MP484

Arthropod Pests of Equines

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Arthropod Pests of Equines

The list of arthropod pests that irritate, damage or transmit disease to horses, donkeys and mules is substantial. Insect pests in the Order Diptera (true flies) include several biting flies (horse and deer flies, stable flies, horn flies, biting midges and black flies), as well as mosquitoes and horse bots. Lice (Order Phthiraptera) are wingless insects that feed on equines during cooler months. Although ticks and mites (Order Acari) are not insects, they are important pests in some regions. Another important pest is the blister beetle (Order Coleoptera, Family Meloidae), which does not feed on equines but is toxic to equines that consume hay (alfalfa) contaminated with adult blister beetles.

Flies (Order Diptera)

Horse and Deer Flies (Family Tabanidae)

Horse and deer flies are the largest flies attacking equines. They are plentiful during certain periods of summer and early fall, especially in marshy or swampy locales. Abundant populations feeding on equines can result in fatigue, blood loss and reduced weight gain, and their painful bites make horses unmanageable to handlers or riders. Horse flies have also been shown to transmit Equine Infectious Anemia (EIA), an infectious viral disease of equines. Additional information on EIA is available in the fact sheet ***FSA3032, Equine Infectious Anemia in Arkansas*** (*http://www.uaex.uada.edu/Other_Areas/publications/PDF/FSA-3032.pdf*).

Female horse and deer flies have knife-like mouthparts that slice through the skin resulting in blood pooling. The fly then feeds on the blood pool. Wounds caused by horse fly bites continue to bleed after the fly leaves its host. Horse flies are stout bodied and range from ½ to 1¼ inches in size. Several species occur in Arkansas. However, the black (*Tabanus atratus* Fabricius), black-striped (*Hybomitra lasiophthalma* Macquart), lined (*Tabanus lineola* Fabricius) and autumn (*Tabanus sulcifrons* Macquart) are among the most important (**Figures 1a-d**). Deer flies are easily distinguished from horse flies by their smaller size (¼ to ⅜ inch) and brown or orange markings on picture-like wings (**Figure 2**). Many horse and deer fly species lay eggs on vegetation (**Figure 3**) in swampy or marshy areas with larvae developing in wet or moist soil near water; however, some species will develop in well-drained soil. Development from egg to adult varies with species and ranges from 2.5 months to 2 years. Horse flies overwinter as larvae (**Figure 4**).

Horse flies are difficult to control for a number of reasons: their large size and rapid feeding on hosts make it difficult to deliver a lethal insecticide dose; they are capable of feeding on a variety of host species; and, in certain areas, their breeding habitat can be extensive. With the abundance of alternate hosts, insecticide treatments of domestic livestock do little to control the horse fly and deer fly population. However, insecticide/repellent applications will provide short-term relief from biting horse and deer flies. Most of the products used on equines against horse flies are synthetic pyrethroid formulations (such as permethrin). Some ready-to-use formulations containing oil and piperonyl butoxide may provide longer-term control. Consult the horse section of ***MP144, Insecticide Recommendations for Arkansas*** (*http://www.uaex.uada.edu/Other_Areas/publications/PDF/MP144/MP-144.asp*), for a listing of insecticides.

Figure 1a. Black horse fly (*Tabanus atratus*). (*Sturgis McKeever, Georgia Southern University, Bugwood.org*)

Figure 1b. Black-striped horse fly (*Hybomitra lasiophthalma*). (*Sturgis McKeever, Georgia Southern University, Bugwood.org*)

Figure 1c. Lined horse fly (*Tabanus lineola*). (*Sturgis McKeever, Georgia Southern University, Bugwood.org*)

Figure 1d. Autumn horse fly (*Tabanus sulcifrons*). (*Sturgis McKeever, Georgia Southern University, Bugwood.org*)

Figure 2. Deer fly (*Chrysops reicherti*). (*Sturgis McKeever, Georgia Southern University, Bugwood.org*)

Figure 3. Horse fly eggs on vegetation. (*Sturgis McKeever, Georgia Southern University, Bugwood.org*)

Figure 4. Black horse fly (*Tabanus atratus*) larva. (*Sturgis McKeever, Georgia Southern University, Bugwood.org*)

Elimination of horse and deer fly breeding habitats is impractical. If a breeding site is located, it may be too large to eliminate or elimination would result in destruction of environmentally sensitive wetlands. Mowing (vegetation management) around swampy areas or ponds may provide limited population reduction because horse flies lay eggs on vegetation overhanging moist soil. However, keep in mind that horse flies will travel long distances, meaning other breeding areas beyond your control could be the source of your horse or deer fly problem.

Horse fly traps are available commercially or can be constructed. Some of these traps will catch a large number of horse flies; however, they may have little impact on the abundance of horse flies feeding on livestock. Shelters will provide relief because horse flies prefer sunny areas and seldom enter barns or heavily shaded areas. However, animals that are loafing in shelters to avoid horse flies are not grazing.

Mosquito (Family Culicidae)

Several mosquito species occur in Arkansas, and many of them will readily feed on equines. During certain periods and in some areas, mosquitoes become abundant and cause annoyance, possible skin eruptions and blood loss. In addition, some species are capable of transmitting diseases – of particular importance are West Nile Virus (WNV), Eastern Equine Encephalitis (EEE), Western Equine Encephalitis (WEE) and Venezuelan Equine Encephalitis (VEE). Fortunately, immunizations are available to protect horses from these diseases. Consult ***FSA3059, Horse Health, Diseases and Vaccinations*** (*http://www.uaex.uada.edu/Other_Areas/publications/PDF/FSA-3059.pdf*), for more information.

Only the female mosquito feeds on blood, which is essential for egg production (**Figure 5**). She uses her long proboscis to pierce the skin of the host and to suck blood. Depending upon the species, most female mosquitoes either lay eggs in rafts on water's surface (e.g., *Culex* spp.); singly on the water's surface (e.g., *Anopheles* spp.); or on wet soil/mud prone to flooding (some *Psorophora* and *Aedes* spp.). After eggs hatch, larvae develop in stagnant standing water including floodwater, shallow pools or ponds, ditches, artificial containers or tree holes. Some mosquito species breed in specific types of stagnant water. Larval (wrigglers) and pupal (tumblers) forms are aquatic, and in contrast to many insects, the mosquito pupae are

Figure 5. Female adult mosquito. (*Jim Occi, BugPics, www.insectimages.org*)

Figure 6. Life cycle of the mosquito. (*Art Cushman, USDA; Property of the Smithsonian Institution, Department of Entomology, Bugwood.org*)

active (**Figure 6**). The development period (egg, larval and pupal stages) is temperature dependent. For example, *Culex tarsalis* Coquillett could complete its life cycle in 14 days at 70°F and only 10 days at 80°F. During optimal conditions, some species can develop from egg to adult in as little as 4 days or as long as a month in less-optimal conditions. Adults emerge from the pupal stage. Flight distance from breeding site to a host varies greatly with species; some mosquitoes fly a few hundred yards while others travel many miles. Depending on the species and climate, mosquitoes can overwinter as adult females, eggs or larvae.

Pyrethroid insecticide sprays, wipe-ons and pour-ons can be applied to horses for relief from biting mosquitoes. Space sprays or fogs can be used to temporarily control mosquitoes that enter stables and barns. Consult the horse section of ***MP144, Insecticide Recommendations for Arkansas*** (*http://www.uaex.uada.edu/Other_Areas/publications/PDF/ MP144/MP-144.asp*), for a listing of insecticides.

When practical, elimination of mosquito breeding sites will help control some species. However, some types, such as floodwater mosquitoes, have expansive breeding areas that would require

organized abatement and use of mosquito larvicides. Horse owners can remove and/or empty containers (bird baths, waterers, debris, cans, buckets, used tires, etc.). Cleaning of gutters and routine changing of water in animal troughs will also help. Larger stock tanks and small ponds can be treated with biological larvicides containing Bti (*Bacillus thuringiensis israelensis*). ***FSA7059, Mosquito Control Around the Home and in Communities*** (*http://www.uaex.uada.edu/Other_Areas/publications/PDF/FSA-7059.pdf*), provides additional information on controlling mosquitoes around the home and farm.

Black Fly (Family Simuliidae)

Black flies are small blood-feeding flies in the Family Simuliidae (**Figure 7**). They are formidable pests of domestic animals, poultry, humans and wildlife and can potentially impact all facets of outdoor life. Black flies breed in flowing water. In some species that breed in large rivers, as many as a billion flies can develop per kilometer of river per day. Other species breed in small heavily wooded streams, making management difficult.

The buffalo gnat, *Cnephia pecuarum* (Riley), is one of the most important livestock pest species of the black fly group in Arkansas. A severe outbreak of buffalo gnats in 1931 caused the death of over 1,000 mules along the lower Mississippi River. Livestock mortality is usually the result of acute toxemia or anaphylactic shock caused by the introduction of black fly saliva during massive feeding. However, livestock death through exsanguination (blood loss causing deficiency in oxygen transport) has been observed. Flood control on the Mississippi River and its tributaries has greatly diminished the pest status of buffalo gnats. However, black flies and buffalo gnats still cause significant problems in localized areas of the state such as in southwest Arkansas along the Sulfur River, in the lower White River in eastern Arkansas as well as some areas associated with the Arkansas River.

Immature black flies can be found in virtually any flowing water, from small intermittent streams to large rivers. Eggs are either laid on the surface or in the water. In several species, black flies overwinter as eggs that hatch into larvae in late winter or early spring. After hatching, the spindle-shaped larvae will attach to suitable substrates (submerged rocks, debris or trailing vegetation) with the aid of silk glands and the posterior sucker (**Figure 8**). Once attached, the larva is able to filter (from the flowing water) food material, such as diatoms and small particles, with its mouth brushes. The larval period of six or seven instars (stages) varies in length

Figure 7. Adult black fly, *Simulium slossonae.* (*J. F. Butler, University of Florida*)

Figure 8. Immature life stages of black fly, *Simulium decorum* Walker. (*Whitney Cranshaw, Colorado State University, Bugwood.org*)

depending on the species and water temperature. Pupation or transformation of the larva into pupa (a transitional phase between the adult and larva) occurs in a basket-like cocoon on the object that the larva was attached to last (**Figure 8**). The pupa, which does not feed, breathes through respiratory filaments.

Pyrethroid insecticide sprays, wipe-ons and pour-ons are routinely used to protect livestock from black flies; however, reapplication might be necessary. Consult the horse section of ***MP144, Insecticide Recommendations for Arkansas*** (*http://www.uaex.uada.edu/Other_Areas/publications/PDF/ MP144/MP-144.asp*), for a listing of insecticides. Horse owners sometimes apply white petroleum jelly to the inside of horses' ears to reduce the number of bites. Providing shelters is an effective means of protecting livestock and poultry from black flies because many black fly species rarely enter shelters. Another technique that has been used is a smudge fire (smoldering fire that produces dense smoke). Smoke from smudge fires may allow animals relief from black fly attack; however, animals will remain near the smoke and not graze.

The most effective method for managing black flies is controlling immature stages in rivers and

streams. Although effective, this method is expensive, requires surveillance of the larvae in rivers and streams and must be an organized management program involving various agencies. The product of choice today is the entomopathogenic bacterium, *Bacillus thuringienesis* var. *israelensis*, found in commercially available insecticide formulations.

Biting Midge (Family Ceratopogonidae)

Biting midges (also called no-see-ums or punkies) are tiny biting flies in the Family Ceratopogonidae. These almost-microscopic biters are a nuisance to livestock and humans. The name no-see-um is appropriate because they are difficult to see and their bite is disproportionate to their size. Some members of the genus *Culicoides* are potential vectors of the bluetongue virus in sheep and cattle and epizootic hemorrhagic disease (EHD) in wild ruminants such as deer. Horses experience equine allergic dermatitis or a localized allergic reaction to biting midges. This dermatitis usually occurs on the withers, mane, tail or ears of sensitive horses.

Adults are less than ⅛ inch and sometimes closer to 1/16 of an inch in length (**Figure 9**). Wings are covered with dense hairs that result in pigmented patterns on the wings. Mouthparts are well-developed with elongated mandibles adapted for blood sucking. Both males and females feed on nectar, but only the female feeds on blood, which is necessary for her eggs to mature. Biting midge eggs are only about 1/100 inch long and are laid on moist soil. Eggs hatch into worm-like larvae with short brush-like breathing structures that allow them to breathe in an aquatic environment. Although larvae are not strictly aquatic or terrestrial, they cannot develop without moisture. After adults emerge from the final pupal stage, they feed and mate. Common breeding areas include the edges of springs, streams and ponds, muddy and swampy areas, tree holes and even water associated with air conditioning units.

Figure 9. Adult biting midge, *Culicoides sonorensis* Wirth and Jones. (*Scott Bauer, USDA Agricultural Research Service, Bugwood.org*)

Protection of livestock from biting midges using insecticides is unlikely to affect the biting midge population but can provide relief. Many of the insecticides or repellents used for black flies will provide relief from biting midges. Consult the horse section of ***MP144, Insecticide Recommendations for Arkansas*** (*http://www.uaex.uada.edu/Other_Areas/publications/PDF/MP144/MP-144.asp*), for a listing of insecticides. Permanent larval habitat modifications can help to reduce insect populations over the long term but may be cost-prohibitive.

Stable Fly (Family Muscidae)

The stable fly, *Stomoxys calcitrans* (L.), is a blood-feeding fly that feeds on a variety of livestock, domestic animals and humans. This painful biter is about the same size as the house fly but possesses piercing mouthparts that protrude from under its head to allow it to take blood meals (**Figure 10**). Both male and female stable flies feed on blood. Stable flies have been shown capable of transmitting EIA in equines.

Figure 10. Adult stable fly, *Stomoxys calcitrans* (Linnaeus). (*Whitney Cranshaw, Colorado State University, Bugwood.org*)

The stable fly life cycle possesses the same life stages as a house fly, horn fly and face fly and consists of the egg, larva (maggot) pupa and adult. They breed in decaying organic material, such as hay mixed with manure and urine (**Figure 11**). Adults can live 20 to 30 days, and a female can lay 200 to 400 eggs in her lifetime. The entire life cycle of a stable fly can be completed in about three

Figure 11. Potential stable fly breeding site. (*University of Missouri Extension Service*)

weeks. Overwintering of stable flies is not completely known, but larvae likely develop slowly during winter months under the frost line and move toward the soil surface to pupate as temperatures rise.

Good sanitation around stables, feeding areas, corrals and barns is the most important aspect of controlling stable flies. The aim of sanitation is to reduce and/or eliminate habitat for larval development. Accumulated manure and wasted feed should be removed and/or spread thinly. Vegetation management in areas where manure, hay and dead organic matter accumulate is also recommended. Excess moisture around the barnyard should be reduced or eliminated. Reduce or eliminate hay wastage as this becomes ideal breeding habitat when the hay becomes wet and soaked with manure and urine.

At times, a good sanitation program requires augmentation with insecticide applications. Insecticide control for stable flies may be direct application to the animal to provide relief or application of residual insecticides to areas where adult stable flies congregate or rest. Resting sites may include vegetation near the stable, fences, surfaces of stalls and sides of the barn. When necessary, some insecticides in the form of sprays and wipe-ons can be applied directly to horses. Be certain to thoroughly treat the legs and lower portions of the body as these are preferred feeding sites. Reapplication may become necessary. Consult the horse section of ***MP144, Insecticide Recommendations for Arkansas*** (*http://www.uaex.uada.edu/Other_Areas/publications/PDF/MP144/MP-144.asp*), for a listing of insecticides.

Horn Fly (Family Muscidae)

The horn fly, *Haematobia irritans* (L.), is primarily a blood-feeding pest of cattle. However, it can be a significant nuisance of equines pastured with or near cattle (**Figure 12**). Adult horn flies resemble house and stable flies but are much smaller (ca. ⅛ inch or ½ the size of house flies) (**Figure 13**). Horn fly larvae develop in cattle feces only. Eggs are laid only in fresh (less than 10 minutes old) cattle feces. Their life stages are very similar to other manure-breeding fly pests of livestock (house, stable and face flies). Under optimal environmental conditions, development from egg to adult can occur in as little as 9 to 12 days. Horn flies survive the winter as pupae in the soil. Adults emerge in mid-March with populations peaking in late May or early June.

A good horn fly control program on your cattle herd is the best approach to manage horn fly issues on your equines. See ***FSA7031, Controlling Horn Flies on Cattle*** (*http://www.uaex.uada.edu/Other_Areas/publications/PDF/FSA-7031.pdf*). The application of insecticide to equines might become necessary when your horses are pastured near neighboring cattle or you have horn fly control problems with your cattle herd. Insecticide sprays, wipe-ons and some pour-ons can be used on equines for horn fly issues. Consult the horse section of ***MP144, Insecticide Recommendations for Arkansas*** (*http://www.uaex.uada.edu/Other_Areas/publications/PDF/MP144/MP-144.asp*), for a listing of insecticides.

Figure 12. Horn flies on the belly of a horse.

Figure 13. Adult horn fly, *Haematobia irritans* (L.). (*Craig Sheppard, University of Georgia, Bugwood.org*)

Face Fly (Family Muscidae)

The face fly, *Musca autumnalis* DeGeer, is a non-biting fly that resembles the house fly (**Figure 14**). Adult females persistently feed on secretions around the animals' eyes, nose or wounds, causing severe annoyance. She can also serve as a vector of pinkeye. Adult males feed on nectar. Their life cycle is very similar to the horn fly in that eggs are laid in very fresh cattle feces. Development period from egg to adult takes from 11 to 17 days. They overwinter as adults in protected areas, such as farmhouses, barns and church steeples.

Figure 14. Face flies on a horse. (*www.localriding.com*)

In northern Arkansas counties, face flies occasionally reach pest status in cattle and equines. Issues are usually associated with equines pastured with cattle. Face flies are challenging to control on the animal because the face is a difficult area to treat and the flies feed only intermittently. Sprays and wipe-on insecticide formulations can provide relief from persistent face fly feeding. Consult the horse section of ***MP144, Insecticide Recommendations for Arkansas*** (*https://www.uaex.uada.edu/Other_Areas/publications/PDF/MP144/MP-144.asp*), for a listing of insecticides. In cattle, feed-through insect growth regulators used to control horn fly larvae developing in cattle feces will also control face fly larvae.

House Fly (Family Muscidae)

The house fly, *Musca domestica* L., is not parasitic on animals but rather is a non-biting premise fly (**Figure 15**) that is ¼ inch long and often seen around barns, stables, corrals and garbage. House flies are dull gray with four black stripes on the thorax. They breed in manure, decaying feed, organic matter and garbage. Their life cycle (**Figure 16**) consists of egg, larval (maggot), pupal

Figure 15. Adult house fly, *Musca domestica* L. (*Clemson University – USDA Cooperative Extension Slide Series, Bugwood.org*)

Figure 16. House fly life cycle. (*Clemson University – USDA Cooperative Extension Slide Series, Bugwood.org*)

and adult stages and is normally completed in 10 to 21 days, although flies can develop in as little as a week when temperatures are high. Females usually lay up to 600 eggs during their lifetime, and 1 pound of manure is sufficient for more than 1,500 maggots. House flies have multiple generations per year and overwinter in all life stages.

Although non-parasitic, house flies are important nuisance pests around animal facilities and have been shown to carry many pathogens of human and animal concern. Similar to stable fly management, sanitation is essential and is the first line of defense in controlling house flies. A program integrating trapping (sticky ribbons and tapes), insecticide baits, selective use of residual insecticide sprays and conservation of natural enemies with sanitation is the most effective approach. Weekly (at least) removal and/or thin (as thin as possible) spreading of fly breeding material will break the fly life cycle. Sanitation efforts should focus on animal confinement areas, stalls, under feeders and accumulated feed within feeders. Consult the horse or barns and stables sections of ***MP144, Insecticide Recommendations for Arkansas*** (*http://www.uaex.uada.edu/Other_Areas/publications/PDF/MP144/MP-144.asp*), for a listing of insecticides.

Horse Bot Fly (Family Gasterophilidae)

Horse bot flies are in the Family Gasterophilidae. The larval forms are important internal parasites of equines. The three species considered important in the U.S. are *Gasterophilus intestinalis* (DeGeer), the horse bot fly; *Gasterophilus nasalis* (L.), the throat bot; and *Gasterophilus haemorrhoidalis* (L.), the nose bot. Adults resemble bees in that they are about the same size and hairy-bodied (**Figure 17**). Adult bot flies are short-lived, possess non-functional mouthparts and do not feed. Adult activity begins in warm weather and ceases at the first frost.

Figure 17. Adult bot fly, *Gasterophilus nasalis* (L.). (*Marcelo de Campos Pereira, http://www.icb.usp.br/~marcelcp/*)

Adult female bot flies attach eggs to the hairs of the host's body similar to lice (**Figure 18**). The site of egg attachment is specific to the bot fly species. Horse bot flies attach eggs on the forelegs between the knee and hock; throat bot flies attach eggs under the jaw; and nose bot flies attach eggs to the upper lip. Horse and throat bot fly eggs are stalkless, and nose bot fly eggs are stalked. For the horse bot fly, egg hatching is stimulated by moisture and friction from the animal's licking. Larvae gain access to the host's mouth by this licking and burrow into the tongue or gums. They remain there for about a month, then pass to the stomach, attaching to its mucous membrane where they remain for about 9 months (**Figure 19**). In the spring, larvae (**Figure 20**) detach from the stomach and are passed with feces and pupate (**Figure 21**) outside their host. Adults emerge from pupae in about a month to 6 weeks. Horse bot flies may cause significant damage to the stomach lining and possibly stomach rupture or colic if the passageway between the stomach and small intestine becomes blocked. The life cycle of the throat and nose bot flies are similar to the horse bot fly, except mature nose bot fly larvae attach to the rectum near the anus and the mature throat bot fly larvae attach in the duodenum (first section of small intestine) near the pylorus.

Chemical control of bot flies is aimed at the parasitic stage within its host. Several formulations of ivermectin and other macrocyclic lactones are available for bot fly control in equines. These products are relatively easy to use, effective and should be administered after fly activity ceases (after second killing frost). ***FSA3096, Livestock Health Series: Internal Parasites of the Horse*** (*https://www.uaex.uada.edu/Other_Areas/publications/PDF/FSA-3096.pdf*), is available for more information on internal parasites including bots.

Non-chemical bot fly control is aimed at the eggs. Equine owners can frequently sponge the horse with warm water to stimulate hatching of bot fly eggs. Newly hatched bot fly larvae quickly die especially if done on a cool day. For the horse bot fly, concentrate efforts on the animal's legs between the hock and knee. Also, applying insecticidal washes to egg-laying sites can reduce the number of larvae ingested by the animal. These remedies should reduce the number of bot fly larvae ingested by the animal but will not control any larvae that were unaffected and ingested. Because of the seriousness of bot fly infestations, treatment with a boticide to control the parasitic stages is recommended.

Figure 18. Eggs of the bot fly, *Gasterophilus intestinalis* (DeGeer), deposited on the hairs of a horse's foreleg. (*Marcelo de Campos Pereira, http://www.icb.usp.br/~marcelcp/*)

Figure 19. Bot fly larvae, *Gasterophilus nasalis* (L.), attached to the pyloric region of horse stomachs. *(Marcelo de Campos Pereira, http://www.icb.usp.br/~marcelcp/)*

Figure 20. Bot fly larva, *Gasterophilus intestinalis* (DeGeer). (*Marcelo de Campos Pereira, http://www.icb.usp.br/~marcelcp/*)

Figure 21. Pupa of bot fly, *Gasterophilus nasalis* (L.). (*Marcelo de Campos Pereira, http://www.icb.usp.br/~marcelcp/*)

Lice (Order Phthiraptera)

Lice are small (⅟₀ to ⅛ inch), wingless, species-specific external parasites of livestock and poultry. Two species occasionally infest equines: the horse sucking louse, *Haematopinus asini* (L.), Family Haematopinidae (**Figure 22**), and the horse biting louse, *Bovicola equi* (Denny), Family Trichodectidae (**Figure 23**). Sucking lice pierce the skin and suck blood while the biting lice move about on the animal chewing hairs, skin and secretions. Both types of lice are problems during the winter and early spring but reproduce year-round at least on some animals. Animals infested with lice will have an unkempt coat, scaly skin and possibly raw areas on the skin. Infested animals will scratch and rub to relieve the itching caused by lice. Weight loss or reduced weight gain can occur with heavy louse infestations.

Lice can produce multiple generations per year, thus allowing numbers to become high if uncontrolled. All louse stages (egg, nymph and adult) are found on the animal. Adult female lice glue eggs

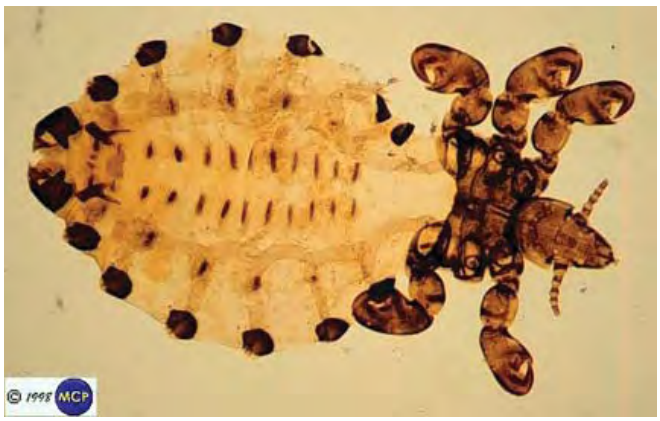

Figure 22. Sucking louse, *Haematopinus* sp. (*Marcelo de Campos Pereira, http://www.icb.usp.br/~marcelcp/*)

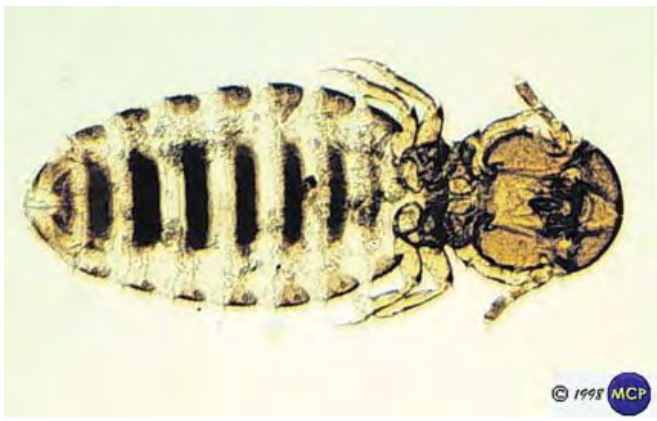

Figure 23. Horse biting louse, *Bovicola equi* (Denny). (*Marcelo de Campos Pereira, http://www.icb.usp.br/~marcelcp/*)

(called nits) to hairs (**Figure 24**), eggs hatch into nymphs in about 10 to 15 days, and after three molts, nymphs become adults. It requires about 1 month for an egg to develop into an adult.

Figure 24. Lice eggs (nits) attached to horse hairs. (*Marcelo de Campos Pereira, http://www.icb.usp.br/~marcelcp/*)

Louse infestations are identified more quickly if horses are routinely groomed. Sufficient nutrition will allow the animal to better deal with blood loss and irritation. Synthetic pyrethroids such as permethrin and organophosphate insecticides such as coumaphos may be used to control louse infestations. Specific dust, spray and pour-on formulations labeled for use on equines are widely available. Consult the horse section of ***MP144, Insecticide Recommendations for Arkansas*** (*https://www.uaex.uada.edu/Other_Areas/publications/PDF/MP144/MP-144.asp*), for a listing of insecticides available for louse control on equines.

Ticks and Mites (Subclass Acari)

Arkansas is well known for its abundance of ticks and its fair share of tick-borne diseases. Several hard tick species (Family Ixodidae) will attack horses pastured in areas with suitable tick habitat. Among the most common are the Lone Star tick, *Amblyomma americanum* (L.); the Gulf Coast tick, *Amblyomma maculatum* Koch; the American dog tick, *Dermacentor variabilis* (Say); the winter tick, *Dermacentor albipictus* (Packard); and the black-legged tick, *Ixodes scapularis* Say (**Figures 25a-e**). Heavy tick burdens in livestock may result in anemia and irritation, and some tick species are disease vectors.

Although hard tick life cycles vary with species, all have an egg, larval (six legs), nymphal (eight legs) and adult (eight legs) stage. Both male and female ticks attach to their host, mate and feed. Most ticks drop off the host animal between each stage (i.e., three-host ticks); however, the winter tick is a one-host tick meaning that all stages are on the host except for the egg-laying female and host-seeking larvae. Host-seeking ticks (larvae, nymphs or adults) attach to vegetation and wait to detect heat and carbon dioxide from a host (a behavior called questing) passing by so they can attach and take a blood meal. Ticks remain attached to and feed upon the host from a few to several days. Replete (blood-engorged) female adults detach and fall from the host to lay eggs; eggs hatch into host-seeking larvae.

Five tick-borne pathogens that result in human disease occur in Arkansas. See ***FSA7047, Tick-Borne Diseases in Arkansas*** (*https://www.uaex.uada.edu/Other_Areas/publications/PDF/FSA-7047.pdf*), for more information on tick-borne diseases in Arkansas. In addition, ticks have been shown to transmit pathogens such as equine granulocytic erhlichiosis, tularemia and Lyme disease in equines. More recently, equine piroplasmosis (also called horse tick fever or babesiosis) was identified from horses in south Texas.

Figure 25a. Lone Star tick, *Amblyomma americanum.* (*Susan Ellis, USDA APHIS PPQ, Bugwood.org*)

Figure 25b. Gulf Coast tick, *Amblyomma maculatum* Koch. (*Mat Pound, USDA Agricultural Research Service, Bugwood.org*)

Figure 25c. American dog tick, *Dermacentor variabilis* (Say). (*Gary Alpert, Harvard University, Bugwood.org*)

Figure 25d. Winter tick, *Dermacentor albipictus* (Packard). (*Mat Pound, USDA Agricultural Research Service, Bugwood.org*)

Figure 25e. Black-legged tick, *Ixodes scapularis* Say. (*Mat Pound, USDA Agricultural Research Service, Bugwood.org*)

In certain circumstances, habitat modification through vegetation management is a viable method to reduce localized tick populations by reducing moisture and humidity of free-living tick microhabitat. Clearing brush, cutting weeds and tall grass and clearing trees will reduce the humidity, making the habitat less suitable for tick development. Some studies have also shown that controlled burns can result in 70 to 95 percent reductions in tick populations following the burn. These reductions are related to both tick mortality and habitat modification. Like vegetation management, controlled burning provides temporary control. Most often controlled burns are conducted during early spring. Anyone considering a controlled burn should first consult the Arkansas Forestry Commission and local fire department.

In most circumstances, applying insecticides to a woodland pasture is impractical. This method can reduce tick presence in small areas such as yards, but in large pastures this option is difficult and costly. However, insecticide applied to the animals will provide temporary relief. Many of the insecticide formulations labeled to control lice and biting flies will also provide tick control. Consult the horse section of ***MP144, Insecticide Recommendations for Arkansas*** (*http://www.uaex.uada.edu/Other_Areas/publications/PDF/MP144/MP-144.asp*), for a listing of insecticides available for tick control on equines.

Tiny microscopic mites (**Figure 26**) are occasional pests that invade the skin of equines. Mites can cause certain skin conditions such as dry, cracked and scabby skin, often referred to as mange.

Figure 26. The itch mite, *Sarcoptes scabiei* (DeGeer). (*Marcelo de Campos Pereira, http://www.icb.usp.br/~marcelcp/*)

Because of the irritation of mite feeding, infested animals often scratch, rub and lick infested areas which may result in secondary infection. The three types of horse mange are sarcoptic, chorioptic and psoroptic, and each is caused by a specific species of mite. All three species are very difficult to see with the naked eye. Mite infestations are confirmed through examination of skin scrapings under microscopic observation. Early detection will help limit the spread of the mites to other horses because they spread from horse to horse by direct contact, or by the use of common grooming tools and tack. Frequent grooming helps aid early detection. Confirmation and treatment is usually made by a veterinarian.

Blister Beetles (Order Coleoptera, Family Meloidae)

Blister beetle (**Figure 27**) contamination of alfalfa hay is a serious concern for alfalfa producers and equine owners. Blister beetle poisoning (cantharidiasis) results from livestock consuming hay contaminated with cantharidin. Cantharidin occurs in blister beetles and is an irritant capable of blistering internal and external body tissues. Although cattle, sheep and poultry are susceptible, horses are the most susceptible with the most deaths occurring from cantharidiasis being reported. Symptoms include tongue and mouth blistering, colic, diarrhea, blood or intestinal lining discharge in stools and problems with urination or bloody urine. A veterinarian should be contacted immediately if a case of blister beetle poisoning is suspected. Additional information on blister beetles is available in ***FSA7054, Blister Beetle Management in Alfalfa*** (*http://www.uaex.uada.edu/Other_Areas/publications/PDF/FSA-7054.pdf*).

Figure 27. Threestriped blister beetle, *Epicauta vittata* (Fabricius). (*Clemson University – USDA Cooperative Extension Slide Series, Bugwood.org*)

References

Kaufman, P. E., C. W. Pitts and D. A. Rutz. 2000. *Pest Management Recommendations for Horses*. University Park, PA: Cornell and Penn State Cooperative Extension Publication.

Lancaster, J. L., and M. V. Meisch. 1986. *Arthropods in Livestock and Poultry Production*. Ellis Horwood Limited, NY. 402 pp.

Meyer, H. J., R. D. Christie and D. K. McBride. 1991. *Insect Pests of Horses*. NDSU Extension Service, North Dakota State University of Agri. and Applied Sci. Extension Bulletin No. 55.

Mullen, G. R., and L. A. Durden. 2002. *Medical and Veterinary Entomology*. Academic Press/Elsevier Science, San Diego. 597 pp.

Swinker, A., and F. B. Peairs. 1998. *Horse Arthropod Pests*. Colorado State University No. 1.202.

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