

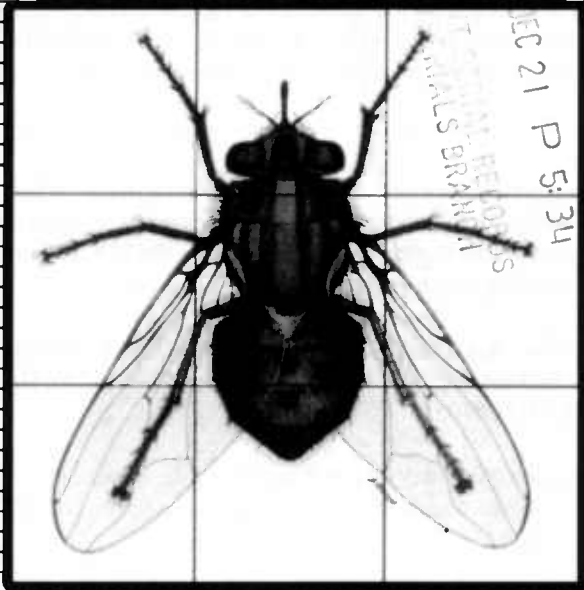
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# How To Control House and Stable Flies Without Using Pesticides



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# **How To Control House and Stable Flies Without Using Pesticides**

L.G. Pickens, E.T. Schmidtman, and R.W. Miller

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# Abstract

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Farmers, homeowners, and directors of recreational areas are advised on the control of the house fly and the stable fly with minimum use of insecticides. New management techniques are described, such as surveying barnyard and dumpster areas weekly so that fly-breeding sites can be identified and removed. Recommendations are made for the management of animal bedding to prevent fly breeding. Various outdoor and indoor fly traps are described in detail. A recipe is given for a fly bait called Beltsville Bait. Also included are field observations on the use of parasitoids to kill fly pupae.

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House flies and stable flies are common pests around farms, feedlots, restaurants, food markets, and residences. These flies are a nuisance, are a health hazard to humans and animals, and may reduce animal weight gain or milk production. The flies not only are a nuisance to farmers but can disperse from the farms to nearby suburbs and annoy homeowners. The homeowners may have little tolerance for these pests and may bring legal action against the farmer. This friction is becoming increasingly more common as the suburbs encroach on areas that were previously agricultural. House flies and stable flies often occur together, but they differ in their behavior and may require different types of control strategies.

Houseflies can transmit 65 different pathogens, ranging from viruses to helminths, and can cause such diseases as polio, hepatitis, cholera, anthrax, diphtheria, typhoid fever, and yaws in humans. They can also be vectors of parasitic worms: cestodes of poultry and nematodes that cause habronemiasis in horses. Stable flies act as both biological and mechanical vectors of many diseases, including nematode worms, surra, and infectious anemia of horses. They also cause significant anemia of cattle due to blood loss, and the feeding of stable flies can reduce the weight gain of cattle by 25 percent.

## **Biology of House Flies and Stable Flies**

### **House Flies**

House flies develop in moist organic material such as animal manure, animal bedding, spilled grain and silage, ripe vegetables, lawn clippings, and garbage. On many farms, major sources of house fly breeding are open trench-type silos, straw bedding in calf pens, stacked manure, and spilled feed. Around residences or restaurants, the flies often breed in spilled or accumulated garbage.

House flies can complete a generation in 2 to 3 weeks, and each female can produce up to 120 offspring. The adults often fly 1 mile or more in search of breeding sites and will follow odors upwind for 5 miles or more.

## **Stable Flies**

The immature stages of stable flies (figs. 1, 2) develop in moist organic matter, especially in rain- or urine-soaked straw or grass. The adults are particularly annoying to humans and animals because they feed by piercing the skin and sucking blood. Adult stable flies (fig. 3) are most abundant near animal shelters, calf pens, and isolated trees used by animals for shade. Piles of lawn clippings, weeds, and plant residues left in fields after harvest may also allow the hatching of large numbers of stable flies. Sometimes large numbers may hatch in the wet, trampled hay pulled from rolled hay bales by cattle in pastures. Adult stable flies are attracted to animals and often gather in buildings or shaded areas where animals seek shelter; when abundant, these flies may prevent animals from grazing during daylight hours.

## **Control of Flies**

Although there are many insecticides that can control flies, they should not be extensively used, for the following reasons: (1) Flies often become resistant to frequently used insecticides; (2) few new insecticides are available, and some of those now in use are being taken off the market; and (3) chemical insecticides can be hazardous to the environment and to the user. For these reasons, alternatives to chemical insecticides should be used to control house and stable flies. One alternative is to combine the removal or management of fly-breeding material with the use of traps and parasitic wasps to kill both the adult and immature flies.

## **Management of Manure and Refuse**

The most important part of a successful fly control program is the frequent cleanup and proper disposal or storage of animal manure, bedding, and spilled feed or garbage. Once each week, a walk-around inspection should be made of the barnyard, animal pens, and garbage-storage areas to locate all fly-breeding or fly-attracting materials.

All accumulations of soiled animal bedding, spilled feed, animal manure, lawn clippings, and garbage should be removed once or twice a week and

*Figure 1. Larva of the stable fly*



*Figure 2. Pupa of the stable fly*



*Figure 3. Adult stable fly*



should be stacked compactly, spread *thinly* on fields to depths of less than 2 inches, buried, burned, or put into fly-tight pits or boxes. Stacks of bedding and manure must be kept compact, with the sides as vertical as possible, so that the borders of the stack are free of spillage. If stacked manure is turned over once or twice a month, composting will be speeded up and any developing flies will be moved to the interior of the stack where temperatures will be too high for them to survive. Keeping the stacks compact reduces the area covered by the manure and makes it much easier to encircle the stack with traps to catch adult flies.

Spilled grain or feed around grain bins or feed troughs and spilled garbage around cans or dumpsters should be cleaned up every 2 or 3 days. Dog feces near houses or picnic areas should not be allowed to accumulate; they should be removed or burned. Open-trench silos should be well drained and kept free of wastage along the edges and the open end. Piles of straw or vegetable crop wastes should not be allowed to remain on the fields after harvest; they should be spread out to dry, burned, or plowed under. Round bales of hay or stacks of loose hay placed in pastures for free-access usage by animals should be inspected weekly; any accumulation of loose hay around their bases should be removed before flies breed in it.

Calf pens and animal shelters should be located on well-drained soil, and coarse sawdust should be used for bedding. Straw should not be used for animal bedding, because it is one of the best fly-breeding materials. Garbage cans and dumpsters should be cleaned weekly, and the soil around them should be kept free of spillage, weeds, and grass. Good soil drainage is important. Tightly fitting lids should be kept on garbage cans to avoid the release of odors that attract flies. Poultry manure pits should be kept as dry as possible, and a 6-inch border of manure should be left in the pits when they are cleaned out, so that established parasites and predators will remain in the pit.

## Traps

The use of traps can help reduce adult fly populations if a sufficient number of traps are placed in the correct locations and kept functional. A satisfactory trapping program usually requires both indoor and outdoor traps.

**Outdoor traps.** House flies are strongly attracted to odors, so odor-producing baits can be used to lure adult flies to traps. Baits made of mixtures of water, molasses, grain, milk, and bananas are often effective, but they are difficult to transport or store and may vary in attractiveness to flies from day to day, because of fluctuating fermentation odors. The Beltsville Bait, created at the Beltsville Agricultural Research Center (see appendix), avoids those problems; it is nontoxic and can be stored as dry cubes. Just before use, 1/4 pound of dry bait (two cubes) is put into a 2-quart pan filled with water; the top of the pan is 1/2 inch beneath an inverted-cone type of trap (figs. 4, 5). The trap depends on sunlight to lure the flies up from the bait, through the cone, and into the enclosed space, so it should be placed in full sunlight. Because flies are attracted to the bait from only a short distance, the traps should be placed within 6 feet of areas where flies are active, such as the east and west ends of barns that house animals, along the edges of manure stacks, near calf hutches, under grain storage bins, and around garbage cans and dumpsters.

Captured flies will soon die of dehydration. The traps should be emptied when they are 1/4 full with dead flies. The discarded flies should not be allowed to accumulate in piles because they in turn can become fly-breeding sites. The bait pans should be cleaned and baited every 1 to 2 weeks and should be kept filled with water.

House flies are also attracted to white surfaces. They can be trapped by the use of pyramidal traps that have a white surface coated with a clear adhesive (fig. 5). Adhesives (such as Stikem) can be painted on clear or white plastic or on white freezer paper that has been fastened to the traps. The plastic or paper can then be removed and replaced when it is covered with flies or when the adhesive is no longer tacky. A variation of pyramidal traps has battery-powered grids that electrocute the attracted flies (fig. 6). The electrocuting grids should be kept clear of large insects, which can short-circuit the wires; otherwise, this trap requires little attention.

Stable flies prefer vertical white panels that are not more than 30 inches above the ground. They are also attracted to carbon dioxide-producing baits. The flies can be lured to bait placed near the panels and then captured by adhesive coatings or killed by electrocuting grids on the panels (fig. 6). The traps should be placed within 12 feet of fly-breeding areas such as calf pens, cattle loafing barns, grass silage, and straw piles and near animal sleeping

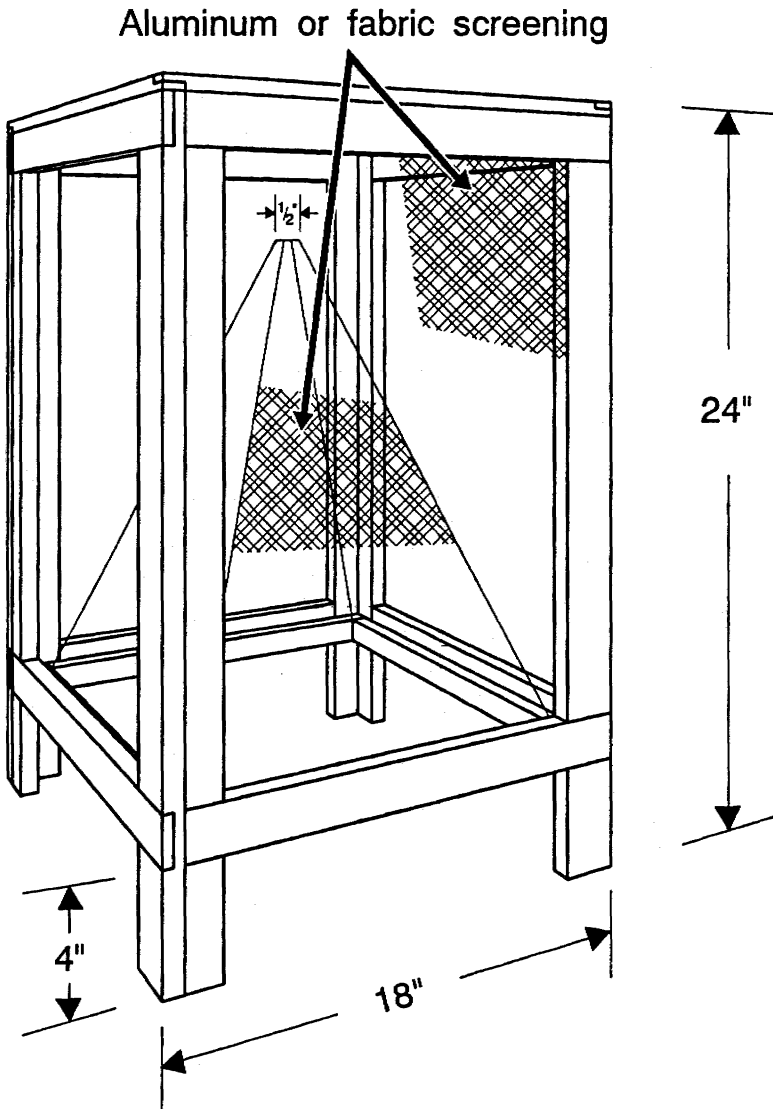
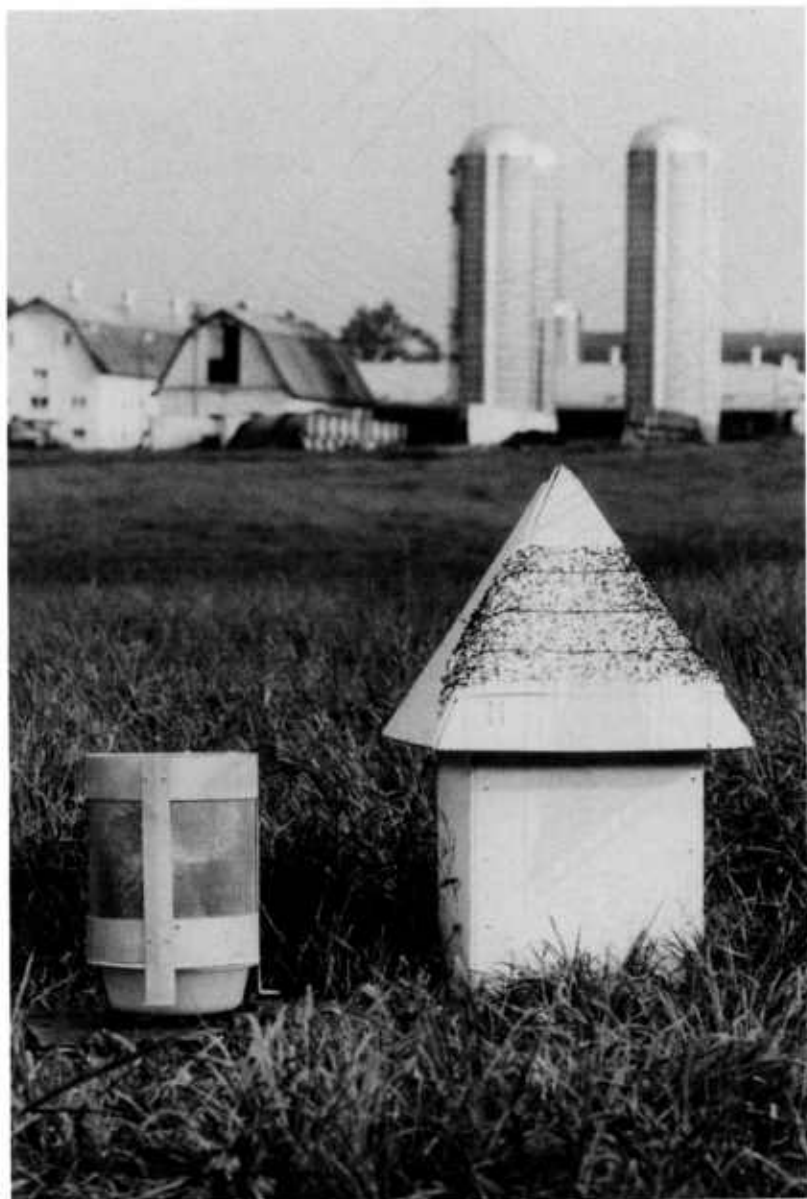


Figure 4. Cone trap. Bait pan is placed beneath bottom of the cone.



*Figure 5. A baited cone type of trap and an adhesive-covered pyramidal trap covered with house flies*

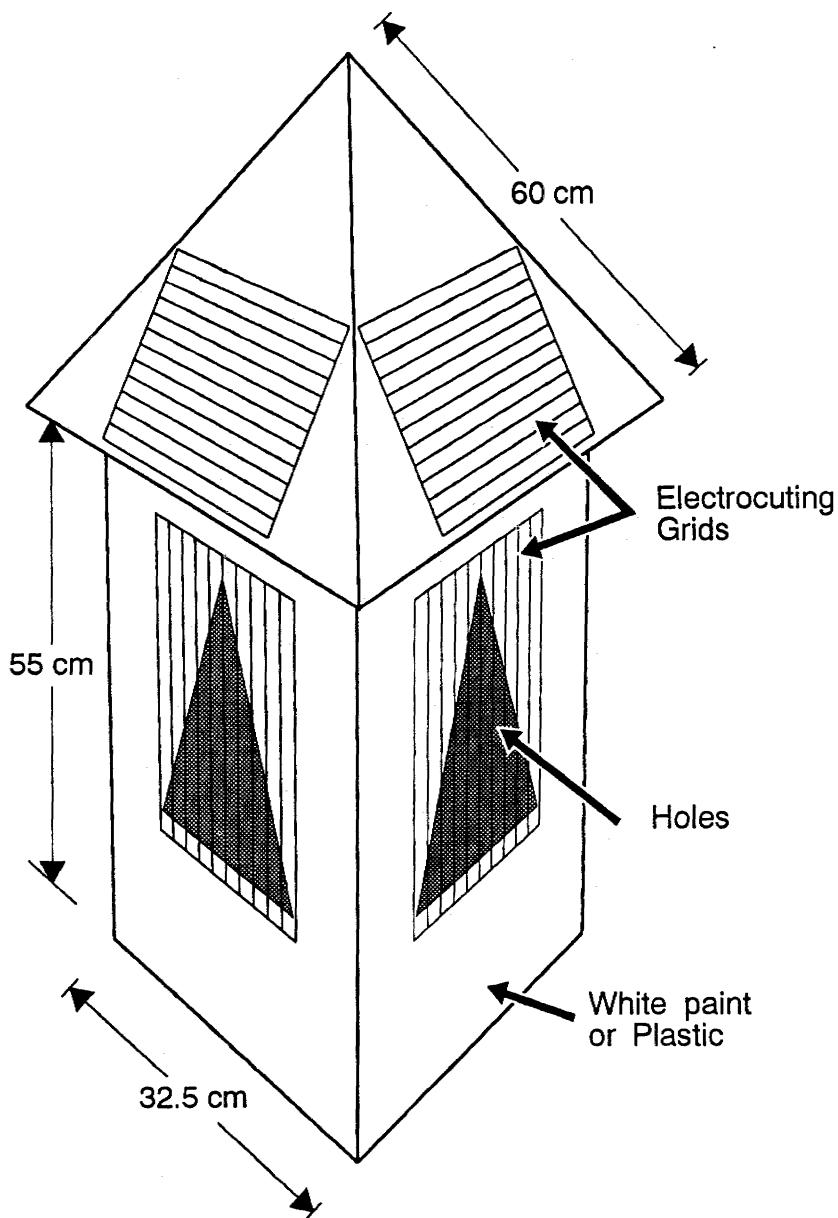


Figure 6. Electrocuting pyramidal trap on a base. House flies are attracted to the pyramid, and stable flies are attracted to the base.

grounds or holding areas. Traps should also be placed under solitary trees or in cuts through woods or between buildings.

**Indoor traps.** House flies and stable flies readily enter buildings in which animals are kept or in which food is stored or prepared. Flies inside buildings can be captured by traps that use ultraviolet-emitting fluorescent light bulbs (blacklight or blacklight blue) as the attractant. The flies either are electrocuted by grids or are captured in a cage by means of a cone entry (fig. 7). Lighted traps should be mounted within 1 yard of the floor at locations in the building where flies are observed to gather. Such spots are along feed troughs, near calves, near doorways, along dark hallways, and where food is prepared or stored. Hungry flies will circle the inside of a building by flying along the perimeter (outer walls) at floor level when searching for food; so it is important that some traps be on the perimeter walls, especially in hallways and near entrance doors. Lighted traps will not attract flies from more than 15 to 20 feet away in most locations, so a sufficient number of traps must be used to intercept most of the wandering flies. A general rule is to use one trap along every 30 feet of wall. Several models of traps using ultraviolet light are available commercially, or the cage type of trap (fig. 7) can be constructed.

A window-mounted trap or an artificially illuminated window type of trap (fig. 8) may be used to catch large numbers of flies inside darkened buildings. The flies are attracted into the trap chamber by light from the back side of the trap; once inside, the flies will exhaust themselves in trying to escape through the lighted back, rather than exiting through the entry holes. In homes or shops, white or yellow sticky paper or sticky plastic strips can be hung from ceilings or can be placed on tables, benches, or windows.

Barnyard or dumpster areas should be surveyed weekly so that new fly-breeding sites can be identified and removed. These sites include grain spillage, accumulations of manure, piles of straw, spilled garbage, and lawn clippings. Whenever possible, graded sawdust should be used instead of straw for animal bedding. The outdoor pyramidal traps should be placed at the entrances to buildings, in alleys between buildings, in cuts through forests, under solitary trees, and at intervals of about 20 to 30 feet around animal sleeping areas, corrals, and manure piles. The traps should initially be scattered about the barnyard or around the garbage-collecting or food-loading areas until the best spots for catching flies are located; then the traps

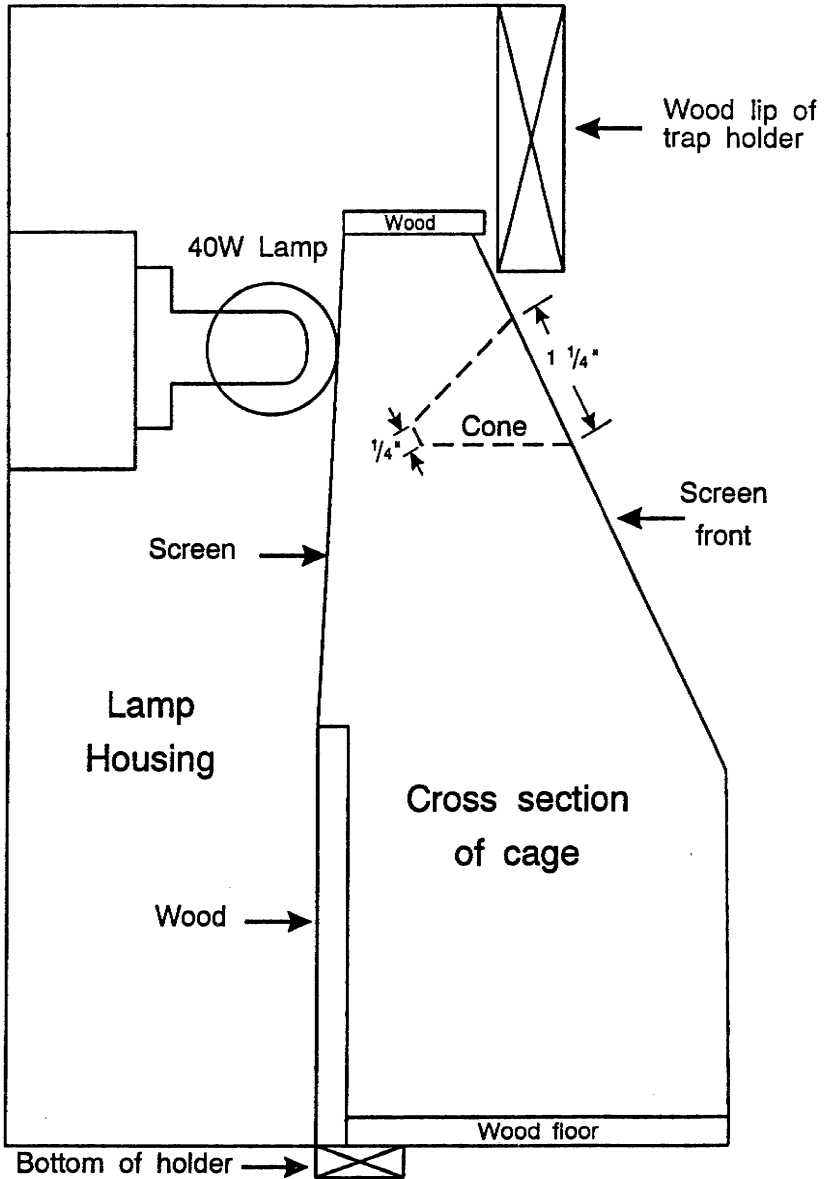


Figure 7. Cage type of electric trap for indoor use

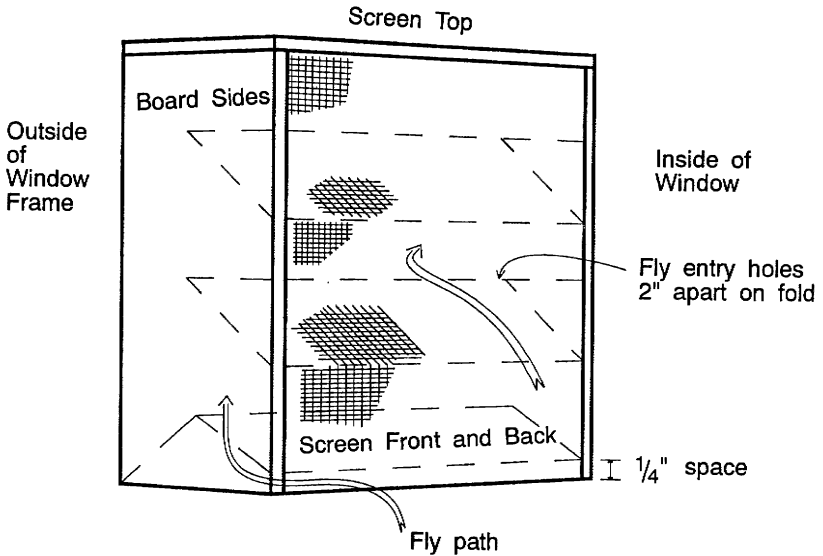


Figure 8. Window trap for barns

should be massed at those spots. Outdoor bait traps (inverted-cone type) should be placed in full sunlight and should be sheltered from strong winds. Especially good sites are those that receive sunlight in the early morning and late afternoon hours. Traps should be placed as close as possible to animals and to fly-breeding materials or placed in areas where flies are observed to gather. Indoor lighted traps should be placed within 3 feet of the floor and on the perimeter walls, in hallways, and anyplace flies gather in buildings.

Generally, one should plan to use one inverted-cone trap (baited) or one pyramidal trap (with either adhesive or electrocuting grids) for every 20 to 30 feet of perimeter of outdoor fly-breeding area and one electric trap (with ultraviolet light and electrocuting grid or cage) for every 30 feet of the interior perimeter of a building.



## Parasitic Wasps

Flies have natural insect enemies, such as parasitic wasps (fig. 9), which are found in and around fly-breeding materials. These wasps, referred to as fly parasitoids, kill the immature stages of the flies and are harmless to humans and livestock. Several species of fly parasitoids are available from commercial sources. Although releases of parasitoids will aid in fly control, they are not fast-acting or 100 percent effective and therefore should not be the sole control method; rather, they should be used in conjunction with other management practices.



Figure 9. Parasitic wasp on fly pupa

The following suggestions can help maximize the effectiveness of a parasitoid-release program:

1. The incidence of fly breeding should be reduced by following the suggestions previously described.
2. The use of insecticides should be avoided, especially the synthetic pyrethroids.
3. The species of parasitoids being released should be suited for the locality; suitability should be confirmed by a county extension agent or state university extension entomologist.
4. Parasitoids should be released at the recommended places and times.

Parasitoids are usually shipped as larvae inside fly pupae, and the parasitoid-infested pupae should be placed in areas where flies are known to breed. A good technique is to place the pupae in bags made of window screening (18 by 18 mesh) inside hardware-cloth (1/2-inch mesh) cylinders and then attach the cylinders to walls or posts near fly-breeding sites. This method will protect the parasitized fly pupae from birds, cattle, mice, and other animals that eat insects.

## **Chemical Insecticides**

If the previously described techniques are used, the populations of house flies and stable flies can be greatly reduced without the use of toxic chemicals. However, at times the number of flies may increase explosively, and it may be necessary to use a chemical insecticide to quickly reduce the population. If flies are a problem indoors, often all that is needed is the use of a space spray or fog with a pyrethrin-based insecticide (applied according to directions on the label). However, this type of treatment has no residual action and must be repeated whenever flies reach an unacceptable level. Chemical larvicides are available to kill fly larvae, but such treatment is costly and is usually not necessary if manure is managed properly and if flies are trapped at the breeding site.

## Appendix. Beltsville Bait

The ingredients and directions for making Beltsville Bait, an attractant for the house fly, are as follows:

- 1 pound granulated sugar
- 1 pound baking powder (double-acting type),  
such as Calumet brand
- 2 ounces dry bakers' yeast
- 6 ounces air-dried blood or freeze-dried fish meal
- 1/4 cup honey
- 2 tablespoons water\*

Mix ingredients thoroughly. Press mixture into a plastic ice-cube tray to form cubes. Invert the tray to dump the cubes, and let them dry to form hard blocks. To use the bait, add 2 cubes of bait to 2 quarts of water. Place bait in a wide-mouth pan beneath a cone type of trap.

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\* Quantity of water needed may vary with humidity of air when mixing. Use only sufficient water to bind dry ingredients together when they are compressed.