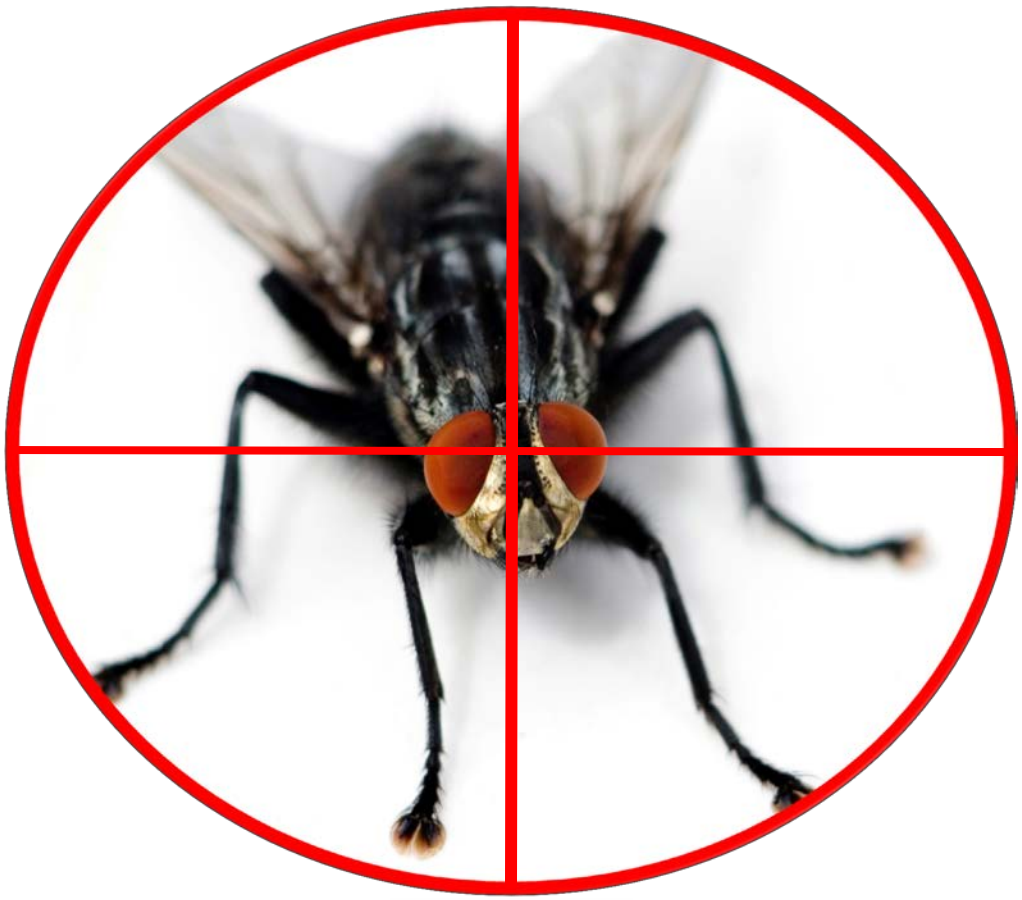
FLY CONTROL GUIDE



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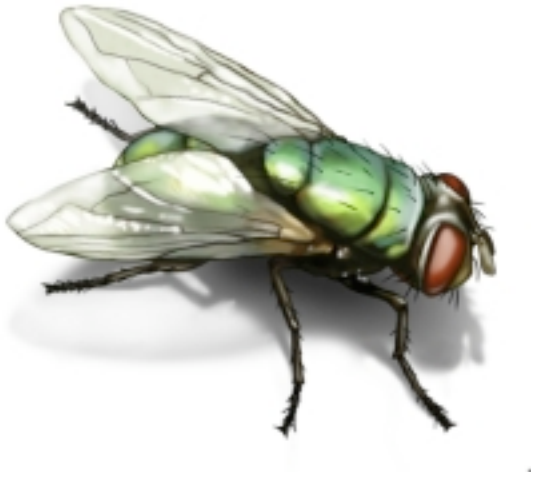


Introduction

Flies are highly adaptable creatures and NOTHING you discover should ever surprise you.

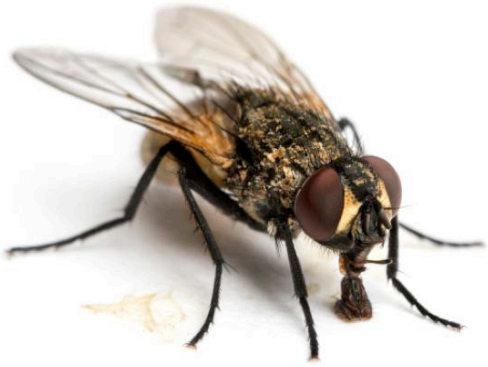
During the warm months of the year, each person likely has at least one encounter with a fly every day, even if it is as simple as noticing one flying by. In extreme cases, a homeowner or business experiences a serious fly invasion; one where the services of a pest professional may be needed. Flies belong to the order Diptera with more than 150,000 species described thus far worldwide. A relative tiny percent of these are known to be structural pests; however, mosquitoes and several other types of flies are society's most important public health threat. Within structures, flies are considered a nuisance first and serve as a health concern when found in food production or health-care environments.

Some of our most frustrating days will involve flies, usually fruit or phorid flies, and attempting to discover the locations or breeding sites and other conditions conducive to the infestation. Other fly issues are more easily answered. But the solutions always come back to the type of fly involved. This hand out will provide a few tips for key pest flies.

BIG FLIES

House Flies

Outside. Most house fly issues originate from the exterior. House flies (family Muscidae) breed primarily in animal manure and secondarily in moist, organic materials associated with Dumpsters and other trash receptacles. If found breeding indoors, the breeding site will most likely involve an overlooked trash can, poorly maintained trash room or rotting produce stored in boxes or bags. It has been reported house flies breeding indoors involved an overlooked box half-full of rotting potatoes...in the middle of winter!



Where a house or building is located also may play a role in the numbers of house flies seen around/entering a building. Structures near farms where livestock are present are more prone to house flies, face flies, little house flies and even stable flies (family Muscidae) — all of which breed in fresh animal manure. The building doesn't even need to be adjacent to the farm as house flies are capable of flying two to three miles, attracted by odours or other factors. When establishing a house fly management program, more comprehensive efforts often are needed for buildings afflicted by larger numbers of flies.

Trash Receptacles and Entryways. Are outside trash cans and Dumpsters clean? Are these located as far from doors as possible? Even clean Dumpsters and trash cans will attract some flies, but the messier receptacles bring more flies, thus increasing the number of flies potentially entering inside. Locating Dumpsters and trash cans as far from the building as possible helps minimize flies near entryways. Use of fly baits in these areas can be beneficial in reducing numbers of flies in the area.

Doors should not be propped open and when opened, should close within a few seconds. If ventilation is needed, such as seen with overhead doors in warehouses during summer, doors should be equipped with tight-fitting screens. Use of plastic curtains on overhead doors can help exclude flies where the doors are used frequently.

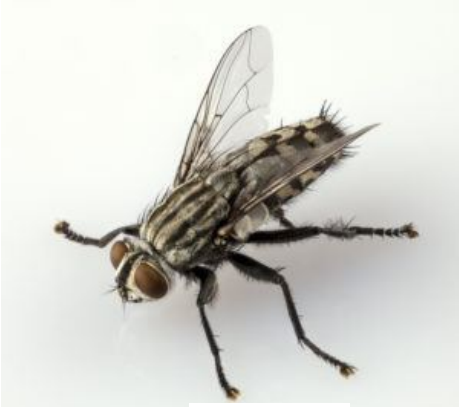
Insect Light Traps (ILTs). A well-designed insect light trap program is essential for any commercial building with house fly issues. ILTs work attracting and catching flies 24 hours a day...as long as they are well maintained and UV bulbs are changed out as recommended by the manufacturer.

Placement of ILTs is key to effectiveness. If placed too near natural light, an ILT's ability to attract flies during the daytime will be negated. Placement too high on a wall, above 5 feet, will decrease the numbers of house flies captured. Hanging an ILT too close to doorways allows flies to fly right past the trap before they even "see" it. Locating traps so they can be seen from the outside can attract night-time flying insects to the building. Pest professionals have a variety of quality, economical ILT choices to offer customers. Design the ILT plan to follow the natural flow flies might take from entryways through the building. Use as many ILTs as needed — don't settle for just one in the back and one in the front.

Blow Flies, Bottle Flies & Flesh Flies

Similar to House Flies. Relative to their presence in and around structures, blow and bottle flies (family Calliphoridae) and flesh flies (family Sarcophagidae) are similar to house flies. Such flies are attracted by garbage and food odours; most infestations originate from the exterior. Control strategies focused on sanitation, exclusion and ILTs are key for all these flies.

Where's the Carcass? Blow flies and flesh flies both primarily breed in animal carcasses outdoors, often being the first insects to discover a freshly dead animal. When dozens of these flies suddenly appear inside, it's a good bet that some animal has died within the walls, ceiling, attic, crawlspace or chimney. On occasions the presence of blow flies inside a premises led to the discovery of a dead mouse, rat or bird is involved. Once a dead mouse that had already been infested by blow fly larvae, was allowed in the experiment, for the flies to fully develop within a container; 125 blow flies were the result. Imagine the number of flies produced from a larger animal.



Flesh Fly

Although the cause is easy to discern in these cases, finding an animal carcass within the voids of a structure can be quite difficult. Blow fly and flesh fly larvae crawl out of the breeding material to find a place to pupate and often the larvae can be found dropping from ceilings or crawling along baseboards. If larvae are found on top of a counter, bed, etc., look for vents or light fixtures in the ceiling from which larvae could have emerged. Either investigate the attic directly above or inspect the ceiling void, remove the vent cover or fixture, and examine the void for an animal carcass.

Use Traps. ILTs and/or sticky traps can help remove adult flies quickly until the dead animal is discovered.

SMALL FLIES

Small flies are basically red flags with wings. They may take a backseat to large flies, but keep in mind this fact: they are mechanical vectors of bacteria. Imagine unsanitary conditions where they lay their eggs, breed or feed. Small flies can physically transport some potential diseases from those areas. So don't just ignore them.

Small flies invading your facilities can, without question, be a significant public health threat.

Organic matter and moist environments present in those facilities attract fruit, drain and phorid flies. To eliminate them, it's important to initiate an IPM program that includes a biodegradable product that removes the organic debris where larvae develop. Below you'll find a helpful list of likely small fly breeding zones:

In **kitchens**, where organic debris can be found, look for these areas: top and bottom gaps or open cracks in vinyl or tile baseboard moldings; wall surfaces under food service tables and counters; floors and walls behind equipment legs, drain lines and other obstacles; and dishwasher disposals.

Also, be aware of the potential of dirty dishes, pots and pans left sitting over long periods of time; plumbing leaks, broken connections, and drip lines above floor drains, as well as irregular floor levels with low spots containing standing water.

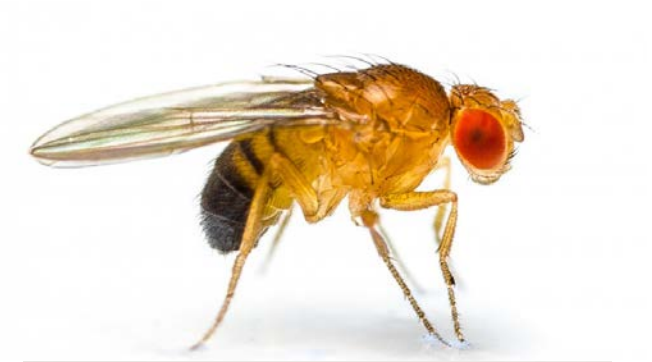
Plastic garbage cans with surface scratches and cracks containing debris can be a breeding source, as can floor drains, floor tiles with broken grout and open cracks, and rubber floor mats.

In **kitchen storage and utility areas**, be sure to watch out for improper storage conditions for fruits and vegetables; rotten fruits or vegetables in storage or on floors under equipment; improper storage or spills of bakery fillings, puddings and jams; covered or uncovered food that has been forgotten or neglected; un-rinsed cans or bottles in recycle or garbage bins; and incorrectly stored dirty brooms.

In **bar areas**, beer and soda drain trays, and connecting plastic drip line hose(s) to floor drain can be breeding zones, as can soda unit dispensers, supply tubes leading through counter tops to bulk containers; walls, baseboards, and floor areas under bottle racks, sinks and refrigerators; drain tube drip pipes above floor drains. Washrooms can contain other breeding areas, such as baseboard moldings; the toilet base at the floor; floor and sink drains; broken drain lines, and dirty mop and/or broom storage spaces.

Fruit Flies

Red-eyed fruit flies and dark-eyed fruit flies, also known as Drosophildae, the most common of small fly species can be found infesting restaurants, homes and other buildings. They are each one-quarter inch in size and are usually attracted to decaying fruits, vegetables and other organic matter. One source of such material can be spray-washed plant floors.



The spraying action can force lots of organic matter to floor drains. Not regularly cleaning drains and floor cracks, crevices and corners could create feeding and breeding sites. The red-eyed fruit fly seems to prefer fresh organic matter, while its dark-eyed cousin can be found in more putrid conditions. They can reproduce where wet or damp organic matter exists and evolves from larvae that need moist organic matter in order to survive.

Freshly Decaying Materials. Fruit fly larvae feed on yeasts that develop in freshly decaying organic materials, usually those containing sugars. The first place to look is where fresh fruits and vegetables are stored outside of coolers. Experience has shown that a single onion, potato, lemon or banana can serve as a breeding site for fruit flies. From there, check trash cans, recycling bins and for pieces of fruit or vegetables kicked under tables or appliances.

Fruit flies have been found breeding in drains, most often the drains in soft drink beverage towers. Also beware of leaks occurring with the lines that run from beverage towers to the boxes/canisters of syrups. Often, these lines run through walls, ceilings and under slab floors. A pinhole leak in one syrup line creates a breeding source for fruit (and phorid) flies that may not be easy to access. With floor drains, fruit flies may be found breeding in organics at the top of the drain but rarely are found deeper into the drain line. Last, in commercial kitchens, sugars and other organics can accumulate along and under baseboards, cracks at floor level and within the spaces of rubber floor mats.

Bacterial Cleaning Products. Obviously, the key to minimizing fruit fly infestations is through good sanitation practices. The varying levels of cleaning and maintenance in kitchens complicates the efforts for effective fruit fly management. It is recommended to convert cleaning materials to the use of a bacteria-based cleaning product, which can be highly beneficial for fruit fly control.

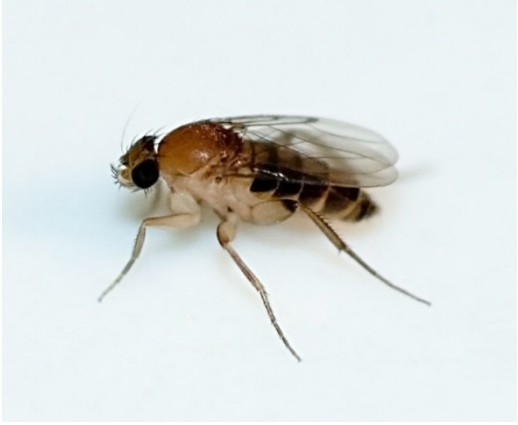
The types and numbers of bacteria vary by product but all are designed to attack and consume sugars, greases and proteins present in the organic build-ups in drains and on floors that support fruit, phorid and moth flies. Properly used, bacterial cleaning products deny fly larvae the foods they need to thrive and so, over time, fly populations plummet. Elimination of flies may not occur just with the use of such products alone if fruit flies are breeding in trash cans, recycle bins or other sites where bacterial products are not contacting.

For the bacteria to perform their job, the customer must refrain from using standard cleaning products, drain cleaners or bleach on floors and drains. Such chemicals will kill the bacteria.

Additionally, customers are advised that results may take a week or two. Consult the manufacturer of the bacterial cleaning product of choice for specific information on gaining the best results with each product.

Fruit Fly Traps. A number of effective fruit fly traps are available that will attract and remove adult flies while the search for and elimination of breeding sites is ongoing. When placed near suspected breeding sites, trapping adult fruit flies helps reduce the numbers seen by customers and employees. Traps also can be spaced uniformly in an area to help narrow the search for breeding site locations. The traps with the larger number of flies are likely closer to the breeding site. Talk to yopur pest management provider about traps.

Phorid Flies



Phorid flies, also known as humpbacked flies, also known as Phoridae, are sometimes considered the most dangerous, most troublesome of the small fly species. They are very small, usually an eighth of an inch long, and usually flit about in a zigzag pattern. They more or less differ in appearance from other small flies by the "humpback" shape of their abdomen. They are usually tan to dark brown in colour and have dark eyes. Phorid flies are a serious problem for food-manufacturing facilities and an infestation can possibly come from a sewer break under a building. They will often feed and breed in moist decaying matter. Like the other small fly species, they are frequently found in unsanitary areas and often transmit disease by carrying germs and bacteria onto food products and sterile surfaces.

Breeding Sites Highly Varied. Phorid, or humpbacked flies, are a large group of small flies known to exploit a large variety of breeding material. Although they can be found living in the same types of decaying organic matter as fruit flies, phorid flies can breed in materials in a high degree of decay, particularly in drains and drain lines, contaminated soil, rotting vegetation and dead animals. Inspection once traced a phorid fly infestation back to an open pail of organic glue used in a bookbinding factory. In another case, the flies were found breeding in wet flour that had washed up into cracks beneath the equipment in a small bakery. When dealing with phorid flies, inspections will need to be more far-ranging than those involving fruit flies.

Process of Elimination. Inspections should focus first on the more obvious sites for breeding such as drains, trash receptacles and wet debris trapped in cracks at floor level (use a putty knife or spatula). If phorid flies are not located or continue to be an issue after steps have been taken to clean up those breeding sites, you will have to look deeper. If walls are wet and could have flies breeding within, drill a small hole into the wall void(s) and tape a clear plastic cup containing an insect monitoring trap over the hole. Check it the next day. Adult flies, if inside the wall, will fly to the light coming through the hole and be snared on the trap. Any walls with flies will need to be opened by the maintenance staff to determine the issue and then corrected.

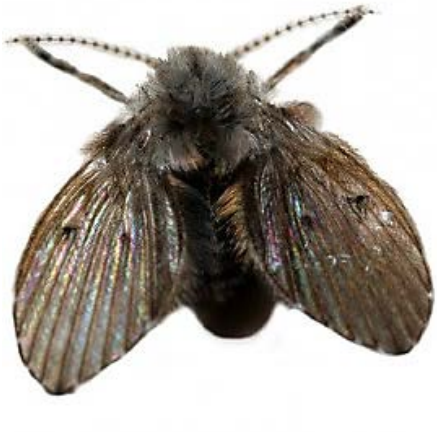
If a broken drain line is suspected beneath a slab floor, you can use the same clear cup/trap technique after drilling holes through the slab in areas where you suspect the drain line might be fractured or leaking. It may take a couple of days for flies to begin emerging from under the slab into the cups and if they do, then the customer needs to employ a plumber to scope the drain lines, find and fix the break.

With drain line breaks, it is extremely important that all wet, contaminated soil be removed and replaced with fresh soil at the time the drain line is repaired. If the contaminated soil remains, phorid flies will continue to breed and invade the building above. This fact also holds true for sub-slab drain line breaks involving moth flies.

The Odd Cases. With phorid flies, you can run into the once-in-a-lifetime kind of infestation which can involve the building's history and construction. A case involving a bathroom in a new home was discovered when the pest professional opened the block foundation to access the bath trap under the tub. Within the hollow blocks, he found a bag of faeces a construction worker had tucked inside during construction.

A pest management consultant spent many days deducing the source of a major phorid fly problem in a hospital. Ultimately, he discovered the contractor had incorrectly installed the drain line system under the kitchen floor and for months food-laden water had been accumulating in the soil underneath. It took weeks of excavation of soil and installing the drain lines correctly to remedy the situation.

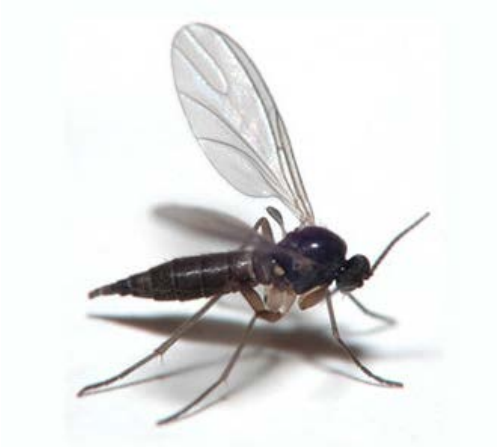
Drain Flies



Drain flies, also known as moth flies, also known as Psychodidae, are small, dark, fuzzy, moth-like creatures with heart-shaped wings. Scales on their wings often resemble moths. They are not exclusive to drains but often can be found in sump pumps or sewer lines, as well as in washroom floor drains. These pests breed in polluted shallow water or the scum that you can often find around drains. Adult drain flies can be stationary during the day, but at night can be seen zipping through the air over sinks, drains and other breeding areas. They prefer highly decayed matter, such as that found in sewage treatment areas and lines.

Because polluted waters and wet organic materials are preferred developmental sites, inspect the following areas: Broken drain pipes under the floor; Sump pump pits; Garbage cans; Clogged storm drains; Moist compost and decaying organic material ; Sewer leaks/backups and septic tanks; Sinks and drains, particularly bathroom drains; Cracked shower pans, old decaying grout; Leaks under dishwashers and other equipment

Fungus Gnats



Adult fungus gnats are about one-sixteenth of an inch long. They are greyish to black in colour, slender and appear mosquito-like with long legs and antennae. Larvae feed on fungus growing in the soil and moist organic matter. Common developmental sites include:

- Areas of moisture and organic matter such as moist soil
- Potted plants
- Wet sub-roofing, particularly on flat roofs
- Leaking pipes above ceilings/behind walls

Summary

Flies are adaptable creatures and remember that the flies we deal with all require moist, decaying organic materials of some kind to breed. Finding where these exist in and around a building and confirming which are being exploited by your target fly will often test your and the pest investigators' skills. Be sure to check with maintenance staff about plumbing and maintenance issues and get them involved in cleaning up and making necessary repairs. Otherwise, flies will persist.

Control Methods. Small fly problems are often caused by structural issues (i.e., improperly sloping floors, cracked tile areas, improperly sealed coves, etc.) or sanitation-related problems. Both structural and sanitation issues require complete cooperation from the client.

Sanitation. Small flies are dependent upon moisture and organic debris to breed and develop. Sanitation is critical to the success of any small fly control program. Some common sanitation recommendations include:

- Cover trash cans with sealed lids, use liners and empty trash cans frequently.
- Clean Dumpsters and Dumpster pads weekly during fly season. Position Dumpsters as far away from the building as practical.
- Rags and towels should be sealed in bags until cleaned and mops and brooms should be dry and clean.
- Use an organic, enzymatic cleaner to eliminate residues and food debris in and around drains.
- Use brushes to remove food debris in drains, on floors, under equipment and in grout areas.
- Store produce in coolers and remove all rotting produce.
- Clean spills immediately.
- Use directed floor fans to help areas dry.

Exclusion/Mechanical. Flies can gain access to facilities through doors, windows and other openings. Conduct an inspection to determine whether exclusionary measures are adequate to prevent flies from entering the facility. It may be necessary to replace window or door screening with size 20 mesh screens. Check for air flow (positive or negative pressure) in the building. If the fly source is outdoors, does opening the doors draw insects into the building? The facility manager may need to seal around windows and doors and place air curtains above "high-traffic" entrances. Caulking of cracks and gaps also is important to prevent access to small flies to moist areas containing organic matter.

Traps. Insect light traps are useful for ongoing control of phorid flies and fungus gnats. Specific small fly traps, such as those for fruit flies that contain grenadine or vinegar, can help reduce fly numbers. Be certain to inspect and replace these traps so the bait does not become rancid, supporting fly development. Hanging glue traps can be used to lower fly populations if non-chemical control is needed.