

Animal Sciences

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Fly Control in Beef Cattle

Introduction

Controlling fly populations from late spring through a killing frost in the fall has always been a challenge. Flies are not only a nuisance but can cause irritating bites and transmit diseases, such as pinkeye and anaplasmosis. Face flies, horn flies and stable flies are the big three, but house flies can also become a problem. All four fly types have different life cycles, feeding patterns and resting habits, which makes control more challenging. For this reason, a multiprong approach to fly control is typically needed. The good news is that we have multiple options.

Types of flies

Horn flies

These small, bloodsucking flies stay with an animal and typically only leave to lay eggs in fresh manure. They can be found on the neck, topline and underline of cattle. Horn flies are likely the most costly ectoparasite for beef producers, costing the industry more than \$1 billion per year. Development from egg to sexual maturity takes from 10 to 14 days, depending on weather conditions. Each female lives 14 to 28 days and can produce 200 to 500 eggs that are deposited in fresh, undisturbed

Figure 1. The four common flies of concern. Courtesy of <u>https://grow.ifa.coop/cattle/</u> <u>cattle-fly-control-methods-and-strategies</u>.

manure. This short and highly productive life cycle can result in a very rapid increase in horn fly populations.

Each fly averages more than 30 meals and removes in excess of 1 cc of blood per day. Horn fly feeding causes skin irritation, anemia, decreased feed intake, diminished weight gains, and lower milk production. About 80% of the horn flies can be found on about 20% of the animals, with bulls typically attracting the most. The economic threshold is estimated to be 200 horn flies per animal. Therefore, implementing a control strategy at or above that concentration is necessary. Untreated cattle can have in excess of several thousand horn flies per animal.

Figure 2. Horn flies on the back.

Figure 3. Flies laying their eggs in fresh manure.

Face flies

Face flies favor areas of higher humidity and more rainfall than other major fly species. They can be found feeding on body secretions such as tears, saliva, nasal mucus, blood serum from wounds, and perspiration. Face flies are capable of traveling several miles from neighboring/adjacent properties and from animal to animal. That increases the control challenge. Pinkeye and other eye disease transmissions are the greatest concern.

Figure 4. Face flies around eyes and nose.

Stable flies

Stable flies are a bloodsucking fly that cause significant animal pain. Typically found on cattle legs, they can feed several times per day and can remain on the animal for three to five minutes for each feeding. Stable flies develop where there is decaying organic matter, such as manure and wasted feed around feed bunks, feed storage areas, hay feeders, and runoff drainage retention structures. When there is a significant stable fly population, cattle can be found huddling together or standing in water to minimize their exposure.

Figure 5. Stable flies on legs. Courtesy of <u>https://grow.ifa.coop/cattle/cattle-fly-control-methods-and-strategies</u>.

House flies

Much like the stable fly, house flies develop in fresh manure and decaying organic matter. House flies feed on organic waste material, which includes tears and mucous around the eyes and nose. More than 65 human and animal diseases that can be transmitted by house flies have been identified, including pinkeye, mastitis, anthrax, and salmonella.

Methods of Control

Sanitation and Management of the Environment

Minimizing fly breeding areas is a critically important element of fly control for confinement operations. Understanding where flies live, breed and rest enhances the ability to implement an effective fly control strategy. Ensuring areas are well drained and have minimal accumulation of decaying plant materials, manure piles, as well as soiled and uneaten feed will significantly reduce house fly and stable fly populations.

Areas of focus should include edges of the operation, such as fence lines, where manure can mix with wet soil; feeding aprons, under feed bunks, damp areas in and around feed storage and use areas, pen corners, wet areas around water troughs and handling facilities, and managing excessive vegetation in and around facilities. Poor sanitation can lead to fly populations that are difficult to control by other methods. Because house flies and stable flies develop quickly in warm weather, cleanup should be done every seven days to disrupt their life cycle. For flies to develop, moisture is needed; therefore, minimizing wet areas and maintaining a "dry" lot surface enhances fly control efficacy.

Self-applicators

Insecticide containing dust bags, back rubbers, face strips, fly bullets (different version of a rub), and mineral feeder covers can be effective when properly installed and maintained. To be effective, however, cattle must be forced to use the self-applicator. CAUTION: Be sure to wear protective clothing and gloves when handling insecticides to prevent absorption into the skin.

Dust bags and back rubbers can be used to reduce face and horn fly populations, but must be placed in forceduse traffic areas for effective control. For example, they need to be hung across gateways as cattle move to and from water or mineral feeding areas. They should be placed lower than shoulder height so animals have to raise them to walk under. Fly strips and fly bullets attached to back rubbers can increase their effectiveness for animals of various sizes. Dust in bags should be kept dry by placing them under a shelter or inside a protective canvas cover.

Back rubbers, fly strips and fly bullets need to be checked and recharged weekly with an oil-based insecticide. The oil base can be diesel fuel, No. 2 heating oil, or a labelrecommended mineral oil as a carrier. Do NOT use waste oil or motor oil as the carrier.

To increase the effectiveness of oilers against face flies, fly strips can be placed at 4- to 6-inch intervals along the length of the device. Check and service back rubbers and oilers at least weekly. (The insecticides approved for use with dairy cattle are more restrictive than those approved for beef cattle.) When recharging backrubs, they need to be taken down and coiled in an empty container; add the oil-based insecticide over the top and let it soak overnight. Insecticide-saturated covers can also be used on mineral feeders to manage against pinkeye.

Photo 6. Back rubber with fly strips and fly bullets. Photo courtesy of <u>valleyvet.com</u>

Feed-through products

Insect growth regulators (IGR) can be used as a feed additive in vitamin-mineral mixes and supplements to disrupt the life-cycle of both face and horn flies as they develop in fresh manure. Since house and stable flies can develop in many areas where fresh manure is not present, IGR feed additives will not provide good control. To be most effective in controlling face and horn fly populations, start feeding the IGR products before the beginning of fly season. Since face and horn flies deposit their eggs in fresh manure, the IGR products must be present when eggs are deposited. Expect a delay in response if IGR feeding begins after flies are already present.

Another important aspect is that flies, and especially face flies, can travel several miles to find a host. Therefore, for an IGR product to be effective, fly control measures on neighboring farms must also be in place, and each animal must consume the labeled amount daily. Be sure to check the label for proper dosage and active ingredients to control the fly populations of concern.*Panic:* Smothering that seems to be caused by a disturbance, such as a predator, sudden noise or intense light. Panic smothering can often cause mortality of larger groups of birds.

Producer applied products

Pour-ons, sprays, and projectile capsules that burst on impact are among the many products available for direct animal application. The key to successful fly control with these products is applying enough insecticide to be effective and administration with proper frequency. Most of these products have been formulated to have residual activity, but rain events do shorten their effectiveness. Pour-ons contain concentrated forms of insecticide that are applied down the topline and then disperse to cover the skin surface. Ideally these products are applied in a narrow alley or chute for proper placement and dosage. Typically, products that are oil-based last longer (up to three weeks) than water-based products. As a rule of thumb, products that have a higher insecticide concentration tend to be more effective. Pour-ons tend to provide effective horn fly control, somewhat less face fly control, and almost no house and stable fly control.

Livestock sprays are available and labeled for both dairy cattle and beef cattle, but again, the list of products labeled for dairy cattle is more restrictive. The challenge of using livestock sprays is getting adequate coverage of each animal and applying the insecticide so that no feed or water is contaminated.

While some anthelmintic (dewormer) products have label claims for external parasite control, producers should avoid both overuse and application of reduced dosages to minimize future internal parasite resistance. The use of projectile capsules that burst on impact are an option in some extensive production scenarios but are less likely to provide effective control because of placement and dosage. Because this method involves a projectile capsule, it is likely to cause a change in animal behavior that will make cattle more difficult to handle in the future.

Insecticide impregnated ear tags

The fly season can last for more than six months, which can pose a challenge to using fly control tags. These tags are designed to release insecticide over time, but they typically last only eight to 12 weeks. After 12 weeks the insecticide release from the tags becomes weaker and allows greater opportunity for development of resistance to the active ingredients of the tag. Applying tags when cattle are turned out to spring pasture is too early for effective late-season control. Application should be delayed until flies become active (rule of thumb, 200 flies per animal; typically late May/early June) for optimal control. To obtain maximum horn and face fly control, two tags per adult animal are typically needed. If face flies are present, the calf may also need a tag.

Be sure to not only read and follow label directions, but also confirm that tags contain the active insecticide ingredients for effective control of the flies of concern, and use protective clothing and gloves when handling insecticides. The three main product classes are pyrethroids, organophosphates and microcyclic lactones. The primary issue with insecticide ear tags is horn fly resistance to the insecticides impregnated in the tags, especially the pyrethroid insecticides. Product classes (not just product names) should be rotated annually. Because resistance is a major concern, it is important to remove tags in the fall after a killing frost to minimize insecticide resistance.

Premise control

This diversified category is intended to help control flies around premises and includes premise sprays, fly traps, insecticide baits and predator wasps. Premise sprays contain insecticides with residual activity that typically kill flies when they land on a surface – but remain effective for no more than two to three weeks. House flies like sunny surfaces during the day and come inside barns during the night. To control these flies, premise sprays should be focused on fences, building walls (inside and outside) and ceilings. Stable flies, however, like to rest in shady areas and are rarely found inside buildings. Premise sprays to control stable flies should focus on fences, feed bunks and vegetation around dry lots that are shaded. When using residual sprays, be careful to avoid contaminating feed and water resources. Low-pressure sprayers, mist blower sprayers and foggers can be used as an area control measure to cover large drylot spaces and fly resting areas for quick knockdown of both house and stable fly populations. However, area sprays do not typically have residual activity and need frequent reapplication.

Fly traps come as either a sticky trap that catch flies as they land on them, or an odor-attractant trap that entices flies into an inescapable container. Fly baits contain an attractant that can be used in bait stations, as a scatter bait, or mixed with water and applied to surfaces. Fly baits seem to be effective only for house and blow flies. A word of caution: Products that contain odorattractants do attract flies; therefore, these products should not be placed inside or near barns or houses.

Resistance

Fly resistance to insecticides is defined by the Insecticide Resistance Action Committee (IRAC, <u>https://irac-online.</u> <u>org/</u>) as a heritable change in the sensitivity of a pest population reflected in repeated failure of a product to achieve the expected level of control when used according to the label recommendation for that pest species. Bottom line is that flies can develop resistance to a given class of insecticide (mode of action) if used repeatedly.

Fly Control Product Comparisons

A good resource to compare fly control products across the areas discussed above, as well as what fly species they control, is covered in a free, online chart in the Cattle/Fly Control Management section of this website: (https://www.pbsanimalhealth.com/a/helpfulcharts/?page=30). Self-applicator mixing instructions can be found at this website: https://www.valleyvet.com/ library/cattle-rub-insecticide-chart.html.

Biological Control

Small parasitic wasps can be used in and around premises to control both house and stable fly populations. Parasitic wasps insert their eggs into fly pupae. After hatching, the wasp larvae parasitize and kill the developing house and stable fly pupae. The number of wasps needed, and frequency of release, depends on cattle numbers. Companies that market these parasitic wasps have formulas and guidelines for this determination. Good sanitation and manure management, plus timely parasitic wasp release, can be an effective control combination for house and stable fly control in and around drylots.

Alternative Fly Control Methods

There has been an increased interest in identifying noninsecticide fly control alternatives. Garlic, cinnamon, and other essential oil-based extracts are alternatives being discussed, but the research on their effectiveness is limited. While some of these products might reduce fly populations, current knowledge suggest that other fly control methods will be needed in combination to obtain the desired level of control.

Genetics and Animal Selection

There is limited data that address the issue of genetic selection of cattle with fly resistance, but it appears that some animals, for whatever reason, tend to attract a greater number of flies than other animals. There may be some logic in individually identifying those animals with notably higher fly counts and add this to the list of genetic selection criteria.

Summary

- Always read and follow label directions to ensure that products are applied in the right way at the right time, and that the product will control fly populations of concern. The label will specify if the product is approved for use in beef and/or dairy, and if there is any withdrawal period required before animal slaughter.
- Be sure to wear protective clothing and gloves when handling insecticides to prevent absorption into the skin.
- To achieve effective fly control, a multi-pronged approach is typically needed.
- Selecting the most effective control method for any given operation will depend on type of flies, product efficacy for each fly population, product cost, ease of product administration, level of resistance to insecticides within class (mode of action), and herd management practices.
- Management practices such as sanitation, management of the environment and parasitic wasps are logical first steps to minimizing premise fly populations.
- Products available on the market become significantly less effective when the environment is not managed to control fly breeding areas.
- Resistance of fly populations to current insecticides must be considered. Fly populations can develop reduced susceptibility to the active ingredients in fly control products when used repeatedly over time.
- Rotate insecticide classes not product names, but active ingredients with different modes of action (MOAs). That should help maintain or enhance insecticide efficacy. Rotating active ingredients late in the fly season can help reduce wintering resistant flies.

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- Avoid using two different long-acting active ingredient modes of action at the same time. Rotate MOA classes between applications when applying insecticides more than once per season. Limiting fly exposure to any one MOA will help reduce selection pressure for the emergence of resistance in next-generation fly populations.
- Discontinue using insecticide impregnated ear tags in the fall after a killing frost

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