cultural methods of fly and odor control for poultry farms

By
Sergio Neyeloff, Ph.D.,
Extension Agricultural Engineer
FLIES ARE BASICALLY A NUISANCE.

They are bothersome to most people and under certain conditions have been identified as potential disease vectors, mechanical and biological. This has been a cause of concern associated with recent fly outbreaks in which poultry (and other) farms have been found to be a contributing factor. Consultation with veterinary and pathology experts reveal that there is no evidence in Connecticut of any poultry disease that can be transmitted to humans by flies, however, flies may be vectors of diseases originating in sites other than farms.

Although more than 16,000 species of flies have been identified in North America, the species abundant around farms in our state are few. These are the house fly, the lesser house fly, the soldier fly and the stable fly. The methods of control described here will be effective against most fly species.

The four basic methods of fly control are: Chemical, Biological, Mechanic, and Cultural. A fly control program will generally use a combination of them. Chemical methods are those which use insecticides to kill flies at some stage of their development. A biological method utilizes some kind of live predator to kill or parasitize flies so that they can't reproduce. Mechanical methods are those in which some kind of mechanical device is used to kill flies at some stage of their development. Cultural methods consist of management practices that inhibit fly breeding by breaking their life cycle, or preventing it from starting at all, by creating an environment unsuitable for the flies to breed, develop, feed, and rest.

This publication has to do with cultural methods of fly control. Any method alone will not eliminate the possibility of fly breeding in and around poultry houses but, if carefully followed, will certainly alleviate the problem greatly.

Fly populations can develop only under a limited range of moisture conditions during their initial stages in life. This range is about 40 to 85% moisture in the material where the eggs are laid and the larval and pupal stages take place. Eggs are laid on moist,
warm organic matter and hatch in about one day. The larvae emerging from the eggs live approximately a week; they feed, grow, and migrate to dry areas to pupate. Time in the pupal stage varies considerably but under favorable conditions it lasts about three days. After the pupal stage, the adult fly emerges and will typically mate within 2 days. During its close to 30-day life span an adult fly will lay almost 1000 eggs.

By far the most common place for flies to breed in a poultry house is where manure is deposited. Fresh manure is about 75% moisture, an ideal breeding place. Poultry houses are kept at temperatures in the range of 70-75°F. This, too, favors breeding. Furthermore, ventilating air in the house dries some of the manure and creates areas for fly larvae to pupate.

To prevent fly breeding in manure, one has to handle the manure dry (less than 45% moisture) or very wet (more than 85% moisture). Manure that is stored wet goes through an incomplete anaerobic digestion process that results, unfortunately, in the generation of foul-smelling gases. These gases are released when manure is moved or stirred, as when it is transported to be spread on land. Aside from the odor nuisance potential, the practice of handling manure as a slurry should be discouraged because of the higher costs of transportation and the possibility of spills.

Adult flies are strong fliers. Under favorable conditions they may fly up to 5 miles, although they usually remain within the immediate vicinity of their breeding site. They are attracted to food, filth, and waste materials such as poultry and livestock feeds, silage, manure, and garbage. Fresh poultry waste attracts flies particularly because of the ammonia which is given off.

Adult flies also exhibit certain other patterns of behavior. They will only leave their shelter (poultry house or stable) during the warmer times of the day; they will rest in calm, protected and sunny places such as eaves, posts, light-colored walls, tall grassy areas, and so on.

Flies are warm weather insects. They are inactive at temperatures below 45°F and die at temperatures below freezing. Flight begins with temperatures about 55°F, complete activity occurs when temperatures reach 70°F and maximum activity at 90°F. Temperatures above 100°F will produce a rapid decline in activity and will result in death at 112°F.

Fly populations can build up rapidly, increasing gradually during the spring and reaching the maximum during late summer. Fly populations vary con-
siderably from year to year. This is a function of the
physical environment, weather, parasitism by other
organisms, predation, and competition. The fly
season in the Northeastern U.S. is from June through
September.

The recommendations presented here are directed
towards keeping manure as dry as possible, prevent-
ing the introduction of extraneous water into the
manure, and providing overall farm management
guidelines to minimize fly breeding and odor prob-
lems. While routine management practices are most
important, proper manure and farm management
can be enhanced by incorporating some features at
the planning and design stages of the farmstead.

RECOMMENDED PRACTICES

Planning Farmstead
1. Plan building locations so that a bufferstrip of
trees and shrubs can be maintained between poultry
houses and neighbors. A distance greater than 100
feet from lot boundaries appears reasonable.
2. Plan manure storages as in (1).
3. Work out manure removal and land disposal
agreements.
4. Plan for an accepted method of dead bird
disposal (pit or incinerator).
5. Plan for an accepted method for disposal of
broken eggs and other refuse (bury, truck away).

House Design (Undercage storage of manure)
1. Build a true high-rise house (a house that has the
pit floor at the same elevation as outside grade).
2. Insulate as much of the pit wall as possible.
3. Build on a well-drained area.
4. Install footing drains.
5. Seal foundation walls.
7. Build concrete pad with buck wall outside the
clean-out doors.
8. Grade away from building (5-10% grade).
9. Install circulating fans in the pit, one 36” fan for
every 5000 hens. Create race track pattern of air
flow.
10. Install lighting in the manure pit. A 40-watt bulb
per 500 square feet. (For use when cleaning and in-
specting).

In-House Management
1. Check watering equipment twice daily.
2. Maintain manufacturer’s recommended water
pressure in watering equipment.
(3) Keep watering equipment clean (troughs, cups)
(4) Inspect pit daily for water leaks. If water spills occur, shovel wet manure on dry manure, spread and mix shavings in wet manure.
(5) Start the manure accumulation on a 2-4” bed of dry sawdust or shavings.
(6) If excessively wet droppings are observed have a veterinarian check the flock. This may be a disease or contaminated water problem.
(7) Remove (and dispose of) dead birds daily.
(8) Plan to clean house just ahead of dry weather season. Winter and Spring are the drier seasons in Connecticut.
(9) If fly populations appear to be on the increase use pesticides.

Around the house management
(1) Keep grassed areas mowed.
(2) Keep areas around the house dry, free of litter, manure and garbage.
(3) Sweep and remove feed spilled around the feed bins.

Trucking and Spreading Manure
(1) Keep equipment clean and in good repair.
(2) Avoid busy roads and times of day when traffic is heavy.
(3) Avoid moving and spreading manure on weekends, holidays and during periods of humid, heavy weather.
(4) Go around heavily populated areas if possible.
(5) Spread on
  a) Flat lands
  b) Perennial hay or pasture
  c) Cropland above meadows, pastures and woodland
  d) Fields remote from houses and streams
(6) Avoid spreading on
  a) Frozen ground or snow
  b) Fields that may flood or receive runoff
  c) Fields from which runoff may reach streams or other critical areas.
(7) Incorporate manure into soil as soon after spreading as possible.
(8) Use common sense, take the time to do a good, neat job and don’t offend thy neighbors!

Open Manure Storage Areas
(1) Get the advice and assistance from SCS, DEP and Extension Service to locate and design a storage area.
(2) Dump manure into the pits when unloading.
(3) Keep areas around storage pits clean and mowed.
(4) When small amounts of manure must be stored for short periods of time:
   a) Select an out-of-sight location.
   b) Select a dry site from which runoff will not reach streams, roads, neighbors etc.
   c) Spread as soon as possible.

Since there is no method available to guarantee total fly control, an effort must be made continually to keep fly populations down to a reasonable level. A recent Federal publication notes:

"Flies have been the intimate companion of man since long before the dawn of recorded history... Present methods of fly control are only partially effective; ready answers cannot be given to every fly control problem. However, recognized techniques, judiciously employed can bring about a dramatic reduction in numbers of flies..."(1).

Flies will breed in swamps, landfills, city dumps, privies in campgrounds, sewage treatment plants, food processing plants, garbage cans and so on.

Animal manures attract and can be a breeding media for flies. Animal manures can be foul-smelling and unsightly too. The proper management of manures and the care of the farmstead in general will help farmers enjoy their place of work and live on better terms with their neighbors.

References

(2) Van der Heide, L. 1981. Professor of Pathobiology. The University of Connecticut, Storrs, CT. Personal communication.