

IPM: Integrated Pest Management



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October 1995

Horn Fly Biology and Management

Of the many species of insects that feed on the blood of cattle, the horn fly, *Haematobia irritans*, is the most common fly pest. The horn fly's feeding activity causes anemia due to loss of blood, reduced weight gain, and a general weakening of the animals.

Identification

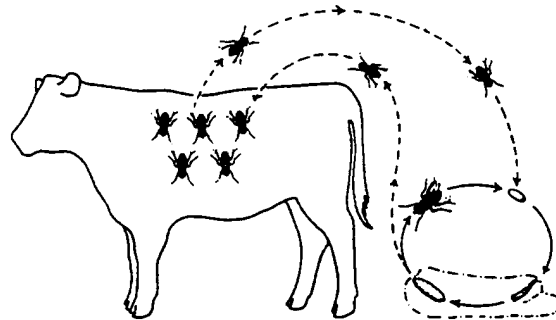
Horn flies are 3/16-inch long and dark gray in color. They resemble house flies but are half as large and have blood-sucking mouthparts. An easy way to identify horn flies in the field is by their habit of clustering around the horn bases or on the shoulders and backs of cattle. The flies often move to the animal's belly on extremely hot days or during rain storms. They will fly up in a swarm when disturbed but immediately return to the animal.

Both male and female horn flies are blood feeders. The flies feed in a head-downward position, holding their wings at a 45-degree angle to their bodies. Each fly feeds intermittently, 10 to 40 times a day for 10 to 25 minutes at a time. Such continual feeding causes the cattle considerable pain and aggravation.

Biology, Habits, and Life Cycle

Adult horn flies spend their entire lives on cattle. Females leave only to lay their eggs in fresh manure. Their requirement for fresh manure results in interesting egg-laying behavior. After mating and feeding, the female horn fly moves to the rear of the animal and awaits defecation. As defecation occurs, the fly heads toward the ground and is blanketed with fresh dung.

Egg laying usually occurs in the early morning. Each female fly lays up to 500 small, reddish brown eggs in clumps on grass and other vegetation under the manure. The eggs hatch in a few hours; maggots



The life cycle of the horn fly is 3 weeks or more.

mature in 10 to 14 days. Horn fly maggots develop best in manure from cattle that are on pasture and poorly on the manure from cattle on concentrated feed.

Mature horn fly maggots transform to the pupal stage in or below the manure. Upon emergence from the pupal stage, the adult flies immediately seek out cattle to begin feeding.

In West Virginia, the horn fly is a pest during warmer months, usually April or May through September or October. Adult flies are killed by frost arrest and with the onset of cold weather, many of the flies develop at the pupal stage as fall approaches. The pupae enter a resting phase known as diapause and overwinter beneath manure pads or in the soil. The diapausing pupae produce adult flies the following spring.

Economic Threshold

Horn flies are monitored by counting the number of flies on the heads, backs, and shoulders of at least 15 cattle.

An average of more than 50 flies per side or 100 flies per animal is considered the "treatment threshold," or that number above which control measures may be required. The "economic injury level" is given as 200 flies per animal, since many experts estimate that fewer than this will not result in measurable economic loss.

In cases of heavy infestation, weight gain may be reduced by up to 0.5 pound per day. In one study, heifers not infested with horn flies gained an average of 20 pounds more than infested heifers over a 79-day test period. Loss from horn fly feeding is also apparent in lactating cows, where horn flies can reduce milk production by 10 to 20 percent.

Management Strategies

Because the horn fly breeds in fresh manure, such cultural control methods as cleanup of barnyard manure, used effectively against the house fly and the stable fly, are not practical.

Also, biological control methods that have been successful against other fly pests have not been developed for control of the horn fly. However, because horn flies stay on the animal all of the time, they are relatively easy to control with ear tags, dust bags, oilers, or nonchemical walk-through traps.

Biological Control. Biological control of the horn fly is limited at present to organisms that occur naturally in the field. The horn fly's immature stages (eggs, maggots, and pupae) are attacked by predaceous mites, predaceous beetles, and parasitic wasps. Methods of capitalizing on the presence of these naturally occurring biological control agents to augment pest management programs are presently unknown. The parasitic wasps released in management programs for the house fly and the stable fly are ineffective against horn flies.

Dung beetles can limit horn fly populations by removing and burying the manure before the fly completes its development. In the United States however, dung beetle populations have not increased in proportion to the increase in livestock production and the corresponding increase in dung pats. It is

possible that the widespread use of certain dewormers and systemic insecticides in manure may be responsible. In recent years, several species of exotic dung-burying beetles have been introduced by USDA in efforts to implement biological control of dung-breeding flies. Unfortunately, the program has not yet reached the stage where individual producers are able to obtain and use dung beetles for horn fly control.

Mechanical Control. A walk-through fly trap, first proposed in the 1930s, is the most promising tool for non-chemical horn fly control. The trap is placed where cattle must pass through it to obtain water or access to salt. The trap works on the inverted-cone principle, whereby insects are funneled in through a large opening and subsequently unable to find an escape route through a small opening. As cattle enter the trap, strips of canvas brush along their backs and dislodge the flies. The flies are attracted to light, move toward the screened sides of the trap, and are unable to escape. Research indicates that use of such a trap can provide a 50 percent reduction in the number of horn flies in a herd.

A more detailed description and diagrams of the trap are provided in "A Walk-Through Trap to Control Horn Flies on Cattle" on page 10651 of this notebook.

References:

- Foreyt, William J. 1994. *Veterinary Parasitology Reference Manual*. 3rd edition.
- Metcalf, Robert L. and Robert A. Metcalf. 1993. *Destructive and useful insects*, 5th edition. McGraw-Hill, Inc., 1073 pp.
- Rutz, Donald A., Christopher J. Geden and Charles W. Pitts. 1993. *Pest management recommendations for dairy cattle*. A Cornell and Penn State Cooperative Extension Publication.
- Williams, Ralph E., Robert D. Hall, Alberto B. Broce and Philip J. Scholl, eds. 1985. *Livestock Entomology*. John Wiley & Sons, 335 pp.