THE FACE FLY, *MUSCA AUTUMNALIS DE GEER*, was introduced into North America in the early 1950s and is a common pest on pasture and dairy cattle and occasionally horses. It is found throughout much of the United States with the exception of the southern tier of states. Face flies usually cluster around the eyes and muzzle of cattle or horses, where they feed on eye and nasal secretions. When abundant, this species annoys livestock and may disrupt grazing patterns, although the economic significance of this has not been demonstrated. Face flies are intermediate hosts of a variety of *Thelazia* eyeworms, and are competent mechanical vectors of the bacterial pathogen, *Moraxella bovis*, which is responsible for pinkeye (also known as infectious bovine keratoconjunctivitis). These flies may cause eye injury, transmit pathogens, and reduce milk production, resulting in significant veterinary and economic impacts to the livestock industry, and justifying costs associated with control efforts.

**Biology and Life Cycle**

Face flies are similar in appearance to house flies, but they are slightly larger and have darker bodies (Figure 1). Both male and female face flies have a grey thorax with black stripes. The abdomen of the male is predominately yellow/orange with a longitudinal black midline; for the female it is primarily grey with black patches.

The life cycle of a face fly can be completed in two to three weeks, as it moves through the egg, larval, pupal and adult stages. Each female lays approximately 25 eggs per cycle (Krafsur and Moon 1997). Eggs are laid on freshly deposited cattle manure in open pasture and rangeland. Fly survival is higher in these locations compared to feedlots and stockyards because manure is not trampled. The eggs are unique in that they have a slender, elongated respiratory stalk that protrudes from the manure after they are deposited by the female (Figure 2, page 2). The larvae feed and grow through three stages of development before they emerge from the manure pat and pupate in soil adjacent to the pat. The color of the puparium changes from yellow to white as it calcifies and, finally, to grey, as the nearly-mature adult fly prepares to emerge (Figure 3, page 2).

After emergence, face flies mate and females search for a protein source that is necessary for egg development. This protein source is typically from nasal discharges, eye secretions or blood from cattle and horses. Female flies will congregate around the eyes, mouth and muzzle to feed (Figure 4, page 3). They do not bite, but their spongy mouthparts are equipped with jagged spines (prestomal teeth) that probe and scrape the outer tissue (conjunctivae) that covers the eye. This feeding action irritates the eye.
and results in tears produced by the animal that are protein-rich. They are also attracted to blood seeping from wounds caused by mechanical damage or biting flies. By comparison, male face flies only feed on nectar and dung. House flies may also occur on the faces of animals, but they are considered harmless because they lack the sharp pre-stomal teeth characteristic of face flies.

Face flies do not enter darkened buildings or shelters during the warm summer months. However, they overwinter as adults and may be problematic in the fall as they enter protected areas such as attics, barns or sheds. They may be a nuisance in homes if they find their way inside living areas during periods of warm weather in the winter.

Veterinary and Economic Importance

Female face flies annoy livestock because they congregate on an animal’s face, persistently clustering around the eyes, mouth and muzzle. An average of 12 to 14 flies on the face of an animal can reduce grazing by as much as one hour per day. Fly populations above 20 are considered a heavy infestation, and cattle may stop feeding and exhibit avoidance behaviors, such as frequent head shaking, bunching up or moving into a shaded area, which can impact weight gains. The flies frequently move from one animal to another, especially after being disturbed. Dairy cattle will bunch together to avoid face flies, which increases heat stress and reduces milk production.

The feeding activity by face flies irritates the animals’ eyes and causes excessive tearing, giving them an unhealthy appearance (Figure 5, page 3). This eye injury can predispose animals to infection by the pinkeye bacterium, *M. bovis*. Face flies can get contaminated with *M. bovis* by feeding on a pinkeye-infected animal and then they may expose the pathogen to other animals in the herd by physical contact. Symptoms include reddened conjunctiva,

excessive tearing, opacity, and often corneal ulceration. One or both eyes may be affected, and it occurs more frequently on white-faced cows. Costs associated with pinkeye include surveillance and treatment of affected animals, as well as the expenses of blindness if the disease is not detected. It should be mentioned that pinkeye was present in Montana before face flies were introduced. However, when face flies are present, the incidence of the disease in a herd is increased.

The face fly is also an intermediate host of Thelazia eyeworms, which are nematodes that live in the tear ducts of cattle and horses. Transmission occurs when face flies are feeding on or around the eyes. Fortunately, these infections are considered harmless and cause no symptoms.

Face Fly Management

There are limited non-insecticidal options available for effective face fly control (Krafsur and Moon 1997). Face flies deposit their eggs in fresh manure on open pasture/rangeland, and therefore cultural control, such as manure removal used in confined animal facilities to control fly pests, is impractical. Biological control is limited to the beneficial organisms that occur naturally in the field. Supplementing beneficial organisms by making massive releases, which is often done in confined animal facilities, is also impractical. Adult face flies are attacked by parasitic nematodes and yellow dung flies; larvae and pupae are attacked by predaceous arthropods, including mites, beetles, flies and parasitic wasps (Skidmore 1991). However, these beneficial arthropods are unable to maintain fly populations below pest levels.

The best available option for reducing adult face flies on livestock is the use of insecticides applied to the animal. Acceptable control can be difficult to achieve because flies spend a limited amount of time on the animal, so exposure to topical insecticides is
often insufficient to kill the flies. Methods of applying insecticides to cattle include dust bags, back rubbers or oilers, feed additives and insecticide ear tags.

Dust bags and backrubbers can provide acceptable face fly control when used on a daily basis. This can be achieved by fencing off a water source or mineral tub and suspending bags at the entrance and exit gates, forcing cattle to contact the bag or oiler whenever they access the area. Forced use may not be practical with pasture or range cattle. In this case dust bags or backrubbers can be placed at locations where cattle loaf during the day, encouraging voluntary usage. Generally, two dust bags in a loafing area are sufficient for treating approximately 50 – 60 cattle. Several types of dust bag and backrubber insecticides are available at ranch supply stores for face fly control.

Oral larvicides, such as the insect growth regulator, diflubenzuron or the organophosphate, rabon, when incorporated into loose mineral or mineral blocks, will kill face fly larvae developing in the manure, but will have no impact on adult face flies. These products generally kill 80% to 90% of the developing fly larvae, but there may not be a corresponding reduction of flies on the animal if they are in close proximity to untreated cattle. Face flies are strong fliers and will migrate from an untreated herd.

Insecticide-impregnated ear tags will provide control of face flies. Because face flies attack old and young animals, both cows and calves must be tagged if effective control is to be achieved. There are a variety of ear tags on the market containing different insecticides (e.g., synthetic pyrethroid [SP], organophosphate [OP], avermectin [AV]) or combinations of insecticides (SP + OP, OP + OP). Field studies suggest that pyrethroid tags, especially those containing the synergist piperonyl butoxide, are more effective than organophosphate tags (Johnson, unpublished data).

References


FIGURE 4. Face flies on the face of a cow. (University of Georgia – USDA Cooperative Extension Slide Series)

FIGURE 5. Feeding by face flies resulting in eye secretion stains below the eye. (Photo by University of Nebraska)