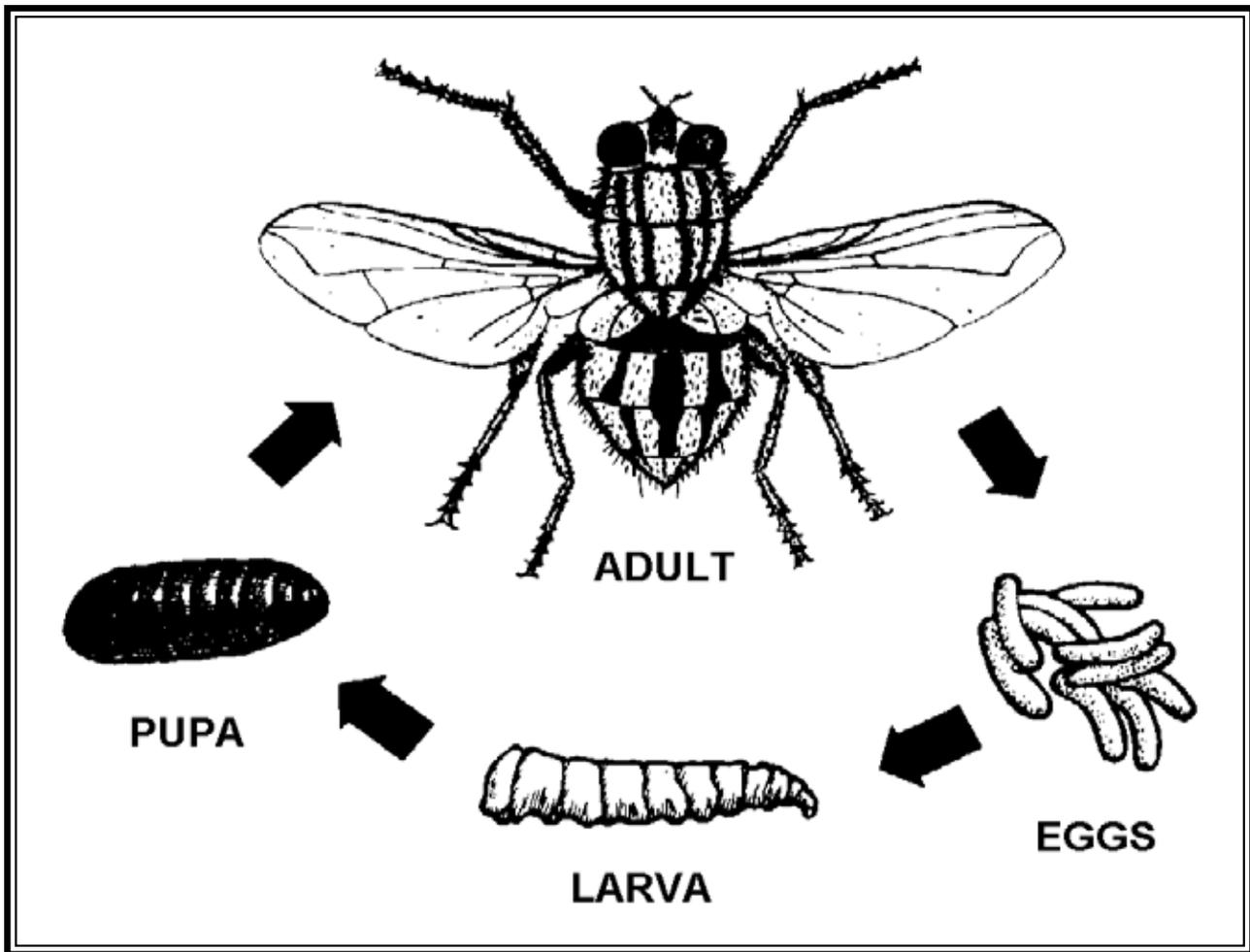


CHAPTER 31

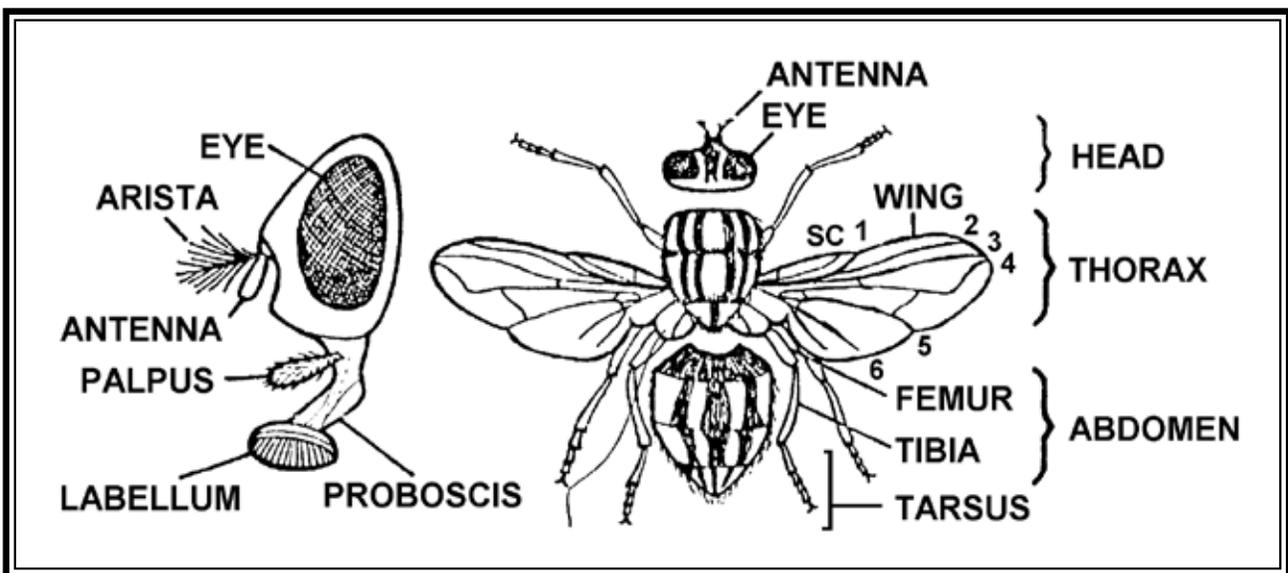
THE BEST CONTROL FOR FLIES



The Fly: The Devil's Mascot!

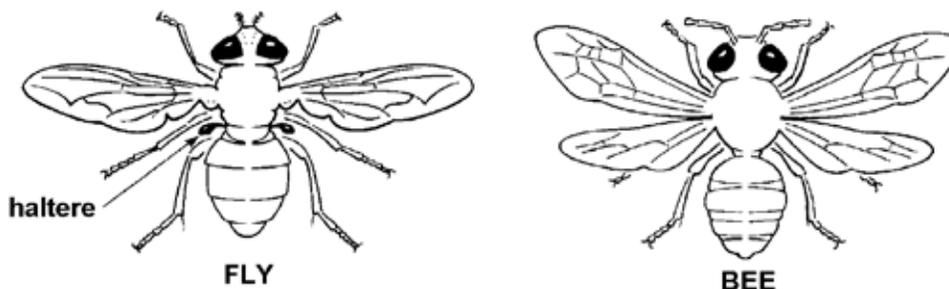


LIFE CYCLE OF THE HOUSE FLY

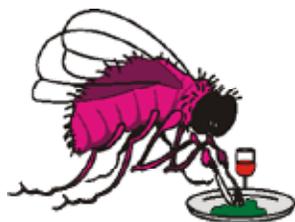


FLY ANATOMY

GENERAL DESCRIPTION



Flies belong to the insect order Diptera and are related to mosquitoes and gnats. Of the more than 700,000 known species of insects, well over 120,000 are flies. Diptera means two (“di”) wings (“ptera”), and it is on the basis of this single characteristic (one pair of wings) that all the species of flies are grouped together. As stated, Diptera literally means “two-winged” and, indeed, only the front pair of wings are functional and they are clear and membranous. The hind wings are represented by a pair of small knob-like or club-shaped organs called *halteres* or balancers. These small, vibrating structures aid in flying and are in place of a second pair of wings. The vibrating halteres have their own set of control muscles that are controlled by the fly’s visual system. Without them flies tumble and crash; with them, they can change course without a wobble in less than 30 milliseconds - and make the fly extremely hard to swat. The adult fly does not possess mandibles, but the mouthparts are modified into a proboscis for sponging/lapping or piercing and sucking. Flies are cold-blooded insects that move about looking for external heat sources; most flies are diurnal and are attracted to certain wavelengths of light. Flies buzz around windows and can be easily vacuumed up by windows or lights. Most flies have large compound eyes and usually three simple eyes. Each of the fly’s compound eyes has about 4,000 six-sided lenses - so they can detect the slightest movement. Flies taste with special hairs on their feet. The larvae or maggot is legless and the head is often reduced or indistinguishable and retracted into the thoracic segments. Flies can range from tiny midges less than 1/16” long to huge robber flies more than 3” long.



The two-winged flies constitute a larger order of insects and well over 120,000 different species are known throughout the world. This group forms one of the most highly specialized of insect orders and many species are of the utmost significance in regard to human welfare. Diseases, e.g., malaria, dysentery, sleeping sickness, onchocerciasis, elephantiasis and yellow fever are carried or transmitted from man to man by bloodsucking dipterous flies. Many other diseases are transmitted mechanically by flies due to the habit exhibited by many species of sucking liquid from excreta and other decaying organic matter and then settling on and vomiting on your food. **If there is anything as “harmless as a fly”, it is not the common housefly or any of its relatives.** The fly was made to distribute quantities of pathogenic disease organisms. Its 6 feet are equipped with bristles and sticky pads and its proboscis is hairy. A sticky liquid comes out of the hollow hairs on their feet allowing them to walk upside down and on glass, etc. The fly’s digestive tract is an incubator for germs! The Author’s Mother began to teach him IPM control when he was a very young boy. She said, “Shut the door; you are letting in the flies!” This is still good advice - even better is to have a second entry door or an air curtain as an extra barrier against fly invasion.

All flies pass through four distinct stages of their life cycle: egg, larva, pupa and adult (complete metamorphosis). The synanthropic (attracted to habitats) filth flies look for any warm, filthy, moist environment in which to lay their eggs, since their larvae feed and grow under these conditions. An adult female housefly may lay up to 2,400 eggs in her lifetime, singly or in groups. **More than a thousand flies and 2,000 maggots a week can be produced in just one dirty garbage can!** Fly larvae, called maggots, have a wide range of feeding habits depending on the species. Some larvae feed on plants and can be serious agricultural pests. Others feed on rotting or decaying plants or animals, or on animal excrement. Maggots of other species are internal parasites of arthropods or vertebrates. Most adult flies are winged and fly readily. As stated previously, flies and all other dipterans only have one pair of wings, as opposed to other orders of winged insects, e.g., bees, termites, moths, etc. which have two pairs. Routinely steam clean or spray/



clean/mist all infested areas with Safe Solutions, Inc. Enzyme Cleaner and/or Peppermint Soap and/or borax and lightly dust with their food-grade DE.

Of the five most serious diseases in the world, flies, including mosquitoes, spread the organisms that are responsible for four: Malaria, sleeping sickness, Leishmaniasis and filarasis. They also are responsible for spreading anthrax, yellow fever, typhoid, parathoid, bacillary dysentery, pinworms, roundworms, whipworms, hookworms and tapeworms and various diarrheal illnesses. In the United States, the toll of the worst afflictions - heart attacks, cancer and strokes - is annually numbered in the thousands; in the tropics, the dead and disabled from fly borne diseases are counted by the **millions**. In the United States flies are considered more annoying than dangerous, but as recently as the turn of the 20th century, malaria and typhoid were major health problems. **The activity of flies is a nuisance and the accumulation of dead adults is a respiratory hazard for many people.**

Flies, the order **Diptera**, are one of the largest and most dynamic orders of insects. This vast order is characterized by having only one pair of wings. Most flies are also small, soft bodied; often, two large eyes that cover the front of the head. Maggots leave the breeding source when they are ready to pupate and are extremely difficult (if not impossible) to control with volatile, synthetic pesticide poisons; they are quickly and better and more safely controlled with proper sanitation (removal of all infested items or dirt) and/or by spraying them with diluted enzyme cleaners or soaps. My daughter, Tyre Ann, sprayed maggots on and in her goat and got control using only the original preformed enzyme cleaner diluted 4 oz. per quart of water. The new cleaner from Safe Solutions, Inc. will only require 1 oz. per quart of water or you could simply dust with their food-grade DE.

Flies can be divided into two groups; distinguishing differences center around the appearance of the legless larvae (or maggots) and adults.

In Group 1:

- ♦ The adults are small - gnat or mosquito-like with long antennae and slender legs
- ♦ Larvae have head capsules and most live in water or moist soil.

In Group 2:

- ♦ The adults have stout bodies; their antennae are short or not visible; some are relatively large but usually not long legged.
- ♦ Larvae do not have discernible heads and are often maggot-like. Their harborage varies - they live in water, filth, soil, carcasses, plant tissues or animal tissues.

Any dull gray flies about 1/4" long found inside or even near structures will likely be called house flies. Even if the identification is incorrect, it probably is not far wrong. Flies often tell the same sickening story: they frequent garbage, dead animals and manure. Their larvae or maggots live in that awful material. To enter a building, they have flown inside through an open door or window, or they have moved inside from a dead bird or rodent rotting in a wall or ceiling.



Appearance - Both the house fly (*Musca domestica*) that lives on garbage or manure, and its close relative, the face fly (*Musca autumnalis*) that lives on fresh cattle manure, are about 1/4" long, and are considered filth flies. They have a dull-gray thorax with dark stripes and a dark, dull abdomen with yellow sides.

Flesh flies, also called filth flies, (the family *Sarcophagidae*) live on meat scraps, dead animals and dog excrement; they are more than 1/4" long, have a dull-gray thorax with three distinct dark stripes and a gray checkerboard abdomen.

Blow flies (the family *Calliphoridae*) are about 1/4" long. Their thorax and abdomen are shiny black, metallic green or bronze, or they have a metallic blue abdomen with a dull thorax. They live on dead animals, meat scraps in garbage and wet mixed garbage. They are also considered filth flies.

The cluster fly (*Pollenia rudis*) is also in the family *Calliphoridae*. It is slightly more than 1/4" long. Its thorax is covered with gray or yellowish hairs; it has no stripes; its abdomen is dark gray with light patches. They are called over-wintering flies.

Flies are serious pests in and around buildings because they can transmit many disease organisms, e.g., St. Louis encephalitis, a strain of the brain inflammation disease, salmonella, etc. and carry filth. They also leave deposits of regurgitated food and excrement on dishes, food, walls, furniture, draperies, paintings and other belongings. They are extremely annoying due to their flying, buzzing and habit of landing on people, dishes, food, walls, windows and furnishings. In general they interfere with our health and comfort. Flies are also pests in outdoor eating areas, open-air markets and home yards. Proper sanitation is very important. Dispose of refuse frequently and prevent the accumulation of rotting or decaying vegetation and/or animal droppings. Keep screens in good repair. Sticky fly strips and fly swatters can also be effective.

Exact identification may be difficult. **Although there are many thousands of species of flies, only a few are considered to be persistent pests in or around our buildings, e.g., house flies, little house flies, cluster flies, vinegar or fruit flies and blow flies.**

<http://images.google.com/images?q=Diptera+%2B+pictures&hl=en&sa=X&oi=images&ct=title>

<http://animaldiversity.ummz.umich.edu/site/accounts/pictures/Diptera.html>

<http://www.myrmecos.net/insects/flies.html>

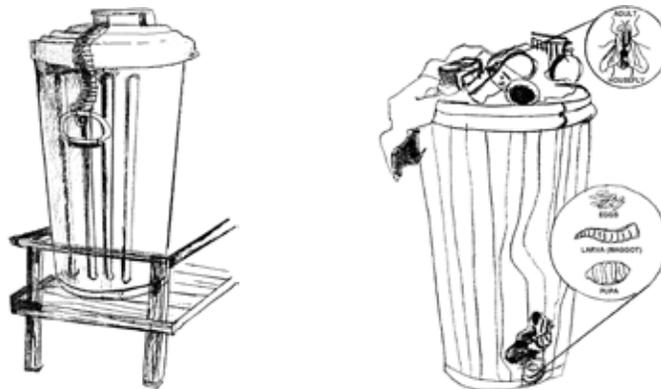
<http://www.ent.iastate.edu/imagegal/diptera/>

<http://www.diptera.info/news.php>

The same flies that enter structures: house flies, face flies, some blow flies, flesh flies and cluster flies normally overwinter as adults. In nature these locations are under bark, in hollow parts of trees or under the bark of logs. They begin seeking shelter at the end of the hot part of summer.

If they begin investigating structure walls in this search for winter harborage, their upward movement often brings them to openings under siding, ventilators and weep holes in masonry, cracks around windows, wire penetrations, wall voids and openings around the roof. Unused attics are good overwintering sites. Flies, elm leaf beetles, box elder bugs and female paper wasps (all hidden in attic cracks) will begin flying to windows on warm winter days. They often make their way down through closets and chimney cracks into living spaces of the home. This same behavior takes place in schools, office buildings, hospitals and other structures.

INTELLIGENT PEST MANAGEMENT® GUIDELINES for House Flies and Little House Flies - Successful control of the common house fly and the little house fly requires an integrated pest management approach, using proper sanitation practices, steam cleaning, the use of Safe Solutions, Inc. Enzyme Cleaners and/or food-grade DE and/or borax, natural enemies, e.g., fly parasite wasps, exclusion techniques, and traps are used to reduce the numbers of adult flies inside buildings and outdoors to reduce egg production and control developing larvae. Before attempting to control any flies. Make sure the fly species is correctly identified. Find out how the flies are getting into your building and try to locate where they are breeding. Estimate the size of the population so your IPM control measures can be subsequently and correctly evaluated: traps and sticky tapes are useful techniques for monitoring fly populations and can supplement visual observations. Observe the locations and density of fecal and regurgitated food spots in areas where flies have rested. A simple way to monitor fly activity is to attach a small white card to a resting surface and observe the buildup of spots over a period of time, e.g., 1 - 2 days. Use similar cards to follow up after control and sanitation measures have been taken to evaluate your techniques. Be sure to routinely and thoroughly clean/spray/mist with diluted SafeSolutions, Inc. Enzyme Cleaner with or without Peppermint and/or borax or DOT or DE. Sometimes control is simply securely double-bagging the trash.



Sanitation - Sanitation is the primary control method used to reduce house fly and little house fly populations. The ancient Jews developed the Mosaic Code which held prevention of disease was more effective than remedial action. Isolation and disinfection of the rooms of the sick, sanitary processing of meat (kosher) and recognition of flies as carriers of disease were part of the Mosaic Code. Garbage was hauled out of Jerusalem in carts to the Kidron Valley where it was burned. The Mosaic Code gave us guidelines for healthy living, modern sanitation and true IPM practices for the last 3,000 years. In 1666 the City of Paris cleaned the streets for the first time and struck two coins to mark the event! Suitable larval development sites must be eliminated by keeping interior and outside areas free of garbage, decaying plant material, animal feces, and other food. Garbage cans are one of the main source of domestic fly production in urban areas - as many as 2000 fly maggots per week can be produced in a single garbage can in hot weather. More than 20 fly species breed in garbage; during the summer order twice weekly garbage pick-up and clean the cans and dumpsters each time they are emptied with diluted enzyme cleaner and borax. Put liquid grease in the freezer until it congeals before putting this mess in the dumpster - then dispose of it the same day pick up is scheduled. Cans should be lined with plastic liners and emptied twice each week and thoroughly cleaned of residues that support maggot growth. Use diluted enzyme cleaner and borax or steam clean. Garbage cans should be large enough so they will never overflow and set on racks to reduce fly breeding beneath them. Use tight-fitting lids to keep adult flies from getting in and laying their eggs. Drain and wrap garbage before placing it in the can or use a garbage disposal. Dispose of grass clippings by spreading them thinly over an area so they will not become breeding sites. Do not compost these clippings unless you routinely plan on turning them. If garbage collection is not available, garbage should be buried and covered with at least 2 feet of compacted earth. Steam clean and/or spray all collection containers/ areas with Safe Solutions, Inc. Enzyme Cleaner with Peppermint as needed. Then sprinkle dry soap or borax or food-grade DE into the dry containers. **If you follow a fly for a day, you will not eat for a week.**

Animal, e.g., dog, feces should be removed from yards daily and buried or properly composted or placed in sealed containers to reduce fly breeding sites. Livestock areas near buildings are also an important source of house flies. Animal or chicken manure should be removed from pens several times per week and buried or spread on the fields or composted and periodically turned to kill developing larvae/maggots and/or use wasp parasites. Feed the animals food-grade DE per label directions and no maggots will develop in their feces.

Exclusion or Mechanical Controls - Exclude flies from buildings by properly caulking and making sure all doors and windows fit tightly and are properly screened. Air-curtains or fans above entrances to buildings also help to prevent light-weight fly entry. Store garbage debris and other filth in closed containers away from building entries to reduce the number of flies congregating there. Create only one (new ultraviolet) light/heat source and vacuum up the attracted flies. **Repellents** - try planting tansy or basil - oils of lavender, peppermint, eucalyptus, menthol, mint or cloves also can repel - try spraying these in diluted soap solutions.

Trapping - Use exterior traps baited with an attractant, e.g., raw hamburger, to capture large numbers of house flies. Commercial attractants and traps are available. Fermenting molasses also is a good bait for outdoor use; add ammonium carbonate to the bait to increase its attractiveness. Keep traps away from buildings. When traps become filled, bury or otherwise dispose of the dead fly mess. See the section at the rear of this chapter on traps and baits. You can make a fly trap out of a 1-gallon mayonnaise jar with 1 cup of milk and 1 egg inside; secure a 3/4" - 1" upside down J or candy cane pipe in the top and catch some flies.

Sticky paper traps (Sticky traps work best if they are chartreuse or white in color with flies imprinted on them.) and window scoops, pheromone traps and electrocutor traps work well indoors and do not emit objectionable odors. Electrocutor traps use an ultraviolet light to attract flies to an electrically charged grid, killing them on contact. Electrocutor traps can effectively reduce adult fly populations in enclosed areas. However, do not use these types of traps outside because they are not selective and may destroy many non-target and beneficial insects. There are many different sizes and colors of sticky paper on sheets or rolls or ribbons that can be placed near problem areas. There is also a black light trap that uses disposable glue strips and attractants that is very good and described later in this manual.

Parasites and Predators - Natural and biological controls are very important in fly management around livestock, but are less important in other areas. Several naturally occurring wasp parasites attack fly pupae. Parasites can be purchased and released to augment naturally occurring species, e.g., *Spalangia endius*: The New Zealand strain is currently in widest use; *Muscidifurax zoraptor*: has replaced *M. raptor*, which was used previously - the giant Denver strain is now in common use; *Pachycrepoideus vindemiae*: has replaced *Sphegigaster* spp. due to

its greater effectiveness and *Tachinaephagus zealandicus*: which is effective in cooler weather. Many species of insects, birds (including poultry), reptiles and small mammals feed on fly larvae, pupae and adults, and can be significant predators of these pests.

If large numbers of adult flies suddenly appear in a building, first try to let them out through windows. If this is not successful, put out white or chartreuse colored sheets of paper (with flies imprinted or Xeroxed on them if possible) to attract them and then use a vacuum or rinse-and-vac and vacuum them up. If you must spray- spray them only with diluted Safe Solutions, Inc. Enzyme Cleaner with Peppermint or lightly dust with food-grade DE.

FLIES PEST OVERVIEW

CLASS - Insecta

ORDER - Diptera

FAMILIES - Muscidae (house, stable, and face flies), Chironomidae (midges), Phoridae (phorid flies), Calliphoridae (cluster and green bottle flies), Psychodidae (drain and moth flies), Trypatidae (fruit fly), Tabanidae (horse fly), Mycetophilidae and Sciaidae (fungus gnats) and Sarcophagidae (flesh flies).

TYPE METAMORPHOSIS - Complete

Egg - Laid by adult female in manure, garbage, or rotting materials.

Larva - Legless maggot which tapers from the rear to the front.

Pupa - Transformation period between the larval and adult stages - virtually immune to volatile, synthetic pesticide poisons.

Adult - Fertile males and females.

DISEASE ASPECTS - Capable of carrying many disease organisms such as typhoid fever, dysentery and amebic dysentery; potential transmitters of tuberculosis, parasites, bacteria, fungal pathogens, viruses, etc.

Type Mouthparts

Sponging - House, cluster, fruit, moth, filter and sewer drain, blow, blue and green bottle, face and male horse flies. Their salivary glands run the entire length of their bodies; they vomit saliva to make solid food liquid!

Piercing/Sucking - Female horse and stable flies.

Length of Life Cycle - Varies, depending upon species, food sources and weather conditions.

Habitat - Flies are found in a variety of filthy locations, both indoors and outdoors. They are most numerous where food or garbage is stored, handled or prepared, or wherever suitable breeding sites are available.

Nature of Injury - Pollution of food, annoyance, bites and can also carry disease viruses, germs and parasitic worms. One fly can carry as many as 6 million disease-causing bacteria. Many ride along on its hairy body and sticky foot pads. The digestive tract carries even more - these emerge and begin their own colonies as the fly dissolves its food by vomiting on it. Remember, it feeds on feces and chocolate eclairs! Exod. 8:24. Diseases include cholera, dysentery, polio, plague, tuberculosis and numerous eye diseases.

Harborage Points - Flies breed and develop in dead animals, fruits, flowers, manure, compost piles, decayed materials, garbage, etc. from which the adults forage in your buildings and structures in search of food or shelter. Some flies are strong fliers or are carried long distances by the wind, so the breeding area might be a great distance from your building. **Almost half the flies are generated in garbage, so store your garbage properly.** Routinely clean all garbage containers with steam or diluted Safe Solutions, Inc. Enzyme Cleaner and/or borax.

Schedule 2 summer pick-ups per week or as needed.

Flight Patterns - Flies fly near passageways, food and trash receptacles, near light sources and typically within 18 inches of the floor. They try to avoid very, hot, dry environments and do not normally fly when it is cold.

Fly Control Techniques - First of all, good sanitation is the basic step in all fly control. Routinely steam clean or power wash and/or spray with Not Nice to Bugs®, diluted Safe Solutions Enzyme Cleaner with Peppermint* and/or borax or CB Mop Up®.** Second, identify the adult flies to help determine where they are coming from, e.g., refrigerator condensation pans, kitchen floors underneath equipment, garbage disposals, garbage cans or dumpsters and/or food preparation equipment. Dry and then wrap in plastic all organic garbage before placing it in the garbage can. Use tight-fitting lids held to garbage cans by tie downs, tape and/or spring fasteners to prevent dog, cat and raccoon access. Daily bury or flush garbage and manure. Screen windows and doors to keep flies out. Feed food-grade DE to the animals per the label directions to eliminate maggots in their feces. Use vacuums, fly swatters or sticky tapes to remove flies inside. Maintain baited fly traps outdoors to reduce the number of flies during warm weather. Dispose of pet feces in the toilet or bury it deep. Whenever possible, food and materials on which the flies can lay their eggs must be removed and/or destroyed as a breeding medium, and kept away from the egg-laying adult. Garbage cans and chutes should be routinely steam cleaned or power washed with diluted Safe Solutions, Inc. Enzyme Cleaners. Kennels, stables, manure piles and compost heaps should also be routinely cleaned and can also be treated with eggs of fly parasite wasps. **Flies are cold-blooded and prefer temperatures between 75° F. and 85° F., so simply cooling the room will cause most flies to search elsewhere for a heat/light (try ultraviolet) source - be there and vacuum them up. One of the best ways to keep flies from entering a building is through the proper use of fans, lighting, caulking, sealing and screening.** Carefully caulk all cracks, crevices and other openings, e.g., where pipes or lines enter the building with silicone caulk, aerosol foam and/or hydraulic cement. The building should be examined routinely to make sure that all screens fit tightly and have no holes in them. If the screens are not satisfactory, fix them immediately to permanently eliminate the flies. As an alternative to screens in areas of heavy traffic, air or bead curtains have proven moderately effective in deterring flies. The beads should be oval with each string's beads offset from the next string so that the beads fit into each other's contours, eliminating gaps. The bead strings have the added advantage of brushing flies off people and pets so the flies do not piggyback a ride into the building. Hang up clusters of clove; make flypaper by spreading honey on yellow (flies' favorite color) paper; scratch an orange peel and leave it out - the citrus oil repels flies. Fruit flies can be controlled with grated lime or diluted enzyme cleaner. Make or purchase fly traps. Disodium octoborate tetrahydrate or borax also control fly problems when properly used. There are many ways to control flies within a building. One method is to simply use a vacuum or fly swatter rather than a pyrethrin aerosol. If you must use an aerosol, circulate throughout the room delivering short bursts directed upward so the insecticide particles carry to the flies' resting places. This can only be done during non-working and non-school hours. Remember, care should be taken not to contaminate foods, house plants, pet birds or goldfish. But better still if you must spray, use diluted enzyme cleaners or dust with food-grade DE. Vacuums can be used safely at any time and you will have to use a vacuum to remove all the dead flies anyway so why not just suck them up alive using either a dry or wet vac and promptly dispose of the contents?

Sugar poison baits can be used, as a last resort. You can make your own liquid baits out of 3% sodium borate or 1% protease enzymes or 3% enzyme cleaner or food-grade DE and 10% sucrose in water or purchase commercial baits. One should be careful not to place these where humans or pets are liable to get into them. Those commercial products are usually *registered* for outside use only, but they can be very effective. **Be sure to carefully read the label and follow directions explicitly.**

Many other devices can also be used instead of any chemical treatment, such as negative ion plates, steam cleaners, fly swatters, Not Nice to Bugs®, Safe Solutions Enzyme Cleaner with Peppermint or food-grade DE or fly traps, baited traps, air fans over doors, air screens or electronic control systems.

SPECIFIC EXAMPLES

HOUSE FLY & LITTLE HOUSE FLY

Musca domestica (Linnaeus)

Fannia spp.



HOUSE FLY



LITTLE HOUSE FLY

House Fly Description

Adult - The house fly is the world's most common fly found in and around homes and livestock. About 1/8" to 3/8" long (female usually larger than male) and the space between her eggs is about twice as broad as the male. Dull to dark gray with a thorax that bears four narrow black stripes. Has two transparent wings and two small balancers or halteres on the third segment of the thorax. The house fly can beat its wings over 20,000 times a minute. (Some midges beat 5 times faster.) They can fly over a mile and are found all over the world. They have mouthparts that only allow them to ingest liquids, so they vomit saliva on solid foods to liquefy them prior to sucking up this mess. They harbor over 100 different pathogenic organisms and may transmit more than 65 diseases, particularly intestinal diseases and the bacteria that causes stomach and duodenal ulcers. One pair can theoretically generate an amazing 325,923,200,000,000 offspring in one summer and a single housefly can carry up to 6 million bacteria! In 1911, entomologist C. Hodge estimated that one pair of flies could theoretically produce 191,010,000,000,000,000,000 flies from April to August. Allowing 1/8 cubic inch per fly - Hodge determined that would be enough flies to cover the earth 47 feet deep! House fly adults usually die when the temperature drops to freezing, 0°C. They search for food in the daytime and taste food with special hairs on their feet. One of the main reasons these flies are not so numerous is that about 30 species of wasps are parasites of house flies. Development is negligible before 52° F.

Pupa - Crawls to a drier area and the mature larva contracts until its skin forms an oval, shell-like case, which ages from yellow, red-brown to black in color, usually 1/4" long and found in a dry, cool place, e.g., in the soil. The fly breaks open the case and emerges and is ready to breed in a few hours. This pupal stage usually takes 4 - 20 days depending on temperature and humidity.

Larva - White, headless and footless maggot, 1/4" - 1/2" long, pointed in front and blunt in the rear. There usually are three stages, or instars, of development. In the last stage the maggot looks greasy and cream-colored and the larva pupates in the last larval skin which hardens and blackens in color to become a pupal case or puparium. The larva is found in refuse, manure, garbage, wet straw, fermenting/rotting materials, etc. (The wetter the better.) This stage of larval growth may take 3 - 30 days, depending on the humidity and temperature. The larva emerges from a slit the length of the egg. The egg shell or chorion is left behind.

Egg - Very small, elongated or oval, whitish-gray or cream colored 1/25" - 1/32" long, objects laid in 5 to 6 batches in masses of 75 - 150 eggs in any warm decaying mess, e.g., vegetable material, human or animal excrement, moist manure, or even ground contaminated with blood or these materials; a total of 600 - 900 eggs may be laid in 4 - 12 days. Females are attracted to the odor of ammonia e.g., urine; the dung must be no more than 72 hours old. They hatch in 3 hours to 3 days. House flies love fermenting, fresh horse manure and have become less of a pest since the advent of the automobile or horseless carriage. Must be 59° F. or above for eggs to be laid and they will not lay eggs on dry manure.



The adult stages of the house fly and five main species of little house flies can live for a few days without food and almost 2 months with food and are typically found in buildings such as schools, restaurants, homes, offices, hospitals and grocery stores. House flies cruise around at about 4½ mph but can accelerate when they see danger coming. Little house fly males love to enter air-conditioned buildings when outside temperatures rise above 80° F. During the day they rest on walls, floors and ceilings inside. Outside they rest on garbage cans, plants, wires, the ground and other surfaces. They can travel many miles to seek out these locations for shelter, food and suitable breeding sites. At night they rest on ceilings and wires inside, so vacuum them up then. Outside they rest on wires, edges of buildings and plants, usually 5 - 15 feet off the ground. Besides their visual annoyance, these two species are capable of carrying disease-causing organisms on in and on their bodies. Adult flies feed on vomit, spit and fecal matter, then on your sandwich. Their bodies are covered with crud, bacteria, viruses, and other disease organisms which, in addition to their own vomit and excrement, they deposit wherever they alight. Flies can contaminate food, cooking and eating utensils and other items with these

organisms and transmit salmonella, diarrhea, dysentery, typhoid fever, cholera, tuberculosis, anthrax, leprosy, yaws and infectious hepatitis and even death. In addition to disease organisms, these flies at times carry eggs of pin-worms, roundworms, whipworms, hookworms, *Ascaris*, and tapeworms, which may occasionally infect people. **House flies are claimed by some health experts to be the greatest threat to people's health of any species of insect due to their ability to transmit so many diseases and parasite organisms and their dogged persistence in entering our buildings to share these pathogens with us.**

Adult house flies are present throughout the year but are most abundant in late summer and early fall. An adult house fly usually lives from 30 to 50 days and can fly as far as 20 miles, but usually confines its activities with a 1 to 4 mile range (but can travel up to 20 miles); it remains within the confines of a small area if food is plentiful. They are inactive after the temperature drops below 44° F. During its adult stage, house flies feed on many substances including feces, decaying organic matter and a variety of liquid foods. They are attracted to indoor food preparation and serving areas and fermenting or rotting organic matter. They are known to harbor over 100 pathogenic organisms. Because of their sponging mouthparts, they can feed only on liquids. However, through regurgitation, they are able to liquefy many desirable solid foods. Normally, a house fly excretes and regurgitates whenever it comes to rest. This habit, coupled with its many body hairs and bristles and the sticky pads at the base of the claws on each leg, make house flies extremely well adapted for transporting many terrible human disease organisms. Fifteen generations of house flies can be born each year!

Little House Fly Description, Development and Habits - The five main species of little house fly are smaller and more slender than the common house fly. They are dull gray, with yellow on the upper abdomen and with 3 darker longitudinal strips on the top of the thorax. When at rest, the wings of the little house fly are partly folded over each other and are held parallel to the long axis of the body. There are also distinct, obvious differences in the pattern of wing veins that can be used to distinguish the house fly from the little house flies. ***Fannia canicularis*** seem to prefer empty beer cans to garbage, so mix some aspartame (1 - 2 packets) in 2" of beer in an open beer can as a bait for this species.

At a temperature of 75° F., eggs of the little house fly hatch in about 3 days and the larval period lasts about 11 days; pupation takes approximately 10 days. After emerging as adults, female little house flies are reported to live an average of 24 days. Males circle in shady areas. Larvae (maggots) of little house flies are flattened with prominent lateral spines; they feed on garbage and human and pet feces. They are light cream colored when first hatched and become darker brown as they mature. Like the common house fly, little house fly larvae feed on decaying human, animal and vegetable matter and excrement. Adult females usually do not enter buildings, but males often become abundant indoors and hover about aimlessly in the middle of rooms and in shaded outdoor areas. They can be found throughout a building rather than just in food serving and preparation areas. Like the common house fly, these flies can transmit similar diseases and parasite organisms. **Routinely clean with diluted Safe Solutions, Inc. Enzyme Cleaners and/or borax. Install parasitic wasps. Following is the web site address of one supplier: http://gurneys.com/product.asp_Q_pn_E_12683**

LESSER HOUSEFLY

Fannia canicularis

Family Diptera

It is a non-biting "filth fly". It looks similar but smaller to *Musca domestica* and has a similar life cycle with a smaller/leaner abdomen. The lesser housefly tends to fly in circles around people and objects, and when they land they prefer vertical surfaces, including suspended lines or chains. The entire life cycle usually takes 15 - 30 days. The lesser housefly is a major pest of chicken farms where it breeds in the manure. They are health hazards because they can create accidental myiasis, food spoilage and mechanical transmission of pathogens. When they enter homes or buildings in large numbers they can cause great annoyance. Larvae can develop in open wounds and in your digestive tract. Take Not Nice to Toxins or a teaspoon of food-grade DE to control them. You must find and remove the breeding area or dust with food-grade DE or install parasitoid wasps or histerid beetles. Don't forget to screen and caulk.

A thorough inspection will locate fly breeding and larval developmental sites. Try to do this at night when the flies are resting near their food and/or larval developmental sites.

Inspection: The key is sanitation.

When any of these flies become problems inside, their (filthy) breeding site and their larvae will usually be close by. If animals are nearby, investigate for manure concentrations. Garbage cans, garbage chutes, trash cans, animal feces and dumpsters are often the problem source; even soil where garbage or manure has decomposed will support infestations. Sanitation is the safest and best solution once you have located the breeding source for the flies. Routinely clean or flood the area with diluted enzyme cleaner, peppermint soap and/or borax or steam clean. The best control is to prevent flies from breeding, so dust with and feed animals food-grade DE.

- House flies infest most garbage, manure (horses, cattle, poultry, pet), filth accumulations.
- Face flies need fresh cattle manure for egg laying.
- Flesh flies, like blow flies, live in pet manure, meat scraps in garage and dead animals.
- Blow flies are scavengers and live in manure, carrion, dead birds and rodents in wall voids and chimneys. One blow fly, called the cluster fly, parasitizes earthworms.

Look for fly sources where buildings are infested. Observe sanitation in the areas where flies are problems.

- The most common means of fly entry is through open doors. Look for door props and hooks as well as gaps where broom handles are stuck over hinges to hold the door open. Close the doors.

Evaluate garbage/manure management. (In 4 days, 400 maggots/flies can be found per pound of manure.)

- Garbage left in the building or on loading docks is a fly and pest attractant.
- Garbage should be removed from the premises at least twice a week and stored in tightly sealed plastic bags. Double-bag during fly seasons.
- Garbage containers/dumpsters should be hosed down when empty and sprayed to the point of run-off with 1 oz. Safe Solutions Enzyme Cleaner with Peppermint per 1 qt. water, then sprayed with 1 c. borax per 1 gal. water or dusted with food-grade DE.

In favorable weather, house fly larvae mature in 6 - 10 days and blow flies in 3 - 9 days. They live in refuse only from the egg laying to the mature larval stage. Then the mature larvae crawl away to pupate, emerging as adults later. Spray/clean with diluted Safe Solutions, Inc. Enzyme Cleaner, borax and/or sodium borates and/or steam clean. **There is no substitute for sanitation in house fly control.**

Habitat Alterations

- Caulk and tighten around all openings such as screens, doors, windows, ventilators and eaves. Routinely remove or bury all breeding sites, e.g., manure, garbage and filth or feed the animals food-grade DE.
- Try planting basil or tansy by your kitchen door or on your table - or try oil of cloves or oil of lavender or mint or neem sprigs to repel flies.
- Don't forget to simply spray maggots and flies with diluted Safe Solutions, Inc. Enzyme Cleaner with Peppermint. No volatile, synthetic pesticide poison works as well or as safely. **Emphasize sanitation:** Make the following recommendations to all occupants. (If sanitation cannot be improved, other methods of control will not be nearly as effective.)
- Quickly bury or remove breeding materials such as garbage and manure and other filth.
- Clean garbage cans and dumpsters regularly, with Safe Solutions Enzyme Cleaner with Peppermint and/or borax and any fresh overflow immediately. Rinse with a hose and then spray the diluted enzyme cleaner and borax while the surfaces are wet.
- Clean food delivery spills immediately.
- Drain wet areas around garbage collection sites; then lightly dust with food-grade DE.
- Keep loading docks clean; mop with borax.
- Install air curtains where doors remain open for deliveries, etc..
- Replace white security lights inside and outside with yellow lights.
- Routinely add enzyme cleaner to the drains or soak infested soils with diluted enzyme cleaner.

Intelligent Pest Management® Control

- Practice proper sanitation and exclusion.
- Vacuum all visible flies. Remove and/or eliminate all larval development sites.
- Install sticky window scoops to the windows; sticky fly strips can be placed in low access rooms, such as attics and storerooms.
- Simply use a fly swatter. Don't forget to try the new fly traps and sticks with various fly attractants. Fit garbage receptacles with tight fitting lids, rinse out receptacles with water and then spray with Safe Solutions, Inc. Not Nice to Bugs® or Enzyme Cleaners* and borax and put garbage in sealed plastic bags.
- Electric fly traps will control only a low level of adult flies. (Watch these traps to see what kinds of flies are being caught.) Spray adults and maggots with diluted Safe Solutions Enzyme Cleaner with Peppermint.
- Try planting basil or tansy by your kitchen door or on your table - try oil of cloves or oil of lavender or mint or neem sprigs to repel flies.
- Don't forget to simply spray maggots and flies with Not Nice to Bugs® or diluted Safe Solutions Enzyme Cleaner with Peppermint. No volatile, synthetic pesticide poison works as well or as safely. Then spray with diluted borax or food-grade DE.
- Insect light traps work best "the lower, the better"; no more than 5' high if possible. Keep them out of moving air and use those with the most bulbs and wattage.
- Do not place blacklight fly traps where they will attract insects from outside; Do not put them in competition with other lights such as those from vending machines, etc. Vacuums can be used to quickly remove any remaining adult flies - after elimination of breeding sites and exclusion methods are in effect.
- Caulk, screen all doors, windows and vents, plug all holes, patch, seal, close, etc.
- Make diluted 4% enzyme cleaner or 1% protease enzyme baits.

Follow-up - Regularly check habitat reduction, sanitation and exclusion methods to see that are being properly maintained. Observe work habits that run counter to the pest management program (sanitation, habitat alteration, and so forth). Hold training clinics for workers about fly pest management.

Remove or eliminate all visible the larval developmental sites. Regularly empty and clean out garbage receptacles with Safe Solutions Enzyme Cleaner with Peppermint and/or borax and/or render breeding materials unsuitable by drying them out and lightly dusting with food-grade DE.

Maintain all of your garbage receptacles with tight-fitting closures, then store all garbage in securely tied plastic bags. Also maintain tight-fitting windows and doors, securely screened doors with self-closures; caulk or seal all cracks and crevices and all holes through exterior walls for utilities; keep all vents securely screened, etc., and use air curtains, insect electrocutors (light traps), sticky-surfaced traps, etc. Routinely steam clean with or clean/spray with Safe Solutions, Inc. Enzyme Cleaner with Peppermint and/or borax cleaners. It, obviously, helps to spray dumpsters and garbage receptacles **after** they are empty and drained properly with diluted enzyme cleaners. Don't forget to spray the entire inside (including the cover). If necessary outdoors, use Mop Up® or borax or boric acid in the bottom of dumpsters and garbage cans. Better yet, lightly dust with food-grade DE.

House Fly Caution: House flies (and cockroaches and even field slugs) can carry pathogenic *E. coli*, so clean routinely with steam or Safe Solutions Enzyme Cleaner with Peppermint. The CDC estimates that *E. coli* O157: H7 which was probably created by human (antibiotic) activities causes more than 73,000 illnesses a year in the USA resulting in a cost of \$400 million, and growing antibiotic resistance is making these cases hardest to treat and will ultimately lead to more and more deaths. **Antibacterial soaps are no more efficient than regular soap and water for fighting infections and create even more resistant pests.**



FACE FLY
Musca autumnalis (DeGeer)

The common name face fly comes from the habit of adult flies feeding on the watery (ocular and nasal) secretions (exogenous protein required for ovarian development) on the faces of cattle. Inside homes their behavior is similar to cluster flies where they overwinter. They were introduced into the U. S. and Canada in the early 1950's from Europe. They look almost identical to the house fly and they overwinter like cluster flies.

Adult - About 1/4" long - only a little larger than the house fly with the four dark stripes on the thorax. Adult invades buildings to hibernate in the walls, attics, etc. and emerges in the spring. Can be seen during the summer in groups of 20 - 100 around the faces of cattle. Very annoying to horses and cattle as the adults suck up the excretions from their eyes, nose and mouth. We have given these animals some relief by wiping their faces with diluted enzyme cleaner. They enter homes in late summer and fall to overwinter.

Larva - 1/4"-7/16" long - tapering towards the head that has 1 pair of dark hooks. Breed in undisturbed, fresh manure and other excrement; 3 larval instars - yellowish in color. Diatomaceous earth added at a rate of 2% of the feed not only will aid in controlling internal parasites - it also reduces the number of flies in the manure. Larvae only develop in dung from cattle feeding primarily on pasture and forage so simply add some grain to the diet of the cattle to stop these flies.

Pupa - Pupate in soil adjacent to larval living places; dirty white in color.

Egg - (30 - 230) Laid just below the surface of fresh bovine dung (less than 1 day old); has a dark or black respiratory stalk at one end for breathing, hatches in 10 - 23 hours.

Adult life - Hibernates in buildings in fall like cluster flies. Feeds on animal secretions, nectar and fresh manure; causes pink eye in cattle. Note: Add fly parasite wasps to your manure piles. Normally present outside from April to October - with wasp numbers increasing as fall approaches.

Do not attempt to kill these flies inside the wall voids at anytime - use vacuums and traps and practice proper sanitation and exclusion.

Horn Fly

***Haematobia irritans* (Linnaeus)**

The horn fly will pierce the skin of the animal host and each fly can take 20 meals per day. They often cluster around the bases of the horns of cattle and can even number 10,000 to 20,000 biting flies per animal. The horn fly is dark gray in color and about 1/2 to 1/3 the size of the common house fly. The adult female deposits her 14 - 17 eggs exclusively in fresh cattle manure (within 10 minutes of dropping). The eggs are reddish-brown and hard to see in the manure. The adults remain on the host except when laying eggs or flying to a new host. Cattle dips or sprays of diluted Safe Solutions Enzyme Cleaner with Peppermint will quickly eradicate this pest, especially if you feed the infested cattle food-grade DE, especially during the warmer months. Losses to the horn fly in Florida alone are estimated to total \$36 million per year.

The horn fly was first introduced into the United States more than a century ago. Since then, it has become one of our most important fly pests of pasture and range cattle. They are small, gray flies, only about 3/16 inch long. They often congregate densely on cattle, each fly oriented with its head in the same direction as hair tips of that site on the host. Their hosts are primarily cattle but to a lesser extent will feed on horses, sheep, and goats. Both male and female horn flies feed on blood by using a slender, black piercing mouthpart that projects forward from underneath their heads. Males feed about 20 times and females about 40 times daily. This feeding activity is painful and annoying to cattle. Horn flies congregate on the backs of cattle, often clustering around the horns and on the midline and spreading down the sides. Sometimes, when the weather is hot, they may move down onto the belly. On finding a host, horn flies tend to remain on it and/or others in the same herd for their entire lives, moving to different anatomical sites to regulate their temperature and minimize exposure to the wind. They are strong fliers, on emerging as adults they will fly to find hosts; up to 10 miles has been recorded; but, most probably find cattle within 3 miles. Even though they are strong fliers, most of their adult life is spent on the same host or migrating to new animals in the same herd or flying down to deposit their eggs. The irritation and blood loss causes cattle to lose 0.3 to 0.5 lbs per day and for dairy animals their incessant feeding clearly causes lower milk production. Large populations of horn flies may cause open sores on the head and underline which can predispose their hosts to secondary infections of both disease and parasites. Because of their piercing-sucking mouthparts, horn flies are suspected of mechanically transmitting anthrax and other diseases within a herd. Horn fly numbers of 50 or more per lactating dairy cow or 200 or more horn flies per beef cow are considered to be of economic importance. Extreme numbers of 10,000 to 20,000 flies per animal have been reported and could make blood loss alone (0.5 gal/month) an important factor in reduced production. Horn fly populations have been generally noted to be lower on dairy cattle than beef cattle. The feed ration fed to dairy animals greatly affects

the fly's larvae to be able to survive in the manure. After the flies feed and mate, the female is ready to deposit eggs. She moves to the rear of the cattle host, frequently during early morning. Female flies can lay 14 - 17 eggs at one time and up to 200 eggs during their lifetime - the eggs are small, reddish-brown and difficult to detect in the manure; and are generally laid in clumps on the fresh manure or on grass and other vegetation covered by the cow pat. Depending on temperature, the eggs hatch usually within 18 hours, and three instars of maggots/larvae then develop in the dung - often in 14 to 18 days, but in as few as 10 days under ideal conditions. All of the eggs that will hatch are only found in fresh cow manure; the female fly often begins ovipositing before the cow has completed her defecation or at least within 10 minutes. Horn fly maggots or larvae live in fresh pats of cow dung and feed on the microbial flora and fauna in it and from decomposition products of microbial action on the dung. When mature, the maggots pupate in or below the pat. When the adults emerge from the pupal case, it takes 3 days for the complete maturation of the reproductive organs for egg production. The total life cycle from egg to egg-laying adult usually takes from 10 to 14 days. As summer progresses, more horn fly eggs develop but in the more temperate areas, they only mature only to the pupal stage. Rather than emerging as adults, they overwinter (diapause). Diapausing pupae will wait to produce adult horn flies the following spring. When temperatures begin hitting the upper 60's and lower 70's during the day. Apparently, diapause is triggered by a combination of light and temperature. **Because Horn flies rarely leave their host except to deposit their eggs or to find another host - safe and very effective control can be achieved by simply spraying or dipping infected hosts once a week for three weeks with Safe Solutions Enzyme Cleaner with Peppermint at a rate of 3 to 4 oz. per 1 gal. water and/or by simply feeding the infected cattle hosts food-grade diatomaceous earth (DE) at a rate of 2% by weight of their dry ration and feeding any infected goat hosts at a rate of 1% in their grain. Note: Dung beetles will eat horn fly eggs.**



STABLE FLY Also known as the toothed biting fly, the biting house fly, beach fly or dog fly.

Stomoxys calcitrans (Linnaeus)

In the U. S., annual losses in cattle production caused by this pest have been estimated at \$398.8 million (Drummond, et al. 1981).

Adult - 1/4" long, of a general grayish color, superficially resembles the house fly. Mouthparts protrude forward under the head as a stiff, somewhat pointed, bayonet-like, slender, black (non-retractile) proboscis or beak with which it pierces the skin (even through stockings) the *bite* - feels like being stabbed with a large pin or darning needle. When the deliberative body that created the U. S. Declaration of Independence was in session, they were in a hall located next to a horse stable. Numerous stable flies that easily bit through silk stockings hurried the meeting and the signing; had it not been for the stable fly, we would not be celebrating our Independence Day on the fourth of July! The abdomen has seven rounded dark spots on the upper side, arranged in a figure eight. An adult lives from 2 - 3 weeks and the female must have at least one blood meal before she can reproduce. **Pierce the skin and both males and females suck blood.** They attack and bite any and all warm blooded animals, including you and me. **They are attracted to dogs and prefer to land on and bite the legs of the animals on which they feed.**

Pupa - Pupates in a brown cocoon among the straw usually in 1 - 4 weeks, but up to several months.

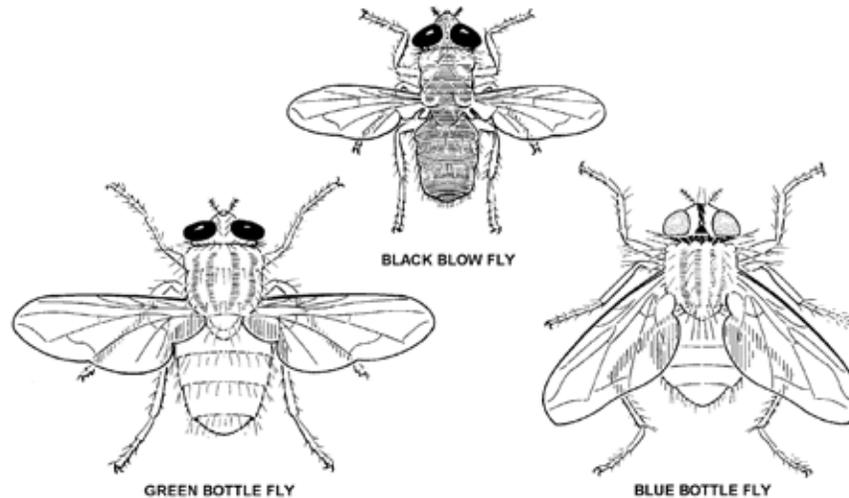
Larva - Yellowish-white maggot found in damp, decaying masses of rotting vegetation, e.g., straw, grass clippings, grain, hay, etc.. The larva pass through 3 instars and then pupate in the last larval skin. The maggot is 3/4" long when full grown, tapering almost to a point at the head with the posterior end cut off squarely. Larval stage usually lasts 2 - 4 weeks.

Egg - The ovid cream-colored eggs are laid in groups of a hundred or so in moist, rotting, fermenting or damp straw or hay, fermenting grass and seed weeds especially in manure containing straw. Preferred breeding materials include marine grass, straw, grain wastes, seaweed, grass cuttings and horse manure. Hatch in 1 - 3 days. Try using the **IPM** and sanitation techniques mentioned previously for house flies including wasp parasites to control both stable and face fly populations.

Adult life - Frequently found around stables, horses, cattle, beached and dogs; they live about 3 weeks. They will attack you more readily if you are wearing dark colors. Probably causes diseases, e.g., anthrax, and will lower milk and beef production. They are already resistant to DDT, lindane, chlordane, toxaphene, dieldrin, stirofos,

dichlorvos and permethrin to some extent, but show no resistance to the pestisafe®, diluted Safe Solutions, Inc. Enzyme Cleaner and/or a fly swatter and/or traps and/or food-grade DE. Control of the stable fly is based primarily on the elimination of its breeding sites. If waste vegetation can not be removed, it should be dried or composted with bacteria and/or enzymes. Most active in the late afternoon and at dusk.

Note: Vertically-oriented black stripes drawn on a light background will help draw stable flies away from your animals.



BLACK BLOW FLY, GREEN BOTTLE FLY, BLUE BOTTLE FLY About 80 species occur throughout the U. S. and Canada representative examples include - *Phormia regina*, (Meigen), *Phaenicia pallescens* (Shannon), *Cynomya cadaverina* (Robineau-Desvoidy), *Lucilia illustuis* (Meigen), or *Phaenicia* (formerly *Lucilia*] *sericata* (Meigen), *Lucilia caesar* (Linnaeus), *Calliphora vicina* (Robineau-Desvoidy) - formerly *C. erythrocephala* (Meig.), and *Calliphora vomitoria* (Linnaeus). The blow flies, including the black blow fly, the green bottle fly and the blue bottle fly, are only occasional pests in buildings.

Bottle flies are easily recognized by their bright shiny colors (metallic blue, green, bronze or black sheen) and stout bristles on their bodies. They are usually seen flying up against window glass or screens; these flies make audible buzzing sounds. They can smell a dead creature in seconds, even from long distances! Typically these flies emerge from rotting meat or carcasses of dead animals, so their sudden appearance in large numbers in a building could indicate the presence of a dead animal outside the building or in a wall void, attic, crawl space or other inaccessible area. **Find and remove the dead animal or fish.** Adult blow flies readily deposit eggs in garbage or exposed meat or fish in kitchens, markets or other food-handling establishments and are capable of transmitting disease organisms to food in this manner. These flies are most active during warm, sunny periods and usually enter buildings in the spring and fall, seeking shelter from cool nighttime temperatures. Because they are strongly attracted to flesh, they attack an animal soon after death or begin depositing eggs into fresh meat a few minutes after exposure. Blow flies also deposit eggs into wounds of animals and people, resulting in a condition known as myiasis - the invading and consuming of living tissue by fly larvae. The maggots give off a chemical that helps wounds to heal. They often over-winter in wall or roof voids. The term bottle fly probably from the word *bot* an old name for a maggot. You can use these flies to locate dead animals inside a building.

Description, Development and Habits - Blow flies are larger than the common house fly. Adults range between 3/8" and 1/2" in length. The black blow fly is a blue-green, dark blue or greenish black color. The green bottle fly is brilliant metallic bluish green. The blue bottle fly has a metallic blue abdomen with a dark grayish thorax and large red eyes. These flies have 4 - 8 broods per year and females produce from 600 - 2,400 eggs, laid in batches of 100 to 200; eggs are usually laid outside in decomposing birds, meat or animal carcasses or garbage containing some animal or decaying organic matter, decaying vegetables or grass clippings or leaves or in animal manure. Blow flies also deposit eggs into dog feces or any decaying organic matter with a high crude protein content, even dry cat food. The usual larval stage pass through instars and lasts 2 - 10 days; pupation usually takes place in the soil within the top 2". Full-grown larvae or pupae can hibernate in the soil over winter. Numerous pupae can indicate the breeding source is near. These flies are often the first to arrive and infest the dead and are often used by forensic entomologists to help determine the time of death.

Intelligent Pest Management® Guidelines for Blow Flies - The most important control for blow flies in buildings is sanitation and exclusion. Properly screen windows and doors and seal up other openings where they might enter. Properly dispose of garbage, dead animals or birds, spoiled meat, animal by-products, dog feces and other waste products in and around buildings to avoid attracting blow flies and/or creating breeding sites. The sudden appearance of large numbers of blow flies inside a building usually indicates the presence of a dead animal, perhaps as a result of pest control activities directed toward rodents or other vertebrate pests. **The dead animals should be removed if possible. Vacuum adults if their numbers are high.** You may have to inspect the area at night when the flies are resting near the larval developmental sites. Soak or flood these sites with diluted Safe Solutions Enzyme Cleaner with Peppermint. Blow flies may overwinter in much the same manner as face or cluster flies - crawling up (southern) exterior walls (as the temperature drops) of a particular building to find entry points into void areas where they can *hibernate*.

Several traps are commercially available for trapping blow flies. These use an attractant, e.g., fresh fish-flavored cat food or tuna fish, and have an escape-proof entrance.

A simple way to reduce problems in structures where blow flies are persistent pests and larval sources cannot be located is to make a small, pencil-sized opening at the top corner of each window screen so flies can exit; blow flies are attracted by the light coming in a window and habitually crawl to the top of window screens. Small holes such as these should not allow other pests to enter.

Note: Green blow fly larvae (*Lucilia sericata*) can treat osteomyelitis, infected wounds, ulcers, gangrene, bed sores and abscesses. As bacteria become resistant to antibiotics maggots and their secretions of powerful protein-digestive enzymes can be used to destroy all manner of microorganisms (the same way that Safe Solutions Enzyme Cleaner does) and will promote tissue repair. Maggots eat only dead tissue and simply drop off the wounds when they are full to pupate.

CLUSTER FLY

***Pollenia rudis* (Fabricus) (Family Calliphoridae) and *Dasyphora cyanella* (Family Muscidae) or green cluster fly or attic fly**



Adult - The adult cluster fly resembles but is a little larger than the house fly in size and shape; about 1/4" - 3/8" long, dirty (non-metallic) dark gray in color and sparsely covered with short curly golden yellow hairs on the front top of the thorax and a black and silver checkered (irregular) pattern on its abdomen. They can squeeze into very small cracks and often will invade buildings in the fall to seek a warm place to hibernate in clusters through the winter. **Frequently described as dusty-looking.** When crushed, this fly smells like buckwheat honey. Distributed throughout the U. S. and Canada except for the southern states bordering the Gulf of Mexico. The Green Cluster Fly is a metallic blue-green to reddish fly that is a household pest in Europe.

Larva - White, grub-like, parasitic to earthworms. Larval stage (feeding within the worm) lasts from 13 - 22 days.

Pupa - Enclosed in an oval, shell-like case in the soil; pupa stage may extend from 7 - 14 days.

Egg - Laid indiscriminately in cracks in the soil; hatches in about 3 days.

This species gets its common name from its habit of entering buildings in fall and forming compact clusters or aggregations of hibernating individuals, commonly in unused rooms, wall voids or attics of buildings (usually in the warmest locations). They remain immobile until there is an increase in temperature - then "awakened" adults *buzz* around drunkenly, giving the occupants the "creeps." They are attracted to light, especially window light, so set up traps in windows and/or near light bulbs. Collectively, they give off a sweetish smell when disturbed." Specifically, cluster flies occur wherever their host earthworm, *Allolobophora rosea* (Savigny), occurs, which is usually in a well-drained silt-loam soil with grass cover. The adults normally live outdoors and can be seen on fruits and flowers. The larvae are parasitic on earthworms. In the South there may be as many as 4 cluster fly broods each season! Their flight is sluggish and accompanied by an audible

buzzing sound. These flies enter buildings by crawling through small openings in attics, siding and under eaves. They get into rooms through gaps in moldings and baseboards, window pulley holes in older sash-type windows and other small openings, **so caulk thoroughly**. During the fall, swarms of cluster flies enter and accumulate or “cluster” or huddle together in attics, wall voids, false ceilings, closets and empty rooms leaving stains on walls, draperies and other surfaces where they rest or “hibernate”. On warm, sunny days in early spring they are annoying because they fly *drunkenly* around in rooms and collect on windows and fall into food, dishes and elsewhere. They are not attracted to any baits.

Inspection - Frequently finding flies dead at windows may indicate an attic infestation. Then look outside at the south and west walls on sunny, cool days.

Habit Alteration

- Caulk cracks and crevices as much as possible.
- Tighten up and caulk around windows and screen ventilating spaces under the roof.

Intelligent Pest Management® Guidelines for Cluster Flies - The primary control of cluster flies should be to limit their access to buildings by closing off any small openings and cracks that provide entry. Typically, they use the same structure year after year. They do not multiply within structures. Seal cracks and openings around windows, eaves and siding. Install fly screens over air intake vents and/or air conditioning systems. Seal off attic openings with screen or caulking. Indoors: Remove flies by vacuuming and/or sticky scoops in the windows and/or lights left burning in the attic, etc. with newspaper under the lights to collect the dead flies. Try using negative ion plates inside. Make a powdered egg shell trap; when the dust covers their bodies they die.

Control - No attempt should be made to kill these insects in wall voids at any time because the bodies of dead insects attract dermestid beetles (larder beetles, carpet beetles, etc.). Dermestid larvae wander and will readily enter the living space, causing more serious problems. Instead, wait until summer when all live overwintering adults are out of the wall voids. Temporary relief is possible by using a fly swatter, sticky fly ribbons, a vacuum and/or sticky window scoops and permanent relief is obtain by caulking and sealing all visible interior entrances, especially around windows and flashing on south sides of buildings where flies enter. They give off a buckwheat honey odor and leave a greasy spot when crushed. **Try spraying them with diluted Safe Solutions, Inc. Enzyme Cleaner with Peppermint outside.**

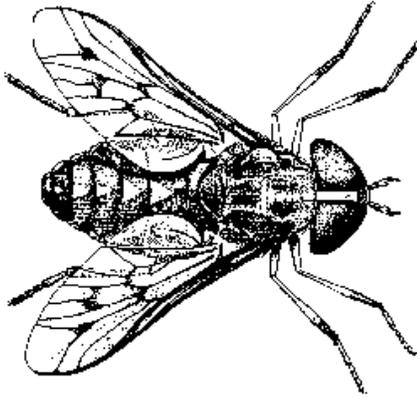
- Caulk around window and door frames and other cracks and crevices, especially those that lead to wall voids.
- Use vacuums where large numbers of flies are active or dead; this will control/remove all exposed individuals. Steam clean or clean and/or spray with diluted Safe Solutions Enzyme Cleaner with Peppermint.
- Install sticky scoops and screens to windows.
- Hang sticky fly strips in front of attic windows, especially east windows, install lights (in attics and elevator shafts); leave the lights burning 24 hours; place buckets or newspaper directly under the lights to catch the flies that are attracted and fly to their deaths.
- Practice proper exclusion and/or lightly dust with food-grade DE.

Remember, permanent control begins and ends outside. Therefore, use of preventative physical barriers aimed at adults before they congregate and attempt to enter buildings is recommended. Physical barriers involve exclusion. All vents (roof, overhang, weepholes, etc.) should be screened with at least 16-mesh screening. Caulk/seal around all visible cracks, crevices, plumbing and cable entrances, windows, doors and overhangs. **Seal all possible routes of entry.** Use silicone caulk, mortar and/or foam to seal. Entry routes include around window pulleys (seal with tape or steel wood), window frames, door frames, baseboards, etc.. For electrical outlets and switch boxes and heating duct and air return vents, remove the cover plate, seal with foam and replace. For light fixtures and ceiling fans, remove the fixture to its base plate, seal with foam and replace.

If cluster flies are in a false ceiling area, the population can be reduced by installing a continuously burning 60-watt bulb which attracts the flies, causes them to fly around the light and exhaust their stored food, and die right under the light, then routinely remove them with a vacuum. To speed the process, use old fashioned fly strips, glue boards, duct tape or other sticky surfaces which may be suspended from the uppermost surface of the false ceiling void near the light. Routinely remove and replace these sticky surfaces. To reduce the number of

flies coming into a room from a false ceiling, seal cracks through which any light enters. Use duct tape or caulk. In elevator shafts, install the continuously burning 60-watt bulb just above a 5-gal. pail of soapy water or above the pit floor. Again, vacuum dead flies daily.

DEER FLIES AND HORSE FLIES
Chrysops spp. and Tabanus spp.
Family Tabanidae



The tabanids - deer flies (*Chrysops spp.*) and horse flies (*Tabanus spp.*) are beautiful, fascinating creatures with gender-specific blood feeding and much surreptitious behavior. The Tabanidae are notorious pests of not only deer and horses but most mammals including man or reptiles or birds. Some species are vectors of disease organisms such as anthrax, tularemia and encephalitis. Several other bacteria, viruses, fevers, worms and protozoans can also be transmitted as they move from host to host to complete their blood meals. They inflict painful bites usually causing a flow of blood and a very irritating welt. Some people suffer severe lesions, high fever and general disability following bites of these flies. Approximately 335 species and subspecies are found throughout North America and over 2,000 species worldwide. Deer flies, which are smaller than horse flies, usually attack the head and upper body of man, whereas horse flies seldom feed on the head.

Outside Control - Females are attracted to light so change the lighting - other outside control, e.g., with diluted enzyme cleaner may not be practical because of the many larval development sites, the great distances these flies can fly (over 31 miles) and because the adults seldom rest in the same areas at night. Wear light colored clothing and a hat outside - try Safe Solutions, Inc. Enzyme Cleaner, neem or see Organic Mosquito Repellent for use as a repellent for these flies. Natural controls of tabanid populations are cannibalism among larvae and parasitism of eggs by trichogrammatid and scelionid wasps (Pechuman 1981). Use Safe Solutions Insect Repellent.

Want to stop the relentless biting attack of deer flies? Deer flies like to fly around the head of their intended victim - so take advantage of this behavior and hang a blue plastic cup upside down with Tanglefoot painted inside of it, or secure a glue board or the sticky part of a sticky trap, or a piece of fly paper or a 2" wide strip of (white) cloth adhesive tape 5" - 6" long (with Tanglefoot or STP or honey on it) onto the back or top of your cap - trapping the deer flies when they land on your head to bite. There also is a commercial 4 pack of deer fly paper called Tred Not available for about \$3.00. Traps that use carbon dioxide, ammonia and to octenol and a suspended black ball as attractants, e.g., the Gressitt-Malaise trap, may catch several thousand tabanids per day. You can also hang bright blue buckets (about the size of a man's head) painted with Tanglefoot inside, upside down, and about 5' - 6' above ground and carry them around the infested area. Feed your horses garlic and food-grade DE.

Inside Control - Exclusion via screens and caulk is the best control - clean or spray with diluted enzyme cleaner, use a light trap or light yellow or better yet white fly paper and/or put on fans and/or air conditioning - these flies are most active on hot, sunny, windless days - even a slight drop in temperature or increase in wind velocity will greatly reduce the numbers flying around both inside or outside, **so use air conditioners and/or fans.**

Adults - They are medium to large flies 1/4" to over 1" in length, black to brown to pale yellow in color with stripes usually on the abdomen. Most are stout bodied without bristles, often have (large) bright green or purple eyes. Most live 3-4 weeks - strong fliers. Most feed during full daylight. Mouthparts are for tearing and lapping - most females need a blood meal for egg laying. Blood is obtained with the proboscis. Horse flies are like mosquitoes in that females feed on blood, but the males feed chiefly on nectar and pollen.

Pupa - Larvae move to drier fringe areas to people.

Larvae - Larval stage of some species develop in relatively dry environments, but most develop in wet soils by the edges of fresh or salt water. Upon hatching they fall into the water or moist soil where horsefly larvae are carnivorous and cannibalistic, feeding on insect larva, toad tadpoles, earthworms, snails, maggots, etc., deerfly larvae feed on decaying organic matter they go through a variable number of instars or stadia, commonly 5 - 7

among *Chrysops* and 7 - 11 among Tabaninae. **They generally overwinter as larvae.**

Eggs - 100-1,000 eggs are laid in masses with a jelly-like material deerflies generally lay single layer masses and horseflies 3-4 layer masses.

A Deer and Horse Fly Repellent can be made with 1 tsp. soap, 1 tsp. hot sauce, 2 tsp. garlic juice and 5 tsp. vinegar; dab on with a cloth. Feed horses garlic.

MOTH FLIES (DRAIN FLIES, FILTER FLIES, SEWAGE OR SEWER FLIES)

Family Psychodidae, *Psychodidae spp.*



Moth flies are about 1/8" long; when crushed they leave a powdery smudge. Their dark color comes from tiny hairs that cover the wings which are held in roof-like fashion over the body making them look "fuzzy". Moth flies have long, drooping antennae. Larvae live in the gelatinous material (bio-films) in sink drain traps and sewers and sewage treatment plants. Where sinks regularly overflow, these flies build up in the overflow pipe. When shower pans leak, the area underneath becomes a fly breeding source. When drain traps of sinks, commodes, and floor drains dry out, large numbers can enter dwellings from the sewer. They can also breed in damp crawl spaces; is so, look for a leaking drainpipe. Check spider webs for dead moth flies. Put tape

sticky-side down over drains and cracks in the floor to inspect for those which are infested. Drain traps should be cleaned mechanically or with diluted enzyme cleaner or a commercial drain cleaner. Without larval control, adults will continuously emerge. You could install a tennis ball that floats to allow drainage and seals the drain to deny access into your building from sewer and drain insect pests. In sewage treatment plants, drain flies feed on the gelatinous material that collects on stones in trickling filter beds. Over time, cast skins from these filter flies can slow down water drainage. When sewage treatment plant filter beds malfunction or become out of balance, the moth flies can become problems in nearby neighborhoods. The filter bed should be routinely cleaned by reverse or back flushing. Cases of bronchial asthma have been caused by inhaling disintegrating filter flies. **Treat and clean drains regularly with Safe Solutions, Inc. Enzyme Cleaners. Spray Not Nice to Bugs® as needed.**

Control - Finding and eliminating breeding sources using sanitation and habitat reduction are the keys to control.

- Properly clean drains and roof gutters and vacuum up pests; clean drains with enzyme cleaner or drain openers monthly or as needed.
- Spray adults and breeding areas with 1 oz. Safe Solutions Enzyme Cleaner with Peppermint per 1 qt. water as needed. **You must remove the gelatinous film in which they breed.**

Adult - Small to minute, about 1/16" - 1/4" long, very hairy or *fuzzy*, moth-like, with relatively large, usually rounded wings. Normally they will run and only fly weakly, but can be carried a mile or so by the prevailing wind. Found about sinks, bath tubs, wet interior walls and lavatories where breeding occurs in the drain pipes, in the gelatinous residues built up on the interior of the pipe and trap interiors. They can also be found out of doors in damp situations. Very prevalent around sewage filter plants. **Named for their fuzzy appearance**, their colors range from yellow to brownish gray to black. They are carried by the wind for miles and can easily penetrate ordinary screens. Also known as sewer flies or filter flies. A common eastern species is *Psychoda alternata* (Say), as is *Psychoda cinerea* (Banks), in the western states look for *Psychoda pacifica* (Kincaid). They are strongly attracted to light.

Pupa - Found in same areas as larva.

Larva - The tiny young live in kitchen drains, water, sewage, dung and decaying vegetable matter. The traps in drain pipes are capable of supporting large populations of these pests. Both larva and pupa have breathing tubes which they extend through the decomposing film. About 1/8" to 3/8" long, eyeless and legless. Usually 4 molts or instars as a larva.

Egg - Laid in irregular masses of 30 - 100 upon the surface of the water film.

Adult Life - Because they originate from filthy sources and can easily penetrate screen barriers, stick to clothes, are routinely breathed into mouths and noses, and routinely fall into our food and drinking water, they transmit many diseases to us. The adults only live for about 2 weeks and are not strong fliers. Even their dead bodies cause bronchial asthma as they disintegrate and contaminate our ambient air. Submerge the maggots for 24 - 48 hours and they will drown; clean out traps, pits and pipes routinely; be sure to remove the gelatinous lining with scrubbing, Safe Solutions, Inc. Enzyme Cleaners, foaming drain cleaners or flush with large amounts of hot soapy water.

Intelligent Pest Management® Control Techniques - Routine and proper sanitation and removal of their breeding sites is the main approach. Clean gelatinous film from all drain traps, overflow and basement drains with steam or diluted Safe Solutions, Inc. Enzyme Cleaners. Pour a large quantity of boiling water or diluted enzyme cleaner down drains and through the overflow. Clean garbage containers regularly. Do not let wet lint accumulate under washing machine. Light up darkness; repair plumbing and properly install dehumidifiers. Keep screens in good repair. Install adequate extraction fans to laundry and bathroom areas. Because of their extremely small size, drain and moth flies are able to penetrate ordinary screens. Moth flies are weak fliers, usually seen crawling on surfaces. When they do fly, it is only for short distances in characteristic short, jerky lines. During the day, they typically rest on vertical surfaces near drain openings indoors and in shaded areas outside, so vacuum them there and then. Their greatest activity is in the evening when they can be seen flying or hovering above drain openings indoors or sewage filter beds, etc. outside. **Mist or spray with diluted Safe Solutions Enzyme Cleaners with Peppermint or spray Not Nice to Bugs®.**

First of all locate the breeding site. Carefully inspect and routinely clean or remove any/all drains, sewer leaks found, garbage cans, saucers under potted plants, bird baths or feeders, clogged roof gutters, clogged storm drains, air conditioners, cooling towers, moist compost, rain barrels and septic tanks. If large numbers of flies are seen, be sure to check for nearby sewage treatment plants, especially if you are upwind from the plant. Drains can often be cleaned out with over-the-counter drain cleaners or simply by flushing them with very hot (scalding), soapy water. If this is not successful, mechanical cleaning of the drain with a stiff brush may be required to remove the gelatinous film lining, and this should be followed with a caustic drain cleaner. **(Caution: Never use bleach in combination with ammonia or any drain cleaner.)** Large numbers of adult flies can be vacuumed, but only the elimination of the breeding site(s) will provide long-term control. **Use diluted Safe Solutions Enzyme Cleaner with Peppermint or spray Not Nice to Bugs®.**

When large populations of these flies are breeding in sewage filter beds, control usually consists of the periodic flooding for 24 - 48 hours to drown all larvae and pupae (eggs, however, are unaffected by flooding), or you can simply spray the area with diluted enzyme cleaner. Weed control (mow them down or spray weeds with boiling water or steam or burn them with propane) should help to remove adult roosting sites.

FRUIT FLIES AND PHORID (or Humpbacked or Scuttle) FLIES OVERVIEW ***Drosophila* and the family Phoridae**



Drosophilidae



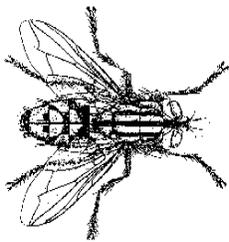
Wing

These small flies (from two different fly families) often are mistaken for each other. They both are about 1/8" long and somewhat similar looking, but their biology and management are very different. Treatment of these fly infestations are a good example of the site specific nature of successful pest management. The phorids are also known as humpbacked flies are small to minute flies that superficially resemble drosophila flies, but do not have red eyes. **Larvae can only survive in moist, decaying organic matter.**

There are about 60 genera and more than 3,400 described species with the *Drosophilidae*. Only about 200 species are found in temperate North America. Several species of *Drosophila* (the fruit, vinegar or pomace flies 3 - 5 mm long) have been immensely beneficial to mankind because of their use in the study of genetics and heredity. The family Drosophilidae has a name that translates better from the Greek as "dew loving" rather than "fruit loving". Females lay about 500 (up to 2000) eggs that hatch within 24 - 30 hours into tiny maggots or larvae. The larvae feed mainly on the yeast in fermenting materials and after 5 - 6 days (3 instars) the fully developed larvae crawl to a drier area to pupate. Newly hatched flies are attracted to the light, become sexually active in 2 days and mate, usually more than once. They are strong fliers and their entire life cycle can be from 8 to 15 days depending on the temperature. Fruit flies, e.g., *Drosophila funebris* (Fabricus) are attracted to

nearly any material that is fermented by yeast (including human and animal excrement and fruit and uncooked food). These small flies commonly have bright red eyes, although some species' eyes are dull dark red. The head and thorax are yellowish to brown, and the abdomen is light brown to dark with yellow bands. The wing vein structure is important and can be seen with a hand lens. It consists of a thickened vein bordering the front margin of the wing from the attachment at the thorax to the wing tip. Four other long veins can be seen on the rest of the wing. Trap them on glueboards or duct tape baited with a drop of vinegar. Make a bait of chardonnay and some aspartame. Keep ripe fruit in the refrigerator.

In a common Fruit Fly infestation, flies are attracted to the sweet odor of fermentation in ripe fruit, like bananas; they lay their eggs in the cracks of the peel. Fruit fly larvae hatch, then feed on yeast cells in the fruit. The life cycle can be completed in not much more than a week. Newly emerged adults are attracted to lights, but egg laying females will not leave fermenting materials. Fruits, vegetables, beer, fermenting water from refrigerators, humidifiers, sink drains, sour mops and rags, and rotting pet food are good examples of fermenting material. Infestations are common in orchards, breweries, restaurants, canneries, mausoleums, hospitals, trash receptacles, garbage disposals and homes. Phoridae flies with long skinny legs can be found running around on cup edges, in water basins, floor drains, dirty mops, patient wounds, packaging tape dispensers, planters, roof gutters, refrigerator drip pans, forgotten (fermenting) drinks, rotting mops, lab petri dishes, sewer pipes, vases, restrooms, garbage chutes and disposals, drains, water fountains, elevator pits, mausoleums, pantries, refrigerators, manure, rotting meat, overwatered soil of potted plants, sewer or septic systems, trash receptacles, etc.; **find the breeding source and eliminate** or routinely steam clean and/or routinely clean with Safe Solutions Enzyme Cleaner with Peppermint or their Not Nice to Bugs®.



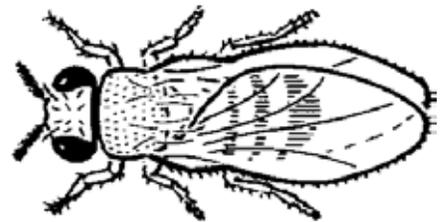
FLESH FLIES - family Sarcophagidae - there are at least 327 species in the U. S. and Canada. Adults are 1/4" - 7/16" long - most species develop in spoiling meat, decayed flesh, garbage and/or fecal material. Some species are beneficial and are parasitic on arthropod pests. Find breeding and larval developmental sites and correct the problem. Inspect at night when resting flies indicate the sites - then clean up - vacuum up any adults. Proper sanitation and exclusion should solve your problem. Soak the entire area with diluted enzyme cleaner. Lower the temperature to 40° F. and you stop reproduction and larval development. They lay maggots and not eggs, which, if ingested, can survive in your intestine for up to 6 years!

VINEGAR OR FRUIT OR POMACE FLY

Drosophila spp.

A/K/A/ Pomace Flies

Adult - About 1/10" - 1/4" long, yellowish, usually has bright red eyes and a tan-colored head and thorax with blackish crossbands on their abdomen. They have a distinctive feathery antennal bristles. Will usually be found hovering over or on and about fresh and rotting fruits and vegetables and in the briny liquids on top of improperly canned fruit and vegetables. They are strong fliers that easily pass through ordinary screens. *Drosophila repleta* (Wollasten) is dull, dark brown. *Drosophila melanogaster* (Meigen) is light brown with red eyes is the most common pest species.



Pupa - Larva crawl from the moist feeding area and pupate on a dry surface in a brownish-tan or straw-colored cocoon. The puparium or last larval skin has a conspicuous pair of filaments on the anterior end.

Larva - Small, legless, eyeless maggots pointed at the head end. They hatch from the barely visible, elongate eggs in about 24-hours. Common in fresh or overripe/fermenting fruits and vegetables or in are imperfectly sealed canned goods. Feed principally on yeast in the fermenting fluids of sugars and starches. About 1/4" - 3/8" long, have a pale white color with black and yellow markings. Larval stages normally take 5 - 6 days.

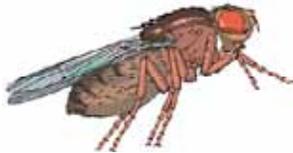
Egg - About 500 laid by female on mops filled with beer, wine or vinegar and on surfaces of fermenting fruit and vegetables and around spigots and bung holes of wine, vinegar and cider barrels; hatch in about 30 hours.

Adult Life - Larvae and adults will feed on excrement and then on fruit and other uncooked foods acting as

vectors of disease, e.g., diarrhea, intestinal myiasis, etc. Common in fruit markets, restaurants and homes or wherever fruits and vegetables are allowed to ferment. The adults are sexually active in 12 hours and begin laying eggs in two days and are attracted to light. They may breed in drains, but usually in any crack or crevice that contains food and moisture. Fruit flies have the dubious distinction of being the shortest-lived insects - the entire life cycle can be completed in less than 14 days. Wind stops them from laying eggs, so turn on the fans and leave them on 24/7.

Intelligent Pest Management® Control is proper sanitation by destroying, cleaning, freezing or removing all rotting fruits, vegetables, stale beer, open jars of fruits and vegetables, empty catsup bottles, soured mops, drains, fermented liquids of all types and all sour, gelatinous layers. Thoroughly patch all cracks and crevices. They can be easily trapped and/or sprayed with diluted Safe Solutions, Inc. Enzyme Cleaners and/or vacuumed. Lower the temperature to 40° F. Put diluted vinegar or Splenda® (sucralose) in a narrow neck beer/pop bottle.

These pests are associated with overripe or rotting fruit and vegetables as well as garbage, waste water and residues from beverages. Adults are small enough to gain entry into buildings through most window screens. They can also be carried into buildings as eggs or larvae on fruits and vegetables and other food



items. Besides being a nuisance, these flies can transmit diseases to people via food contamination and bacterial and fungal organisms to non-infected fruit, which cause the new produce to spoil. Adults of these tiny flies are often seen hovering over fruit or garbage. They are serious problems in packing houses and food processing plants as well as kitchens and restaurants. **They are attracted to the early stages of food decay and briefly to lights just after they emerge as adults.**

Inspection - When certain the infesting insect is a fruit fly, look for fermenting materials in desks, lockers and cupboards. Begin with ripe fruit and vegetables, then proceed to less obvious possibilities.

- Use fly paper or traps baited with yeast, bananas or vinegar to find the most heavily infested areas when the source is very obscure. Bait and/or spray with diluted enzyme sprays where possible. The Author has seen them fly directly into open Safe Solutions, Inc. #2 preformed Enzyme Cleaners containers and commit *suicide*.
- Be sure to inspect outside of the building near windows. **Inspect garbage and disposers.**

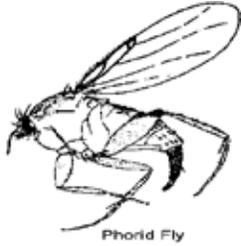
Habitat Alteration

- Wind stops fruit flies from staying in an area and/or laying eggs. Leave fans run 24/7.
- Tighten up any and all gaps where flies can enter. Store food and garbage properly.
- Use small mesh screening to exclude these small flies. Cover garbage and compost.
- Discard or clean any/all infested materials. Clean all drains and garbage cans with enzymes.
- Use precautions to remove flies before fruit is brought to terminal points when the infestation originates in the field or orchard. Infestations in canneries and fruit markets are particularly difficult to manage.

Intelligent Pest Management® Control - Practice proper sanitation and eliminate all food sources.

- Install fans; put on low speed during customer hours and high speed overnight.
- Lower the temperature to 40° F. Keep foods sealed, covered or refrigerated. Bury garbage.
- Use vacuums and/or vinegar traps and/or a glass of pickle juice and/or diluted Safe Solutions, Inc. Enzyme Cleaners. Keep foods enclosed or covered. Bury garbage. Use baits, e.g., chardonnay and aspartame.
- Practice proper sanitation and routinely clean with diluted enzyme cleaner with peppermint.
- Pour a small amount of beer or fermented diluted enzyme cleaner or diluted cider vinegar into a wide mouth jar - cut one corner of a plastic bag and attach the plastic bag to the jar with a rubber band - clean as needed.

PHORID FLIES



Phorids or humpbacked flies are 1/8" long, about the same size as fruit flies or a little smaller and without the red eyes. They are usually tan to dark brown in color and have a humpbacked appearance - a visual effect caused by a small head located low on the front bulge of the thorax. Wing venation consists of several short, thickened veins on the foremargin of the wing near the attachment to the thorax. These veins do not extend to the wing tip, and other veins are weak or nearly invisible. Phorids run in short jerks. Mature larvae are up to 3/8" long whitish, or grayish or yellow white in color and go through 3 instars, and can be found in any wet organic material. They are also known as "coffin flies."

These 1/64"-1/4" flies become problems when they infest decomposing plant or animal matter. They can breed in any moist, organic matter. Buried animals, mops, garbage, or broken sewer lines (under slabs) support large numbers of phorids. Phorids also infest bodies in mausoleums and morgues. Females can lay up to 749 eggs usually from 1 - 100 are laid at one time usually on or near larval food source. If she can not reach the body this horrid little fly lays her eggs on the seal and the maggots after they hatch - wiggle in! Adults are able to emerge from the underground infestation site upwards through several feet of soil. If broken sewer lines are under buildings, phorids can come up through cracks in concrete floors or around floor drains. When water and sewage wash out cavities in the soil around the pipe, immense numbers of flies are produced. Vacuum and properly dispose of the contents. There are about 2,500 species known worldwide with 226 species in the U. S. and Canada.

Inspection - Carefully identify the infesting fly as a phorid. Locate the area where most flies appear. Ask occupants if there have been sewer problems, buried garbage, decaying vegetable, or animal matter close by.

Habitat Alteration - Eliminate the food source and the breeding area.

- Find and remove all breeding sources, e.g., decaying bodies/animals, glue, paint, garbage or drains.
- Daily remove garbage, decaying matter and soil contaminated by it or food with diluted enzymes.
- Where sewer lines must be repaired, insist that sewage contaminated soil also be removed or, at a minimum, treated with copious amounts of diluted Safe Solutions Enzyme Cleaner with Peppermint.
- Caulk all floor and wall and/or ceiling cracks where flies may enter.

Intelligent Pest Management® Guidelines for Small Flies - Reduce the screen mesh size to help in controlling fruit, vinegar and phorid flies because of their small size. **Sanitation practices are the most effective control methods used to reduce populations.** Insist "first in must be first out" on all fruit and vegetable inventories; routinely eliminate food and breeding sources including rotting or fermenting fruits and vegetables and residues such as peelings, cores and juices. Thorough, daily cleanup must include the removal of any food items accidentally swept beneath appliances, tables, counters or other equipment. Thoroughly clean up spilled liquids to prevent vinegar flies from breeding in dried residues. Remove liquids and food particles from cracks and crevices; then caulk and seal them all. Place garbage in plastic bags and keep the mess stored in covered trash cans well away from buildings. Daily dispose of dishwasher, water from floor moppings, and garbage-laden water from sinks. Rinse mops in bleach or borax or Safe Solutions Enzyme Cleaner and hang them to dry. Repair sewer lines and bury all garbage, decaying animal or vegetable materials as soon as the problem becomes known. Clean routinely with enzyme cleaners or soaps. **Routinely clean and/or treat all garbage receptacles and drains with diluted Safe Solutions, Inc. Enzyme Cleaners and/or borax or Not Nice to Bugs®.**

Vacuum and use insect electrocutors (light traps) to reduce populations of flying adults in enclosed areas. Use traps baited with fruits, vinegar and/or yeast to collect adults in enclosed areas, but first and foremost create and maintain careful sanitation and inventory methods. One very effective non-pesticide technology that is readily available and easy to deploy are fruit fly traps. One made by Agrisense hangs from the ceiling. It is baited with malt vinegar; the flies enter through a hole in the bottom, can't get out and eventually drown. The basic principle of a baited funnel-type traps has been used for at least several hundred years to rapidly clear out fruit flies from rooms. Probably the most popular design on the market today is Victor's Flying Insect Trap (originally called the Fly-In Saucer). <http://www.victorpest.com/canada/insects.asp> Newer models come with a bright yellow plastic label that hides the shocking contents from delicate eyes. These one-quart devices are inexpensive and very effective in controlling fruit/vinegar flies. You can use white glue boards or duct tape treated with a few drops of vinegar. *Final Note on Traps:* Atlantic Paste & Glue Co., Inc. <http://www.catchmaster.com/home.html> has developed a lighted fly trap with replaceable/disposable glue boards. The trap attracts flies with a black light and warmth

and the glue attracts flies with a peanut butter scent and an optional sex (pheromone) attractant. It can be used even in food preparation areas.

FUNGUS GNATS

Families: Fungivoridae - formerly known as Mycetophilidae (714 species) and Sciaridae (137 species) in the U. S. and Canada

Fungus gnats (1/32-7/16" long) are slender, delicate mosquito-like insects that are attracted to light. They also look like fruit flies with beige wings. Their larvae infest moist/damp soil and feed on fungi associated with decaying vegetation. Indoors, fungus gnats infest flower pots. The eggs are laid on top of the soil and the maggots may suck juices from the plant roots. Put yellow paper (or index cards) covered with honey or sticky glue or petroleum jelly in pots - replace as needed. When we found fungus gnats coming up the heating ducts that were installed incorrectly under a slab - we simply installed furnace filters inside the ducts to catch and filter out the fungus gnats. The filters were cut to size and washed as needed. They also build up in pigeon droppings on outside ledges, then enter dwellings through nearby windows. Vacuum and clean, exclude and practice habitat reduction and proper sanitation. Put clear plastic bags over all living plants with wet soil at night to see if they are infested. Lightly treat soil with diluted Safe Solutions enzyme cleaners. Flood plants or other infested soils with enzymes. You can simply soak plants overnight in tap water - be sure the water covers just above the soil line; remove in the a.m. and drain well. Then resoak in a few weeks to kill any eggs that were laid by the adults. Find and eliminate all larval developmental sites. Have a roofer use an infrared device to detect water sources. All wet areas should be opened up and wet material should be replaced. Properly install and use fans, air conditioners and dehumidifiers - vacuum up all adults - which are attracted to light. Glue a bright yellow plastic cup to the plastic lid of a coffee can, let dry then apply petroleum jelly, honey or Tanglefoot (<http://www.tanglefoot.com>) to the yellow exterior surface of the cup to trap fungus gnats and/or white flies. The soil or wet site in which they are breeding must be found and then dried out or flooded with diluted enzymes. The top 3" of soil should be raked and overturned to speed dry, all overflow saucers under plants should be cleaned with diluted Safe Solutions Enzyme Cleaners and/or dried out periodically.

Kill or control the fungus and you will kill and/or control these gnats.



Fungus Gnat

Medflies or the Mediterranean fruit fly can be killed with baits that contain protease enzymes or diluted Safe Solutions, Inc. Enzyme Cleaners, food-grade DE, red food dye or less than 1% borax. Sprays of diluted enzyme cleaner will also kill them. Borax will sterilize the female flies if it does not kill them. Always test spray a small area first. Make a mix of 7 parts water to 1 part cider vinegar and place in baby food jars or small glasses to attract fungus gnats to their deaths by drowning. Also see:

<http://store.arbico-organics.com/organic-pest-control-beneficial-insects-organisms-fungus-gnat-control.html>

MIDGES

The family Chironomidae

Midges also look very much like mosquitoes but do not bite. Midge larvae (1/32"-1/8" long) live in water, especially in quiet, still water. Eggs are normally laid in masses over open water or attached to aquatic vegetation.

Adult midges 1/32" - 3/8" long with slender bodies and wings are the driving force behind some spider infestations on buildings and monuments (see Orb Web spiders, Chapter 24). The adults fly to lights and enter dwellings through gaps. There are about 817 species in the U. S. and Canada.



Fly management is site specific; volatile pesticide poisons are generally not useful. Turning off or manipulating lights will reduce midge attraction. As part of the fly management plan, note flight periods and times. The larvae of some species of midges indicate a larger pollution problem. In small bodies of water - tadpole shrimp (*Triops longicaudatus*), goldfish and/or carp have been used to control midges. Hang a light (mercury-vapor) 4-6' above

the water to attract, hold and reduce their numbers. Fog and/or spray with diluted Safe Solutions, Inc. Enzyme Cleaners. Note: Yellow lights and sodium vapor exterior lighting does not attract midges.

INTELLIGENT PEST MANAGEMENT® SUMMARY

Flies are insects with complete metamorphosis; the great order Diptera is characterized by having only one pair of wings. These insects carry diseases and are responsible for millions of deaths each year because of their disease vectoring ability, particularly in less developed countries. In urban areas, flies contaminate food and people in schools, restaurants, hospitals, homes. They are annoying indicators of sanitation, structural and cultural problems.

Practice proper exclusion and proper sanitation; clean and/or spray with Not Nice to Bugs® or with diluted Safe Solutions Enzyme Cleaner with Peppermint and borax; vacuum up any exposed individuals.

Safe Solutions, Inc. Food-Grade Diatomaceous Earth (DE) - Sprays and baits containing up to 90% Safe Solutions, Inc. DE in skim milk (8%) and yeast extract (2%) give a fast knockdown of houseflies and mosquitoes or DE (67%) in molasses (33%) still are considered to be non-toxic - and some commercial baits have now been approved in meat packing plants. As you know, we prefer to limit our use of even food-grade DE; we have found diluted enzyme cleaners work quicker, but dusting with food-grade DE provides residual control.

Non-Toxic Fruit Fly Control

Use some cheap red wine, diluted enzyme cleaner or combine 1 c. vinegar, 2 c. water and 1 tsp. honey in a capped 2-liter soda bottle. Shake well and then punch a couple of small holes (big enough for flies to get through) in the bottle sides above the liquid level. Hang above five feet of the ground, using string pushed through a hole you punch in the bottle's cap. An alternative bait trap is beer in a wide mouthed jar with a plastic bag attached to the top with a rubber band - cut off the corner of the bag. The only maintenance requires is periodic dumping of dead flies. As fruit flies are weak fliers, simply using a fan directing the air current away from fruit or other produce will lead to their demise. Try a fruit-mimic sphere covered with fruit juice and aspartame. See an example at this web site: <http://www.tanglefoot.com/products/ttsphere.htm>

Alternative Fly Controls

Vacuum up all flies attracted to warmth, pheromone or food odors, light, color and/or blacklight. Place a few branches of the neem tree or the pepper tree (*Schinus molle*) on the table or wherever you want to repel flies - this has been used in those countries fortunate to have these native trees for years. Go into your garden and put some lavender or thyme on the table or doors. Another (old) remedy to attract and kill flies is to soak ½ ounce of guassia chips in 1 pint of cold water. Place this in a saucer (away from people and pets) with ½ cup of sugar and leave out. Make your own fly paper with honey or molasses spread on bright white or yellow paper. Keep flies out of a building with an aroma therapy diffuser. Essential oils of cedar, eucalyptus, peppermint, lavender or anise are effective fly repellents. You can also fog or clean and/or spray diluted Safe Solutions Enzyme Cleaner with Peppermint. Routinely clean the garbage cans/area with 1 c. borax in 1 gal. hot water or steam clean and/or lightly dust with food-grade DE. Muscovy ducks are large, well-muscled ducks. Females weigh about 8 pounds and drakes can reach 15 pounds. Extremely self-reliant, these birds will forage for tender grasses, and pond and dry-land weeds, and their healthy appetite for flies, mosquitoes, slugs, snails and even mice make them very handy to have around. Just be careful to protect young plants: Muscovies sometimes uproot flowers and vegetables in their zeal to locate worms and other soil-dwelling delicacies. They also love reaching up to pluck fruit from bushes.

Safe Solutions, Inc. Enzyme Cleaner with or without Peppermint Sprays

Very diluted solutions of Safe Solutions, Inc. Enzyme Cleaners, especially with Peppermint, will kill all stages of flies. Once the garbage container is empty, rinse with water and then liberally spray all surfaces of any garbage cans/bins with a stronger solution and you can control flies and yellow jackets for an extended period of time. The diluted enzyme cleaner will eat the garbage and the odors and will also create deadly baits. You may also wish to include a "kicker" or "residual" of either ½ c. borax or disodium tetrahydrate per 1 gal. water or lightly dust with food-grade DE.

Safe Solutions, Inc. Enzyme Cleaners are labeled hypoallergenic, non-toxic, non-pathogenic, non-corrosive, non-flammable and yet in my experience are excellent sprays to kill insect pests, odors, scale and molds. The Author knows people who brush their dental plates with diluted Safe Solutions #2 preformed enzyme cleaner to control odors, drink small amounts of the original formula to fight calcium build-up and spray plants to increase root growth and alfalfa production. The Author knows of others that spray or soak or rinse their feet, etc. with diluted enzyme cleaner to control their athlete's foot, pyorrhea, dandruff, lice and/or fungus/ringworm problems. When sprayed with a volatile, synthetic pesticide, roaches will run away and hide, but when sprayed with a diluted enzyme cleaner with peppermint they only travel a few inches before they die. Scale and mold are controlled quickly. Enzyme cleaner sprayed fruit trees resulted in better pest control than synthetic pesticides. If you must spray *something*, spray diluted enzyme cleaner with peppermint first and check the results before spraying something *stronger*. The Author has seen roaches come out in broad daylight to watch and drink (and die) as floors are cleaned with diluted enzyme cleaner, which not only clean but work as a safer broad spectrum pestisafe®. You can clean floors, drains and virtually everything with enzyme cleaners which digest or remove odors, urine, blood, body fluids, muck and many other protein substances. Spray garbage receptacles monthly to control flies, yellow jackets and odors. Incorporate diluted enzyme cleaner with peppermint in the rinse-and-vac to quickly kill any insect pests you suck up. It truly is an excellent and inexpensive IPM tool that will grow in usage as we continue to experiment with it. The Author has USA, Australian and Canadian patents on the use of enzymes and surfactants for pest, fungus, lice, weed, mold and mildew control.

Negative Ion Plates - Try using negative ion plates to repel flies from inside structures and/or to help keep them outside.

White Index Cards - Place white index cards in various fly resting areas; these cards will show vomit and fecal spots made by the flies. Replace them routinely to monitor the need for further controls.

Mint - Plant or spray mint, e.g., peppermint (oils or soaps) to keep flies away from specific or entrances on hot summer days. Try Safe Solutions, Inc. Peppermint Soap or Enzyme Cleaner with Peppermint; dilute 1 oz. of either in 1 quart of water and spray entrances, garbage cans and dumpsters. Add borax for residual action.

Wasps - There are several species of parasitic wasps available from commercial insectaries to control houseflies and stable flies, e.g., *Muscidifurax raptor*, *Spalangia endius* and *Spalangia cameroni*, that attack the pupae of filth flies. <http://spalding-labs.com/betterFlyControlBiologically.php> A Brazilian wasp, *Tachinaephagus zealandicus*, attacks larval flies.

Natural Predators of the Horn Fly - The horn fly, *Haematobia irritans* (Linnaeus) is a terrible pest of cattle. Animal losses from blood loss, annoyance and lost weight have reached \$870 million in just the U. S. (Kunz, et al 1991) Synthetic insecticide resistance is common. If you don't spray these volatile, "registered" pesticide poisons, the dung arthropod community will reduce horn fly populations (they eat the eggs and larvae as they mature in cattle dung) naturally.

Beneficial Flies

Syrphid or Hover Flies resemble wasps and each green or tan worm-like maggot or larva of these flies can put away 1,000 aphids before becoming an adult; they also feed on other soft-bodied insects, e.g., mealybugs, thrips and leafhoppers. There are approximately 1,000 species in the U. S. that also are important pollinators. Plant tansy (*Phacelia tanacetifolia*) to attract hover flies. **Tachid Flies** often resemble black houseflies but also can be found in various shades of yellow, brown and red. There are almost 1,300 species in the U. S. Some of their maggots or larvae invade and feed on many caterpillars, grasshoppers, beetles and bugs. If you wish to attract them, plant a small patch of buckwheat.

Beneficial Organisms - Fly parasites (Beneficial Insectary, 9664 Tanqueray Ct., Redding, CA 96003, 1-800-477-3715, web site: <http://www.insectary.com>) or fly predators (Spaulding Laboratories, 760 Printz Rd., Arroyo Grande, CA 93420, 1-888-562-5696, web site: <http://www.spalding-labs.com>) can be introduced to destroy pest flies in their immature larval and pupal stages. There are several nematodes, parasitic wasps, black soldier flies, maggots of the black dump fly and various fungi that will control pest fly populations.

TRAPS AND BAITS: Make your own enzyme cleaner (3% or less) or protease (1% or less) baits, but they should

be fresh. Solar traps and food baited traps are best suited for exterior use and light-baited traps are best suited for indoor use. Purchase a Flies B Gone Fly Trap from Safe Solutions, Inc. <http://www.safesolutionsinc.com>.

Traps for Fruit Flies - Pour a small amount of beer into a wide-mouth jar. Cut the corner out of a plastic bag and attach the bag to the jar with a rubber band. Flies will enter and be trapped.

FOOD BAITED TRAPS: Fermenting foods, e.g., molasses, honey, table sugar and other such materials are attractive baits for house flies. Try 20% dry milk, 20% molasses, 10% sugar, 20% Brewer's yeast and 30% water. Blow flies love to find meat products like tuna. Another bait for house flies and biting flies consists of 1 pound of sugar, 1 pound of baking powder, 2 oz. of baker's yeast, 6 oz. of air-dried blood or freeze dried fishmeal, ¼ cup honey and 2 tablespoons of water or grape juice; mix thoroughly, place in an ice cube tray (plastic). Dump out the cubes, air dry and add one cube per quart of water as needed. Try a fermenting banana, or just grape juice.

DISPOSABLE/REUSABLE TRAPS: Can be purchased from Safe Solutions, Inc. at <http://www.safesolutionsinc.com> or Linda Jensen at <http://www.flybusters.com> or made out of a 2-liter bottle. Cut off the top where it begins to curve, invert it so it looks like a funnel, tape the ends with white tape - bait with a dry food bait and wrap the exterior with aluminum foil. The clear plastic on top will let in the sunlight, or leave the foil off and pour in 2" - 3" of a liquid bait. See which version works best for you. Hospitals used to stick a potato full of toothpicks (coated with adhesive) and hang it from the ceiling - flies came for the peculiar geometry and the white potato. When full, the trap can be thrown away. Pheromone attractants produce no odors and attract only male flies as the trap begins to stink, other flies are attracted. Place all traps in sheltered locations (out of the wind), either on the ground or no more than 3 feet off the ground. Traps that are cubic work better than those that are cylindrical, but remember, house flies are attracted to geometrical patterns, cones, white pyramids, dark, vertical lines and/or yellow or white surfaces. Stable flies are attracted to white vertical panels or cubes. Build a cube (screened box) 18"x18"x18", elevated 2" - 3" off the ground, roll screen to make a cone (hold it together with wire woven through the entire length) and large enough at the base to fill in the bottom. Cut a small hole (about ½") at the top of the cone. Put the screen cone into the bottom of the screened box. Secure the base of the cone to the bottom of the box, and duct (or white) tape the edges so no flies can escape once they get inside. Place the trap with the cone base over a pan that contains a food bait on the ground. Flies are first attracted to the food bait. After they feed, they fly upward or crawl upward into the sunlight and into and out of the cone. As the fly "escapes" from the cone into the screened box, it is trapped and quickly dies of dehydration. Traps with the wooden frame and pan painted white are generally more effective. Sticky traps or sheets or fly paper can be used inside to trap flies, but, they should not be placed directly over food preparation areas. Use a large 1 gal. mayonnaise jar with a screw top lid; install/secure a ½" - 1" plastic or copper crook neck pipe (upside down J) through the top of the lid, extending into the jar 2" - 3" and above the jar 5" - 6"; put 1 egg mixed in 1 c. milk into the bottom of the jar - you will catch flies, usually without odor. To make another bait, mix 1 pound sugar, 1 pound baking powder, 2 oz. baking yeast, 6 oz. blood or fish meal, ¼ c. honey and 2 T. water. Form the mixture into cubes in an ice cube tray and then let it dry. To use the bait, mix 1 cube in 1 qt. water.

LIGHTED AND ELECTRICAL TRAPS: There are many commercial varieties to purchase and install. They are constantly improving, e.g., adding pheromones, etc. Ultraviolet light will attract flies up to 3,000 sq. ft. - they last 6 - 8 months.

A cup of soapy water - An alternative way to catch or trap individual flies resting on the ceiling in sensitive areas or accounts is to slowly raise a cup or glass of soapy water directly up at the resting fly - normally it will "dive" right in and drown.

REPELLENTS: The active smell of citronella oil is repellant to house flies and works better than DEET against stable flies. Laurel oil, lavender oil, and rose geranium oil repels both house flies and mosquitoes. You can burn geraniol and citronella oil candles to repel house flies. Perfumes and colognes that contain bisabolene will also repel mosquitoes and house flies.

A deer and horse fly repellent can be made with 1 tsp. soap, 1 tsp. hot sauce, 2 tsp. garlic juice and 5 tsp. vinegar; dab on with a cloth. **Caution: If you are pregnant, don't use pennyroyal, even topically, as it may increase the risk of miscarriage. Note: Citronella oil has been known to attract female black bears.**

Flies - Typical First Strikes by Housekeeping & Maintenance

Whatever you do, realize that proper food and garbage storage, traps, sanitation, exclusion, and mechanical controls still work far better than dangerous, volatile, synthetic pesticide poisons and are a lot safer and cheaper. Good sanitation is the basic step in all fly management.

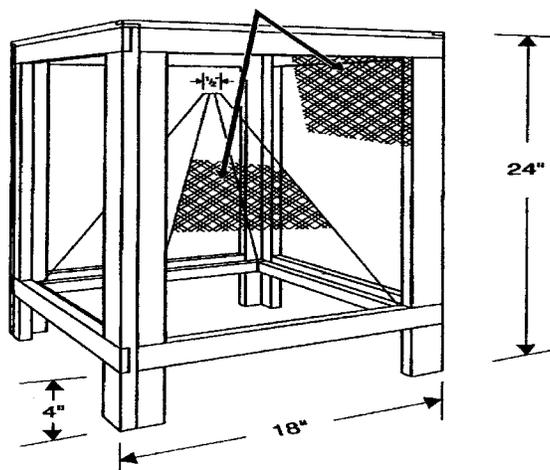
1. Use a fly swatter or vacuum up all visible flies. Use fly paper and fly traps. **A fly has an unblurred range of vision of only about 1½ feet. You should aim your flyswatter about 1½” behind the fly, because when houseflies take off from a horizontal surface, they jump upward and backward.** Keep screens in good repair. Install a fan to blow a steady stream of air to the outside through exterior doors and in all problem areas. Shut doors.
2. Routinely clean with 1 oz. - 2 oz. Safe Solutions Enzyme Cleaner per 1 gal. water or steam clean. Institute proper food and garbage storage. Routinely empty and clean dumpsters and all garbage containers. Remove all animal feces or droppings and/or feed the animals food-grade DE. Improve sanitation and manure removal.
3. Daily empty and clean all food handling equipment, dishes and garbage containers and daily remove and/or bury all animal droppings, fruit and organic debris inside and/or outside. Fly paper, fly strings (¼” sticky nylon tape) and/or fly traps should be installed. Spray Not Nice to Bugs® as needed.
4. Add 1 oz. per 1 qt. water Safe Solutions, Inc. Enzyme Cleaner to the drains each week. Spray all garbage containers with borax (¼ c. per 1 qt. water) and enzyme cleaner (1 oz. per 1 qt. water). Lightly dust with food-grade DE.
5. Double bag and securely tie each garbage bag. **Schedule twice weekly summer garbage removal.**
6. Mechanical Exclusion: Caulk, seal and screen all openings. Properly store food materials and garbage. Screen doors should open outward so flies are not forced inside each time the doors are closed. Have fans blow out the door entrances. Make anti-fly curtains of strings of beads or plastic strips where there is lot of traffic. Screen all windows, doors, vents and other openings.
7. Spray or sprinkle or dust food-grade DE or dry soap or borax into garbage cans or dumpsters after they have been washed with 1 oz. Safe Solutions Enzyme Cleaner with Peppermint per 1 qt. water and allowed to dry; it acts as a repellent. Low concentrations of borax in water quickly eliminate fly odors and fly specks from walls, etc. Throw in some citronella or geraniol beads. A home-made fly repellent consisting of 1 part liquid dish soap, 1 part vinegar and 3 parts water — spray this on goats and horses and wherever you wish to see them remove themselves.
8. Place tansy near your kitchen door or where flies tend to cluster. Other repellents include oil of cloves, cedarwood, citronella, cedar, orange, lemon, camphor, pine, juniper, laurel, garlic, peppermint, geraniol, lavender and/or evergreen or other essential oils and/or mint sprigs and/or geranium extracts and bisabolene. Try an aroma-therapy machine to dispense some of these fragrances and repel your fly problems, if you are not sensitive.
9. Set a sponge in a saucer and soak it with oil of lavender to repel flies.
10. A pot of basil set on a window sill or table will help reduce the number of house and blue bottle flies in the room.
11. Spray or mist any remaining visible flies with (1 oz. per 1 qt. water) Safe Solutions Enzyme Cleaners with Peppermint or Not Nice to Bugs®.
12. Make and use some fly traps - either 2-liter containers or hanging duct tape (sticky-side out) or imprinted glue traps or narrow neck bottles with diluted vinegar and a few drops of dish soap. See “trapping flies outdoors.”
13. Flies and flying ants and other flying insects are attracted to the light, so darken all windows but one, or turn off all lights but one and/or install one black light or ultraviolet light and then vacuum up those pests that are attracted. You can also purchase some excellent traps.
14. Set out a saucer filled with bubble soap to attract and kill flies. Some smell like candy.
15. Remember, adult flies eat only sugar, so make some light Karo Syrup or honey or sugar water with 5% borax or 3% boric acid baits or, better yet, 90% fermenting molasses and 10% enzyme cleaner or aspartame or 5% food-grade DE baits. If you use DE or boron-type baits, be sure to keep them out of the reach of children, pets and wildlife.
16. Some people have had success hanging zip-lock bags filled with water and a shiny penny or some tin foil in the bag every 3 feet. The sun’s refractive light is said to disorient flies when the sun’s rays are shining through the bags.
17. Safe Solutions, Inc. food-grade diatomaceous earth will control fly problems. If fed to animals at a rate

of 4% - 5% of their daily food ration, it will control internal parasites and fly larvae (maggots) in the droppings. Research has shown a 17% increase in milk production and healthier pets and/or livestock. You can also lightly dust this food-grade DE on barn windows, etc.

18. Trapping Flies Outdoors: To capture flies outside, use traps with a screen cone suspended above the bait. These traps should be at least 4 feet above the ground. These cone-type traps take advantage of the fly's habit of flying or walking toward light. Cone traps can be easily made from wood and aluminum or plastic screening; use the dimensions shown in Figure 3. Flies are attracted to the bait in the pan under the trap. Once the flies are under the trap, the brightest spot they see is the hole in the cone above them. They walk up through the hole and are trapped in the outer screen cage. Since flies are attracted to the light and it is always lighter above them, they can not find their way back out through the hole in the cone.
19. Hop vines and pepper tree leaves and berries are repellant to house flies.
20. A 2% emulsion of avocado or basil oil will also repel flies.
21. Mix chopped toad stools with sweet milk in a saucer to ferment overnight. The next day this toxic mix will attract and kill large numbers of flies, but keep it out of the reach of children and animals.
22. Biting flies are attracted to octenol, phelols (found in urine), carbon dioxide (CO₂), skin odors, moving objects and things that are round or spherical and black or dark in color.
23. Stick some duct tape on the edges of your windows with the bulk of the sticky-side open and towards the outside; replace the tape as needed.
24. Fungus gnats are attracted to lime-colored items so paint some lime-colored paper with honey or Vaseline or better yet, spray with a non-drying glue.
25. Phorid and fruit flies are attracted to acetic acid (vinegar), so put some drops on duct tape or glue boards.
26. Whiteflies are attracted to yellow plastic bags coated with fresh petroluem jelly placed over large cans. When the bag is covered with dead whiteflies, throw it away and replace it with another over the can.
27. Refrigerate trash and/or recycle rooms. Move dumpsters away from the building.
28. Finely powdered egg shells will eventually destroy flies that land on and get covered with this egg shell dust, but the Author prefers Safe Solutions, Inc. food-grade DE.
29. Buy some Flies B Gone traps from Safe Solutions, Inc., <http://www.safesolutionsinc.com>.
30. Maggots don't like geraniums, cloves, bay leaves or citrus peels and will quickly die in salt water or when sprinkled with salt or sprayed with steam. Virtually no pesticide will kill them.
31. Flies die when placed in a freezer for several minutes.
32. **If you still have flies, read the entire chapter.**

The following illustration is from "IPM for Pennsylvania Schools: A How to Manual."

Cone Trap Diagram



A bait pan is placed beneath the cone. Make sure the top edge of the bait pan is *above* the bottom edge of the trap. The top also is made of screening, and should be hinged (to empty the trap) and closed with a hook and eye. Weather-stripping or a strip of foam or cloth glued to all four sides of the underside of the lid will prevent flies from squeezing out.

(Note: This trap will also catch yellowjackets who enter to attack the trapped flies.)

Note: a fly urinates every few minutes and vomits on everything it wants to eat by literally blotting up the puked-up mess. There probably are a million species of flies. A fly has no lungs; it sucks are through little holes called spiracles. It has about 1500 little hairs on its feet to taste food. Flies carry more than 100 different disease-causing bacteria on their hairy bodies.

Richard Conniff noted in 1996 that a well-fed fly can defecate at least once every 4.5 minutes and city flies can carry up to 500 million, bacteria whereas country or suburban flies may only carry up to 100,000 bacteria.

“A truth, once it is established by proof, neither gains additional force from its acceptance by all scholars, nor loses any force if all reject it....” — Maimonides

A fisherman once observed that a basket of crabs does not need a lid. As soon as one crab starts to crawl up the side, the other crabs reach up and pull it down. People are a lot like crabs.

Question: What has four wheels and flies?

Answer: A garbage truck.



Poison Note: Fly bait in Mountain Dew will kill any animal that drinks it.

If Noah had been a little wiser, he would have swatted those two flies!

**Beelzebub, another name for the devil, is Hebrew for “Lord of the Flies.”
The Philistines appointed Beelzebub or Ba’al Zevur as their patron diety.**

Bob is the name of two men who betrayed me. — SLT



Thomas Jefferson to James Madison 6 Sept. 1789 “The earth belongs... to the living...no man can, by *natural right*, oblige the lands he occupied, or the persons who succeed him in that occupation, to the payment of debts contracted by him. For if he could, he might, during his own life, eat up the usufruct of the lands for several generations to come, and then the lands would belong to the dead, and not to the living,”

“Ask: How can we support and perpetuate the rights of all living things to share in a world of abundance? How can we love the children of all species — not just our own — for all time? Imagine what a world of prosperity and health in the future will look like, and begin designing for it right now....” *Cradle to Cradle: Remaking the Way We Make Things*, William McDonough & Michael Braungart



***Safe Solutions products may be purchased online at:**
<http://www.safesolutionsinc.com>
or by telephone at:
1-888-443-8738.