

Horn Flies on Cattle: Biology and Management

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Horn flies are an important blood feeding insect on range and pasture cattle in Montana. They are responsible for production losses in mature cattle and lower weaning weights in calves. Producers can minimize these losses by using one of the control tactics listed in this guide.



MontGuide

MT200912AG New 5/09

THE HORN FLY, *HAEMATOBIA IRRITANS* (L.), IS one of the most important blood-sucking pests of pastured cattle in North America. In the U.S. alone, annual losses in cattle production and control costs exceed \$780 million. Horn flies are very common on beef cattle in Montana. When abundant, cattle experience pain and annoyance from fly bites, which interfere with normal activities of cattle including feeding and resting. The result may be decreased milk production, reduced weight gains and poor feeding efficiency. Consequently, it is important that livestock producers be aware of the economic importance of this pest and select an appropriate control method for its management.

Horn fly biology

Adult horn flies are $\frac{3}{16}$ inch long and are about half the size of a housefly. They are dark gray in color, with two dark stripes on the thorax and a few faint spots on the top of the abdomen. While at rest on the animal, the wings are held partially open, forming a V-shape. These flies are external blood-feeders and an individual fly will bite an animal and feed on blood 20 to 30 times per day. Depending on the infestation level, this can calculate into thousands of bites per day that an animal tolerates.

Both male and female flies spend the majority of their time in the summer on the animal, moving from the backs and sides to belly during the heat of the day. Females leave the animal to deposit eggs in fresh manure and then return to the animal to resume feeding. A female will deposit up to 500 eggs during her lifetime. Horn fly larvae, which are typical-looking fly maggots, hatch and develop in the manure. Ten to 14 days are required in the summer to complete larval development and transform to the pupal stage. There are several generations of flies during the summer. A rapid buildup of flies occurs in mid-summer with adult populations generally peaking in late summer. As daily temperatures decline in the fall, the horn fly pupae go

into hibernation and spend the winter in the soil. Adult flies emerge from the hibernating pupae as early as April.

Economic Impact

Horn flies are fairly specific for cattle, but in their absence they will feed on other animals such as horses. The flies show a preference for larger animals (bulls, cows, steers, heifers) and tend not to bother calves until the end of the summer when calves have grown. Cattle infested with 200 or more flies will bunch together, expend energy attempting to escape from the flies, reduce their food intake while combating flies and alter grazing behavior due to fly irritation. The pain and annoyance caused by these flies is often manifested in reduced milk production and lighter calves at weaning time. Nebraska studies demonstrated calf weaning weights were 10 to 20 pounds higher when horn flies were controlled on cows. Other studies around the U.S. and Canada have shown improved weight gains of stocker cattle and replacement heifers when comparing treated to untreated animals. For example, in a three year Louisiana study, yearling replacement heifers treated for horn flies had a 17 percent weight gain advantage over untreated heifers. Some of these studies have indicated that as few as 200 flies per animal will result in reduced feed efficiency and lowered weight gains. In addition, horn flies have been implicated in the spread of summer mastitis.

Management

Because of the economic losses associated with horn flies they should be controlled on beef cattle. A Canadian study demonstrated that economic benefits (i.e., increased weight gains, increased milk production, better pasture utilization, and higher feed efficiency) are maximized if fly-free grazing is maintained for 115 days. Generally, insecticides are the primary method used for controlling horn flies because biological control and cultural tactics have proven ineffective. There are many effective insecticide application

methods available to control horn flies on pastured cattle. These include dust bags, back rubbers (oilers), insecticidal ear tags, sprays, pour-ons, boluses, and oral larvicides (feed-additives). Because flies remain on the animal, self-treatment control devices are effective for horn fly control. Efficacy, cost, convenience, and herd management practices should be considered when designing a horn fly control program.

Dust bags

Dust bags contain insecticide dust that filters through the bottom of the bag when cattle contact the bag while passing under it. The best horn fly control is achieved when cattle are forced to pass under the bags on their way to get water, feed or mineral. This is accomplished by fencing the water tank and suspending the dust bags in the entrance-exit gate. Forced-use of dust bags is often not practical with range cattle because they may obtain water from stock ponds or streams. In this case, dust bags can be placed at locations where cattle loaf during the day to be used free-choice. In some cases older cattle and bulls will dominate a dust bag so only a few animals are treated. Dust bags in forced-use situations provide 80-90 percent horn fly control. Studies have shown that horn fly control is 25-50 percent less using free-choice dust bags compared to forced-use dust bags. Bags should be inspected regularly and recharged with insecticide dust when necessary.

Back rubbers and oilers

A back rubber consists of a chain or chains wrapped in burlap and secured with wire. The burlap is treated with an insecticide designed for back rubbers and is diluted with No. 2 diesel fuel or commercial back rubber oil. Do not use motor oil to dilute the insecticide. Back rubbers and oilers, like dust bags, work best in a forced-use situation.

Insecticide ear tags

Insecticide ear tags contain one or more insecticides embedded in a plastic matrix. Movement of the tag while the animal is moving or grooming slowly releases small quantities of insecticide over a period of time (weeks) which travels through the hair coat of the animal. Generally, ear tags are more effective against insects such as horn flies that spend the majority of their life on the animal and are less effective or ineffective against insect pests that are on the animal for a short period of time (e.g., mosquito, deer fly, horse fly).

When ear tags were first introduced in the late 1970s they were very effective against horn flies, providing season-long control. However, this initial success was short-lived. Within a few years, horn flies developed resistance to pyrethroid insecticides used in the tags and many producers stopped using them, choosing to go back to dust bags, oilers or feed additives or do nothing at all. Animal health companies have developed different insecticide chemistry to combat

the resistance problem. As a result, there are many different types of tags on the market with different insecticides. Currently, there are ear tags on the market that contain one or more synthetic pyrethroids, one or more organophosphate insecticides, or a combination of a synthetic pyrethroid and an organophosphate. There are also ear tags that contain endosulfan, an organochlorine insecticide, and abamectin, an insecticide derived from the soil bacterium *Streptomyces avermitilis*.

Animal Sprays

Insecticide sprays come as ready-to-use or are diluted with water before applying. It is important to get complete coverage of each animal with the spray and penetration to the skin. Animals can be treated in small groups to assure complete coverage.

High pressure sprays can be used to treat cattle thoroughly and inexpensively on a per head basis. More handling is required using sprays since they must be confined in a corral so that they can be sprayed thoroughly. While sprays are generally easy to apply, several applications during the summer may be needed because their duration of control is often limited (3 to 4 weeks).

Pour-ons

Pour on insecticides are ready-to-use formulations that are applied in measured doses to animals based upon body weight. Most function as contact insecticides. Typically, they provide fly reduction for several weeks, so they must be re-applied periodically. The duration of control will vary with weather and other factors so re-apply when fly numbers build back up to about 50 per side but no sooner than the label instructions allow.

Oral larvicides (feed additives) and boluses

Oral larvicides (feed additives) are insecticides that are incorporated into mineral blocks, tubs or loose mineral. The insecticide is passed out in the manure and kills fly larvae that develop in manure. Oral larvicides are effective when consumed in sufficient quantities all season long. A bolus containing an insect growth regulator is also available. The bolus enters the cow's reticulum and slowly releases the insecticide which passes out with the manure. Adult horn fly numbers may appear unaffected if the cattle consuming feed additives or receiving a bolus are in close proximity to an untreated herd. Supplementary control measures must be taken to deal with adult flies migrating in from nearby untreated herds. An untreated herd may provide enough flies to keep fly populations above the economic threshold for both treated and untreated cattle.

Chemistry	Active Ingredient	Brand Name
Dustbag insecticides		
OP	coumaphos	Co-Ral Dust
OP	tetrachlorvinphos	Rabon Dust
SP	zeta-cypermethrin + piperonyl butoxide	PYthon Dust
Note: several different dusts can be hand-sprinkled on cattle. Do not use these in dust bags unless the label indicates you can do so.		
Back rubber insecticides		
OP	coumaphos	Co-Ral Fly and Tick Spray
OP	tetrachlorvinphos	Ravap EC
SP	permethrin	Permethrin II, Durvet permethrin, Brute, Prozap X, Permethrin 10, Ectiban
Insecticide ear tags		
SP	permethrin	Atroban, Apollo, Ectiban, Ectrin, Ear Force, Expar Extra, Gard Star Plus, New Z Permethrin, Permethrin
SP	cyfluthrin	Cutter Gold
SP	beta-cyfluthrin	CyLence Ultra
SP	zeta-cypermethrin	Python, ZetaGard
SP	zeta-cypermethrin + synergist	Python Magnum
SP	lambda-cyhalothrin	Saber Extra, Excalibur
OP	ethion	Commando
OP	coumaphos + diazinon	Co-Ral Plus
OP	fenthion	Cutter Blue
OP	pirimiphos methyl	Cominator, Rotator, Tomahawk
OP	diazinon (20%)	Optimizer, Bova Gard, X-Terminator
OP	diazinon (40%)	Patriot, Cutter
OP	diazinon + chlorpyrifos	Warrior, Diaphos Rx
SP + OP	lambda-cyhalothrin + pirimiphos methyl	Double Barrel
SP + OP	permethrin + chlorpyrifos + synergist	Ear Force Ranger
SP + OP	permethrin + chlorpyrifos	Perma-Tect II
OC	endosulfan	Avenger
AV	abamectin	XP-820
Animal spray insecticide		
OP	coumaphos	Co-Ral
OP	tetrachlorvinphos	Rabon
OP	tetrachlorvinphos + dichlorvos	Ravap EC
SP	permethrin	Atroban, Expar, Permethrin II, Ectiban, GardStar, many others
Insecticide pour-ons		
SP	permethrin	Atroban, Expar, Permethrin II, Ectiban, GardStar, Brute, Ultra Boss, many others
SP	lambda-cyhalothrin	Saber
AV*	endectocides	Ivomec, Cydectin, Dectomax
Oral larvicides (feed additives)		
IGR	diflubenzuron	Clarify Larvicide
IGR	methoprene	Altosid IGR
OP	tetrachlorvinphos	Rabon Oral Larvicide
Bolus insecticides		
IGR	diflubenzuron	Vigilante

OP=organophosphahate, SP=synthetic pyrethroid, OC=organochlorine, AV=avermectin, IGR=insect growth regulator

* Endectocides are used for internal and external parasite control. For optimal horn fly control over an extended period, use other methods and chemistries.

Resistance Management

Horn flies can develop resistance to any insecticide regardless of the delivery method. However, resistance to ear tag insecticides occurs more readily than from other methods because insecticide is constantly being released from the ear tag and horn flies are exposed to the insecticide throughout the entire summer. Resistance is suspected if horn flies are not controlled a few weeks after applying tags to the animals or if horn flies are infesting cattle by mid-summer. Research has demonstrated that resistance follows the continuous use of an ear tag containing an insecticide of the same chemical class for two or three years. Thus, producers should avoid using ear tags in the same chemical class for two or more consecutive years. This can be accomplished by rotating ear tags or delivery methods on an annual basis. For example, use a synthetic pyrethroid tag one year, an organophosphate tag the following year and dust bags, back rubbers or animal sprays the third year. If a producer prefers ear tags, then incorporate an organochlorine or avermectin tag the third year.

Carefully read and follow the insecticide label concerning the application of any insecticide to cattle and precautions concerning calves and lactating dairy cattle.

Every attempt was made to include all products commercially available for horn fly control.

Omission of any product was unintentional. Products are not listed in order of preference or superiority for horn fly control.

Due to constantly changing labels, laws and regulations, MSU Extension can assume no liability for the suggested use of chemicals contained herein. Pesticides must be applied legally, complying with all label directions and precautions on the pesticide container and any supplemental labeling and rules of state and federal pesticide regulatory agencies.



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