

Poultry Area Fly Control

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There are several species of flies commonly found around caged layer poultry houses. The most common species are the house fly and the lesser house fly. Other annoying flies are blow flies (which breed on bird carcasses, broken eggs, and other garbage), soldier flies, fruit flies, gnats, and rat tailed maggots.

The house fly is by far the most important problem in caged layer operations. Not only are they a nuisance but they also are carriers of diseases. With the spread of non-farm residences into rural areas near poultry operations, egg producers are faced with increasing pressures from non-farm residents and health officials to control house flies. Also, the shift to large poultry operations has resulted in heavy concentrations of manure, a major source of fly breeding. According to workers in Georgia, as many as 1000 flies can develop in one pound of suitable breeding media. They are difficult to control, especially when the population becomes extremely high. A dedicated effort involving integrated pest management (IPM) will be needed to maintain house flies at a low level.

Fly Biology

All flies pass through four life stages: egg, larva (maggot), pupa, and adult. During its life cycle, which is about 30 days, a house fly female can lay up to 1000 eggs. These eggs are deposited on moist manure or any type of moist rotten or decaying organic matter. The eggs hatch in 10-12 hours and the maggots move into the wet manure. Fly maggots mature in 4-5 days under warm moist conditions. Pupation occurs in the drier parts of manure with the adult flies emerging in 3-5 days. Under ideal conditions a house fly can complete its life cycle in 9-14 days. The life cycle can be much longer in cooler temperatures. Although capable of movement up to several miles, house flies normally move no more than one half to three quarters of a mile from their breeding sites.

An IPM Program to Control House Flies

Step 1. Population Monitoring

It is essential to know as early as possible which houses are the major sources of fly breeding. The simplest and quickest method of taking quantitative fly counts is the moving tape method. A roll of ordinary sticky fly tape is carefully extended full length and held by the top loop so that the cardboard carton is almost touching the floor. The operator then walks at a normal pace up and down a standardized number of rows (at least 2 full rows) holding the tape by his or her side and slightly in front. At the end of the circuit, the number of flies that have stuck on the tapes is counted and recorded on a chart. These counts should be made in each house twice a week. Population increases and decreases can then be seen and compared from each house. The problem houses can thus be determined early enough to begin supplemental control measures before the fly population gets out of control. The producer also has quantitative evidence of the progress of his or her IPM program to present to interested neighbors or health officials.

The producer has to judge, based on the population dynamics in each house, when to apply supplementary control measures (**treatment threshold**). This decision is based on application costs and the nuisance situation to the surrounding residents.

Step 2. Sanitation and Manure Management

Inside: Manure is usually removed once a year in high-rise egg houses. It is allowed to cone up under the cages and kept as dry as possible. If at all possible, this manure should be removed during the cooler months of the year. Do not disturb the manure during the summer months. When it is spread on fields it is important to scatter the manure thinly so that the eggs and larvae are killed by drying. It is best to plow or disk it under immediately after spreading. In shallow pit houses, frequent removal of manure once or twice a week reduces fly breeding. It is important to make sure that spilled manure is not left in wet piles around the disposal equipment and in areas that the disposal equipment does not reach. If manure has to be stored, be sure to cover it completely with a heavy grade of black plastic. Cover the edges of the plastic with soil to prevent house flies from entering. House fly eggs need relative humidity levels of 90% or higher to develop successfully.

Flies normally breed in wet manure (above 40% moisture). **Leaking waterers are a major source of wet manure.** Thousands of house flies can breed in just one leaking water spot. Daily inspection and repair of all leaking waterers is essential. Provide abundant cross ventilation by the use of fans above the cages and in the manure pits, especially in hot weather.

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Outside: All garbage, leaking feed, spilled manure, bird carcasses, eggs, and miscellaneous trash should be removed regularly. Vegetation, weeds, and grass should be kept trimmed around the houses. Junk, trash, and rusting equipment which provide resting sites for flies should be removed. Install proper eave troughs and down spouts on houses to carry rain water away from buildings. Provide proper drainage in poultry yards and roadways.

Step 3. Biological Control

Natural fly predators (insects and mites that actively feed on fly eggs and larvae) and parasites (small, stingless wasps that lay their eggs in and kill the pupae of house flies) can build up in manure accumulations. They can significantly reduce house fly breeding. Biological control is more effective if the sanitation and manure management as listed in Step 2 is conscientiously applied. In high-rise houses, never clean out a house completely of manure. Leave at least a fourth of the manure undisturbed so that the natural enemies can survive and move into the new manure. Biological control is not as effective in shallow-pit houses; however, if manure is kept dry, the natural enemies are more effective.

Several commercial companies sell parasites for release in poultry houses. These parasites are supposed to be self-propagating in the process of controlling flies; however, quality control of these commercially available parasites is quite variable. Often, only a small percentage of the parasites are actually alive by the time the producer receives them. Producers intending to use these parasites are advised to set aside a small sample of them to check for emergence before releasing them in the houses.

A specific biological control program for house flies in high-rise poultry houses has been developed for Virginia. A predaceous fly larva, *Hydrotaea aenescens*, is mass-reared and released, resulting in a low house fly population with a reduced need for chemical control. (For more information, see VCE publication 444-769, "Instructions on Insectary Establishment, Mass Rearing, and Release of *Hydrotaea aenescens*: a House Fly Predator")

Step 4. Chemical Control

Insecticides should be used to supplement steps 2 (sanitation) and 3 (biological control). Insecticides can be used to attract and kill those flies that survived the larval stages. They should be applied so that they will not contact and kill house fly predators and parasites. Other insecticides can be used as an emergency control measure when fly populations threaten to overwhelm IPM control measures.

Fly Baits: These are designed to kill flies that have escaped the natural enemies in the manure and should be a regular part of the house fly IPM program. They are inexpensive and simple to use. They should be put out at the beginning of the fly season and renewed at least once a week through warm weather. Baits should be placed in containers (i.e., egg cartons) or glued onto cardboard panels so they will not fall into the manure pits.

Contact Sprays: If the moving tape counts indicate that the fly population in a house is threatening to overwhelm the natural controls, contact sprays can be used. As the name implies, these sprays kill flies on contact and are effective as a quick knock down treatment. Contact spray insecticides have a short residual life and will not prevent a later reinfestation. Do not spray in the manure pits or directly on the birds, eggs, feed, or water.

Residual Sprays: These insecticides have a longer residual life and can be used both inside and outside where flies congregate. In darkness, flies tend to "roost" on the upper walls and ceilings of layer houses, so residual insecticides should be concentrated in these areas. Because insecticide resistance is possible, residual sprays should be applied only to problem houses and areas where the moving tape counts indicate that the population growth is becoming serious.

Step 5. Feed-Through Larvicides

When the moving tape counts indicate that the fly population is about to explode, or when equipment failure has caused a temporary build up of wet spots in the manure, application of larvicides in the feed is a practical option. It should be applied until the tape counts indicate that the flies have been significantly reduced.

These syrphid fly larvae live in highly polluted water such as livestock lagoons, polluted abandoned fish pools, foul pools, and streams associated with barnyards. The maggots are able to live in the water if sufficient solids are present as food. The adult flies resemble honey bees and are often seen "hovering" near the ground in the barnyard vicinity. Because the rattailed maggot breeds and feeds in highly polluted water, an effort must be made to keep the lagoon in optimum condition. Usually, the lagoon becomes "out-of-balance" when the water level is not in proper relationship with the solids. Never allow accumulations of manure above the water line, either floating or sticking to the sides, because these conditions promote fly development. Keep the banks steep and the weeds under control.

Use loose soil and construct a soil barrier between the milk house and the rattailed maggot source. As maggots migrate to the soil barrier, they will dig into it to pupate rather than move into the milk house.

Try to agitate the pit contents frequently during the spring and summer by pumping the pits routinely (at least once a week) to disrupt maggot development. Always maintain a waterline above the manure solids. Clean out the pit contents on a routine basis, if possible.

Usually the occurrence of rattailed maggots is a management problem directly related to improper care of the lagoon or a poorly constructed lagoon. The Environmental Protection Agency (EPA) is very concerned with run-off and over-flow leading to pollution. It is very important to coordinate with agricultural designers and Health Department officials before constructing new liquid manure tanks and lagoons. Plans are available from these agencies for constructing tanks to prevent manure seepage and polluted waters, thereby avoiding a rattailed maggot problem.

Table 2.1 - Some Commercial Insecticides Registered for Control of House Flies in Poultry Houses

Insecticide Active Ingredient [Percent A.I. in Product] (Trade Name) ¹	Mixing and Application Information
Fly Baits	
Methomyl [1%]	Ready-to-use bait.
Contact Sprays	
Pyrethrins [0.1% - 0.6%] + Piperonyl Butoxide [1% 6%]	Ready-to-use oil spray; apply as mist or fog. Spray at a rate of 1-2 seconds per 1,000 cubic feet. Close windows and doors for 15 min. or double dosage if area can't be closed.
Dichlorvos [43.2%]	Mix with water as instructed on label, apply as mist or fog.
Tetrachlorvinphos [50%] walls and ceilings	Mix with water as instructed on label, apply to inside or outside
Permethrin [5.7% to 25%]	Check label for specific application instructions.
Tetrachlorvinphos [23%] and Dichlorvos [5.3%]	Check label for specific application instructions.
Dibrom 37% EC	Check label for specific application instructions.
Cyfluthrin	Check label for specific application instructions.
Fenualerate	Check label for specific application instructions.
Stirophos	Check label for specific application instructions.
Imidacloprid	Check label for specific application instructions.
Lambda-cyfluthrin	Check label for specific application instructions.
Feed-Through Larvicides	
Cyromazine [1%] ton of feed. Follow directions according to label.	feed to egg-laying hens only. Mix 1 lb product per label.

¹Trade names are used for clarity only in this publication and do not imply endorsement of the product.

Rattailed Maggots (Syrphid Fly Larvae)

Frequently during the warm summer months, rattailed maggots are reported as a nuisance pest migrating from livestock lagoons and manure pits. These insects are not a problem as long as they remain in the liquid manure pit. However, they have been known to move out of the pit or lagoon in large numbers contaminating livestock feed, accumulating in electrical boxes causing short circuits, and congregating in stacks of egg cartons and other unwanted places. The maggots migrate in search of drier places in which to pupate.

Rattailed maggots, known as the larval or immature stage of syrphid flies, are about 1 1/4 inches long. The body portion is about 3/4 inch long and the tail portion (breathing tube) is about 1/2 inch long. These maggots are white in color and semi-transparent with the body portion being an elongated, oval, cylindrical shape. What appears to be a long tail is actually a breathing tube.

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