External Parasites of Horses

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In Florida, horses have numerous arthropod pests. Most of these pests are considered external parasites as their attack on the horse is principally external, as opposed to internal parasites such as "worms" or nematodes and bots. The common external parasites include filth flies such as non-biting house flies and biting stable flies and occasionally horn flies, the numerous other blood-feeding flies, such as mosquitoes, biting midges, black flies, horse flies and deer flies. There also are numerous small non-biting flies, such as eye gnats. In some areas, ticks are important pests of horses. An emerging pest of concern, but not really an external parasite, is the Africanized honeybee.

To successfully combat these pests and potential threats to equine health, horse owners must understand the biology, ecology and principles of pest management. To attempt control these pests otherwise will often result in failure of the treatment and perhaps additional undesirable impacts including those on animal health and the environment. The most common pests on equine facilities are the house fly, *Musca domestica*, and the stable fly, *Stomoxys calcitrans*. These two pests share many features and many of the techniques used to manage one, often assist in the management of the other. In particular, the house fly has been successfully managed in many livestock, poultry and equine facilities using the principles of integrated pest management (IPM). This system has numerous components that are adaptable to a wide variety of situations and can be customized to an individual farm.

The basics of setting up an IPM program involve the utilization of a multi-step system, which cycles among seven steps: preparation, pest identification, pest sampling, situation analysis, determination of management actions, implementation of these actions and re-evaluation. The first step of a fly pest management program is to realize that if you have horses, you will have flies. To have a goal of and to attempt to eliminate all flies on a farm is unrealistic, will result in failure and will promote insecticide resistance on the farm. Therefore, preparation for the fly season is paramount. These flies will be on the farm, and taking the time to consider your options for their management before they arrive will help you in managing them when they do arrive.

House flies are most often associated with the barn or paddock areas near buildings, while stable flies are associated with both buildings and pastures. Learning to recognize these flies will help one choose the appropriate monitoring and management tactics. Both flies are similar in size and appear to mimic each other. However, a couple of features can be used to help distinguish them. House flies are non-biting and their mouthparts are not visible when they are not feeding. Stable flies have a very prominent pointed "spear-like" mouthpart. When approaching resting flies,

house flies are much more likely to fly away, while stable flies often allow you get quite close. Stable flies appear to have a “checker-board” abdomen (area of body covered by the wings).

When viewing flies on animals, both fly location on the animal and the animal’s reaction to the fly can assist with identification. House flies may (but not often) rest on quiet horses, particularly those near buildings. Stable flies, however, are most often observed on the legs of animals and when feeding, cause foot-stomping, tail shaking and use of the mouth to dislodge flies from legs. The bite from stable flies is quite painful and horses exhibit an aggressive defensive behavior. When not feeding, stable flies rest on structures, fences or vegetation. Although the immature stages (larvae and pupae) of both flies superficially appear to be in similar habitats, there are differences. House flies are more likely to be in more grains-associated decomposing areas, as well as rotting bedding material and do quite well in materials on a concrete or rock base. Stable flies are more likely to be found in rotting organic matter, particularly if it is formed from hay or straw and contains manure or urine with a “soil” interface. Stable flies are quite capable of developing in rotting piles of grass clippings, without the presence of manure. Both flies require a moist immature habitat to develop.

House flies develop from egg to adult in as quickly as 7 days in very warm and wet conditions, whereas, stable flies require nearly 21 days. House flies will lay about twice as many eggs (up to 600) per female as compared to stable flies. Given the rapidity of development and the greater numbers of offspring, unmanaged house fly populations can build to quite high levels very quickly. House flies have been shown to disperse away from livestock, but do not seem to have a targeted dispersal goal. However, recent evidence from our research suggests that stable flies may be developing on non-equine farms, perhaps in residential, agricultural crop areas or cattle farms, blood feeding on cattle and dispersing to horse farms within at least a mile of the cattle, making management more challenging.

Monitoring for house flies can be accomplished using passive surveillance devices, such as spot cards or baited-jug traps. Ten spot cards (3 x 5 inch white index cards) should be suspended in areas of the barns where flies have been observed resting. If baited jug traps are used for surveillance, five jug traps should be positioned in the facility. These traps are containers (labeled for current contents) in which a small amount of one of the fly baits has been placed. These devices are deployed in the barn and checked weekly by counting the numbers of spots or the volume/number of flies in traps. Each farm’s tolerance for flies will indicate when fly management options should be employed. Numbers of spots per card have not been established for horse operations, however, on dairies, 100 spots per card per week has been shown to be a good starting point. Keeping records of these counts as well as perceived fly annoyance levels will help to refine the control threshold for your farm.

Stable fly monitoring is simpler. The numbers of stable flies should be counted on the legs of up to 10 horses. These numbers should be averaged and recorded. If 10 horses are not available, either conduct repeated counts over a specific period of time (perhaps 15 minutes) or use fewer animals. Only flies that can be seen from a stationary position should be counted. Unfortunately, reliable numbers that suggest treatment do not exist for horses, but 2.5 flies per leg (10 per animal) is considered economically damaging to beef cattle and is a good starting point. It is likely that the horse will not tolerate stable flies for long and an alternative is to count

all of the flies that "land" on the horse in a given period of time, perhaps 1 minute. Again, record these numbers, and compare animal comfort (also recorded). Develop your own farm thresholds.

The management options for an IPM program can be grouped into 5 areas: Cultural, Mechanical, Physical, Biological and Chemical. Cultural control consists of changing the environment to make conditions less favorable to fly development and includes sanitation, choice of bedding, site selection and drainage. Mechanical control includes the use of active devices to kill exiting flies, such as cultivation of bedding materials and fly zappers. Physical controls include passive devices to eliminate or exclude existing flies, such as screening, solarization, sticky traps, and flooding of larval development sites. Biological control is the use of living organisms to kill pests at any life stage. These can include predators that consume fly eggs or larvae, parastioids (mistakenly called "fly predators" by some), which are tiny wasps that kill developing fly pupae, and pathogens or pest diseases that typically target adult flies. Chemical control includes the use of pesticides, pheromones, food attractants and repellants.

Cultural control is the foundation of a successful pest management program. Essentially, approaches that do not consider cultural control will likely fail. While biological control is important, it is not a stand-alone option and should be carefully considered. Recent research on Ocala, FL equine farms suggest that the naturally occurring *Spalangia* parastioids are the most commonly encountered with both house flies and stable flies. As these parasitoids are most often found, augmenting these wasps with additional *Spalangia* from a commercial insectary may improve fly management, but only if on-farm production of flies is confirmed and cannot be eliminated using cultural controls.

Chemical control should be the option of last-resort. When used, chemical control first should be attempted with non-residual options, such as baits or pyrethrins-containing (not permethrin) sprays. It is important to remember that any sprayed or fogged material will kill your naturally occurring and released beneficial organisms and that the house fly is resistant to most of the chemistries currently formulated for these applications. Stable flies have shown some resistance to permethrin in recent Florida studies.

Biting midges, also known as no-see-um's, punkies, and Five-O's, are important blood-feeding flies that attack horses in Florida. These flies can vector several pathogens, but rarely do so in Florida. They do, however, cause a condition known as sweet-itch in immuno-sensitive horses. Larvae of these flies develop in aquatic and semi-aquatic environments. Generally, the highest Florida populations are associated with the tidal marshes found on the Gulf coast, but also occur on the Atlantic side as well. There are species that develop in clay-like alkaline soils, while others develop in mosses and algae of shallow-water areas. All adults feed on nectar, but only females take blood. These are pool feeders that inflict a painful bite. Most are crepuscular or night-time feeders and biting is less-common as wind speed increases. Generally, the adults fly less than a mile from the breeding sites.

Management for these pests is difficult. Because they develop in aquatic habitats, larviciding is generally avoided. Insecticide spraying has shown limited success, but animals located within a mosquito-control district treatment area may receive some benefit from these activities.

Protection is most effective by use of several on-farm approaches including screening (not always possible), use of devices to discourage feeding (masks, leggings, belly-guards), avoidance of peak feeding times, fans, and insect repellents during feeding times.

Horse flies and deer flies are commonly called tabanids. These are large, strong-flying, aggressive, blood-feeding flies that inflict painful bites. There are dozens of important species in Florida and these flies emerge at various times thought the year, often overlapping with one another. These flies also develop in aquatic and semi-aquatic environments, like the biting midge and present the same immature site control challenges. The adults will readily fly miles for a blood meal and are difficult to discourage with repellents or whole-animal insecticide sprays, although short-term relief can be obtained. Moving animals away from low-lying areas during a particular species outbreak may provide some relief. There are many traps available for purchase. Most of these traps rely on the excellent visual abilities of the flies and operate through the use of contrasts of black and white or black and yellow. Traps have not been shown to provide sufficient relief to animals, but they can, in some cases, remove large quantities of these flies.

Worldwide, ticks are the most important external arthropod parasite of livestock and horses. In the US ticks are often a minor pest of livestock and horses due to the lack of pathogen presence in our animals. However, there are important pathogens that could readily present themselves and horse owners should be aware of these. Of primary concern is the recent occurrence of Equine Piroplasmosis in Florida. This pathogen is believed to be vectored by several ticks that are present in Florida, although there is considerable debate on the effectiveness of several of these ticks to vector this pathogen. The outbreak that occurred near Tallahassee in 2008 did not involve tick-transmission and has been entirely resolved. That the disease did occur in Florida should remind horse owners to be vigilant about their animals' welfare.

Of the ticks in Florida, those most likely to be found on horses include the Gulf coast tick, *Ambloyomma maculatum* and the Lone star tick, *Amblyomma americanum*. The tropical horse tick, *Anocentor nitens* occurs in southern Florida and is an important vector for several pathogens that currently are not found in Florida. The spinose ear tick, *Otobius megnini* is a unique tick, in that only the larva and nymph are found on the animal, with the adult as a non-feeding stage. This tick does not transmit any pathogen, but causes severe damage to the ear of the horse.

Management of ticks is challenging. When they occur, it is advisable to treat the horse with an approved acaricide. Many of these products are also registered as insecticides and can be found at local businesses. These may be pour-on's, injections, sprays and perhaps dusts. In other areas of the world, resistance is becoming a problem, but is generally not found with the ticks infesting horses in Florida. If ticks are a continual problem on your farm, other options to consider include treatment of the acreage where ticks are expected such as shrubby and forested pastures. Ticks generally do not occur in open well-grazed pastures as they have a high requirement for humidity and treatment of these areas can be avoided.

The European honeybee is a critically important beneficial insect, providing pollination for a large number of crops, including melons and almonds. In recent years, the introduction of a

different honeybee has resulted in alarm across the southwestern U.S. This honeybee has been termed the Africanized-honeybee (AHB) as it is essentially a genetic mixture of two strains of honeybee, the European and a South African strain. This bee is not a parasite of horses, but its presence is something that horse owners should be aware of as it expands its presence in Florida. Currently, the AHB is considered to be present across an area of Florida below a line drawn from Tampa to Daytona. Occasional finds occur north of this line, but to date, it is not believed to be established or common in the northern area.

These bees essentially look the same as European honeybees, but their behavior is quite different, particularly around the hive. The AHB is considerably more likely to respond to a perceived threat to the hive and when it does respond it can result in 10-times as many stings as would be encountered with an attack by a domesticated European honeybee colony. The AHB will pursue the threat for up to ¼ mile, making pastured, tethered or penned animals particularly at risk. Although it was expected that horses would be particularly at risk, for a variety of reasons, to date, only one horse death in Florida has been reported as caused by this new bee.

These bees are no more aggressive than typical bees when foraging at flowers. The presence of managed European honeybee colonies has greatly diluted their effect and are critical in the suppression of this new bee in Florida. When encountered, all AHB colonies are depopulated, further reducing their spread. Besides horses and their owners, others at risk include outdoor workers, sports enthusiasts, rescue personnel and those individuals unable to escape an attack.

Sources of further information include:

University of Florida

EDIS System – Tremendous amount of free information: http://edis.ifas.ufl.edu
External Parasites on Horses: http://edis.ifas.ufl.edu/IG139
Entomology Dept. Publications: http://entnemdept.ifas.ufl.edu/publicat.html
Pest Alert: http://entnemdept.ifas.ufl.edu/pestalert/

County Extension Offices: Fantastic resources for many needs – 1st stop.

Africanized honey bee:

Florida Department of Agriculture, Division of Plant Industry
http://www.doacs.state.fl.us/pi/plantinsp/ahb.html