Beef Cattle Handbook

BCH-3815

Product of Extension Beef Cattle Resource Committee

House Fly and Stable Fly Management in and Near Livestock Facilities

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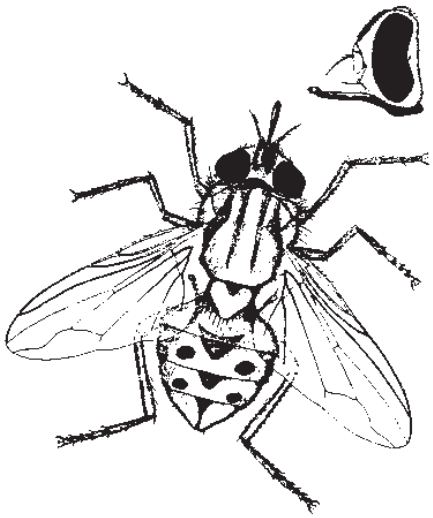
The stable fly and house fly are the major insect pests at confined livestock units. The stable fly has a piercing-type mouthpart which is used to pierce the skin to obtain a blood meal. House flies do not bite because they have a sponging-type mouthpart, with which they feed on semi-liquid material. The life cycles of the two species are similar, consisting of eggs, larvae (maggots), pupae, and adult. During summer months the stable fly completes its life cycle in about 3 weeks. The house fly requires about 2 weeks, or, in southern areas as little as 9 or 10 days. Both species deposit eggs in wet decaying organic matter. This includes spilled livestock feed and manure mixed with soil and moisture. In addition, the house fly will breed in fresh manure. The two species generally overwinter as slowly developing larvae in breeding areas below the frost line. The house fly may breed during the winter in warm buildings if breeding material is present.

Cattle under attack by stable flies will bunch together with each animal attempting to find a position within the bunch which protects their front legs—the favored feeding site of the flies. Considerable energy is expended by foot stomping, tail switching, and throwing the head toward the front legs in an effort to dislodge the flies or prevent feeding.

Stable flies reduce weight gains, milk production, and feed efficiency—both from their feeding and because of the bunching behavior of the cattle, which may induce or increase heat stress. House flies have not been shown to reduce animal weight gain and feed efficiency, but are known to transmit several animal diseases. The disease organisms recovered from house flies range from viruses to nematodes. The most common of these are the bacteria



Stable fly

associated with enteric infections. The house fly mouthparts and feeding habits (filth sources) make it efficient in transmitting bacterial and viral agents. Over one hundred different disease organisms have been recovered from house flies, and the fly has been implicated in the transmission of 65 of these. Transmission may simply involve the mechanical transfer of the disease agent, from the mouthparts or body of the fly, to the animal host. In other cases, the disease agent may multiply in the fly and be transmitted after populations of the disease agent build up to high numbers, or it changes to a different life stage.

One other important economic factor associated with stable flies and house flies is the threat of nuisance

lawsuits. Generally odor, dust, and flies are cited together as constituting a nuisance by the plaintiffs. The lawsuit may seek damages or, perhaps worse, request closing of the livestock facility.

Effective house fly and stable fly control cannot be achieved with insecticides alone. Proper animal manure management and sanitation must be the major element in a good fly control program. Confined livestock facilities should be designed or modified to facilitate ease in cleaning and to minimize accumulations of manure, spilled feed and other sources of organic debris.

Breeding Areas

In feedlots, major fly breeding areas include: 1) fence lines where manure mixed with wet soil accumulates; 2) along feeding aprons where, because of the slope of the aprons, moisture and manure accumulate; 3) at the edges of potholes, in pen corners, and around gates; 4) along pen drainage channels or edges of holding ponds at the water-soil interface, unless it is sloped enough to drain and dry quickly; 5) along the sloping edges of mounds where moisture runoff occurs; 6) around waterers if leakage or spillage occurs; 7) at the edge of and under feed bunks; 8) in and around feed handling facilities if the feed becomes wet; 9) at the edges of stored manure, if the edges are loosely packed and wet; and 10) at the edge of silage and haylage.

In addition, excessive moisture may provide fly breeding areas under round bales, in and around old hay or straw stack butts, and in sick pens and horse stables if hay or straw bedding is used.

Fly Management

Several different pest management strategies can work together to help eliminate fly problems in and around livestock facilities. Sanitation is the most important single part of a fly management program. To be effective, sanitation may need to be supplemented with insecticide sprays and baits, and/or biological control agents such as parasitoids (parasitic wasps).

Reduction of fly breeding areas in feedlots is dependent primarily on manure management and keeping the lots dry. Mounds are a key element in this process. They should be built and maintained to provide a dry area for the cattle and drainage for the excess moisture to move from the pens to the drainage system. During wet periods, the wet edges of the mounds can be scraped out into the lot in a thin layer to facilitate rapid drying.

Maximum stocking rates create tramping action that helps in drying. The lots also can be dragged periodically which helps maintain a dry surface. The area behind the feeding apron should be scraped at two week intervals and either removed or spread out in the lot for rapid drying. Drainage systems should be maintained with enough slope to move the moisture to the holding ponds rapidly which allows for rapid drying.

Haylage and silage piles may have drainage at the edges. The seepage provides an excellent fly breeding site. Covering this seepage area with black plastic should create enough heat to kill the developing fly larvae.

House fly

If manure is used as fertilizer and spread directly on farm fields, care should be taken to spread the manure thin enough for rapid drying. If the manure is spread at depths of 3-4 inches or more and enough moisture is present, it may allow fly breeding.

Water tanks should be surrounded by a concrete apron and equipped with a drain line, to facilitate cleaning without creating a muddy area in the lot. Float valves on waterers should be protected to prevent animals from causing an overflow. Livestock pens usually have enough organic matter present to create a fly breeding area wherever water accumulates.

Feedlots designed or modified to meet the Environmental Protection Agency's pollution runoff standards can have an additional fly breeding area in the debris basin. The purpose of the debris basin is to intercept the feedlot runoff, allow the solids to settle and channel the liquids into the holding pond. The basin should be sloped enough to prevent water from standing and provide quick drying. Solids should be removed regularly to prevent fly breeding.

If spray mists are used to cool cattle or hogs or to settle dust, care should be taken to prevent puddles from forming. Dragging the surface of the lot may fill in low areas where puddles form.

Each livestock unit is different and there may be fly breeding occurring in only two or three locations. However, since even small amounts of fly breeding material can support large numbers of flies, these areas should be located and removed. Manure management and sanitation can be expensive but should be considered a required management practice in livestock production. The benefits—better animal performance, more efficient use of insecticides, better working conditions for employees, more attractive facility for commercial customers, reduced risk of nuisance lawsuits, and reduced chances of disease outbreaks—usually offset the expense.

Insecticides

Area Spray: Insecticide applications should be considered as a part of a total management strategy. The method

of application most often employed is a mist blower (area spray). Diluted insecticide is dripped into a high velocity air stream which breaks the spray into fine droplets. The insecticide droplets are dispensed by the air stream into space occupied by flies. The droplets kill the flies they contact. Insecticides approved for application by this method have little residual value because they decompose very rapidly (two hours) in the environment. The popularity of this system has more to do with the standpoint of labor and time requirements than with its effectiveness.

Factors that will improve the effectiveness of mist blower applications include: 1) Control of weeds and other vegetation around animal facilities. This practice removes a favorable habitat and forces flies to congregate in fewer areas. A useful variation on this is to control all weeds except for a few narrow strips that are left purposely as fly resting areas that can be sprayed. 2) Avoid spraying when temperatures are below 65^{o}F or above 90^{o}F. Insecticides are not very active at cool temperatures, and evaporation and inversion reduces the effectiveness of mist applications at high temperatures. 3) Spray what is mixed the day it is mixed. Insecticides deteriorate when mixed for more than a few hours. 4) Flies rest in trees used as a windbreak during the hot part of the day. Spraying into the trees may kill more flies than spraying the pens. 5) Rotate classes of insecticides once or twice during the season or at least from one season to the next, to reduce the buildup of resistance in the fly populations. For example, rotate from an organophosphorous product to a pyrethroid, then back to an organophosphorous insecticide.

Although mist blowers are the most popular method of applying area sprays, aircraft, hydraulic sprayers and foggers may also be used to dispense area sprays. Regardless of the equipment, it should be adjusted to deliver fine droplets of insecticide into the fly-infested area. Insecticide labels often give application rates in terms of amount of product per cubic foot of space. We suggest 1-5 gallons finished spray per acre.

Residual Spray: Residual insecticides will kill flies that contact the material for 7-14 days. Direct sunlight (ultraviolet radiation, ULV) decomposes the materials, rainfall will wash it off treated surfaces, and in dry weather dust may form a barrier between the treated surface and the flies that land on it.

Residual insecticides are most effective when applied to shaded fly resting surfaces. House flies will "roost" under eaves or inside buildings on the walls, rafters and ceilings at night. Stable flies generally do not enter buildings unless they are well-lighted. They rest on the shady sides of feed bunks, buildings and windbreaks, or on vegetation. Flies absorb enough insecticide when it is applied to the resting sites to kill them. Application of insecticides to resting areas requires more time and labor than application of area sprays.

Labels on residual insecticides usually give the amount of finished spray to apply to 1,000 sq ft of surface. In general, the insecticides can be applied to the point of run-off, and care should be taken not to contaminate feed and water. Some residual insecticides will require the removal of animals from buildings while the spray is being applied. Others will have restrictions on treating the inside of buildings and treating animals under a certain age.

If fly resting areas are not too extensive, residual and area sprays may be rotated. It takes both house fly and stable fly females about six days after emergence to reach the egg depositing stage. In a rotation, a good mist blower application could be followed a week later with a residual application which should be effective for another week. This rotation could be followed throughout the fly season.

Baits: Baits may be used in dry form, or the labels on some liquid insecticides allow for the preparation of wet baits or bait sprays by adding water, sugar, corn syrup or molasses. Baits should be replaced at 2-4 day intervals. Since stable flies feed only on blood, baits are not appropriate for them. Baits will not fully control a house fly population, but they can be used to supplement other control methods. They may be particularly useful around the office, feed storage areas, in the alleyways of confined units and other similar places. Baits can be mixed with water into a slurry and used as a residual treatment in swine, poultry and beef confinement units. Bait stations should be replaced with a new bait at weekly intervals.

Feed additives or boluses: Feed additives are not effective for stable fly control, but may be effective for house flies in arid regions where the only suitable breeding habitat for house flies is fresh manure. The same considerations would hold true for boluses. Under some management conditions, feed additives may be useful for house fly control in confined beef, swine or poultry units.

Animal treatments: Spraying, dusting, pour-ons, spot-ons, dips, ear tags or any other method of applying insecticides directly to animals for control of house flies or stable flies are generally ineffective. The possible exception is the application of insecticides to riding horses or show animals on a daily basis for protection from stable flies.

Larvicides: The application of insecticide to fly breeding areas is not suggested because the pH of the breeding area causes rapid decomposition of the insecticide. Routine use of insecticides on fly larvae also enhances the possibility of insecticide resistance in the fly population. However, if the fly breeding area is too wet or otherwise difficult to clean, larvicides can be used as a temporary solution.

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This publication was prepared in cooperation with the Extension Beef Cattle Resource Committee and its member states and produced in an electronic format by the University of Wisconsin-Extension, Cooperative Extension. Issued in furtherance of Cooperative Extension work, ACTS of May 8 and June 30, 1914.

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