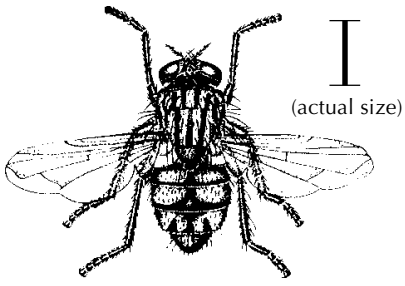

Figure 2. House fly.

PEST NOTES **Publication 7457**

University of California
Division of Agriculture and Natural Resources

February 1999

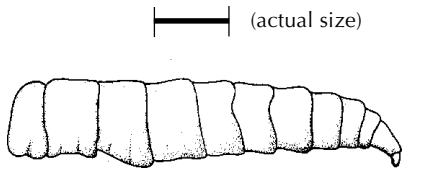

Figure 3. House fly larva.

the large number of eggs produced by each female—several batches of about 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. Under good conditions the eggs hatch in less than a day. The cream-colored larvae can then complete development within a week. Larvae of the house fly have a blunt posterior end and taper to a point at the head end (Fig. 3). Larvae seek drier areas to pupate. Pupation lasts 4 to 5 days and a generation can be completed in less than 2 weeks; during the summer 10 to 12 generations can develop.

Damage

Because they have sponging mouthparts, house flies cannot bite; however, they have been demonstrated to mechanically transmit the causative agents of diarrhea, cholera, yaws, dysentery, and eye infections. Flies are also implicated as mechanical vectors of *Shigella* and *Salmonella*, the latter being a pathogen responsible for food poisoning.

Management of House Flies

Most measures to control house flies are nonchemical. In almost all cases where flies are seen inside a building they have entered from the outside. Therefore, mechanical control remains the first line of defense against house flies. Cracks around windows and doors where flies are entering should be sealed. Well-fitted screens will also limit their access to buildings. For commercial facilities, air doors can provide effective barriers to fly entry, and light traps attract any of those that still manage to get in. A fly swatter can be used effectively against the stray individual that finds its way into a house. Outdoors, regularly remove (at least twice a week) and dispose of organic waste, including dog feces, to reduce the attractiveness of a site to flies and limit their breeding areas. Garbage should not be allowed to accumulate and should be kept in containers with tight-fitting lids. In general, poor exclusion and lack of sanitation are the major contributors to fly problems.

Fly papers or ribbons are effective at eliminating a few flies, but are not effective enough to manage heavy infestations. Inverted cone traps can be effective if the food attractant used draws flies, but they cannot compete with garbage or other aromatic substances in the surrounding area. Bug zappers should only be used indoors and not be visible from the outside through windows or open doorways. Bug zappers outdoors or improper placement indoors can attract more flies than they kill. They should also not be used near food preparation areas because they may actually result in increased food contamination with insect 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 nonchemical strategies have been employed. To kill flies indoors, a nonresidual pyrethrin space spray or aerosol can be used. Keep the room closed for several minutes after treatment until all the flies are dead. Outside, apply residual insecticides to surfaces such as walls and ceilings that are being used by the flies as resting areas. Fly baits used in trash areas are effective in reducing the number of flies around buildings if good sanitation practices are followed. When flies have access to garbage, however, they will not be controlled by baits. Always follow the directions on the insecticide label for safe application.

LITTLE HOUSE FLY

Identification and Life Cycle

While little house flies (*Fannia* spp.) are found throughout the United States, populations of two species thrive in the particular climatic conditions of southern California. Both *Fannia canicularis* and *Fannia femoralis* can be abundant during the cooler months in southern California and are considered major winter pest flies.

Adults are approximately one-half to two-thirds the size of the house fly, *Musca domestica*, and they lack its distinctive thoracic markings (Fig. 4). *Fannia* at rest hold their wings more over the back than *Musca*, creating a narrower V-shape to the wing outline. Flying clusters of male *Fannia* typically form in areas with still air; these milling groups maintain a position 5 or 6 feet above the ground.

Females typically spend most of their time feeding and laying eggs near the larval development site. The immature stages are adapted to tolerate a wide moisture range in the larval development substrate. Egg laying and larval development frequently occur in animal wastes, but various moist organic materials can serve as suitable substrates. Larvae of *Fannia* spp. are brown in color and spiny (Fig. 5). Backyard compost heaps and decomposing piles of grass clippings can produce large numbers of *Fannia*.

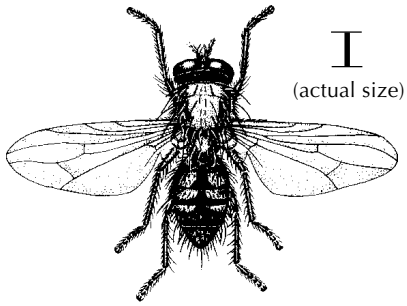

Figure 4. Little house fly.

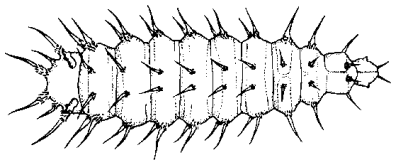

Figure 5. Little house fly larva.

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. Their habit of hovering at face height makes them annoying, though they move readily out of the way when approached. They seldom land and are not considered a significant disease vector.

Strong air currents tend to disperse the male aggregations. As temperatures decline, they seek cover in buildings or protective vegetation. As temperatures rise in late spring and early summer, populations of *Fannia* diminish. In southern California *Fannia* are the main pest fly from November to June, with *Musca domestica* assuming major pest status between June and November.

Management of Little House Flies

Eliminating the breeding site is the preferred method of controlling *Fannia*. Piles of moist, decaying grass clippings are ideal developmental sites, as are accumulations of moist manure. *Fannia* are not attracted to the same fly baits or traps that collect house flies.

FACE FLY

Identification and Life Cycle

Face flies (*Musca antumnalis)* are particularly a problem in rural areas of northern and central California where livestock are present. The hotter, drier weather in southern California is not conducive to their development. The face fly looks virtually identical to the house fly but is somewhat larger and darker in color. Like the house fly it also has sponging mouthparts and cannot bite. However, face fly behavior is distinctive because they are attracted to the eyes, nose, and mouth of cattle and horses.

Female face flies lay their tiny stalked eggs in fresh manure. The yellowish larvae feed on the manure until mature, when they crawl away to a suitable site and pupate in the soil. The life cycle is completed in about 2 weeks.

Damage

Face flies feed on the secretions and sweat of cattle and horses in the summer months. Their habit of feeding around the eyes makes them successful vectors of the causative agent of pinkeye in livestock. They can become pests of humans in fall when swarms of flies enter the walls of buildings to hibernate. Then, on warm days, these hibernating flies can become active and move in large numbers to the inside of the building. Once inside the building they are attracted to light, so they are frequently found flying around windows or lights.

Management of Face Flies

The first step in control is to locate the area where the face flies are hibernating and then treat them directly. The inspection should start on the outside of the south and west sides of the building, because these walls receive the majority of the sun's rays in fall and winter and are therefore usually the warmest parts of the building. The flies are attracted to these warm areas in search of protective harborage for the winter. These flies swarm, then enter cracks and crevices that often lead to structural voids. Sometimes these void spaces are accessible for inspection such as in a crawl space, attic, or false ceiling.

The best nonchemical control method is to vacuum the flies off the surfaces on which they are resting. 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. Dusts are ideal formulations for use in void spaces, but avoid bendiocarb or boric acid dusts because they have given poor results. To prevent future infestations, cracks on the outside that may serve as entry points for flies should be sealed.

STABLE FLY

Identification and Life Cycle

The stable fly (*Stomoxys calcitrans),* sometimes called the "biting fly" or "dog fly," is a common fly attacking people living in neighborhoods with populations of animals or that are close to livestock facilities. These flies are almost indistinguishable from house flies, except that stable flies have a bayonetlike mouthpart (proboscis) protruding from the front of the head (Fig. 6).

Depending on weather conditions, stable flies typically appear in midspring, become severe in early summer, and decrease in numbers by late summer. During prime breeding times in summer, the stable fly can develop from egg to adult in just 2 weeks. The female fly lays over 100 eggs per batch and may lay four or five such batches in her lifetime, so there is potential for rapid population increases. Piles of moist, decaying plant refuse (grass clippings, hay, silage, etc.) should be considered potential sources of stable flies; this is where female stable flies

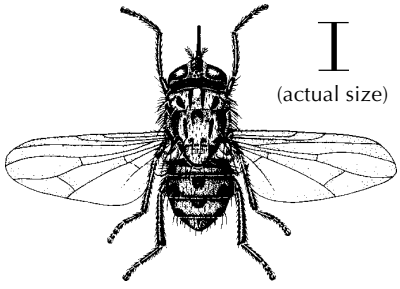

Figure 6. Stable fly.

lay their eggs and where the larvae develop. Larvae of the stable fly resemble larvae of the house fly (Fig. 3). Stable flies do not breed in pure, fresh manure but will develop quite well in manure mixed with hay or other plant material, especially when dampened by urine. Backyard compost heaps and piles of grass clippings are ideal breeding sites for stable fly larvae and may serve as the production source for an entire neighborhood infestation.

Damage

Stable flies bite people and feed on their blood but are not known to be significant vectors of disease. Stable flies also bite animals and tend to feed preferentially on the legs and underside of animals such as cattle and horses. On dogs, stable flies typically feed around the periphery of the ear. Undisturbed, the stable fly can fully engorge in less than 5 minutes. It then flies away to a suitable resting site where it is protected while the blood meal is digested. It is seldom necessary for this pest to fly far to find hosts from which to take a blood meal. When stable flies are a problem in an area, they probably are originating locally.

Management of Stable Flies

The most effective and economical method for reducing populations of the stable fly is elimination of breeding sources. To prevent larval development, moist grass clippings should be spread thinly to dry. Maintain compost piles to promote rapid decomposition of organic matter, which generates heat and makes the pile unsuitable to fly larvae. Another nonchemical measure is pest-proofing the outside of a structure to prevent flies from entering. This technique includes caulking cracks, weatherstripping doors, and installing screens. For protection of dogs and horses that are bothered by stable flies, insect repellents containing permethrin or pyrethrins are effective, but neither provides long-term control, so repeated applications every other day are necessary. Because the stable fly season is relatively short, this approach may be feasible.

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Hedges, Stoy. 1994. *Field Guide for the Management of Structure-Infesting Flies*. Cleveland: Franzak & Foster Co.

For more information contact the University of California Cooperative Extension or agricultural commissioner's office in your county. See your phone book for addresses and phone numbers.

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PRODUCED BY IPM Education and Publications, UC Statewide IPM Project, University of California, Davis, CA 95616-8620.

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This material is partially based upon work supported by the Extension Service, U.S. Department of Agriculture, under special project Section 3(d), Integrated Pest Management.