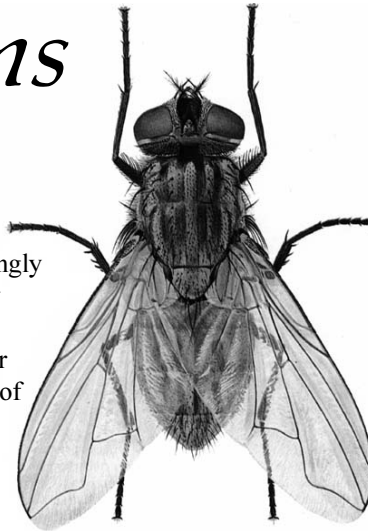


# Management of Flies in Layer Barns

One of the on-going management problems facing egg producers is fly control. As urban developments increasingly move into agricultural areas, the demand for effective fly control has become greater. Flies, when present in large numbers, can cause considerable annoyance to the farmer and their neighbors. Fly control should be a regular part of the management of poultry layer farms.



## Fly Biology

Although a number of different types of flies occur in layer barns, house flies (*Musca domestica*) are the most common and the following discussion relates primarily to this species.

Flies pass through four stages: egg, larva (maggot), pupa and adult. At a temperature of 20°C, the time required to develop from egg to adult is about 20 days. Cooler temperatures lengthen this period and warmer temperatures shorten it. Females mate and begin laying eggs four days after emergence from the pupal stage. A single house fly can deposit five or six lots of 100 to 150 eggs each. Almost any type of warm, moist, organic matter is suitable for fly development. Animal manure is the most common breeding medium in rural areas, but decomposing garbage and other vegetable matter can also produce house flies.

Adult flies usually remain within a mile of their source, but studies have shown them capable of wind-assisted travel of up to six miles in a day and up to 20 miles eventually.

The adult life span is influenced primarily by temperature, although the availability of food and water also play a role. House flies live two to four weeks under normal summer conditions and up to three months during the cooler temperatures of spring and fall.

Flight activity is related to light and temperature. House flies are inactive at night, resting on ceilings and walls. They begin to fly at 6 °C, but temperatures in excess of 20 °C are needed to induce continued flight activity.

## Preventive Management

### (a) Sanitation

Good sanitation is the first step to minimizing flies on poultry farms. Dead birds should be removed and incinerated daily or deposited into a large garbage pail with a tight fitting lid and containing a plastic bag. Weekly, or more often if necessary, incinerate the bag and contents or take it to a suitable disposal area. Dead birds should not be thrown into the manure as this provides an excellent source for fly breeding. Broken and substandard eggs should be placed into a fly-proof pail and not thrown into the manure. Accumulations of spilled feed below the feeders should be avoided.



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Sanitation outside the barns is also important. Piles of organic matter such as household garbage, grass clippings, excrement of farm animals, and spillage under feed bins can be sources of flies. An area of bare ground, achieved through the use of a general herbicide such as Round-Up, or a well maintained lawn adjacent to barns reduces shelter areas for flies.

### **(b) Manure Clean-out**

Fresh manure, because of its high moisture content, is very attractive to flies. Therefore operations that clean out manure once a year should try to avoid removing it during fly season. It is also recommended that a 10 to 15 cm layer of sawdust be spread on the floor below the cages to act as a dry-bed that will absorb moisture from fresh droppings. Alternatively 15 to 20 cm pad of old, dry manure left behind will assist in moisture absorption, and also usually harbours a variety of insects that feed on fly maggots.

In hot summer weather the fly life cycle can be completed in as little as 14 days. Because of this, barns designed for regular manure removal should be scraped out every 10 to 12 days to disrupt fly breeding.

### **(c) Water Spillage**

Because dry manure is not suitable for fly development, it is important to maintain waterers in good working order so as to avoid adding water to the manure from waterers that are overflowing or leaking. The watering system should be checked regularly and the manure examined for “soupy” spots.

Wet spots around barns should be eliminated as they may result in moisture seeping into the building, especially at the end doors, during periods of heavy rain. The ground around the barn should slope away from the structure.

### **(d) Ventilation**

The screens and vents covering the outlets of side-wall ventilating fans should be periodically cleaned to provide optimum air flow, thereby maintaining maximum manure drying capability.

## *Biological Control*

Ideally flies are controlled in the immature (maggot) stage before they become adults and reproduce. In poultry barns this is difficult to achieve with chemicals as the immature stages develop below the surface of the manure, often beyond the reach of insecticides. Even high volume applications have limited success because the high organic content of the manure tends to render organophosphate insecticides less effective. However many natural enemies attack the eggs, larvae, and pupae of flies. Manure that has accumulated for several months usually contains beetles that feed on fly eggs and maggots, and mites that feed on fly eggs.

In addition to naturally occurring beneficial insects, a number of parasites are commercially available. These parasites are considerably smaller than houseflies and are seldom seen after being released into a barn. They burrow into the manure in search of fly pupae and, upon locating them, the parasites insert an egg into the pupae. The egg hatches into a small larva that feeds internally on the developing fly, eventually killing it. After a few days the parasite becomes an adult “wasp” that chews its way out of the now empty fly pupa and begins looking for other fly pupae to parasitize. A number of different parasites are available. Some species, such as *Muscidifurax raptor*, are more effective during the winter and spring while others, such as *Spalangia endius*, should be used in the summer months. Some companies selling parasites advise introducing both species simultaneously, and provide mixed packages for this. Contact a pest control consultant for advice on the best program for your situation.

A parasite release program should begin no later than April, at a rate of five parasites per bird. Three or more releases at the same rate should be made at three to four week intervals. Follow this with monthly or twice-a month releases, depending on fly levels, for the rest of the fly season. Parasite introduction levels may be adjusted based on the existing fly conditions. Control usually becomes apparent 6 to 8 weeks after the initial introduction of parasites. An experienced consultant can help provide advice on this. No special equipment is required for releasing parasites. They are purchased as parasitized house fly pupae and are spread over the manure by hand.

Also commercially available are nematodes that parasitize fly maggots. The insect parasitic nematode *Steinernema carpocapsae* can be applied through a sprayer to the manure where they locate and enter fly larvae, ultimately killing them. Subsequent generations are not very effective in controlling flies, so it may be necessary to make a number of applications.

Care must be taken in the application of insecticides to minimize the hazard to both released and naturally occurring biological control agents for flies. Baits are the most compatible method of insecticide use in barns with established natural control agents. If residual surface sprays are used, an attempt should be made to avoid large amounts of insecticide reaching the manure. If there are localized areas of wet manure with high maggot populations, these should be treated on a “spot spray” basis. Short lived space sprays can be applied as fogs or mists with minimal impact on the beneficial insects.

As well as promoting fly development, wet manure inhibits the breeding of beneficial insects. Because it takes several months for natural enemies to build up to effective levels, when the house is cleaned out some of the old manure should be left behind to provide a reservoir of predators and parasites to repopulate the barn.

## Chemical Control

When used properly chemicals can be effective in reducing fly numbers to tolerable levels. However, insecticides cannot be expected to eliminate a fly population and often repeated applications are necessary to maintain fly numbers at acceptable levels. Chemical control should be considered as a supplement to sanitation and management practices that reduce fly breeding and encourage natural predators and parasites.

Avoid using the same insecticide on a continuous basis as this favors the development of resistance to that chemical.

### Larvicides

Most fly control applications are directed against adults. Chemicals applied to manure to kill larvae must be applied at high rates to reach the maggots which are often a centimeter or more below the surface. In addition, insecticides are quickly rendered ineffective by the high organic content of the manure. Usually only localized “hot-spots” of maggot development should be treated. It may be necessary, because of high fly numbers, to spray all the manure, and this should be accompanied by an intensive control program directed against adults to minimize subsequent breeding.

**Tetrachlorvinphos** (Disvap 50WP): Mix 1kg /50 L water. Apply 4L per 10 m<sup>2</sup> of manure. Repeat at 7 - 10 day intervals.

In some countries “feed-through” insecticides are added to the flocks’ feed. The insecticide passes through the birds without contaminating the eggs or flesh, and renders the manure toxic to developing fly maggots. No feed through products are registered for use in Canada.

### Adulticides

Chemicals to control adult flies can be applied as residual surface sprays, space sprays, and baits.

#### (a) Residual surface sprays

Insecticides with residual action can be applied as coarse sprays or paint-ons to areas that flies frequent such as walls and ceilings near light fixtures. Sprays applied to the walls, under the walkways, and to posts in the pit kill new adult flies as they crawl from the manure to wait for their wings to harden. One kg of sugar per 10 liters of spray will increase effectiveness. The residual activity of indoor surface sprays will be shortened by dust accumulation. Outdoors, flies rest on walls and fences exposed to direct sunlight and these surfaces may also be sprayed.

Continuous use of the same insecticide should be avoided as this enhances development of resistance.

Always read the label fully and follow directions. Do not let the chemicals contact anything but the intended surfaces. Do not contaminate feed or water.

**Dichlorvos spray** (DDVP, Vapona, Dichlorvos, Vapo): Apply according to label directions. Remove poultry before spraying.

**Dimethoate spray** (Cygon, Lagon, Sys-Tem, Dispar): Apply according to label directions. Remove poultry before spraying.

**Malathion spray** (Co-op Backrubber Conc): Produce a 1 - 2% spray by mixing 200 - 400 ml 50% SN per 10 L water. Apply 5 - 10 L per 100 m<sup>2</sup> of surface.

**Permethrin spray** (Ectiban, Sanbar, Sentinel): Apply according to label directions. Can be used with birds in the barn. Do not apply directly to poultry.

**Tetrachlorvinphos spray** (Debantic): Produce a 1 - 2% spray by mixing 200 - 400g of 50% WP per 10 L of water. Apply 5 L per 50 - 100 m<sup>2</sup> of surface.

#### (b) Space sprays (fogs and mists)

Space sprays use very small particles of pesticide solution to kill adult flies through direct contact at the time of application, with no residual action. Misting and fogging will quickly reduce the number of adult flies in a barn, but flies numbers will often rebound within a week. Seal barns as well as possible during the application of space sprays to ensure the required concentration is maintained. In summer this is best done in the early morning or at night so excessive temperatures will not develop. At these times the flies are mainly around the ceiling, and therefore sprays should be concentrated in those areas. In egg packing rooms, aerosol canisters are suitable for fly control. To suppress a high fly fog or mist 4 times at 2 day intervals, followed by 4 weekly applications.

**Always read the label and follow directions.**

#### Dichlorvos ready-to-use solutions:

Apply as a fog or mist according to label directions. Direct mist towards the ceiling. Remove poultry from barn before applying. Close windows and doors before treatment and ventilate thoroughly before returning poultry. Do not contaminate food or water.

#### Dichlorvos resin strips:

Can be useful to control flies in egg processing rooms. Hang the strips in high places and replace as necessary, about every 4 months.

#### Pyrethrin ready to-use solutions:

Apply as a fog or mist according to label directions. Can be used with poultry in the barn. Ventilate 15 minutes after application.

### (c) Baits

A number of commercial fly baits are available to control flies in barns. These contain an insecticide and an attractant, usually sugar and sometimes a synthetic material. Baits are most effective when placed near areas where flies congregate such as windowsills, lights, and walkways. Baits can be purchased as loose granules to be spread on flat surfaces or as impregnated strips to be hung from ceilings. Because of the dust in layer barns, the baits may become covered and require frequent replacement. Baits are very useful as supplemental control in barns that are relying on natural and introduced biological control agents as they don't effect these organisms. Do not handle bait with bare hands. Use gloves or distribute from the container.

**Methomyl and muscalure** (Starbar, Stimukil, Apache): Apply granules at a rate of 250 g per 100 m<sup>2</sup>. Replace as necessary. Do not contaminate feed or water.

### Traps and Electrocutors

Sticky paper, container traps with strong smelling baits, and electric grids using light attractants are commercially available as fly control methods. These can be useful in relatively small areas such as egg packing rooms, but the number required in barns renders these devices impractical for effective fly control.

### *Other Pests*

Occasionally large numbers of beetles or moths are seen in layer barns. These flour moths and beetles usually originate from accumulations of spilled feed or from stored feed in heated areas. To prevent these pests eliminate feed spills and store feed in outdoor bins. When a problem develops, the infestation should be located and removed, and a residual surface spray applied to the wall and floor in the area.

Outbreaks of flies about the size of a fruit fly will sometimes occur in layer barns. This fly, known as the small dung fly, can be a nuisance to the farmer, but they do not leave the barn to become an annoyance to the neighbors. They can be controlled by baits and space sprays, but in many cases small dung flies return to tolerable levels without control measures.

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