Kansas State University Agricultural Experiment Station and Cooperative Extension Service
LIVESTOCK PESTS
K-STATE Research and Extension

Face Flies

The face fly, *Musca autumnalis*, is a close relative of the housefly and similar in appearance, although its biology and behavior are quite different. The face fly is a pest of livestock, causing significant annoyance to cattle and sometimes horses. Adult female flies feed around the eye, and in addition to significant irritation, they can transmit the causative agent of bovine conjunctivitis (*Moraxella bovis*).

Face flies are also a pest of urban settlements in rural areas, where they can enter buildings in large numbers in the fall, searching for overwintering shelter. Introduced to North America from Eurasia shortly after World War II, the pest was first detected in Nova Scotia, Canada, in 1952. It is now endemic across temperate North America wherever horses or livestock are raised, although high summer temperatures appear to limit its range in southern latitudes. There can be as many as 10 generations per year, depending on weather and the length of the growing season; as few as three may occur in the northern limits of its range in Canada.

Biology and Life Cycle

Face flies are adapted to temperate climates and overwinter as unmated adults in a nonreproductive state (diapause). During the growing season, eggs are laid in fresh cattle manure where larvae will feed and complete development in two to three weeks, depending on temperature. In Kansas, face fly densities tend to peak mid- to late-summer after the completion of several generations, and around the time insecticidal ear tags attached to cattle in spring begin to wear off and require replacement.

Because female face flies require undisturbed manure for larval development, this pest is restricted to pastures and rangeland, as females tend to avoid oviposition in feed lots or corrals where manure becomes trampled and contaminated with urine.

The pupal case is unique in being calcified, rather than sclerotized or hardened with chitin, which is typical of most muscid flies. The resulting mineralized casing is hard enough to resist penetration by the ovipositors of most hymenopteran wasps that specialize in parasitizing muscid fly pupae, and it can prevent parasitoid emergence even when eggs are successfully laid, affording the flies considerable resistance to parasitism. Nevertheless, natural mortality of immature stages can exceed 90%, mostly as a result of arthropod predators consuming eggs and early instar larvae in the dung.

Adult flies can live for 20 to 50 days and are sexually dimorphic, with males and females differing in both appearance and behavior. Males lack the horizontal stripes evident on the thorax of females and have eyes that come close to touching on the top of the head (Figure 1). Although each male may mate up to four times, females mate only once and lay about 100 eggs over the course of their lives.

Although they do not bite, female flies cluster on the faces of horses and cattle, feeding on secretions around the eyes, nose, and mouth that contain the proteins they need to mature eggs. More than 90% of the flies observed on cattle are females. Their rasping mouthparts can abrade the sensitive mucosal membranes of the eye, facilitating the entry of pathogens. In contrast, male flies feed mostly on flower nectar and cattle dung and rest on vegetation where they try to ambush passing females.

Aside from the risk of disease transmission, the annoyance caused by female face flies can negatively affect grazing

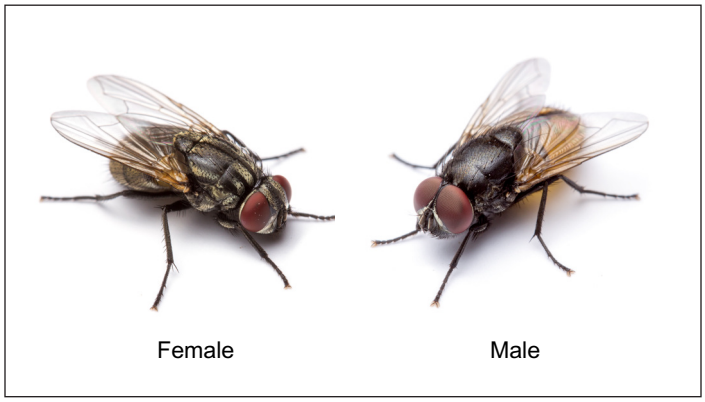

Figure 1: Female and male face flies. *(Matt Bertone, North Carolina State University).*

Figure 2: Healthy cow and cow with bovine conjunctivitis. *(Cassandra Olds, Kansas State University).*

behavior, impeding weight gain and milk production in cattle. Insecticidal-impregnated ear tags and feed-through insect growth regulators can be used to control face flies in pastured animals.

Disease Transmission

Face flies are mechanical vectors of *Moraxella bovis*, the causative agent of bovine conjunctivitis or pinkeye (Figure 2). The bacteria contaminate the mouthparts of adult female flies during feeding and are then transmitted to a new cattle host. This pathogen can also be transmitted by direct animal-animal contact.

Management on Livestock

Cattle pest control ear tags are made of a plastic polymer impregnated with insecticides and are available in several formulations. As the tag contacts the skin, the insecticide is transferred from the tag to the body of the animal. As these tags work by direct contact, it is recommended to tag both ears in the case of cattle. It is recommended to rotate chemical class every year between pyrethroid (one year), organophosphate (one year), and macrocyclic lactones (one year), before beginning with pyrethroids again. Products licensed for use and their chemical classes can be found at: *www.veterinaryentomology.org/vetpestx*.

If resistance is noted for any chemical class, refrain from use for two years. Although many tag labels indicate four to five months of use, effective levels are only sustained for approximately 90 days and tagging time should ideally be performed over peak fly periods. Remove tags after the completion of use to reduce the spread of insecticide resistance.

Feed-through insect growth regulators can be added to supplemental feed and inhibit the emergence of adult flies from manure. These compounds are extremely effective if animals can be dosed correctly. Both ear tags and feed-through insect growth regulators also will reduce horn fly populations.

Management in Buildings

As days become shorter in the fall, and overnight temperatures begin to drop, face flies enter reproductive diapause (cessation of egg development and oviposition) and begin to seek shelter in man-made structures wherever they can gain entry, usually through small gaps in the eaves and soffits of barns, sheds, houses, and church steeples.

Face flies are not cold tolerant — they do not produce "antifreeze" compounds that would enable them to "supercool" and survive below-freezing temperatures, as do many other temperate-adapted insects that overwinter as adults. Rather, they are cold avoidant, and cluster together in the attics of barns and outbuildings in an effort to escape freezing temperatures. In uninsulated buildings, the vast majority will die over the course of the winter, their dead bodies raining down on everything below, causing considerable annoyance to garage-owners, churchgoers, and others. Overwintering survival is more successful in insulated structures and in barns where the body warmth of livestock keeps temperatures above freezing.

The most effective approach to management of face flies in structures is exclusion, although this can be notoriously difficult to achieve, especially in older buildings. Gaps and cracks along eaves and soffits can be sealed from the inside with expanding polyurethane foam (although this will require replacement every few years), and from the outside with caulking. This can be supplemented with the application of a residual insecticide that will kill many flies before they can enter, although a new application will be required every fall. However, even the most diligent exclusion efforts are unlikely to keep out all flies, and additional follow-up controls within structures may be required.

In Kansas, most flies have finished entering structures by late October or early November. At that time, clusters of flies on rafters can be removed by vacuuming them with an extension wand attached to a shop vac or canister-type vacuum. This is best accomplished early on a cold morning when the flies are tightly clustered and unable to take flight.

Cassandra Olds, Entomologist, Kansas State University

J.P. Michaud, Entomologist, Kansas State University

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