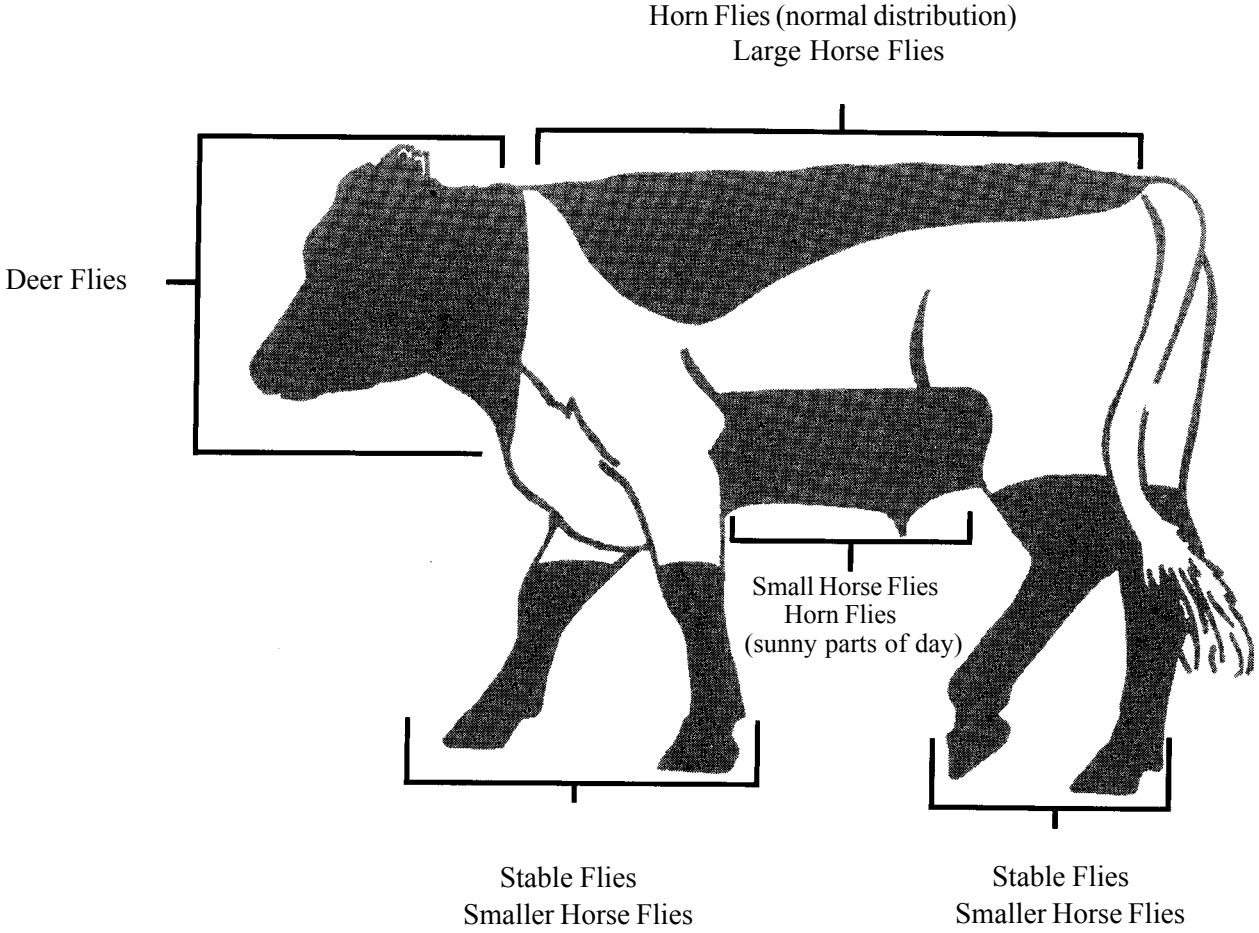
Important Fly Pests of Louisiana Beef Cattle

LSU AgCenter Research & Extension

Introduction

The blood-sucking fly pests of Louisiana beef cattle include the horn fly, stable fly and many species of tabanids. The tabanids are a large group of flies which includes the horse flies and deer flies. Feeding by these flies not only results in blood loss, but it causes annoyance which alters the normal grazing behavior of cattle. The economic impact of these flies is usually attributed to weight loss or reduced weight gain in growing cattle and expenditures for fly control.

The biology of these blood-sucking fly pests varies considerably, and this affects the success of various control methods. By understanding the biology and life cycle of each pest, producers will be better able to devise more effective fly control programs. In most cases, an integrated approach, whereby more than one control method is used, will prove more effective for long-term fly control.



The Tabanids

(Horse Flies and Deer Flies)

Biology

The term horse fly is actually a collective common name that includes a multitude of species that belong to an even broader group of flies referred to as tabanids. Deer flies are also tabanids. There are some 4,000 species of tabanids worldwide, of which about 100 are pests of livestock in Louisiana. All tabanids have certain characteristics in common, but these flies vary in appearance and size, ranging from about 1/4 inch to 1 3/8 inches in length. Tabanids are blood-sucking flies that have broad, flat, blade-like mouthparts which inflict a large, deep and painful wound.

Adult female flies require a blood meal to support egg development, but the remainder of the life cycle is independent of livestock. Male tabanid flies do not bite or suck blood, but rather they feed on nectar, honeydew and other liquids. Female flies feed on these substances, plus blood. After feeding, female flies lay from 100 to 1,000 eggs in layered masses on vegetation which usually overhangs some source of water. The eggs hatch in five to seven days. The newly hatched larvae enter the water where they burrow into the mud to feed on organic debris or small aquatic animals. The length of the larval stage varies according to the species. The larvae develop rapidly in warm weather and then leave the water to pupate in drier soil. Adult flies will usually emerge one to three weeks later. The entire life cycle requires from two months to two years, but most species have only one generation per year. Adult flies are normally present for only about a month, but livestock may be attacked throughout the season if more than one tabanid species is present.

Economic Importance

On a worldwide scale, tabanids are among the major livestock pests. Their relative importance depends on geographic location, however, since an aquatic habitat is essential to complete the life cycle and breed large numbers of flies. Tabanids cause extreme annoyance and blood loss, with more blood loss following the bite because of oozing. Cattle under heavy attack may lose weight or suffer a reduction in daily weight gain and be more susceptible to certain diseases. The annoyance of horse flies often causes bunching of cattle which, in turn, can result in grazing inefficiency. Also, cattle sometimes hook and kick each other because of the annoyance or stampede and injure themselves in an effort to escape the flies.

Tabanids are mechanical vectors of more than 35 diseases, most of which are transmitted between animals through the transfer of blood. Anaplasmosis and equine infectious anemia are examples of these diseases.

Control

Tabanids and deer flies are perhaps the most challenging livestock pests to control, primarily because of their life cycle. First, most of the life cycle (egg, larvae, pupa and even the adult male fly) is independent of livestock. The adult female fly is the only link in the life cycle which requires livestock or some other host. But even so, female flies spend only about four minutes feeding on cattle to generate eggs which develop into another batch of adult flies the next generation. Therefore, population reduction through any one control method is very difficult, thus requiring integrated control strategies and proper herd management.

Controlling the larval stage in its aquatic habitat is one possibility for areawide tabanid control. This requires the widespread application of a residual insecticide, but the insecticide must be safe and very selective to the pest. Otherwise, the potential for harmful environmental complications renders this approach prohibitive. So far, an environmentally friendly insecticide has not been developed for this purpose.

Areawide control of adult tabanids has also been considered, but where attempted it has had only limited success. Fly populations normally return to pretreatment levels in one to three days. Areawide control of adult flies could possibly be successful in geographic locations with a limited tabanid habitat and where the tabanid season is short (synchronous emergence of adult flies). Unfortunately, these requirements exclude most of Louisiana.

Water management in the form of either flooding or draining tabanid habitats has also been investigated. Unfortunately, these efforts have not been totally successful, and they are not always practical for individual producers. Mechanical traps for adult flies have been developed. Although effective in catching flies, they have not provided long term, areawide population suppression.

Spraying cattle with insecticide is perhaps the most obvious approach to horse fly control, but this method is never totally successful either. Partial protection of livestock has been obtained by using synergized pyrethrins and synthetic pyrethroids such as fenvalerate, permethrin, resmethrin and cypermethrin. The effectiveness of these chemicals may be due more to repellency than direct mortality of adult flies. Nevertheless, these insecticides reduce feeding time and blood consumption if applied regularly. The drawback to spraying is the limited residual activity of these materials, plus the expense and work involved with multiple applications. For this reason, chemical control is normally used for valuable livestock under

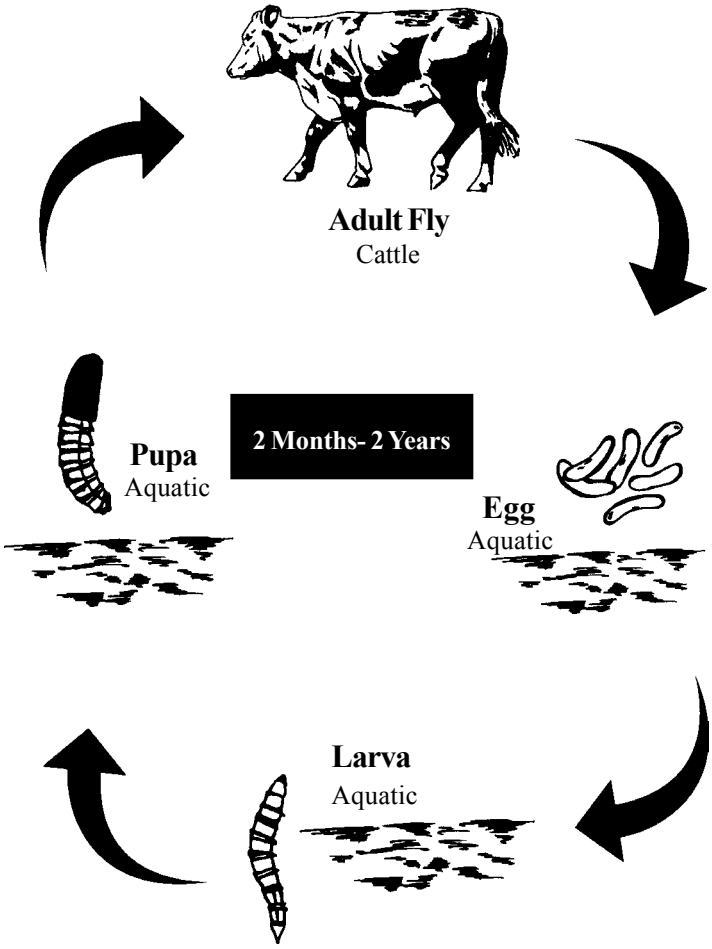
intensive management. Other residual insecticides (non-pyrethroid) have been less effective. Some control can be achieved, but mortality usually occurs after the flies have completed a blood meal.

Proper management of cattle herds may be the most realistic approach to horse fly control. Locating cattle away from tabanid habitats during the tabanid season is an effective way to protect cattle. Simply put, this means to move the cattle away from areas where tabanids breed. This can sometimes be accomplished by using larger pastures or rotating pastures according to the fly season. Also, tabanids are normally more plentiful in and around woods. For this reason, wooded pastures should be avoided during the fly season. In some cases it may be practical to remove trees and other vegetation from pastures, thus reducing the fly population. Vegetation control along aquatic margins might also be considered as a means of population control.

Tabanid flies will not normally enter barns or other structures to attack livestock. Therefore, some protection for cattle can be provided with structures as simple as a roof supported by posts with open sides. Given access to these structures, free roaming cattle will seek shelter from tabanid attack. These shelters might also provide salt, minerals, water or other feeds so they can serve more than one purpose.

Several predators, parasites and other disease agents help control tabanids. For example, dragonflies often intercept and consume adult flies in flight. In some areas of Louisiana with sandy soil, predatory wasps called horse guards are effective in reducing the tabanid burden on cattle. Their seasonal activity is much shorter than the tabanid season, so they do not provide season-long control. Also, horse guards are solitary and have limited reproductive potential. Overall, the impact of natural biological agents is normally not significant.

Horse Flies



Stable Flies

Biology

The stable fly is gray with four black stripes on the back, and the abdomen is checkered in black. Stable flies are very similar to house flies in size and appearance, but they have sword-like mouthparts and suck blood.

The stable fly has a complete life cycle that involves egg, larva, pupa and adult. The eggs hatch in about one day, and the larva molts twice before it pupates. The larval stage requires about 12 to 13 days for complete development, and the pupal stage requires about seven days to develop into an adult fly.

The adult flies begin mating three to five days after emergence, and the females begin laying eggs five to eight days after emergence. Both the males and females require a blood meal before mating, and females require additional blood meals for egg development. Normally, a female can lay between 60 and 130 eggs per blood meal, or 60 to 800 eggs during a lifetime.

Eggs are laid in manure, spilled feed, hay and decaying vegetation, and this is the medium in which larvae develop. The larvae feed exclusively on decaying vegetation. For example, they will not be found in manure unless the manure has been dropped in vegetation and mixed with it. The vegetation becomes a suitable medium when it begins to rot and decay in the manure. The same holds true for manure mixed with spilled feed and manure mixed with hay. The larvae will pupate in or near the decaying organic matter.

Cattle provide an ideal habitat for stable fly breeding, and the life cycle of this pest is closely associated with cattle. Stable flies often breed in hay dropped by cattle while feeding from large hay bales. This hay becomes an ideal medium when mixed with manure, urine and rain. This may be the main source of stable fly infestations in Louisiana. Stable flies also breed in the bedding of outdoor calf hutches, especially if the bedding is coarse straw and if the drainage beneath the bedding is poor. Another good breeding ground is stall litter combined with rain, urine and poor drainage. Other potential media for stable fly development include greenchop, rolled hay residues and silage. Although the stable fly is often closely associated with cattle, this insect can develop and survive independent of cattle. For example, in coastal areas this pest develops in marine and freshwater grasses or algae washed or hauled ashore.

Economic Importance

Stable flies will feed on dogs, humans and many other warm-blooded animals, but in agricultural areas they are mainly pests of livestock. In addition to cattle, this fly is also a pest to horses, sheep, goats and hogs.

Stable flies are pests of cattle because of their blood-sucking activities. In addition to the blood loss, they annoy animals and interfere with their normal feeding behavior. All this results in weight loss or reduced weight gain and increased susceptibility to certain diseases. One research trial showed that 72% of the weight loss from this pest was caused by the bunching of animals and the resulting heat stress. The other 28% weight loss was attributed to actual stable fly feeding and the energy cattle used to fight flies. Efforts have been made to establish some sort of economic threshold for this pest. One source indicates that an average daily count of 25 to 50 flies per animal will have an economic effect on cattle. In another study, an average of only two flies per leg reduced weight gain in feeder heifers. Stable flies also transmit a number of diseases such as equine infectious anemia and anaplasmosis.

Stable flies normally feed below the knees and hocks of their animal hosts, but they move onto the sides and back if populations are heavy. Cattle will sometimes stand in water to escape attack from these flies. Stable flies often tend to stay in one location waiting on cattle, but they have been known to disperse more than three miles in search of a blood meal. These flies can survive by feeding on the nectar and pollen from flowers, but blood is needed for mating and reproduction.

Stable flies can also create socio-political problems for cattle producers in areas where residential home sites are located near cattle barns and pastures. Stable flies generated by the cattle operation will often become a nuisance at neighboring houses where they rest on structure walls, fences, etc. during the day. This has become a greater problem in recent years as the urban migration to country home sites has become increasingly more popular.

Control

Spraying cattle with insecticides is somewhat effective in controlling stable flies, but most chemicals approved for this use have a short-lived efficacy. Multiple applications may be required to protect cattle during the fly season. Synergized pyrethrins and pyrethroids are normally the chemicals of choice. When treating cattle for this pest, thoroughly coat the lower extremities of the animal because this is the body area that will normally be attacked.

Sanitation is probably the most important control method for on-site reduction of stable flies. Control of adult flies with chemicals is futile if new, replacement flies are constantly being produced in a suitable breeding ground. Therefore, proper management of the medium where larvae develop and pupate is essential, and this means it must be either disposed of or rendered unsuitable.

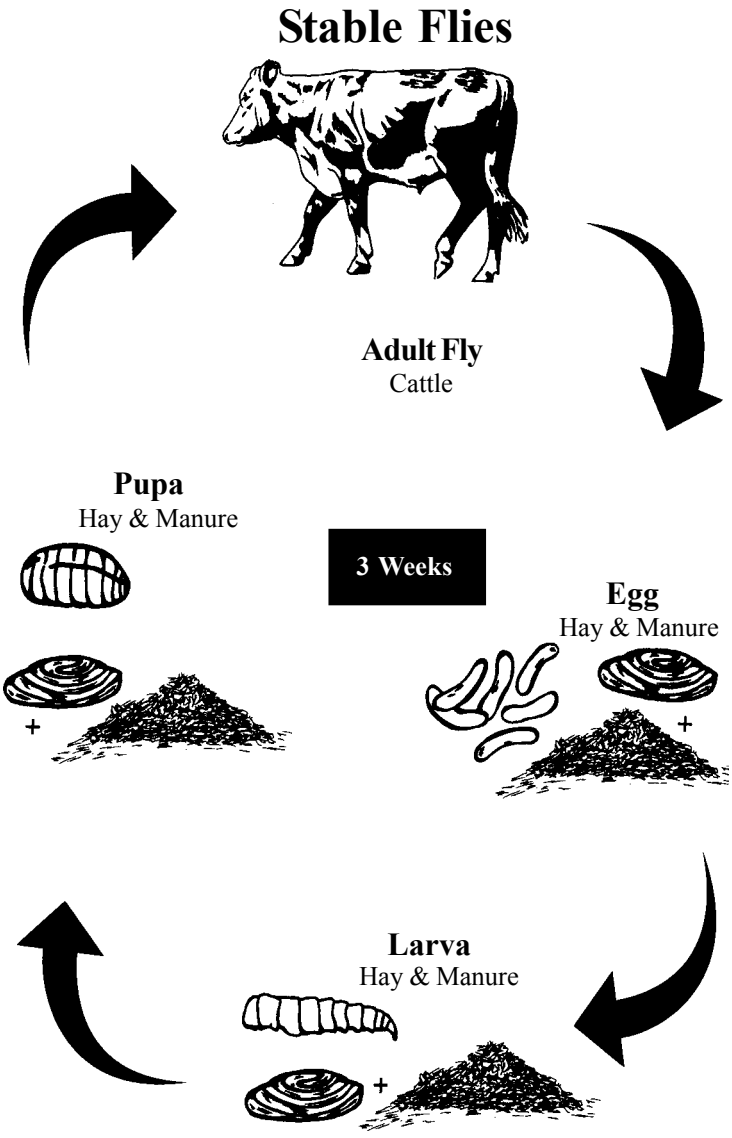
Producers can stack and burn hay residues. Wet hay residues can be stacked, covered with black polyethylene and left to compost. Stacking residues, even if not covered, is good management because it reduces the medium surface area which flies require for development. The internal materials will compost, especially if wet, and the resulting increased temperatures will limit fly development. Spreading or disking can also dry out residues and reduce the number of emerging flies.

If possible, place large hay bales on wagons or other moveable platforms, and move them a short distance once or twice each week. This will tend to scatter the hay residue and prevent a buildup of potential fly medium in one area. Small amounts of hay tend to dry completely. Feeding hay in racks also limits the amount of spilled and wasted hay that is tramped in with manure to form a suitable larval habitat.

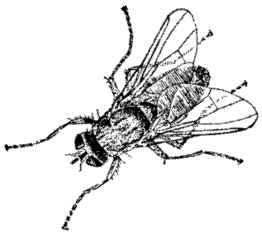
The suitability of bedding in calf hutches and stalls can also be reduced by using materials that stay dry and by improving drainage. Tests have shown that sawdust bedding was the most effective in reducing stable flies.

Several types of commercially available traps remove large numbers of adult flies. Provided that larval habitats are also controlled, traps may be an aid in fly control for some production systems.

Stable flies have several natural control agents such as predators and parasites, but these are generally not effective in controlling heavy infestations.



Horn Flies



Biology

Of the flies discussed in this publication, the horn fly has the closest relationship with cattle. It not only feeds on cattle, but it stays on cattle most of the time, leaving only long enough to lay eggs in freshly dropped manure. The horn fly will also feed on horses, dogs and sometimes people, but cattle manure is required for larval development.

The horn fly is about 3/8 inch in length, or about half the size of a house fly. It is gray with sword-like mouthparts that are used to suck blood. The head of this fly points downward, and the wings are held flat over the back.

Both the male and female horn fly are blood feeders, taking 20-30 blood meals per day. The adults stay on the animal day and night, and leave for only about one minute at a time to lay eggs. The adults need blood to mate successfully and the females need blood for egg development. The adult flies begin mating three to five days following emergence, and adult females start laying eggs three to eight days after emergence. Females will lay 11 to 13 eggs per blood meal, or a total of 100 to 200 eggs over a lifetime.

Although adult horn flies normally stay on their host animal, they can fly or migrate more than three miles if necessary. Dispersal is normally done by adult flies following emergence, but the flies usually stay within the herd after a host has been located. Dispersal of horn flies can prove significant, because insecticide-resistant flies can appear in areas or herds where the particular insecticide has not been used. Similarly, susceptible flies can disperse into areas of known resistance and reduce the problem if the insecticides are no longer used.

Economic Importance

The horn fly is one of the most important pests of cattle. Estimated annual losses of $800 million are attributed to this pest. About $60 million is spent annually on insecticides to control horn flies.

Horn fly feeding on cattle results in blood loss and extreme annoyance, which disrupts normal behavior. This pest reduces milk production in cows which, in turn, decreases the weaning weight of calves. Horn flies also reduce weight gain in growing or yearling cattle. For example, Angus, Hereford and Brahman influenced calves have shown a positive weight gain response to horn fly control. Research also indicates that yearling and growing cattle have a lower tolerance to horn fly infestations than do mature cattle. The standard economic threshold for controlling horn flies is 200 flies per animal.

Control

Insecticides have generally controlled horn flies effectively, because this pest spends most of its adult life on cattle. Resistance to insecticides has also been a problem with horn flies, however, and for the same reason. That is, continuous exposure to insecticide will eventually result in a resistant population, and this is especially true with insecticide- impregnated ear tags that release chemicals over an extended period.

There are several ways in which insecticides can be applied for horn fly control. When sprays and dips are used for the control of other cattle pests, horn fly control is usually attained, too. These applications are often made with solutions that contain strong enough concentrations of insecticide to suppress even resistant horn fly populations for several weeks. Numerous insecticides are labeled and recommended as sprays for horn fly control. Although dipping vats have become rare in recent years, there are still a few materials approved for this use.

A popular method for applying horn fly treatments is the 'pour-on.' These are usually ready-to-use formulations, and a specified amount of material is poured uniformly along the animal's back from the top of the shoulders to the base of the tail. Several products provide dual control of horn flies and lice, and the effectiveness of this 'pour-on' technique is usually as good or better than a spray application. In addition to fly control, 'pour-ons' containing avermectins also reduce larval production in the manure during the period of excretion by treated cattle. 'Pour-ons' allow producers to treat groups of cattle quickly without much stress if proper facilities are available.

Self-treatment devices are a convenient means of applying insecticide for horn fly control. Several activated systems are designed for sprays and dusts, and some are commercially available. Cattle normally pass through an alley or feed on minerals, activating the applicator to administer a small dose of insecticide.

The dust bag and cable backrubber are rather simple self-application systems which can be constructed with materials on hand. These systems are placed around minerals, salt blocks or water, near water or loafing areas, or in frequently used gaps or alleys. The dust bag can be as simple as a burlap sack containing insecticide dust placed inside of another burlap sack, or it can be a commercially available unit. Cattle passing under the bag will be dusted on the back and shoulders. Dust bags are effective if cattle routinely use them, but they require protection from rain and they may be unsatisfactory in humid climates.

The cable backrubber is a self-treatment device which can be used in areas frequented by range cattle. A rather simple backrubber system can be easily constructed by the producer. Basically a cable or chain is wound with burlap or some other absorbent material that can be soaked with a solution containing an insecticide and some type of petroleum product, as per label recommendations. Cattle that pass under the cable are treated on the back and shoulders. "Ready-made" backrubbers are also commercially available through farm supply stores and catalogs. Backrubbers can be effective but they must be recharged every two to three weeks.

Efforts have been made to control horn fly larvae in manure with insecticides and growth regulators that are actually administered to cattle. This is another form of self-application in which the chemical is passed through the animal and into the manure. Chemicals for larval control are often formulated in mineral blocks, feed and water ('feed-throughs'). Also, the ruminant bolus can be used for slow release of compounds into the manure. In general, the performance of 'feed-throughs' and boluses has been disappointing, probably because of the lack of adult fly reduction on the animals at the time of treatment and dispersal of adult flies from untreated herds in the same area. Larvicides would probably be effective in areawide control programs where all the animals were effectively treated. Also, reducing the adult fly population with other insecticides can increase the effectiveness of feed-throughs.

The insecticide-impregnated ear tag was introduced for controlling ear ticks in the 1970s and quickly became popular for horn fly control. The application of these tags is relatively easy, and they are highly effective in controlling susceptible fly populations for months at a time. The first pyrethroid ear tags were highly effective, but, within three years of extensive use, pyrethroid resistance developed in horn fly populations. The current ear tags contain more effective pyrethroids or organophosphates with or without synergists. Resistance can develop with continued use of any class of insecticides, and cross-resistance to pyrethroids is common. There is no guarantee the current ear tags will be effective in the future, although proper management can certainly delay resistance.

Laboratory studies have shown that horn flies can routinely develop resistance to an insecticide within 40 generations of constant exposure. In Louisiana, there is a new generation about every 10 days or about 20 generations per year. Therefore, resistance is likely to develop after two years of exposure to the same class of insecticide (pyrethroid or organophosphate). Considering this, producers should alternate chemical classes of ear tags in an effort to slow the development of resistance. Current horn fly control recommendations suggest a three year rotation. That is, a pyrethroid tag should be used no more than once every three years, and an organophosphate tag should not be used more than two consecutive years.

If tags are used, these additional recommendations will also reduce the probability of insecticide resistance developing in horn flies.

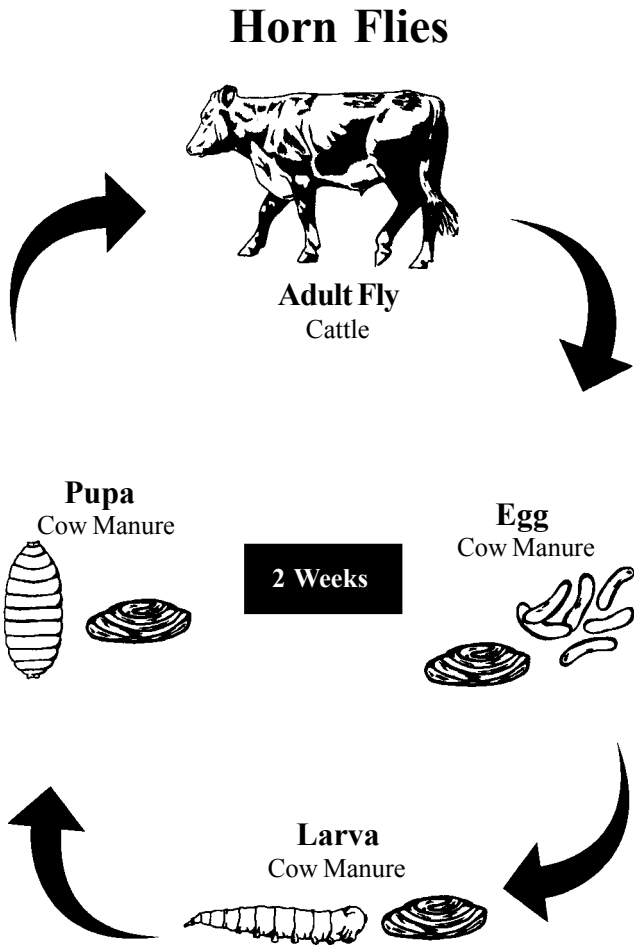
1. Delay tagging until fly populations reach 200 flies per cow.
2. Use the recommended number of tags per cow (normally two, one per ear).
3. Tag all adult animals in a herd.
4. Remove old tags when they are no longer effective.
5. At times of the year when ear tags are not being used, or if tags begin to fail before the fly season is over, use other fly control methods such as sprays, pour-ons, dust bags and backrubbers.

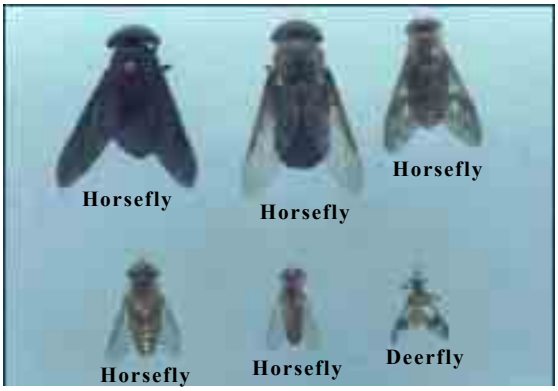
Avermectin "pour-ons" applied in mid-late summer have provided good horn fly control for the remainder of the season.

Any effort to disturb manure pats will reduce larval survival and adult emergence. This is the obvious reason why horn flies are not a pest of confined animals, such as in feed lots. Dragging pastures or using other measures to disturb the manure can be effective.

The biological control of horn flies is achieved by competition for dung (the horn fly larval habitat) and by predation. Dung-burying scarab beetles are effective in increasing dung disposal, but this has not had a significant impact on horn fly populations. Several predatory beetles feed on horn fly larvae.

For current insecticide recommendations for horse flies, deer flies, stable flies and horn flies, refer to LSU AgCenter Publication 1418, Control External Parasites on Beef Cattle.





Different horse fly species and the deer fly.

Large horse fly.

Stable fly breeding area.

Stable flies infesting legs.

Horn flies.

Stable Fly.

Heavy horn fly infestation.

Prepared by:

Jack L. Baldwin, Professor and Extension Entomologist, LSU AgCenter

Lane D. Foil, Professor of Entomology, LSU AgCenter

J.A. Hogsette, Entomologist
Medical and Veterinary Entomology Research Laboratory
USDA, ARS, Gainesville, FL 32604

Louisiana State University Agricultural Center
William B. Richardson, Chancellor
Louisiana Agricultural Experiment Station
David Boethel, Vice Chancellor and Director
Louisiana Cooperative Extension Service
Paul D. Coreil, Vice Chancellor and Director

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