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Protect your partner.
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Cover photo by Arnd Bronkhorst Photography
Stop Bugging Me!

Flying and crawling pests are not only a nuisance, they can carry deadly diseases to you and your animals. In this special issue of Stable Management, we have teamed up with UltraShield® to create a great reference on some of the most common problems that flies, mosquitoes, gnats and ticks bring to your horses. We discuss what you can do to control exposure to those pests while offering management techniques to reduce the incidence of bugs around your farm, barn and horses.

In our cover story on page 3, you will find information on more than 25 specific diseases that flies, mosquitoes, gnats and ticks can spread to horses. There are a myriad of potential disease risks from the vast array of insects that cohabit a horse’s environment, so this information is important in the horse owner’s and manager’s fight to protect his or her animals.

Knowing what ingredients are in your insect sprays, wipes and roll-ons will help you decide which product is best to use in which situation. The article on page 9 enables you to read product labels and understand what ingredients are at work on and around your horses.

Continuing on the theme of understanding what is in the product you are using, you should understand that how a fly product is made will determine how efficient it is when used on a horse that will be sweating. On page 14, learn about the chemical bases for different types of products and what those mean to the products’ effectiveness on your horse during exercise.

Did you know that you are responsible for using pesticides safely? On page 18, learn how to read a product label so you’ll understand how to use that product, and just as importantly, what precautions to take.

Building on that foundation of pest disease education is an article on page 25 that helps you understand the life cycles of pests—how and where insects breed and live—which can help you protect yourself and your horses. For example, did you know horse flies are the ultimate equine vampires? A USDA bulletin pointed out that each horse fly ingests 1 cc of blood at each feeding. If 20-30 flies feed for six hours, the horse loses 20 teaspoons, which over 10 days translates to a quart of blood!

The average 1,000-pound horse will produce approximately 50 pounds of manure each day. That totals to about 8.5 tons per year of material that flies just love! And did you know that mosquitoes can reproduce in as little as two tablespoons of water? Under ideal breeding conditions, that small amount of water only needs to exist for a mere five days for adult mosquitoes to develop. Management of your property will go a long way toward keeping pests from reproducing and gaining access to your animals. As we discuss on page 29, this includes managing manure, eliminating standing water and more.

And how many of us have been fly-spraying the horse and given a quick squirt or two to the dog? Some products work well on equines and canines, but some ingredients should not be used on dogs. Learn more on page 32.

We are happy to team up with UltraShield® to bring you this information in a format that can be kept on your farm office bookshelf and used for years to come. SM

Equine Health Network Group Publisher/Editor

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External pests are not just nuisances; they can bring significant health consequences to your horse. Bugs are persistent and are constantly looking for a meal, causing your horse to repeatedly toss his head, stomp his feet and swish his tail to deter them. With each bite or sip of body fluid, many types of insects serve as mechanical vectors to infect your horse with disease—like little syringes or sponges. You are probably familiar with insect-borne diseases that afflict humans, such Zika virus, dengue virus, encephalitis, yellow fever and malaria. Well, it turns out that the diseases that can be transmitted to horses are also many and varied.
While we want to protect against as many of these diseases as possible with vaccination and good property management, horse owners also need to deter flies, mosquitoes and ticks from getting on and biting their horses.

Let’s take a look at the diseases that these external pests can carry to our horses so we better understand why and how we need to protect against them.

**Mosquito-Borne Disease**

Mosquitoes transmit some of the most ravaging diseases throughout the world. The four most-common mosquito-borne viruses relevant to horses are West Nile virus (WNV), Eastern equine encephalitis (EEE), Western equine encephalitis (WEE) and Venezuelan equine encephalitis (VEE). Each of these diseases is effectively prevented with annual vaccination. However, some parts of the country enjoy mild weather year-round and are impacted by persistent mosquito populations, necessitating twice-annual boosters.

While these four viruses also affect humans, none of them are transmissible between horses or from horse to human. They require a mosquito vector to transmit virus.

Birds (and sometimes rodents) carry the virus but do not become infected.

Mosquitoes bite the bird, then bite the horse or person to transmit disease. Horses and humans are considered “dead-end hosts” because they don’t develop sufficient virus in their bloodstreams to enable transfer to another horse or human through mosquitoes or body fluids. Birds are a necessary part of this process.

**EEE, WEE, VEE**

Eastern equine encephalitis generally occurs east of the Mississippi River. *Culiseta melanura* mosquitoes transmit it to horses, causing serious neurologic disease with 90% fatality.

Horses with encephalitis appear sleepy, hence the moniker “sleeping sickness.” An infected horse develops a fever, involuntary muscle twitching and an uncoordinated (ataxic) gait. Eventually the horse goes down and is unable to get up. Most cases begin to appear in late summer on into the fall months in temperate climate regions, but cases can appear year-round in southern states.

Western equine encephalitis, a similar neurologic disease to EEE, is transmitted by the *Culex tarsalis* mosquito, which lives in the western part of the USA. Fatality rate is about 40-50%. Recent years have seen a dramatic drop in equine cases, with none reported in the western United States since 2004. However, this virus is still found in birds and mosquitoes in this geographical area. Jackrabbits also can serve as a reservoir for the virus.

Venezuelan equine encephalitis causes death in 20-80% of infected horses. The bulk of the cases occur in Latin America, so there is a risk of infection in states bordering Mexico, such as south Texas, New Mexico and Arizona. While no cases of VEE have occurred in the USA in 40 years, with climate change, there could be an influx of this virus moving north out of Mexico. The primary reservoir for this virus is rodents instead of birds.

**West Nile Virus**

West Nile virus infection does not always cause clinical signs when a horse becomes infected, but the disease is quite serious when it does, with a 35% fatality rate.

Along with fever, many horses experience problems with their cranial nerves, which are responsible for functions of the head such as chewing, swallowing, blinking and facial muscle tone, to name a few. Infection with WNV also causes other neurologic problems such as hindlimb weakness, muscle tremors, behavior changes, ataxia, an inability to stand or rise and paralysis. It is possible that other signs of encephalitis, such as seen with...
EEE, WEE or VEE, will develop in a horse infected with WNV: head pressing, aimless wandering, seizures, hyperexcitability and coma. About 40% of the horses that recover from clinical signs of WNV will continue to experience a persistent neurologic deficit.

**Fly-Borne Diseases**

Quite often horse owners consider flies to be merely pests, rather than a threat to the health of their horses. Unfortunately, there are many critical diseases that are carried by flies. Here are the most important in North America.

**Equine Infectious Anemia**

Equine infectious anemia (EIA), historically called swamp fever, is a highly fatal viral disease of horses that is transmitted through bites from horse flies or deer flies. Flies that are interrupted during a blood meal—as they often are by swishing tails and movement or bites by the horse—are able to transfer virus between horses.

Research has shown that a horse that is 50 yards or more from another horse is less likely to be attacked by the same fly. In these cases, the fly usually returns to the original host to attempt to feed again.

EIA also can be transmitted by exposure to contaminated blood products or instruments such as syringes. Currently in the United States, more than half of reported cases of EIA are identified among unsanctioned bush-track and Quarter Horse racing horses. This is due to trainers and owners reusing needles and syringes, intravenous tubing and tattoo equipment without appropriate sterilization, or due to the administration of contaminated blood products. Virus concentration in the residual blood in a used syringe and needle can be up to 10,000-fold greater than that carried by even the largest horse fly; the virus can remain viable for at least four days in these fomites.

There are usually three phases of EIA infection—acute, chronic and an inapparent carrier. Horses that survive the acute phase become chronic, inapparent carriers. The virus causes recurrent fever, lethargy, poor appetite, low platelet numbers and anemia. The big concern is with those horses that remain inapparent carriers; they appear normal but are infected with the EIA virus. Flies (or equipment) can transmit virus from this seemingly normal individual to a naïve horse.

Routine surveillance testing with a Coggins (or ELISA) test can help control outbreaks. An EIA test should be done annually for traveling or show horses—every six months is required by some states—and before a new horse enters a property and the home herd.

**Vesicular Stomatitis**

Insect vectors such as black flies, sand flies and midges are able to transmit vesicular stomatitis virus (VSV), but the virus also can be transmitted between horses by direct contact with infective blisters, water, buckets, contaminated feed or fomites (such as hands, equipment, clothing and shoes).

The horse with vesicular stomatitis develops blisters, usually in and around the mouth. There is sufficient discomfort that an infected horse doesn't want to eat; saliva drools from the mouth as the horse is reluctant to swallow. There is usually a fever, and lesions also can develop around the nose, coronary band, sheath or udder in some horses.

No vaccine is available to prevent vesicular stomatitis, and there is no specific treatment other than supportive care and anti-inflammatory medications. This is a reportable disease, and the affected property will be quarantined until a period of time after the last case on that farm recovers. Vesicular stomatitis is transmissible to humans, so protective gloves are important when handling infected horses.

**Insect Bite Hypersensitivity, Sweet Itch (aka Queensland’s Itch)**

Caused by the Culicoides midge (“no-see-um”), sweet itch is an allergic hypersensitivity to the gnat’s saliva. The midges feed on the horse’s belly, but the midge bites create a systemic allergic reaction.

The horse mutilates itself by rubbing on anything in reach in order to counteract the intense itch. He’ll rub off his mane and tail, and often the horse’s rump, face and chest are raw and bleeding from all of the rubbing. In some cases, there is concurrent airway disease.

A new vaccine against insect bite hypersensitivity is currently being evaluated to help mitigate some of the allergic response to these biting flies. Studies on the vaccine have demonstrated that nearly half of the vaccinated horses improved in clinical signs by 50%, and 21% improved by 75%.

Biting stable flies or house flies can carry fungi into existing wounds to cause ulcerated skin lesions that give the appearance of skin scalding or burns.
Many flies can spread *Corynebacteria pseudotuberculosis* to horses, which can cause lymphangitis.

**Black Fly Dermatitis**

Black flies (*Simulium* spp.) feed on the inside of horse ears and along the neck, chest and belly. Horses can develop an allergic reaction to the saliva from black fly bites to form wheals (hives) and itching. Bleeding and crust forming within the ears cause discomfort and might develop into aural plaques. Some horses become head shy when their ears bother them subsequently to an inflammatory reaction to the black fly bites.

Baby oil or roll-on insecticides inside the ears serve as repellents, as do fly masks with ear covers.

**Onchocerca**

Biting midges (*Culicoides*) or black flies (*Simulium* spp.) are intermediate hosts that can infect a horse with *Onchocerca cervicalis*, which are thread-like filarial worms that migrate beneath the skin or cervicalis, which are thread-like filarial worms that migrate beneath the skin or the chest. The immature forms are located on the abdomen, with the adults present along the nuchal ligament of the neck.

The result is inflammation and dermatitis—crusting, scales, ulcers, hair loss, and/or pigmentation loss—of the neck, chest, withers, forelegs or abdomen.

Uveitis of the eye can develop, often as a reaction to dead or dying microfilaria. Ivermectin is effective at killing *Onchocerca* microfilaria.

Horse flies, stable flies and horn flies can spread *Corynebacteria pseudotuberculosis* to horses, particularly if landing on open sores or injecting the bacteria from fly mouthpieces with a bite.

Infection results in external and/or internal abscesses and/or ulcerative lymphangitis (which results in infection and swelling of the limbs). Abscesses on the chest swell to appear like a pigeon’s breast, hence the common moniker of “pigeon fever.”

**Horn Fly Irritation**

Horn flies can be an irritation to horses when pastured with or close to cattle. These flies like to feed on the shoulders, neck, withers and belly, contributing to abdominal midline dermatitis. Insecticide repellents are effective in reducing irritation caused by these pests.

**Corynebacteria pseudotuberculosis (aka Pigeon Fever)**

House flies, stable flies and horn flies can spread *Corynebacteria pseudotuberculosis* to horses, particularly if landing on open sores or injecting the bacteria from fly mouthpieces with a bite.

Infection results in external and/or internal abscesses and/or ulcerative lymphangitis (which results in infection and swelling of the limbs). Abscesses on the chest swell to appear like a pigeon’s breast, hence the common moniker of “pigeon fever.”

**Potomac Horse Fever**

Potomac horse fever (PHF or equine neorickettsiosis) is caused by bacteria *Neorickettsia risticii*. Although originally localized along the Potomac River in Maryland and Virginia, it has occurred in 44 states in areas with freshwater streams and rivers. It generally is seen seasonally in warm months (i.e., spring, summer and autumn). Clinical signs generally include a horse breaking with severe, pipe-stream diarrhea and colic. About 30% of affected horses die due to subsequent development of severe laminitis.

It took decades of veterinary sleuthing to identify the source of the bacterial pathogen. It begins in snails containing the infectious agent, which is released in snail cercaria—a free-swimming larval stage. Caddis fly and other aquatic insect larvae serve as natural vectors as they pick up the cercaria containing the infective bacteria. As the aquatic insects hatch and emerge from a creek, river or ditch water, the horse incidentally ingests them in contaminated water, hay and pasture to become infected. Infection seems to coincide with large hatchings of caddis flies, mayflies and stoneflies in warm months.

Even horses without access to pasture can become infected—aquatic insects are drawn to lights at night, and many barns and horse facilities have lights on at night.

**Habronemiasis or Summer Sores**

Biting stable flies and house flies that feed on wounds or chronically moist skin can infect a horse’s tissue with *Habronema* or *Draschia* worms. These worms like to reside in the horse’s stomach, passing eggs and larvae into the feces. Once passed in the feces, the worms are then ingested by flies to deposit the larvae on a horse’s mucous membranes, around the eyes or in wounds. The result is a hypersensitivity reaction to the worm larvae—wounds won’t heal, but instead proliferate with excessive amounts of granulation tissue.

Treatment with ivermectin or moxidectin kills *Habronema* spp. almost 100% of the time and is effective for prevention. Using repellents and fly barriers (i.e., masks, sheets and wound bandages) is important in protecting horses.

**Rain Scald/Equine Granular Dermatitis/Phycomycosis**

Biting stable flies and house flies can carry fungi into existing wounds to cause phycomycosis. The fungi cause ulcerated skin lesions that give the appearance of skin scalding or burns.

This fungal infection tends to occur in moist climates with extended periods of warm weather, such as that found in the southeastern United States.
Bot Fly Larvae
Bot flies look a bit like bumblebees, but don't sting or bite. Depending on the specific species, they lay their eggs, called nits, on a horse's legs, mane, shoulders, flanks, neck, below the jaw or on the muzzle. As the horse rubs or grooms its legs or other areas of its body, the sticky nits find their way to the horse’s mouth, where they burrow into the tongue and gums. Once hatched, the larvae are swallowed into the stomach, where they remain for seven to 10 months until they pass through the digestive tract and are eliminated in the manure to start the cycle anew.

In most cases, bot fly larvae are relatively harmless. It is when they occur in large numbers that they can interfere with nutritional absorption and/or create stomach ulcers. Avermectin (ivermectin or moxidectin) deworming medications are effective at killing bot larvae.

Eye Parasites
Thelaziasis is a condition that develops from face flies feeding on eye secretions. Thelazia parasites can burrow into the eye tissues to cause nodular reactions, or the horse might develop chronic conjunctivitis with persistent ocular discharge, corneal inflammation and/or ulcers as a result of this parasite.

Warbles
Usually seen when horses cohabit pastures with cattle, warble flies (Hypoderma spp.) lay their eggs on the hair of the legs and belly of a horse. Once hatched, the larvae then bore inward and migrate through connective tissue toward the epidural fat of the spine or into the esophagus. In the springtime, they move to the subcutaneous back tissues to form a stationary nodule.

They might be unnoticeable until they grow large enough to form a lump. What might also be apparent with close inspection is the presence of an “air hole” that allows the larva to breathe.

Sarcoids
Some equine sarcoïds are caused by bovine papillomavirus. Current research has indicated that insect vectors, such as stable flies, might spread this virus. Virus attached to the fly’s mouthpiece can be inoculated into a horse’s skin with a bite.

African Horsesickness
An incredibly serious and highly fatal disease, African horsesickness (AHS) is transmitted by Culicoides spp. flies. Fortunately, there are no natural cases of this in the United States, but the disease is moving into other areas around the world.

Tick-Borne Diseases
No one likes ticks, and we can be assured our horses feel the same way. Ticks cause discomfort and carry multiple diseases to our equine companions (as well as our dogs, our cats and us!).

In the last few years, new species of ticks have been found in the United States, and the ramification of those new species—and the spread of endemic tick species—are of concern to horse owners.

Lyme Disease
Lyme disease is becoming more prevalent in the United States, especially in the Northeast, the Mid-Atlantic states and the northern Midwest states (particularly Minnesota and Wisconsin).

The blacklegged tick (Ixodes scapularis, also called the deer tick) carries a bacterium, Borrelia burgdorferi, which is the
causative agent of Lyme disease.

A horse infected with *B. burgdorferi* develops a variety of non-specific clinical signs, including low-grade fever, shifting limb lameness, muscle tenderness, muscle wasting and weight loss, stiff gait, lethargy, behavioral changes, increased sensitivity of skin to touch and uveitis (inflammation of the eye tissues surrounding the pupil). Although not a common clinical sign, joint swelling can occur. Rarely, a Lyme disease-infected horse might experience neurologic signs, referred to as neuroborreliosis.

Not all horses infected with *Borrelia* develop clinical signs. It might take up to six weeks after an infection before the animal begins to exhibit clinical signs.

**Anaplasmosis**

Another tick-borne disease is referred to as equine granulocytic ehrlichiosis or anaplasmosis, and it is caused by the bacterium *Anaplasma phagocytophilum*. Black-legged ticks (*Ixodes pacificus* or *scapularis*, aka deer ticks) and the Lone Star tick (*Amblyomma americanum*) are common vectors for disease transmission. Flies also can release these bacteria into a horse’s bloodstream with a bite. Once there, the bacteria invade the white blood cells and cause widespread destruction of red and white blood cells and platelets.

Incubation takes one to two weeks, and there are specific clinical signs horse owners should watch out for: high fever over 104 degrees Fahrenheit, depressed appetite, depression, limb edema (swelling), petechial hemorrhages (tiny blood spots on mucous membranes such as the gums and inner tissue of the nose), icterus (jaundice) and a reluctance to move due to muscle soreness and/or ataxia (incoordination).

**Longhorned Ticks**

A new tick has made its way into the United States: the Asian longhorned tick (ALT) or *Haemaphysalis longicornis*, also called the bush tick or cattle tick. By the end of 2018, sightings of these ticks had occurred in nine states: Arkansas, Connecticut, Maryland, New Jersey, New York, North Carolina, Pennsylvania, Virginia and West Virginia.

The longhorned tick thrives in temperate, humid climates that are thick with moist forests and have regular precipitation. Preferred temperature ranges between 53-104 degrees Fahrenheit, but the ticks don’t tolerate dehydration.

The females are able to reproduce asexually through cloning without a need to mate; this is called parthenogenesis. Each female lays up to 2,000 eggs at a time—all females, making it nearly impossible to eradicate them.

In its typical range of Eastern Asia, New Zealand and Australia, these ticks carry deadly diseases. Infestations also contribute to blood loss, which is significant for livestock producers, with a potentially similar impact on horse health.

As yet, active disease transmission through these ticks has not been identified in the United States, but the research on their impact is just getting started.

**Tularemia**

Although rare, tularemia can occur in horses. Horses acquire it through tick transmission (wood ticks, lone star tick, dog tick). Deer flies also serve as potential vectors in addition to being a bacterial reservoir. Fever, lethargy, lack of appetite, reduced mobility, coughing, septicemia and diarrhea occur suddenly, with a potential for death within a few hours or days.

**Spider Bites**

Last, but certainly not least, is the potential for a horse to develop a serious reaction from a spider bite.

Brown recluse or black widow spiders are the usual culprits. Most of the time an owner won’t see the actual spider, so it is a presumptive diagnosis. Spiders like to inhabit sheds, wood piles and dark, dank places, and they are usually tucked away in hidden crevices.

A black widow female bite can cause systemic injury that includes fever, muscle cramps, respiratory difficulty and pain just like it does with people. A brown recluse causes a localized inflammatory reaction, pain and tissue necrosis.

**In Summary**

There are a myriad of potential disease risks to horses from the vast array of insects that cohabit a horse’s environment.

Insect control strategies, immunization against infectious disease when possible, and diligent attention to management details are important control strategies. Those strategies should be combined with regular monitoring and scrutiny for anything amiss with your horse.
Ingredients for External Pest Control

Chemicals can be beneficial for deterring insects, but they can also cause problems if not used properly.

By Nancy S. Loving, DVM

Insects are incredibly creative about avoiding methods to curtail their access to a horse host. You probably have found that applications of some chemical insecticides are no longer as effective or last as long as in years past. This lack of efficacy has stimulated strategies to protect horses from the annoyance and potential disease risk created by feeding insects.

Chemical Pest Control

Chemical substances for pest control act as repellents that deter insects from landing or cause them to leave before feeding. Nonetheless, the insects are still attracted to a horse's warmth, movement and carbon dioxide exhalation. So chemical control doesn't entirely eliminate the situation, but it minimizes insects' direct contact with a horse.

Many chemical insecticide products on the market use as their active ingredients either pyrethrins or pyrethroids. These compounds have their greatest effect on flies and gnats through adverse effects on the insects' nervous systems. Some pyrethrin/pyrethroid insecticides are also effective against mosquitoes.

While pyrethrin is considered a chemical-based product, it is derived from an
In general, horses should consume 1.5-2% of their body weight per day in forage.

ISTOCKPHOTOS/ MADELEINE STEINBACH

extract of the dried flowers and seed cases of the Chrysanthemum plant—this African painted daisy has developed a natural ability to ward off insects. As a “natural” chemical, it is quite safe to use, but its repellent action is short-lived due to the ease with which it is broken down by ultraviolet from the sun. The biodegradable nature of the pyrethrins makes them environmentally friendly, but it interferes with the longevity of repellent activity.

To counteract that problem, some preparations with pyrethrins contain sunscreen (PABA) to block ultraviolet degradation of pyrethin so fly spray applications last longer. Many preparations with pyrethrins also include piperonyl butoxide (PBO), derived from the sassafras tree, as a synergist to improve duration of effectiveness. PBO helps mitigate the development of fly resistance to repellents by interfering with enzymes an insect uses to denature the repellent.

Pyrethroids are synthetic compounds similar to pyrethrins. These include cypermethrin, permethrin, resmethrin and prallethrin. Working in the lab, chemists have come up with ways to better stabilize pyrethroids so that topical application lasts up to a few days. However, sweat and rain will wash off the insecticide, necessitating reapplication. With this in mind, some fly repellents also contain aloe and lanolin to minimize loss of the chemical through sweat.

DEET (N, N-diethyl-meta-toluamide) is commonly used in people, but it is not often included in insect repellents for horses.

Read the Label
Before the purchase or application of an insecticide for your horse, check the bottle for the list of active ingredients, the concentrations and the names of the targeted pests. Higher concentrations of an active ingredient result in longer duration of effects. Concentrations of pyrethrins and pyrethroids vary from 0.05% to 0.50% to 1%. Spot-on pyrethroids can be as high as 40% concentration. The mildest chemical is pyrethrin; resmethrin is a bit stronger, while permethrin is next in strength and cypermethrin is the most potent, with the potential for more toxic effects to the horse if used improperly.

Read the label details on the insecticides you plan to use. Apply them per the manufacturer’s recommendations. Look for added ingredients that might, in fact, be fly attractants, such as odor-improvements (scents and perfumes). Take note if a product is not intended for use on foals or pregnant or lactating mares. Consider environmental risks, such as the impact of contaminating water sources or other environmentally sensitive areas with the insecticide.

Pyrethroids are toxic to cats, bees, aquatic insects and fish. When applying insecticides to your horse or elsewhere in the barn, caution should be taken to avoid contaminating nearby aquatic habitats, barn cats or flowering plants. Don’t spray those chemicals on a horse’s face; instead, wipe them on with a cloth, keeping well away from the eyes. Roll-on insect repellents are safe to use as long as they don’t contact the eyes. Spot-on insecticides with permethrin applied to the poll, the tail, and behind each hock and knee seem to protect for a couple of weeks. Never apply insecticides directly to open wounds.

Also consider the potential toxicity to humans applying the insecticide, and also to pregnant mothers, children and other barnyard pets. It is always good sense to wear gloves when applying insecticide to minimize skin contact. Stay upwind when spraying and immediately wash any areas of your hands and face that come in contact with chemicals.

‘Natural’ Insecticides
Many horse owners are wary of using chemical insecticides on their horses, so...
they turn to more “natural” products. Herbal fly sprays often combine a number of essential oils such as citronella, lavender, eucalyptus, pine or cedar oil, tea tree, witch hazel, thyme oil, peppermint and pennyroyal, as examples. The most effective essential oils are thyme oil, geraniol, peppermint oil, cedar oil, patchouli and clove, with repellent properties of one to three hours. Herbal repellents don’t last particularly long due to their volatility and evaporation.

Just because a product is called “natural” doesn’t ensure it is safe to use. None of the products that are sold commercially are EPA or FDA tested or approved, and some ingredients have been known to cause skin allergic reactions (dermatitis). Plant-based repellents do not undergo rigorous testing and scrutiny, so they should be used with caution.

One non-toxic compound, citronella, is extracted from the lemongrass plant. It is most effective against mosquitoes, lasting about two hours, so it does require frequent application.

Eucalyptus oil, another natural repellent, is used for its pungent odor, which confuses mosquitoes as they hunt for their target’s location.

Another natural repellent more commonly used against mosquitoes than flies is geraniol from geranium plants.

Recipes for homemade fly sprays are prevalent on the internet. They might contain any number of ingredients added to the previously mentioned essential oils, such as basil, bay leaf, cloves, tansy, black pepper, rue, rosemary, southernwood (related to wormwood), santolina, spearmint, neem (a tree from India) or sassafras.

Many horse owners mix up a concoction that contains “Skin-So-Soft” for its effectiveness against no-see-um midges and blackflies; however, the action of that product is very short lived, measured in minutes, not hours. It has also been noted that several of the ingredients in Skin-So-Soft end up being fly attractants that can override the repellent effect.

**Other Fly Control Methods**

Not all fly control measures rely on some form of chemical or herb.

Mosquito-net material incorporated into fly face masks and fly sheets serves as an excellent barrier against annoying insects. Some masks also come with ear netting to shield the ears; others include an extension piece that covers a large part of the nose and muzzle.

The mesh material in a fly sheet keeps insects from landing directly on the horse’s body—but air circulates over the skin while bugs and some ultraviolet rays are blocked out. Mesh leg boots are also helpful to give comfort to horses that are particularly sensitive to fly irritation on their legs.

Recent research has identified the value of zebra stripes as a pest control. The investigators found that while zebras and horses are approached by a similar number of horse flies, fewer land on the zebras. Then, the researchers placed striped blankets on the same study horses and found that fewer flies landed on the blanketed areas, while the solid head areas still received a lot of fly landings.

Another useful technique to minimize insect annoyance is to bring a horse into a shed or stall and aim a fan appropriately to deter insect entry. Many flies and mosquitoes aren’t able to deal with turbulent air. Stalls can also be screened in extreme insect situations.

Consider the placement and type of lighting in your barn—fluorescent lights attract insects less than incandescent bulbs. At night, turn off the lights. Or turn on incandescent lights elsewhere on the property, away from stabling, to lure insects away from the horses.

Non-stinging fly predator wasps, also called parasitoids, eat fly larvae in manure to reduce the number of flies hatching into adult form. These wasps are best at controlling house flies and stable flies, but they don’t have much impact on horse, deer or face flies. Start your monthly orders before fly season begins and continue through to a killing frost. Spread these wasps on manure around the property. During wet weather that favors fly hatching, weekly application might be necessary.

Daily feed-through insecticides pass through the feces to kill developing fly maggots in manure. They only work in the manure and not in other insect breeding areas. In addition, if feed-through insecticides are used along with parasitoid wasps, killing off the larvae in manure leaves the parasitoid wasps with little to feed on. Consult with your veterinarian about the safety and prudence of using feed-through products.

Another biologic insect control technique is to order nematodes to spread on the property. The worms thrive in moist soil, bedding or manure. They destroy insect larvae by releasing bacteria that are non-toxic to mammals, birds or earthworms. **SM**
Fly, Mosquito and Tick Control That Always Has You Covered

<table>
<thead>
<tr>
<th></th>
<th>UltraShield® EX</th>
<th>UltraShield® Red</th>
<th>UltraShield® Sport</th>
<th>UltraShield® Green</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Active Ingredient(s)</strong></td>
<td>Pyrethrins 0.10% Permethrin 0.50% Piperonyl Butoxide 1.00%</td>
<td>Pyrethrins 0.025% Permethrin 0.90% Tetramethrin 0.25% Cypermethrin 0.10% Piperonyl Butoxide 1.00%</td>
<td>Cypermethrin 1.00%</td>
<td>Thyme Oil 0.01% Cedar Oil 0.05% Lemongrass Oil 0.05% Rosemary Oil 0.05% Citronella Oil 0.06% Clove Oil 0.08% Geraniol 0.70% Sodium Lauryl Sulfate 2.50%</td>
</tr>
<tr>
<td><strong>Kills flies, mosquitoes and ticks</strong></td>
<td>✔</td>
<td>✔</td>
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<tr>
<td><strong>Repels flies, mosquitoes and ticks</strong></td>
<td>✔</td>
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<tr>
<td><strong>Water-based</strong></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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</tr>
<tr>
<td><strong>Includes sunscreens and coat conditioners</strong></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td><strong>Sweat- and weather-resistant</strong></td>
<td>✔ up to 17 days</td>
<td>✔ up to 14 days</td>
<td>✔ up to 7 days</td>
<td>✔</td>
</tr>
<tr>
<td><strong>Eco-safe</strong></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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</tr>
<tr>
<td><strong>Dog-friendly</strong></td>
<td>✔</td>
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Always read and follow label directions.
### Activities and Uses

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<tr>
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<th>UltraShield® EX</th>
<th>UltraShield® Red</th>
<th>UltraShield® Sport</th>
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<td>Competition/Show</td>
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<td>Trail Riding</td>
<td>✔ Heavy fly activity</td>
<td>✔ Light to moderate fly activity</td>
<td>✔ Moderate fly activity</td>
<td>✔ Light fly activity</td>
</tr>
<tr>
<td>Training/Schooling</td>
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<td>✔ Light to moderate fly activity</td>
<td>✔ Light to moderate fly activity</td>
<td>✔ Light fly activity</td>
</tr>
<tr>
<td>Turnout</td>
<td>✔ Heavy fly activity</td>
<td>✔ Moderate fly activity</td>
<td>✔ Light to heavy fly activity</td>
<td>✔ Light fly activity</td>
</tr>
<tr>
<td>In the Barn</td>
<td>✔</td>
<td>✔</td>
<td></td>
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<tr>
<td>Premise Spray</td>
<td>✔</td>
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</tr>
</tbody>
</table>

Always read and follow label directions.

### UltraShield® Fly Mask

- Lightweight
- Breathable
- Moisture-wicking
- UV-blocking
- Double-lock closure
- Double-stitched seams
- Coated for extra durability
- Ear Protection: Available
- Extended Nose Protection: Available
It’s impossible to eliminate insects from the barn. Cleaning stalls daily and removing manure from paddocks go a long way toward reducing habitats for insect populations. Eliminating standing water, trimming tall weeds around fences and using fans are other tactics that can help control these populations. However, even with the most diligent management routines, insects will still be around.

Visit any tack store or online supply company and you’ll find many types of fly sprays. Some are labeled as being sweat- or water-resistant. Ever wonder how those products work and what that claim really means? The answer is in the repellent formulation.

“This falls under the ‘trade secret’ component of formulation chemistry,” said Wes Watson, PhD, a professor and extension specialist of integrated pest management for livestock and poultry at the North Carolina State University Extension.

Before any fly sprays can be sold, the manufacturer must register the product with the United States Environmental Protection Agency (EPA). The EPA evaluates the pesticide on several factors based on the ingredients, which determines the information that must be identified on the label. The pesticide(s) in the bottle must be listed, but the additives might not be required information.

“Sweat is not one of the requirements for registration, but water/rain resistance is,” he said.

The Bases
Fly repellents fall into one of two categories: oil-based or water-based.

“Oil-based fly repellents are more stable and bind with the hairs of the animal, making them more resistant and longer lasting,” said Sonja L. Swiger, an associate professor and veterinary/medical extension entomologist at Texas A&M University.

Oil-based sprays make the horse’s coat shiny when first applied and tend to be faster-working products. The trade-off for longer lasting control is that oil-based products attract more dust and dirt and can act like “suntan lotions” for some horses. Therefore, sensitive horses might be more likely to burn. These products tend to be used at home rather than at a show while trying to keep a horse extra clean.

“Oil-based formulations mix or bind with the active ingredient and adhere to the oils on the skin,” Watson said. “It is common knowledge that pyrethroids found in ear tags [used in cattle] move about the body of the animal in skin oils.”

Conversely, water-based products are oil-free, making them less irritating for horses with sensitive skin. Because they don’t contain oils, they won’t attract as much dust, theoretically helping to keep the horse cleaner longer—or until he rolls!

“A water-based fly repellent needs to be used more often and evaporates faster,” Swiger added.

Since the formulation of fly sprays are proprietary, chances are you won’t find specifics on the label as to what helps keep the product on the horse’s coat. However, it’s helpful to remember that the ingredients in the bottle might be better suited for specific insects, weather conditions or activity levels. Rotating repellents based on these factors can offer your horse the best protection. SM
A Dream Bottle

FOR A

Dream Vacation.

CHECK OUT OUR NEW BOTTLE & ENTER TO WIN THE TRIP OF A LIFETIME AT Absorbine.com/DreamVacation.
$8 off any 1 UltraShield® gallon.

Save on a gallon of the good stuff.

Retailer: W.F. Young, Inc., will redeem this coupon for face value plus 8¢ handling, provided it is redeemed by a consumer at the time of purchase. Coupon(s) not properly redeemed will be void and held. Reproduction of this coupon is expressly prohibited. Any other use constitutes fraud. Consumer must pay sales tax. Offer good only in USA and Military APOs/FPOs. Mail to: CMS 11444, 1 Fawcett Dr., Del Rio, TX 78840. Cash value .001¢. Void where taxed or restricted. Offer limited to one coupon per item per transaction.

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What do you think these bloodsuckers are saying?
Get creative and we might surprise you with some UltraShield®.

1. Put words in their mouths and limbs on their bodies. (Keep it clean, folks.)
2. Snap a shot of your completed cartoon.
3. Upload it to Facebook or Instagram with the hashtag #CaptionThisFeast and tag @Absorbine.
4. Friend us on Facebook and follow us on Instagram while you’re at it.

If we LOL, we may share your entry on our Facebook or Instagram. If we laugh hysterically, we’ll send the authors their favorite UltraShield® fly spray.
Nothing ruins the pleasure of your ride faster than annoying insects. It’s no fun being swarmed by buzzing insects, and it distracts your horse from the task at hand. Those pesky pests also interrupt your horse’s turnout time. Biting bugs can leave unsightly welts. Excessive stomping at flies can wear down your horse’s hooves and even cause damage to joints. Blood-sucking insects can cause itching, fatigue and even malnutrition. Worst of all, insects carry diseases, some of them particularly dangerous to horses.

Many horse owners just use the term “fly spray” when discussing the wide variety of insect repellents on the market that offer relief by keeping bugs at bay. Those products are readily available, easy to use, and come in a wide array of product choices and ingredients. Horse owners often take for granted how they should use the products. But reading the product label and following the manufacturer’s instructions for use on every product helps ensure that you’re getting the most out of your investment and that you are using the product properly.

Knowing what’s on the label and fol-

Tips for Applying Repellents Safely and Effectively

Before you pick up that bottle of fly spray, read the label to maximize your investment.

By Katie Navarra
Knock biting insects out of your training routine.

Training in hot or humid conditions is an invitation for biting and nuisance flies and mosquitoes. Kick them out with UltraShield® Sport. It stays with your horse through heavy workouts in the hottest, muggiest weather, stopping obnoxious insects from annoying everyone around them.

Protect your partner.
lowing the guidelines is also the law, said Sonja L. Swiger, an associate professor and veterinary/medical extension entomologist for Texas A&M University.

“As a pesticide user, you assume all rights when you use the product,” she said. “That means reading the label first to be sure you use it correctly.”

Fly sprays are insecticides, a substance for killing insects. The United States Environmental Protection Agency (EPA) defines a pesticide as “any substance or mixture of substances intended for preventing, destroying, repelling or mitigating any pest.”

When used properly, these products are safe and effective at controlling pests. The product label provides guidelines that explain proper handling and use so that the products work as intended while limiting risk to people or animals on the property.

“The use can be restricted to certain animals, certain application methods and the number of times they can be used on an animal, so it’s important to read the label first to be sure you use it correctly,” Swiger said.

The details included on the packaging can seem overwhelming, but Swiger emphasized the importance of reading the label in its entirety.

“To get the best use out of a product, it is best to apply it and store it according to the label,” she said.

**What to Look For**

A label includes several key areas that can tell you all you need to know about the insect repellent you’re using. Swiger explained what you can find on a label and how to use the available information.

**Use Restrictions:** This section of the product label tells you the limitations of using the product, and the wording varies based on the ingredients in the formulation. For example, it might state that the product cannot be applied to animals of a certain age. It will also tell you how it should be used; for example, that it must be sprayed onto a surface in a mist.

**Instructions for Use:** This includes details on how to apply the product. For example, concentrated formulations need to be diluted with water and give specific details on how to do that. Other formulations are ready for immediate application. In this section, you’ll also find information about whether the repellent can be used as a wipe, a spray or both.

**‘For use’ section** tells you the proper way to apply a repellent, and this can include distance from animal (during application) as well as site location on an animal,” Swiger said. “Plus it will tell you how many times it can be applied to the animal within a set time period.”

**Accidents or Misuse:** The label also includes instructions for what to do if the product gets in a person’s eyes, on his or her clothing or is accidentally ingested. It typically includes basic first aid and an 800 number for medical emergencies.

**Storage and Disposal:** Repellents are formulations of pesticides and other ingredients, such as coat conditioners, sunscreens and more. Storing the product in a space that is too hot or too cold affects the formulation and its effectiveness. Because fly sprays are a blend of chemicals, there are specific instructions for getting rid of empty bottles and excess spray.

**Environmental Hazards:** When used properly, fly sprays are safe for use in horses and ponies, and depending on the formulation, dogs or other livestock. However, they can be deadly to aquatic life or other species (such as bees). Read the environmental hazards section of the label to do your part in protecting the environment.

**Active Ingredients:** This portion of the product label outlines what’s actually inside the bottle. For pesticide-based fly sprays, permethrin, pyrethrin, tetramethrin, cypermethrin and piperonyl butoxide are among the most common insecticides used to control pests around the barn. All-natural products are likely to include essential oils known for their repellent qualities. This can include thyme oil, cedar oil, lemongrass oil, rosemary oil, citronella oil, geraniol, peppermint oil and others.

**Signal Words:** Words such as “caution,” “warning” or “danger” are included on all pesticides and indicate the level of toxicity when used inappropriately. “Caution” indicates the least harmful effects, and “danger” indicates the most poisonous or irritating effects. For example, all fly repellent bottles will say “WARNING: Keep Out of Reach of Children.”

**Take-Home Message**

Fly sprays are a staple in any horse owner’s grooming kit. When used properly, they provide horses relief from the annoying buzzing bugs, biting insects and creepy crawlies that can spread disease. To make the most of any fly spray, read the label before applying. SM
Your horse’s head is a vulnerable target during bug season. Flies are attracted to their eyes and nose for mucous-membrane moisture and protein. Since flies carry bacteria, they can pass those bacteria along with larvae to your horse’s face and eyes. Clearly, in addition to being an irritant, flies contribute to eye infections and allergies.

Your horse’s ears are another prime target. Gnats love to feed there, leaving crusty scabs behind.

Plus, without hands to help them safely swat the flies away, your horse is left to rub them away—potentially leading to injury.

Clearly, good fly control needs to extend to the face. The fly mask acts as a protective barrier against flies in these ways:

• allowing your horse to see out while not allowing flies in to irritate his eyes
• protecting sun-sensitive eyes and skin (such as pink skin under white facial markings) from harmful rays—some designs come with extended muzzles for extra coverage
• if the mask has ear coverings, keeping gnats out of the horse’s ears, which is especially beneficial if you clip their ears

But not all fly masks are created equal. So how should you choose?

**Fabric**

When you look around at all the changes that have taken place in your own athletic, fitness and sports apparel in the last few years, why wouldn’t you choose a fly mask that gives your horse those same advantages?

**Moisture Wicking**

When the sun is blazing, ordinary fabrics heat up quickly. That’s why you’ll notice your horse’s head soaked in sweat when you remove many types of fly masks. That’s because they trap the sweat in a virtual face sauna. Moisture-wicking fabrics are important advances in equine fly masks. Instead of absorbing sweat like other fabrics, the high-tech materials move it to the surface, where it evaporates. This innovation helps keep a human athlete dry and chafe-free, and it works the same way for your horse.

**UV Blocking**

Sunlight includes rays of ultraviolet (UV) radiation that can heat up your horse’s head under his mask, as well as lead to sunburn if not blocked. Now you can choose from masks that offer special, lightweight sun protection built right into the fabric weave, as well as coatings to block the bulk of those UV rays, helping keep your horse cool and protected.

**Durability**

Some products trade comfort for quality and durability. You want a mask that resists snagging and will last you all season and beyond.

Fly masks, like any other equine clothing article, are most likely to come apart where the fabrics are stressed the most—at the seams. Double stitching of seams provides a stronger join and helps to keep the fabric from fraying. It also provides a smoother finish to help prevent chafing in order to improve your horse’s comfort.

**Comfort**

Speaking of comfort, take a moment to consider the edging of the mask. This is the most significant point of contact, typically impacting around the ears, under the jowl and around the muzzle. Most masks use fleece, web or felt in these areas, all with their pros and cons. Fleece edging can cause the horse to sweat while attracting debris. Web helps hold the mask together and doesn’t attract debris, but can chafe. Felt, while thinner than fleece, still causes sweat.
Insects sipping out of your horse's eyes is dangerous, irritating and disgusting. Keep faces cool, dry and comfortable with UltraShield® Fly Masks. With double-locking hook and loop closure and UV-blocking, two-way controlled stretch fabric, they stay on so bugs and sun damage stay out.

Protect your partner.

END FLY FRUSTRATION AT ABSORBINE.COM

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Again, the same new fabric technology available in the fly mask construction can now be found in the edging. Choose masks that offer edging created with the same soft, lightweight performance fabric used to keep your horse cool and dry. This style also helps with durability by protecting the seam and preventing fraying.

**Stick-To-It-ness**
Finally, your mask is only as good as its closure. Hook and loop, also known by the brand name Velcro®, is the most common type of mask fastener. Its sticky design is inspired by the cockleburs a Swiss engineer found stuck in his hunting dog’s fur. (He obviously didn’t have any ShowSheen®.)

The strength of the bond depends on how well the hooks are embedded in the loops and how much surface area is in contact with the hooks.

Horse mask closures come in single- and double-locking styles. Double-locking basically doubles the surface area, doubling the strength of the closure while also protecting it from debris and from curious horses. Wider closures also increase the surface area and the strength of the bond.

**Ear Covers**
Horse fly masks are available with or without ears covers. Ear covers are a great way to protect ears from gnats. But let’s face it: Some horses just don’t like anything near their ears.

**Extended/ Detachable Noses**
An extended nose piece on your fly mask is ideal for protecting your horse’s sensitive nostrils against nuisance flies. It’s also a real must-have for horses with white/pink noses that sunburn easily, offering protection from UV rays.

**Insecticide Treatments**
Some fly masks are treated with insecticides. Unfortunately, this treatment washes away long before fly season is over, so this “extra” might not be worth the money. Try wiping your regular spray on the mask before putting the mask on your horse for a more economical option.

**Mask Fit: Getting It Just Right**
You might think that your horse’s mask needs to be super-snug so that insects can’t creep under it, but that’s not the case. Flies and insects that land on the edge of the mask don’t try to slip underneath it; instead, they just crawl up the outside. So, while fly masks don’t need to fit tight to keep insects out, they do need to fit right.

A mask that is too loose will slide over the horse’s ears, leaving your horse unprotected and leading to the fun game of “find the fly mask” in your field. However, if a mask is too tight, it can rub your horse and cause irritation. The key areas to fit are the eyes, ears, muzzle and throatlatch.

**Ears**
Check to be sure the mask’s ear coverings or holes are roomy enough for the horse’s ears. If the mask doesn’t fit well, it’s likely to leave rub marks. Stretchy, soft fabric and covered seams can help avoid this, as well.

**Muzzle**
The mask’s lower edge needs to reach two to three fingers below the bottom of your horse’s cheekbone. If the mask rests on the cheekbone, it can rub or create a gap where bugs can get in. You should be able to adjust the closure so that you can easily slip a finger between the mask and your horse with his head in normal position—or fit two fingers between the mask and the throatlatch.

**Throatlatch**
This area can get uncomfortably tight when your horse picks his head up unless you allow a couple of fingers’ width between the mask edge and his throatlatch. As with the muzzle, you should also be able to slide your fingers easily between the edge of the mask and the skin at the side of his head. In addition to chafing and binding, a too-tight throatlatch will cause the closure to come undone from the constant pulling.

The design of fly masks with a stretchy fabric under the muzzle and throatlatch area provides just enough “give” to aid in getting the right fit. Your horse’s halter size can also guide you in picking the correct fly mask size.

**Four Keys to Fly Mask Maintenance**
A little TLC can keep your mask on the job longer. Here are some tips.

1. **Check:** Look it over daily for stuck flies, rubs and tears.
2. **Rinse:** A dirty mask can block vision and even shed flecks of dirt into the horse’s eyes. A good splash with the hose or a dunk in a bucket is all you need for daily maintenance.
3. **Wash:** Check the label before you wash a fly mask. Some masks can be thrown into your washing machine or can be washed by hand in a bucket of water with a squirt of mild dish soap. Pay special attention to edging, scrubbing it between your fingers if needed. Always air-dry masks; never put them in a clothes dryer.
4. **Brush:** Hook-and-loop closure straps can become clogged with bits of dirt or hair, making them less “grippyy.” Use your stiff grooming brush on dry closures to remove trapped particles and restore them. To help prevent closure clogs, keep the mask fastened, especially when washing.
Life Cycles of External Pests

Understanding how and where insects breed and live can help you protect yourself and your horses.

By Nancy S. Loving, DVM

In the United States, just a handful of insect species are responsible for transmission of a number of significant diseases. Understanding the life cycle of each pest helps you get a handle on how to control and manage these pests, particularly by targeting specific habitats favorable to breeding.

The most prevalent of the insect pests that play a role in transmission of equine disease are: mosquitoes, stable flies, house flies, black flies, deer flies, horse flies, horn flies, bot flies, Culicoides midges and ticks.

The Life Cycles

Mosquitoes and most of the flies of concern undergo a life cycle referred to as “complete metamorphosis” that transitions the insect from egg to larva to pupa to adult. The last larval stage enters into a non-feeding pupal stage to later emerge as an adult insect.

Most insects don’t live long, but they make up for their short life span by breeding quickly, with females laying lots of eggs.

Mosquitoes

Mosquitoes are prolific and one of the more noxious pests in the world. They carry fatal viral diseases besides being an incredibly annoying nuisance.

Some lay eggs on the surface of shallow, quiet water, with the eggs hatching...
In general, horses should consume 1.5-2% of their body weight per day in forage. Within two to three days, this is called direct hatching. The eggs pass through the larval and pupal stages with adults appearing within seven to 10 days. The timeframe for full development depends on the food supply, larval density, and water temperature.

In late fall, female mosquitoes find places to hide and overwinter in a dormant state inside barns, stalls, buildings, tree holes, culverts, etc. Once the weather warms up, they emerge, take a blood meal, and lay eggs to renew the cycle.

Other mosquitoes go through a delayed hatching process—eggs are laid on moist substrates that once had standing water, but the eggs remain dormant for a time. The eggs need dryness for anywhere from several days to several weeks, and they might remain viable for months to years. Then, once immersed in water, they hatch.

Disturbing the water within the week it takes for mosquitoes to hatch is important for control. You can use mosquito dunks in large water sources and establish drainage of water from smaller areas. Aerators in ponds are also useful.

### Horse Flies and Deer Flies

Deer flies require aquatic habitats such as marshes, ponds, and streams. Horse flies are more varied in their environmental needs for development, using freshwater and saltwater marshes, streams, moist forest soils or decomposing wood.

Both of these large and very annoying flies lay up to 1,000 eggs per season on vegetation along pond or stream banks or in wetlands. Females of several species require a blood meal before they can reproduce.

After two to three days, the eggs hatch and fall to the ground. Horse fly larvae are predators, nourishing themselves from decaying organic matter as well as other insect larvae and worms. Horse flies take one to three years to complete this part of their life cycles, while deer flies can complete their life cycles in a year.

Once mature, the horse fly larvae move to dry areas to finish their development over several weeks to emerge as adults. Horse flies are the ultimate equine vampires. A USDA bulletin pointed out that each horse fly ingests 1 cc of blood at each feeding. If 20-30 flies feed for six hours, the horse loses 20 teaspoons, which over 10 days translates to a quart of blood!

### Black Flies, aka Buffalo Gnats

Black fly females require a blood meal for reproduction. They have a rapid life cycle with up to 500 eggs laid on submerged vegetation located in flowing water. The eggs generally hatch in just four to five days. The larval stages remain attached to stationary objects for one to six months; the duration depends on temperature and food supply.

The pupal stage of a black fly takes just a week. Then the fly emerges as an adult, which lives for two to three weeks.

### House Flies

A female house fly can lay as many as 150 eggs in a batch, with five to six batches laid in just a few days on damp, dark surfaces. Manure, compost and decomposing organic debris make favorable breeding sites.

The eggs hatch quickly, within a day, and the larvae feed off the debris for three to five days. Then they pupate for three to five days.
six days to emerge into a full-grown house fly, which can then start to reproduce within two to three days.

**Stable Flies**

Stable flies flourish in moist, decaying organic material. Even though a female stable fly only lives seven to 10 days, she can lay up to 800 eggs. Each clutch of eggs laid by the female requires a blood meal.

The eggs hatch within 24 hours; the larvae feed and mature over about 13 days, then they pupate. The entire life cycle takes two to four weeks, with most taking 28 days.

Once emerged as an adult stable fly, the female can mate within three to five days and lay eggs five to eight days after emergence.

**Horn Flies**

Horn flies need cow manure in which to lay eggs. Their full life cycle takes 10–20 days. They only live about three weeks, during which time they feed 20–30 times a day.

**Bot Flies** (*Gastrophilus* spp)

Each female bot fly lays 500–1,000 eggs on a horse’s hair, especially on the legs, shoulders, lips and throat area. As a horse grooms itself, the eggs make their way into the mouth, where they hatch into larvae to develop for several weeks. Once swallowed, they attach to the stomach lining for about 10 months. Then they detach from the stomach and are passed through the intestines into the feces. The larvae burrow into the ground to continue their development. They emerge as adult flies in three to 10 weeks to restart the cycle.

**Biting Midges** (*Culicoides*)

Another insect that prefers a moist habitat for development is a midge. Up to 150 eggs are laid on a moist surface such as saturated wood, marshes and bogs, or in water. They hatch within a week. Habitat preference is for damp, muddy areas, feces or decomposing vegetation.

Larvae develop over two weeks to a year, depending on the species. The pupal stage takes two to three days, then the adult emerges. Females need a blood meal to develop eggs. They feed on birds, reptiles and mammals. *Culicoides* begin feeding at dusk and continue through the night. Because they are poor fliers, they don’t tend to disperse more than one-half to 1 mile from where they developed.

Life span of midges ranges from 20-90 days depending on temperature conditions. During that time, females lay several egg masses.

**Ticks**

Ticks usually undergo four developmental stages: egg, six-legged larva, nymph and adult. Many ticks, such as the American dog tick (*Dermacentor variabilis*), require multiple hosts to achieve full development. For example, the egg hatches into a larva, which feeds off a mammal host then falls to the ground. There it molts to a nymph, which finds and attaches to a second mammal host.

Once the nymph has finished feeding, the nymph drops to the ground to molt into an adult, which finds and attaches to a third mammal host to feed, mate and drop again to the ground. Females lay their 3,000–8,000 eggs in the soil.

Ticks flourish in moist woodlands, vegetation and leaf litter around forest edges and grassy fields. Ticks can live up to two years, lying dormant (diapause) as eggs or nymphs in the soil.
Warming weather in spring that moves temperatures above freezing brings them out of their dormancy. Nymphs crawl up grass blades or along tree branches to wait until a potential warm-blooded host comes by. That could be you, atop your horse; it could be your horse; or it could be any number of other woodland or grassland mammals or birds.

Mammals that ticks prefer include mice, deer, squirrels, rabbits, livestock (including horses), dogs, cats and humans. Some ticks prefer birds or even cold-blooded amphibians or reptiles.

Some ticks go through all their life stages on a single host, only leaving the host to lay eggs. Some ticks are so tiny that they are difficult to see—some are no bigger than a poppy or sesame seed before they take a blood meal.

In many cases, a tick must feed for at least 24 hours to be able to transmit a pathogen. While some ticks can spread disease quickly, others take 48 hours or so of being attached to a host before infecting that host with disease.

Using This Information
Once you know about the preferred habitat of the pests that can inconvenience you or your horses, it then becomes easier to work on environmental control measures to minimize infestations.

Tick season for many species tends to coincide with warming weather. This is also the time of year when you are out and about with your horses in fields and forests, where ticks abound.

Warm weather days with temperatures above 32 degrees Fahrenheit occur even in the winter, so tick season can last all year. If the weather gets warm enough, unhatched eggs might hatch and nymphs might make awaken from dormancy, even if just for a short while. It is smart to be vigilant year-round in regard to ticks.

You’ll want to check yourself and your horse immediately upon finishing up a ride. Look in all the soft tissue areas on your horse—the udder, sheath, around the anus, behind the ears, and under the chin and throat. Check your horse all over. Before a tick fills itself with blood, it might be hard to see because some are so small.

As for yourself, remove your clothes and leave them outside or launder them immediately—at the very least, run them through a drying cycle. Go over yourself carefully or have a friend check areas you can’t examine yourself, including your head. There’s nothing more horrifying than finding a tick on yourself that is filled with blood, meaning it has been there for a while.

Mosquitoes are attracted to scents and perfumes that are found in lotions and laundry detergent. Wear light clothing, as that tends to be less of an attractant. In addition, the latest research suggests that zebra-striped fliesheets or blankets might help deter flies from landing on your horse.

Use permethrin or pyrethroid insect repellents to protect your horses, and use DEET or picaridin on yourself and/or your clothing. You can also spray your clothing with pyrethroid products.

Remove and compost manure as frequently as possible to eliminate it as a breeding site. Eliminate as many water-holding vessels as possible from your property; these could otherwise serve as a breeding habitat.

Clean out gutters, keep water tanks clean and fresh, and establish good drainage around barns, water tanks and parking areas to avoid shallow impressions in mud where mosquitoes and other moisture-loving insects like to breed.

Use dunks in large water sources. Mow grasses around the property; spray periodically with permethrin/pyrethrin products. Spray insecticide in crevices in the barn where mosquitoes and other insects might hide to overwinter.

With a little bit of thought and some sensible effort, you can help mitigate the impact of insects on your property. Mitigation efforts are beneficial for their protective effects on horse and human health and also making your horse more comfortable with fewer insects harassing him. SM
Vector-borne diseases globally account for more than 17% of all human infectious diseases, causing more than 700,000 human deaths annually, according to the World Health Organization. While there is no known number for equine disease cases and deaths caused by vectors (insects or ticks), we know the risk is real. Therefore, it behooves us as owners and managers of horse properties and multiple equids to ensure we are doing everything we can to prevent the spread of disease to our horses via insects and ticks.

One of the important ways we can reduce the risk of vector-borne diseases is to manage the property on which horses live with an eye to decreasing the conditions that insects and ticks find suitable. Let’s face it: If the vectors don’t come in contact with the horses as often, the disease risk is greatly diminished.

A study from the University of Florida about pest control on horse farms noted: “Many equine property owners have insufficient knowledge of the identification, biology and presence of filth fly pests on their properties, which is required to develop successful integrated pest manage-
ment programs. They continue to rely on insecticides because they lack adequate understanding of available alternatives. Although a comprehensive understanding of integrated pest management practices was not demonstrated by respondents, a willingness to protect themselves and their animals was apparent."

So, while insecticides are the first tools upon which horse folks rely, there are other things you can do to reduce the number of insects on your property and better protect your horses—and yourselves.

Pasture Management
Cutting back brush, weeds and hanging tree limbs from pastures is one way to reduce the habitats of disease-spreading vectors and reduce the incidence of “pests meeting horses.” Also keep in mind that mice and wildlife are hosts for ticks, so trying to reduce the number of deer and mice on your property will help reduce the tick population.

Unfortunately, sometimes the pests are coming onto your property from adjacent land. Sometimes the land is fallow and is home to deer, mice and an abundance of brush and weeds, making it the perfect haven for pest development. Other times there are horses or cattle on adjacent properties where perhaps the environment is not managed as well as your property. That means manure, weeds and standing water are perfect breeding grounds for disease vectors that can easily cross onto your property and affect your horses.

Since you can’t manage your neighbor’s property, you have to take those challenges into consideration when developing your own pest management program.

Manure Management
If horse manure is part of the life cycle of many “filth” flies that carry disease to horses, then logically, good manure management is an important part of preventing disease spread on your property.

But we all know that going out and picking up every pile of poop produced each day is a difficult, time-consuming and expensive chore. Then, once you have picked up the piles from the pastures and dry lots, you have to compost the manure or dispose of it. If you don’t, it is just as bad—or worse—than when it was dotting the landscape.

According to information on eXtension.org, the “average 1,000-pound horse will produce approximately 50 pounds of manure each day. That totals to about 8.5 tons per year.” So the smaller your property, the more important “poop patrol” is to your horse’s health.

You can discuss manure management strategies with your county extension agent and come up with a plan that you can put in place to help combat flies.

Eliminate Standing Water
According to the University of Illinois, mosquitoes can reproduce in as little as two tablespoons of water. Under ideal breeding conditions, that small amount of water only needs to exist for a mere five days for adult mosquitoes to develop.

What that tells you is that it is nearly impossible to eliminate all mosquito breeding habitats—but you can dramatically reduce them. Also understand that once female mosquitoes lay eggs in and around standing water, the eggs become fairly resistant to drying out, even when the water evaporates or is removed.

Therefore, even if you have done a fabulous job of reducing the amount of standing water in and around your

Using fans and fly spray can help deter pests from feeding on your stabled horses.

Eliminating horse manure is a great way to reduce the number of breeding sites for pests.
facility, when it rains again (or you water the arena, or someone tosses out another bucket of water, etc.), the eggs can become wet and produce the next crop of adult mosquitoes fairly quickly.

According to the Centers for Disease Control (CDC), the species of mosquito Aedes aegypti is known as a “container-breeding mosquito” because it likes to lay eggs in and around standing water, especially preferring man-made containers. This mosquito can carry equine diseases such as West Nile virus and the diseases that cause encephalitides (or brain swelling). The cause of the brain swelling is usually an arbovirus infection (such as West Nile virus [WNV] or Eastern equine encephalitis [EEE]) that is transmitted by the bite of an infected mosquito.

The female Aedes aegypti mosquitoes lay eggs on the walls of water-filled containers. The eggs stick to containers like glue and remain attached until they are scrubbed off. The eggs can survive for up to eight months after the water dries up. When it rains or water covers the eggs again, they hatch and become adults in about a week.

In 2016, the CDC reported that 47 states and the District of Columbia (DC) had 2,240 cases of arboviral disease in humans, including 2,150 WNV cases.

While there is no definitive information on the number of equine West Nile virus cases there were in 2018, the Equine Disease Communication Center had reports of positive cases in 38 of the contiguous United States. Many of those states had multiple cases reported. There is no official estimate of how many cases go unreported in equids each year.

Farm owners and managers should become aware of areas that could hold standing water and allow mosquitoes to breed. Those might include:
- trash around the property
- water tanks that aren’t cleaned regularly
- old tires/junk piles
- flower pots and bird baths
- stagnant creeks or ponds
- gutters on buildings

Simple ways to avoid standing water around your property include cleaning up trash (remember, two tablespoons of water is all that is needed for mosquitoes to breed) and cleaning out clogged roof gutters. Remember to turn over wheelbarrows when not in use and clean livestock watering troughs at least monthly.

When it is not possible to eliminate some breeding sites, you should try to control mosquito populations through the use of larvicides and, under special circumstances, adulticides. Such action should only be taken, however, in consultation with your local county extension agent or university specialist. If the application of such preparations is not advisable, you can use a species of fish that feed on mosquito larvae in places such as horse water tanks.

Weekly applications of mosquito dunks containing Bacillus thuringiensis sub. israelensis (BTI) or Bacillus sphaericus (BS) help control mosquito larvae in larger bodies of standing water, such as water troughs and ponds.

Building Management

There are many management practices that can help protect horses from insects. Keep horses indoors during peak mosquito activity times (dusk to dawn). Put screens on stalls to reduce mosquito entry. Use fans over the horses to help deter mosquitoes, which don’t fly well at higher wind velocities.

You should avoid using lights inside the stable at night whenever possible since mosquitoes are attracted to light. The use of electric bug “zappers” has been debated. These devices will draw insects, but if you are using them near your horses, you could be increasing the population of insects that don’t get “zapped” but that do get to feed on your animals.

Premise Sprays

Some areas have intense insect populations during specific seasons. The use of a permethrin-based premise spray can help mitigate that problem. You might have an automatic insecticide fogging system in your stable, or you can use a hand-held sprayer to cover areas outside of the barn. But be careful to stay away from aquatic habitats and bee areas and from areas where you spread predator wasps.

Other ways to reduce the number of insects around your buildings include applying residual insecticides to barn walls, ceilings and rafters to minimize overwintering of insects. Use different chemicals throughout the insect season to minimize development of resistance by house flies, horn flies and stable flies.

Take-Home Message

The use of insecticides on horses and around facilities can help reduce the number of insects feeding on your horses and spreading disease. As a farm or stable manager, you should also work to reduce manure and water sources that allow insects to develop. SM
Don’t Forget the Dogs

Some equine fly sprays can also be used on dogs. Learn how to determine which products can serve double duty around your barn.

By Katie Navarra

When your dog accompanies you to the barn or has his living quarters in the stable, he is as likely to be bothered by insects as your horse. Spray repellents help keep bothersome flies, ticks, mosquitoes and biting no-see-ums at bay. And depending on the product, one spray might safely protect both your horse and your dog.

But before you spray, read the label to make sure it’s approved for use in dogs. “A product labeled for one animal might not be labeled for another,” said Sonja L. Swiger, an associate professor and veterinary/medical extension entomologist for Texas A&M University. “Misuse or misdosage could be harmful or even fatal.”

Since horses are larger animals, a fly repellent can be applied more often or at a higher rate than is appropriate for smaller animals, such as dogs. For example, a spray might be approved for daily application on horses but only be suitable for weekly or monthly use on dogs.

Read the instructions to find out how to apply the repellent to the dog and in what quantities. A horse’s coat is not as dense as a dog’s. Simply misting the spray onto the horse’s body is usually sufficient, whereas on a dog, you might have to apply against the natural lay of the hair. As with horses, you don’t want the repellent spray to get into your dog’s eyes, nose or mouth. Shielding his eyes while spraying and using a damp cloth to apply repellent as a wipe around the face are important.

Typically, repellents for both species are permethrin-based insecticides or a formulation that has a natural base.

“Both will be equally safe, and maybe most are labeled for both species,” Swiger said. “Again, the big difference would be knowing the appropriate dosage/treatment for each species.”

Treating the dog directly is the most effective method of control, Swiger said. When it comes to dog beds in the kennel or the dog’s living space in barn, Swiger recommended against treating the bedding with chemicals.

“We recommend washing a dog’s bedding in hot water or buying new,” she said. “When it comes to fly control, treating the animal (the host) is much more effective than treating the bedding.”

The same is true for keeping mosquitoes away from your dog.

For products that are labeled for use in a bedding area, follow the label instructions. Treating the premises of the dog’s area such as baseboards, windows, doorways and localized areas of the floor can kill insects such as carpenter bees, cockroaches and other pests. Read the label closely for instructions on how much spray to use and how to apply it for best effectiveness.

If you’re giving your dog feed-through or topical insect repellents to control ticks and other pests, talk with your veterinarian about your intention to use a spray-on product. More isn’t always better.

The next time you’re shopping for a repellent, read the label to see if one product will serve all your needs and to be sure you’re using the product correctly.
Beat bugs 24/7.

Biting insects can be a horse’s worst nightmare. Stop mosquitoes, ticks and flies before they start. UltraShield® Red is made with four powerful active ingredients for rapid knockdown and kill. It lasts up to 7 days for protection that can really handle the heat—day and night.  

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¹Townsend L. Horse flies and deer flies. University of Kentucky EWTACYT-511. ©2019 W.F. Young, Inc.