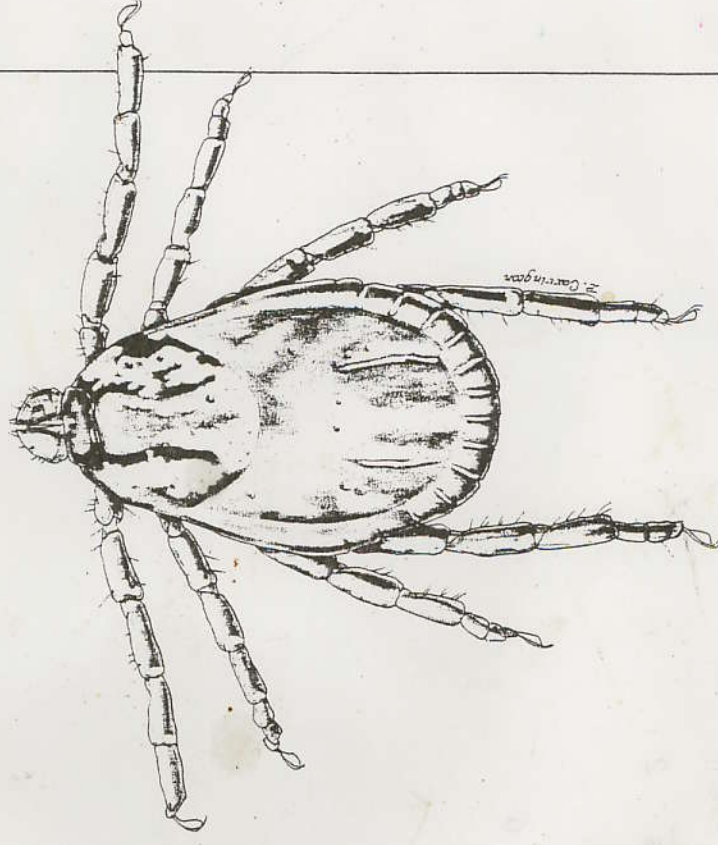


The External Parasites of (A Guide to Identification and Control) **Horses**



Michael F. Berney and H. D. Newson • Department of Entomology
Illustrations by Peter Carrington
Cooperative Extension Service • Michigan State University
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Introduction

This publication is intended for you, the horse person, to use in identifying and controlling the common insect and arthropod pests affecting horses in Michigan.

How to Use this Publication

The Table of Pesticide Primary Active Ingredients (Extension Bulletin E 2081S) is printed separately so that it may be regularly updated without reprinting or replacing the entire publication. Check your county Cooperative Extension Service Office for updates.

By using the following guide, you should be able to identify most external parasites. By reading the life history and control sections, you may better understand the circumstances leading to the presence of a pest on your horse and how you may alter your management program and equine housing to aid in its control.

Finally, by using the Table of Pesticide Primary Active Ingredients to determine which compounds are registered for control of which pests, you can make an educated selection of the appropriate pesticides to control the pest(s) present on your horse.

A Guide to the External Parasites of Horses

For each pest or pest-related symptom you observe on your horse, try to capture the pest, or at least look at it carefully, before using this guide. Always start with #1 (left hand column), and choose the statement that better fits the pest. The bold italic number that follows refers to the next pair of choices. Continue through the key, selecting the statement in each pair that better fits the pest you want to identify, until a selected choice leads to a pest identification.

Example

Starting with #1, the pest is flying (a), so you go to #2; the pest is biting (a), so you go to #5; the fly is larger than 1/4 inch long (b), so you go to #7; the fly is more than 1/3 inch long and stout-bodied (a), so it is a horse or deer fly.

1. a. Flying pest. **see 2**
b. Not flying pest. **see 9**
2. a. A fly with 1 pair of wings; bites and draws blood. **see 5**
b. A fly with 1 pair of wings; doesn't bite or draw blood. **see 3**
3. a. Lays visible eggs on the nose, chin or legs of the horse **Bot flies**
b. Does not lay eggs on the horse. **see 4**
4. a. Flies, houseflylike in appearance, cluster around eyes and nose; are darker and larger than houseflies (most common on horses kept near or with cattle). **Face flies**
b. Flies, houseflylike in appearance, smaller and lighter than above (present in all stables). **Houseflies**

5. a. Fly smaller than 1/4 inch. *see 6*
 b. Fly larger than 1/4 inch. *see 7*
6. a. Fly, mosquito-like in appearance, night feeding only. **Bitting Midges**
 b. Fly more stout bodied, black and humpbacked in appearance; a day feeder only. **Black flies**
7. a. Fly 1/3 to 1 inch in length, heavy-bodied, often with pictured wings; wounds caused by fly are easily visible with blood pooling on the skin surface; most common on top of head, back and tailhead. **Horse and deer flies**
 b. Fly smaller than 1/3 inch or light, thin body. *see 8*
8. a. Fly light bodied, with long, thin legs and proboscis long and piercing. **Mosquitoes**
 b. Fly housefly-like in appearance and size, a day feeder with a very painful bite. **Stable flies**
9. a. Large, flat arachnid (8 legs), nearly oval, from 1/8 to 1/2 inch in diameter, attached to the skin and difficult to remove. **Ticks**
 b. Smaller arachnid (6 or 8 legs) may be impossible to see with naked eye, may be barely visible. *see 10*
10. a. 1/8 to 1/10 inch long, visible; rubbing and scratching in area of infestation, head, neck, base of tail, jaw or flanks. **Lice**
 b. Infested portions of the skin show rubbing; pests are not visible. *see 11*
11. a. Infested area of skin "weepy," majority of hair lost, pimplelike structures form, skin rough and scaly; persistent and spreading condition. **Mange mites**
 b. Infested areas are acutely irritated, pimplelike structures *do not* form, generally transient and not spreading. **Hay or grain itch mites**

Formulations, Application: Methods and Sites of Application

Formulations

The most common formulations used by horse owners are ready to use preparations. These include aerosols, wipes, dusts and sprayable liquids. Convenience and control of the concentration of the active ingredient(s) are the benefits of these formulations, but in general, they are the most expensive per unit of active ingredients.

The formulations that require mixing—wetable powders and emulsifiable concentrates—are less commonly purchased but widely available. The cost per unit of active ingredient in these is generally less, but they can be considerably less convenient to use. A sprayer of some type is required, as is careful measuring and mixing of these materials. Once mixed, they usually cannot be saved for more than a few hours. Cleaning and maintenance of the sprayer is necessary after each use.

Application Methods

Aerosol cans, dusts and liquid wipes all come packaged in applicator containers. In the case of the wipes, a sponge or rag also may be necessary. Some liquids come in trigger spray bottles which may be refilled. These sprayers require little or no maintenance but have a short useful life.

A wide variety of hand and powered sprayers are available and may be used to apply liquids. This type of equipment is generally reserved for use in spraying large numbers of horses and/or for spraying buildings, fences and other structures. Regardless of the type of sprayer used, it must be kept scrupulously clean and free of any pesticides or chemicals other than those to be applied.

Sites of Application

The basic sites of pesticide application for control of the external parasites of horses include the horse's coat, the inside and outside of barns and sheds, fences and other structures, and vegetation beyond the feeding reach of the horse. Under no circumstances should pesticides be applied to the eyes, nostrils or mouth of the horse. Applications to the ears should be made carefully and strictly by label directions. Pay special attention and follow all application instructions on the label—some products may not be safe to apply directly to the horse.

Applications of pesticides to the head of the horse should be made with great care to avoid contact with the eyes, inner ears, nostrils and mouth. Wipes are probably the safest to use here. Some horses react violently to being sprayed in the face, regardless of how gently it's done, and may endanger the handler.

The Classes of Insecticides/Acaracides

Organophosphates

This group includes chlorpyrifos, DDDVP, dioxathion, malathion and ronnel. In general, this group of insecticides provides fair to good control of several insect species and fair control of ticks.

Carbamates

This group is represented here by a single active ingredient: carbaryl. It is only fair in control of the pests listed on the label.

Chlorinated hydrocarbons

This group includes lindane, methoxychlor and naled. Lindane is probably still unmatched for control of mangle mites and lice. The other uses of these active ingredients are probably fair to good.

Synthetic pyrethroids

This group includes allethrin, permethrin and resmethrin. Allethrin and resmethrin are less or equally as effective as pyrethrin. Permethrin is generally very effective where resistance has not developed.

Botanicals

Rotenone and pyrethrin are derived from plants. They are generally short-lived with good to excellent short term control.

Repellents

Butoxypropylene glycol and dipropyl isocinchonemate are short-lived compounds that repel some flying pests.

Calcium polysulfide (lime sulfur)

This compound is an alternative for control of lice. It can be more irritating to the skin than other chemicals.

Mineral Oil

Mineral oil is useful as a barrier application for biting flies in ears.

Pesticides: Their Selection and Use

At the time this list was compiled, several hundred products were available to control one or more of the external parasites of horses. It is impossible to compile a complete list of all formulations of these products, and the result would not be very useful. We, therefore, have compiled a complete list of *active ingredients*, rather than formulations, and the horse pests for which they are approved control methods. When purchasing an insecticide for use on your horse, you should find this list helpful in selecting an appropriate compound.

Be sure to follow the label exactly. Not all insecticides containing these active ingredients are formulated exactly the same. *Information contained on the label takes precedence over that printed here.*

Pesticide Efficacy

All of the active ingredients listed for the control of a particular pest will give some control of that pest. A wide variety of circumstances may lead to one active ingredient's being significantly more effective than another. Resistance may be the explanation if a pesticide fails to control a pest when applied at the same rate and concentration at which it formerly controlled this pest. Insect resistance to insecticides develops when the same active ingredient or similar active ingredients are applied regularly to the same insect population, usually over an extended period of time. The housefly, face fly and other flies, especially, have the potential to develop resistance quickly. Using non-chemical control measures is necessary if resistance development is to be delayed or avoided.

Horse Bot Flies

Bots are the larvae of bot flies (gadflies).

There are three species of "stomach bots" affecting horses in the United States.

Importance

When present in the digestive tract, bots can cause a gastrointestinal upset. If large numbers are present, they can block the stomach outlet, causing colic. On rare occasions this may result in the rupture of the stomach wall and death.

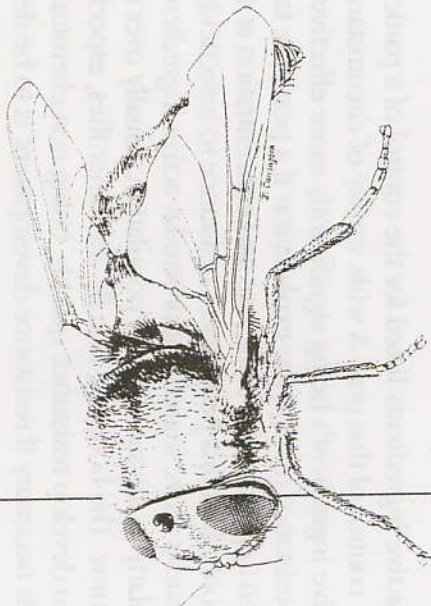
Description

The adults of all three species of botflies are 1/2 to 3/4 inch long and superficially resemble honeybees. Fully grown larvae are 1/2 to 2/3 inch long and very leathery. They have two prominent mouth hooks, and each segment is defined by a complete, circle of obvious spines. The overall appearance is that of an extremely stout, screwlike maggot.

Life Histories

The common horse bot fly, *Gasterophilus intestinalis*

The adult females dart about the forelegs of horses attaching the light yellow eggs to the hairs there. Less commonly, they may also attach them to the hairs on the flanks, belly or shoulders. As the horse rubs its muzzle and tongue over the areas where eggs are attached, the larvae within the eggs react to the change in temperature and leave the eggs. Normally this occurs at least 5 days after the eggs are attached, but in cool weather eggs may remain viable for many weeks. As the larvae hatch, they are picked up by licking and enter the tongue, where they excavate galleries in the mucous membrane. The larvae remain there for 2 to 4 weeks before migrating to the cardiac portion of the stomach and attaching to the stomach lining until the following spring or summer. At this time, they detach from the stomach and pass out with the feces. The



Horse Bot Fly
Gasterophilus intestinalis



Actual size

larvae then pupate in dry soil or dried feces and emerge as new adult flies in 3 to 5 weeks. The adult female survives about 1 week and lays up to 500 eggs.

The nose fly or nose bot fly, *Gasterophilus haemorrhoidalis*

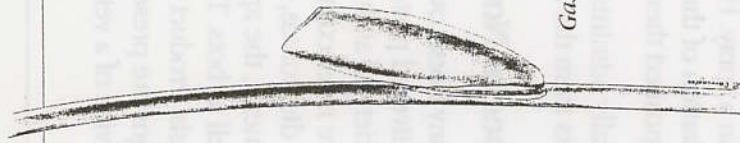
The adult female of this species is distinguished by an orange-red terminal segment and is known as the "red-tailed bot." This insect "strikes" the horse on the nose region in the process of attaching its black eggs to the fine hairs along the lips. The larvae hatch in 2 to 4 days and penetrate the lip membranes and tongue, where they remain for 5 to 6 weeks. They then migrate to the stomach and remain attached to the stomach wall through the winter. In early spring the fully grown larvae detach from the stomach and reattach near the anus before finally dropping to the ground and pupating in dry soil or feces. Adults emerge in 3 to 5 weeks, or longer under cold, dry weather conditions.

The throat bot fly or chin fly, *Gasterophilus nasalis*

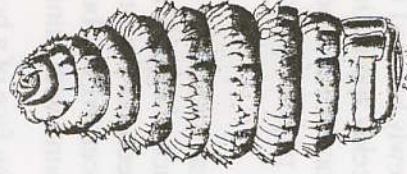
The adult female attaches her eggs to hairs along the underside of the jaw in late spring and early summer. The darting action of the fly disturbs horses intensely, causing them to toss their heads. The larvae hatch in 3 to 5 days without any outside stimulus. Newly hatched larvae crawl along the outside of the jaw, enter the mouth between the lips and burrow into the gums around the teeth. In some cases, larvae in the gums cause the formation of large amounts of pus and produce severe irritation in the mouth. The larvae remain in the gums for about 4 weeks, then move down into the distal part of the stomach and the proximal duodenum, where they aggregate in groups. Further development follows the patterns of *G. intestinalis*.

Management

Sponging with warm water (104-118 degrees F) will cause the hatch of *G. intestinalis* eggs. Using this treatment on cool days (60 degrees F or less), is most effective. The addition of an insecticide to the water on



Gasterophilus intestinalis
egg



Gasterophilus intestinalis
larvae

warm days enhances effectiveness. Topical application of spray or wipe on insecticides will kill newly hatched larvae and reduce the number reaching the stomach. Weekly applications are adequate for *G. intestinalis*. The shorter incubation times of *G. nasalis* and *G. hemorrhoidalis* eggs may require applications 2 to 3 times per week to produce the same effect.

Before applying any topical insecticide for bot larvae management, carefully check for the presence of eggs. The eggs of the common botfly are light colored and easily seen on the forelegs. The eggs of the other two species are less easily discerned, but because they occur over confined areas, they may still be found with minimal effort.

Pesticide application to the face of a horse is safer if done with a wipe than a spray. Horses react unfavorably to being sprayed in the face, and irritation of the eyes, mouth and nose may occur if insecticides are deposited there.

Orally administered insecticides are available as treatments to remove bots from the stomach.

Special Notes on Bot Control—Larval Stages

Many horse owners control the larval stage of bots by using a syringe-delivered paste applied into the mouth. These pastes can contain a variety of anthelmintics, some of which also will control botfly larvae. The most commonly used compounds contain *Ivermectin*, *Trichlorfon* or *dichlorvos*, alone or in combination with other compounds. In general, the applications are intended to control a variety of worms as well as bots. These treatments usually are applied on an as needed basis. Product and timing depends on when and what kinds of clinical signs are present. Before selecting or giving the medication, obtain the advice of a veterinarian.

Horse Flies and Deer Flies

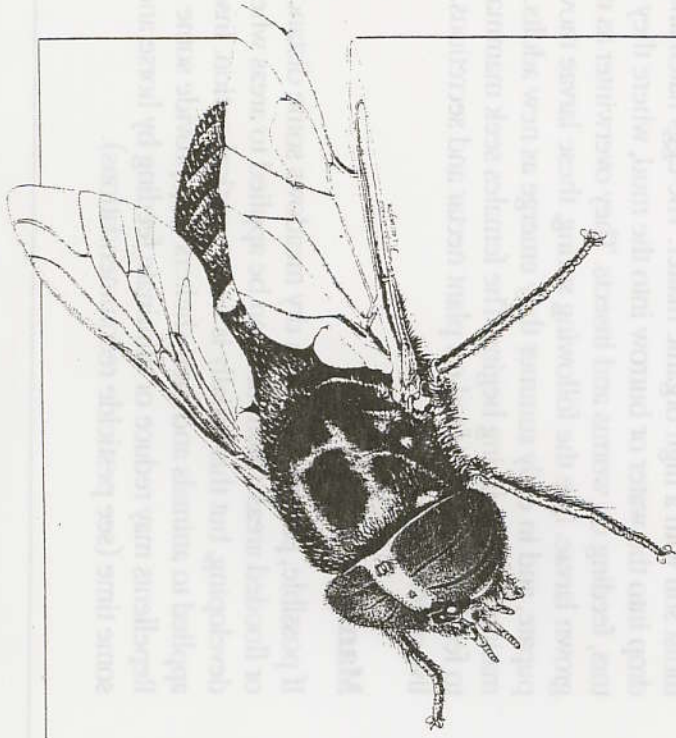
Horse flies and deer flies (*Tabanus*, *Chrysops* and *Hybomitra* spp.) can be serious pests of horses in Michigan. They occur throughout the state but are most numerous near wet or swampy areas.

Importance

Horse and deer flies are capable of injuring horses in a variety of ways. The bites of this group are extremely painful. Females feed on pools of blood on the surface of the horse's skin that result from the deep slashes inflicted by their blade-like mouthparts. Blood loss can be serious when flies are numerous. Both groups have also been implicated in the transmission of equine infectious anemia in the United States. Horses may also become injured while attempting to avoid or drive off these flies.

Description

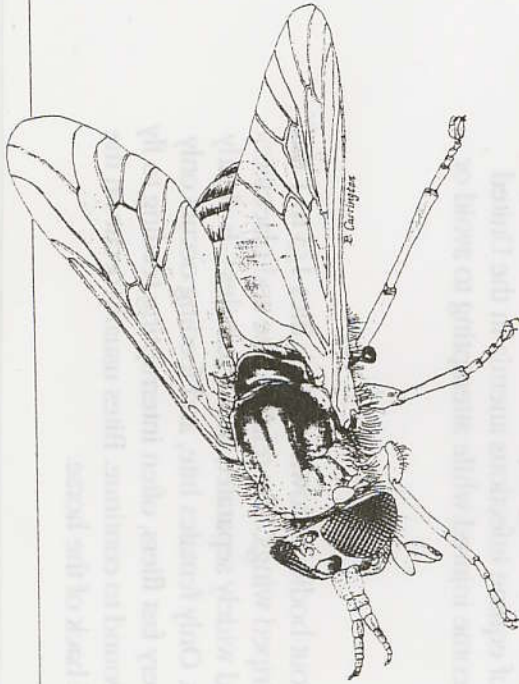
Horse and deer flies are stout-bodied, brown to black flies 1/3 to 1 inch long. They have clear or striped wings. The relative size and placement of the eyes—very large and widely separated in the females—is clearly distinctive among the flies. Only females bite, and feeding occurs only during the day. They are very fast fliers, often interrupting feeding to fly off, only to return to the wound to continue. Bites usually occur on the head, neck, shoulders and back of the horse.



Horse Fly
Hybomitra asiophthalma



Actual size



Deer Fly
Chrysops indus



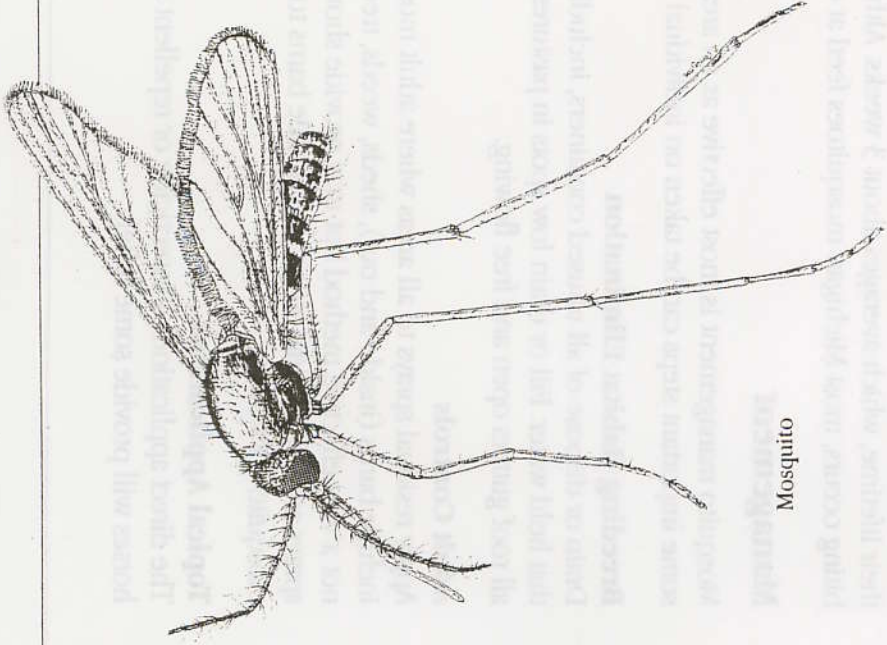
Actual size

Life Cycle

Most horses and deer flies have only one generation per year. During the summer, adult females lay eggs on vegetation above still water or moist soil with a high organic matter. The eggs hatch and the larvae drop into the water or burrow into the mud, where they live as predators, feeding on worms and insects. They overwinter as nearly fully grown larvae. Late the following spring, these larvae move to dry soil to pupate, and in early summer they emerge as new adults. Soon after this, mating and egg laying begins. The females seek mammals upon which to feed, while males feed on plant nectar and secretions. The adults may live as long as 6 weeks.

Management

If possible, pasture horses in dry meadows some distance from low, wet or flooded areas. Chemicals can be applied to areas where larvae are developing, but this usually is not a practical option. Insecticides applied to animals and their shelters may provide some control. Repellents may reduce or eliminate feeding by horse and deer flies for some time (see pesticide recommendations).



Mosquito



Actual size

Mosquitoes

Several species of mosquitoes attack horses in Michigan.

Importance

Mosquitoes, like all the other biting flies, can cause injury to horses in several ways—direct blood loss and injuries incurred by horses attempting to avoid or drive off mosquitoes are two. The most important, however, is the potential for transmission of the equine encephalitis viruses, which can be fatal to unvaccinated horses.

Description

Mosquitoes are familiar to all of us as slender-bodied, long-legged flies about 1/2 inch long. They have a single pair of delicate wings.

Life Cycle

Female mosquitoes found in Michigan lay their eggs either on standing water in ponds or lakes or in almost any type of open container that will hold water, or on moist soil in locations that are subject to periodic flooding. At midsummer temperatures, the time for development from the egg stage to adult can be as short as 10 days. Only females feed on blood which they utilize to produce eggs. Normally, one full blood meal is required to produce a single batch of eggs, up to 300 or more,

and egg development is complete in about 4 to 5 days. Females may take several blood meals and produce a number of egg batches during their lifetime, which averages about 3 weeks. Although some daytime biting occurs, most Michigan mosquitoes feed at dusk and dawn.

Management

Mosquito management is most effective as an areawide project, but some important steps can be taken on individual farms.

Breeding Habitat Elimination

Drain or dispose of all unused containers, including unused stock tanks, that hold water. Fill or drain low spots in pastures and corrals, and keep all roof gutters open and free flowing.

Adult Controls

Apply residual sprays to all areas where adult mosquitoes rest. These include barns (inside and out), sheds, weeds, trees and shrubs. This is not a very effective method but may provide short-term relief. Space sprays and insecticidal strips used inside barns to control flies will aid in mosquito control.

Topical Applications

The direct application of insecticide or repellent sprays or wipes to horses will provide some relief.





Actual size

The Stable Fly

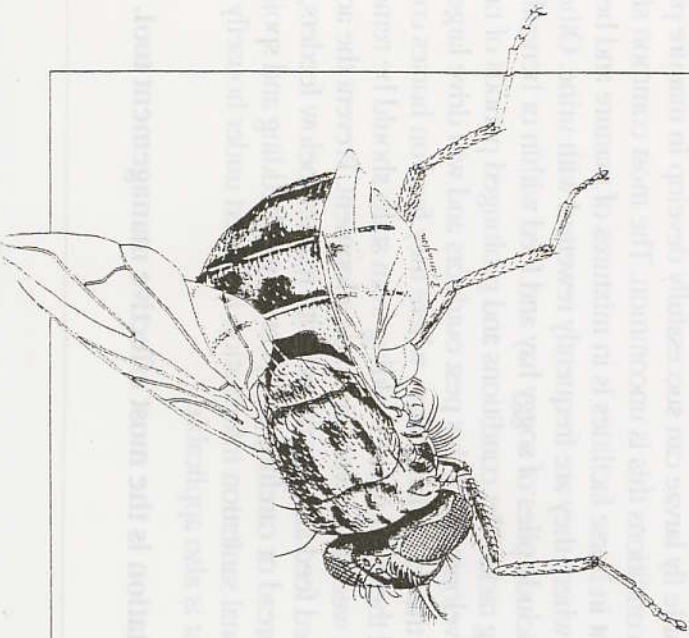
The stable fly, *Stomoxys calcitrans*, is the most serious blood-sucking fly attacking horses in Michigan.

Importance

Both male and female stable flies feed on blood outdoors and during the day. They inflict a painful bite and may feed in several spots on one animal or on several animals before completing their blood meal. This interrupted feeding usually results in several wounds per feeding. Thus, with frequent interruptions, they spend a total of approximately 30 minutes per day feeding. The remainder of the day is spent resting in the shade of trees, fence posts and buildings. Horses suffer in several ways from stable flies. Direct blood loss and loss of condition due to continuous attacks, and injury incurred while avoiding or driving off attacks are common. Stable flies are also intermediate hosts of *Setaria* spp. and *Habronema* spp. These are parasitic worms of the body cavity and digestive tract, respectively. The stable fly has also been implicated in the transmission of equine infectious anemia (EIA).

Description

The adult stable fly is very similar to the housefly in size and color, but is more robust with a broader abdomen. It is generally brownish gray



Stable Fly
S. calcitrans

with a greenish yellow sheen. The abdomen is more or less checkered, and the mouthparts protrude knife-like in front of the head.

Life History

Female stable flies lay eggs throughout the summer and early fall. These are deposited in moist, decaying vegetable matter, such as piles of hay or straw, grain or other feed, and mixtures of bedding and manure. The eggs are small, 1 mm long, and are laid directly in the wet plant material. They hatch in 2 to 5 days. Newly hatched larvae feed on the moist decaying material and complete development in 14 to 25 days. They pupate in a dryer portion of the vegetable matter and emerge as adult flies in 7 to 14 days. Adults live for approximately 3 weeks. Females lay four or five sets of 25 to 50 eggs during their lifetime.

Management

Although stable fly larvae can successfully develop in manure piles, under field conditions this is uncommon. The most common site for development in horse facilities is in mixtures of manure and bedding left in stalls where they are frequently rewetted with urine. Other common sites include piles of soggy hay and feed within or beneath outdoor feeding racks. Wet conditions and prolonged periods of rain also favor the development of this pest outdoors and will drive large numbers of the adults into barns, where they feed on horses confined or sheltered there. All moist bedding from stalls should be removed at least once a week to prevent larval development. Prevent the accumulation of wasted feed and hay mixed with manure below feeders, or promptly spread or carefully compost all wet bedding and spoiled wet hay. Additional sanitation information included under housefly management is also applicable.

Good sanitation is the most effective management tool.

Biting Midges

The biting midges, *Culicoides* spp. and *Leptoconops* spp., can be a significant threat to the health of horses in Michigan.

Importance

Variously known as “punkies,” “no-see-ums” and “sand flies,” this group of flies can affect horses in several ways. Direct loss of blood can be a problem, as well as the irritation caused by the bites. In sensitive individuals, the resultant swellings and lesions may persist for several days. These feeding wounds usually occur on the neck, head, withers, back and tailhead and can be complicated by secondary infections caused by scratching or rubbing. The nematode that causes fistulous withers in horses (*Onchocerca cervicalis*) is transmitted by members of this group. The immature form of this same nematode can also cause severe eye problems.

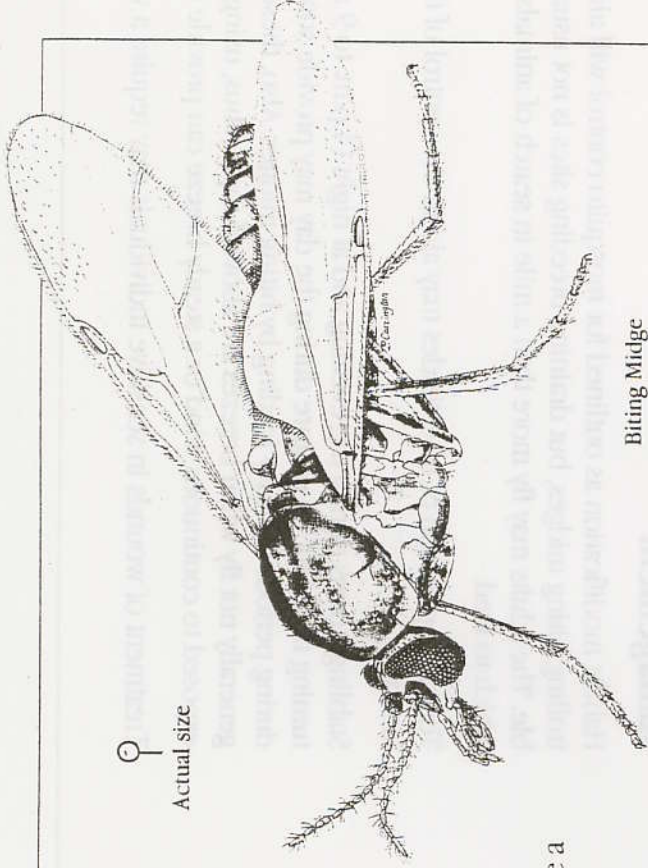
Description

As the popular name “no-see-um” indicates, these flies are very small, usually less than 1 millimeter long. They resemble many other species of gnats and are usually distinguished by the fact that they bite—few other gnats of their size do.

Life History

Most of the members of this group that are important as pests of horses in Michigan complete their larval development in water, such as that

Actual size



Biting Midge
Culicoides variipennis

found in tree holes, artificial containers, swamps, lakes and streams. Several species may occur in the same area and attack horses from early spring through to late fall. Large numbers of adults emerge at one time. At such times, the annoyance to horses may be very significant. Most of the species in Michigan fly and feed at dusk and during the hours of darkness.

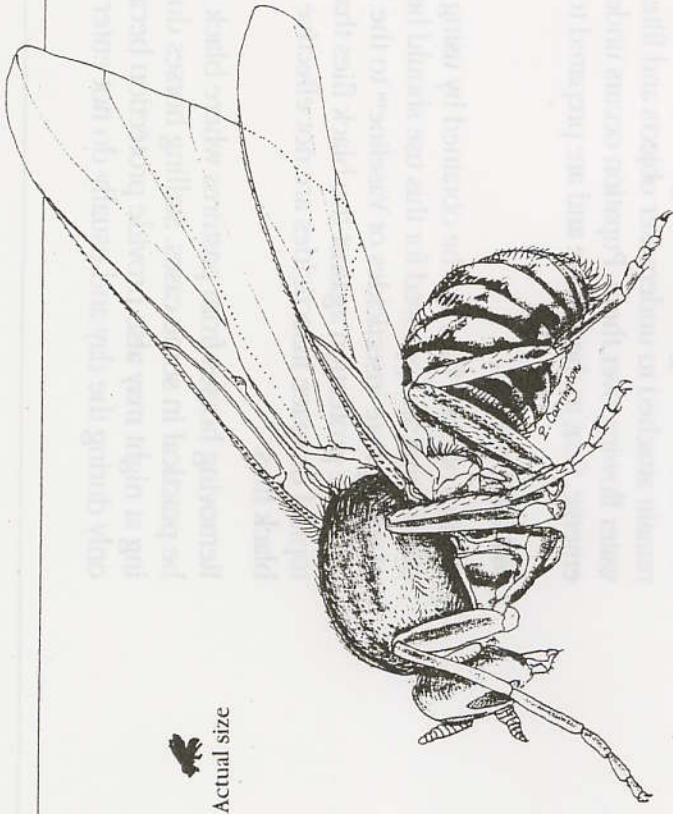
Management

Habitat modification as outlined for mosquito control will aid in controlling biting midges, but draining breeding sites is not usually possible. The adults may fly more than a mile in search of animals upon which to feed.

Topical application of insecticides may aid in the control of these insects.

Stabling horses during the evening and at night (4 p.m. to 9 a.m.) and turning them out on pasture during the day may provide some relief during periods of heavy feeding by biting midges. Also, these pests will generally not fly when breezes are above 3 mph. Thus, using pastures exposed to continuous wind or a steady breeze can provide some relief.

Treatment of wounds in sensitive individuals may require a veterinarian.



Black Fly
Simulium spp.

 Actual size

Black Flies

Black flies, *Simulium* spp., may be severe seasonal parasites of horses in some areas of Michigan.

Importance

Black flies feeding on horses can irritate them to such an extent that they may be difficult or impossible to ride. Anemia resulting from blood loss is also possible when large numbers of flies feed on an animal, and the wounds they produce are usually swollen and irritated. Severe reactions to these bites may occur, and toxemia or anaphylactic shock resulting in death has been reported. One species feeds exclusively in the ears and produces scabbing and thickening of the ear that can result in disfigurement or even closure of the ear canal.

Description

Adult black flies are small, 1/12th to 1/5th inch long, and dark colored with a characteristic humpbacked appearance. The females feed on blood, and the area of the horse upon which they feed can be characteristic for each species.

Life History

Depending upon the species, eggs are laid at varying times of the year in masses or strings on submerged objects in moving water. The larvae remain attached to underwater objects and filter their food out of the water flowing over them. Pupation occurs underwater and the adults emerge, float to the surface and are prepared to fly immediately.

Management

Control of black flies can be obtained by using larvicides in streams, but only chemicals approved for this use should be utilized. The application of appropriate insecticides or Vaseline™ to the interiors of horses' ears will give protection against the black flies that feed there. In general, topical or space insecticides are not effective controls for adult black flies.

Removing horses from pastures where black flies are a problem may be practical in some cases. Stalling horses during the day and pasturing at night may also provide protection because black flies feed only during the day and usually do not enter buildings to feed.

Face Flies

The face fly, *Musca autumnalis*, is a minor pest of horses in Michigan.

Importance

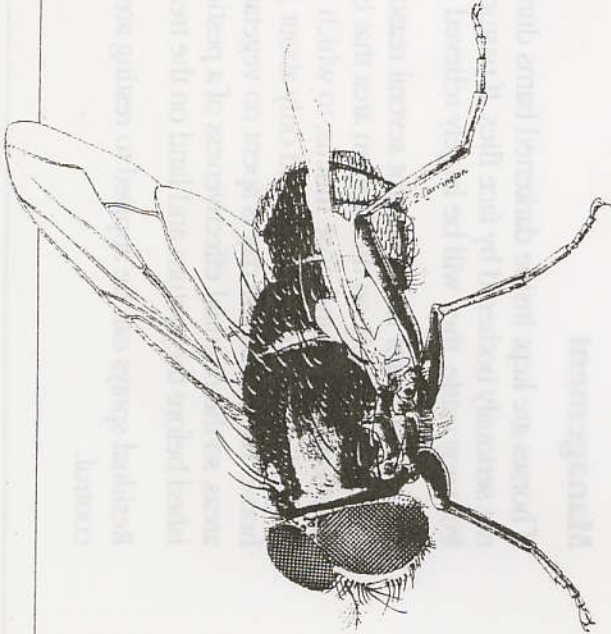
Face flies feed on the mucous secretions from the eyes and nostrils of horses, as well as on blood oozing from injuries and wounds caused by horse flies and stable flies. The presence of face flies within the nostrils and about the eyes is very irritating, so loss of condition due to this constant irritation is possible. Incidental injuries incurred while attempting to fend off face flies are also possible. Face flies have been implicated in the transmission of the eye worm *Thelazia lacrimalis*.

Description

Adult face flies are similar in appearance to, but slightly larger than, houseflies. The abdomen of the female *M. autumnalis* is darker on the sides than that of the housefly. The eyes of the male face fly nearly meet in the center of the face, a diagnostic characteristic that distinguishes face flies from houseflies.

Life History

Adult face flies overwinter unmated in large groups in protected areas of buildings. In spring they emerge, feed and mate. In general, only the



Face Fly

Musca autumnalis



Actual size

females feed on animals, while the males feed on plant secretions and the liquid portion of manure.

Females lay eggs just beneath the surface of very fresh piles of cow manure. The eggs hatch in approximately 1 day. The larvae pupate after 2½ to 4 days. As they prepare to pupate, they depart the manure piles and enter the nearby soil. Here they remain as pupae for approximately 7 days before emerging as new adults.

Adult feeding occurs outside in the daylight, and 75 to 100 flies per animal are not unusual. Face flies are more common on horses kept with or near cattle.

Management

If horses are kept inside darkened barns during daylight hours, they are not seriously bothered by face flies. If pastured substantial distances from any cattle, they will be largely relieved of this pest.

Chemical control is difficult for several reasons. First, the females land almost exclusively on the face, an area that is difficult to treat; secondly, they feed on eye and nose mucus, to which pesticides must not be applied; and thirdly, they spend only about 30 minutes per day on the horse. The rest of the day is spent on vegetation and in surrounding areas, so the residual effectiveness of a pesticide may have greatly diminished before they return and land on the treated animal.

Residual sprays can be applied to resting areas to achieve some adult control.

Houseflies

Houseflies, *Musca domestica*, are frequently the most numerous flies found in association with horses.

Importance

Houseflies usually are only a minor annoyance to horses. They do not bite and are generally less irritating to horses than other flies. Houseflies can be an intermediate host for *Habronema muscae*, a roundworm of horses, and transmit this nematode to horses. The potential for transmission of diseases and other parasites by this fly is very real.

Description

The housefly is familiar to all. It is gray, 1/4 to 1/3 inch long, with four dark stripes running the length of the top of the thorax between the wings. The eyes are separate in both sexes but much closer together in the males.

Life History

Adult females lay eggs in almost any decaying organic matter. Manure of domestic animals, including horses, is an ideal medium for larval development. Eggs hatch in 8 to 12 hours, larvae develop in the medium for 5 days and remain as pupae for 5 more days before emerging as new adults. Both sexes of the adults feed on almost any liquid organic material. Their habit of regurgitating the stomach contents onto the current food source and then lapping up the former stomach con-



House Fly
Musca domestica



Actual size

tents in addition to a portion of the new food source add to their obvious potential as disease vectors.

Management

Sanitation

Disposal or proper composting of all manure on a weekly basis will hold down housefly populations. Thorough scraping of all stalls, pens and corrals, removal of all spilled or rotting feed and hay, and the thin distribution of this material by means of a flail spreader will prevent fly development within it.

Many areas are not routinely cleaned in otherwise thorough sanitation efforts. These can include, but are not limited to, areas around fence posts and garbage cans, outside and under feed troughs and hay racks, bedding storage areas, corners, feed storage areas, under and around water tanks, silo loading and unloading areas, and, of course, inside "empty" manure spreaders.

Flies will not lay eggs in dry manure, bedding, straw, hay or soil, but will frequently lay large numbers of eggs in low, moist spots in corrals and pastures if sufficient manure or other organic matter is present there. Fill in or drain these areas.

Residual Sprays

Sprays can be applied to the interiors and exteriors of buildings as well

as nearby shrubs and trees to help control houseflies. This will not be effective without proper sanitation and so should not be the sole method of fly control.

Insecticidal Baits

Baits can help with adult fly control. Use caution to keep livestock and children away from them.

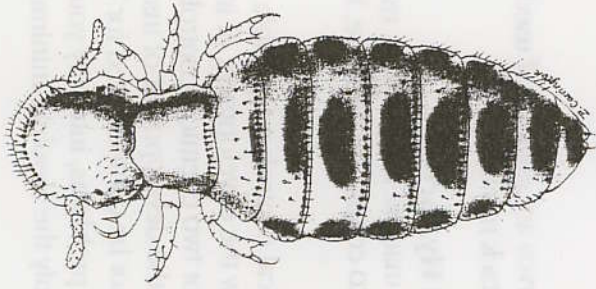
Insecticidal Strips

"Pest strips" containing dichlorvos are effective if used in enclosed areas, such as feed rooms and tack rooms.

Insecticides Applied to Kill Fly Larvae

Some sprays can be applied to manure and to other media where larvae are developing. This will help to control larvae there, but is not a substitute for sanitation.

Integrating as many non-chemical controls as possible with a chemical fly control program should slow the development of insecticide resistance by flies. Reliance on one or two chemical controls rather than proper sanitation will enhance the development of insecticide resistance. Poor sanitation cannot be compensated for by extra sprays. If you have insecticide resistance problems, intensify your non-chemical management of flies and use only the absolute minimum number of insecticide sprays.



Biting Louse
Bovicola equi

Lice (*Pediculosis*)

Two types of lice infest horses in Michigan. The first is biting lice (Mallophaga) and the second is sucking lice (Anoplura). The biting louse of horses is *Bovicola equi*; the sucking louse is *Haematopinus asinii*.

Importance

Louse infestations may produce severe skin irritation and itching, rubbing and missing patches of hair that result from attempts to rub or scratch off these pests. Thus, a patchy coat and surface lesions can sometimes result from louse infestations. Large numbers of *H. asinii* can produce extensive blood loss and anemia in horses. Though they occur throughout the year, both species seem most prevalent during the winter, when the coat is full. Louse infestations occur most often and are most severe in horses with nutritional or other debilitating problems.

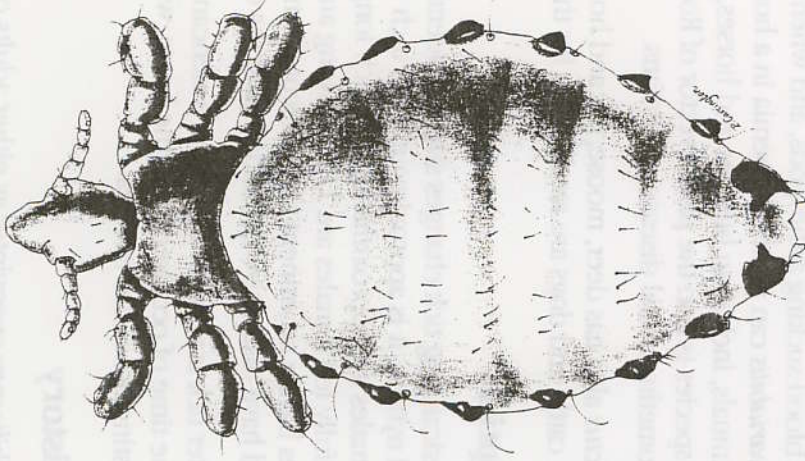
Description

The biting louse, *B. equi*, is very small, about 1/10 inch long, and chestnut brown, with a yellow abdomen and nine brown crossbands on the abdomen. These lice are quite broad and very flat.

The sucking louse, *H. asinii*, is also small, about 1/8 inch long, and gray. It is also broad in the abdomen but much narrower in the head than *B. equi*.



Actual size



Sucking Louse
Haematopinus asini

Life History

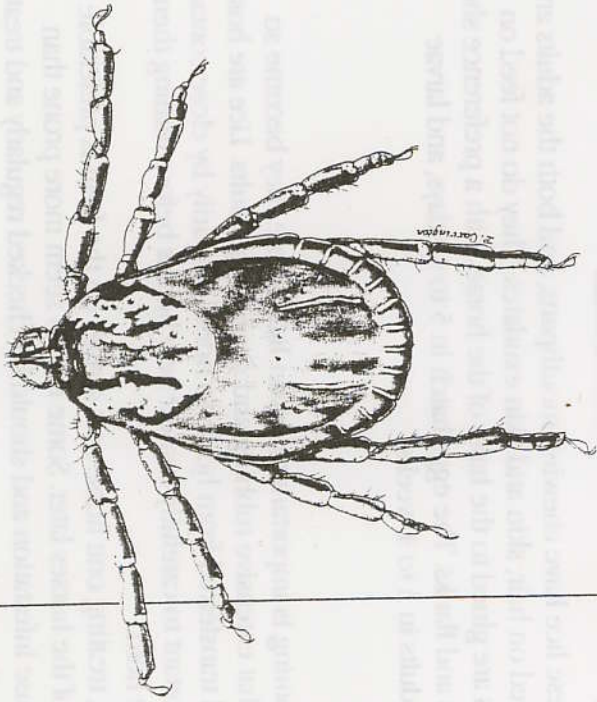
H. asini. All life stages occur on the horse. The juveniles and adults use their piercing, sucking mouthparts to obtain blood from the skin. Eggs are attached to hair with "glue" and hatch in 11 to 20 days. The juveniles complete development to adults in 2 to 4 weeks. These lice are more common and a good deal more irritating to horses than the biting louse. They are most numerous on the head, neck and base of the tail, though they can live elsewhere on the animal.

B. equi. These lice have chewing mouthparts, and both the adults and juveniles feed on hair, skin and skin exudates. They do not feed on blood. Eggs are glued to the hairs of the horse, with a preference shown for the jaws and flanks. The eggs hatch in 5 to 10 days, and larvae mature to adults in 3 to 4 weeks.

Control

Proper grooming is important to detect lice before they become so numerous that extensive rubbing and scratching results. Lice are host specific and transferred from horse to horse primarily by close contact, so it is important to carefully inspect new horses before turning them out with the herd.

If necessary, treating one horse as it arrives on the farm is preferable to treating all of the horses later. Some horses seem more prone than others to louse infestation and should be checked regularly and treated as necessary. Frequently, two treatments spaced 2 weeks apart are necessary to achieve control.



Tick
Dermacentor variabilis



Actual size

Ticks

The American dog tick, *Dermacentor variabilis*, and the winter tick, *Dermacentor albipictus*, are the species of ticks most commonly found on horses in Michigan.

Importance

Ticks are blood-sucking arthropods, and when present in large numbers, *D. variabilis* can produce anemia in a horse. Dogs, deer and other large mammals, including humans and horses, are the hosts for adults. This tick species is also the prime vector of Rocky Mountain spotted fever, a sometimes fatal disease of humans.

D. albipictus also has deer, moose, elk and horses as usual hosts. Humans, cattle and dogs are rarely hosts for this species.

Description

The American dog tick changes size considerably through its life. As a larva and nymph, it is approximately 1/8 inch long. The males and unfed females are approximately 1/4 inch long. All unfed stages are very flat. The fully fed females are 1/2 inch long and look very inflated. All life stages have a prominent shield (scutellum) on the back behind the head and have distinctive coloration patterns on the abdomen.

The winter tick is very similar to the American dog tick in size and coloration. The time of occurrence on the horse, winter vs. summer, most easily distinguishes this species.

Life History

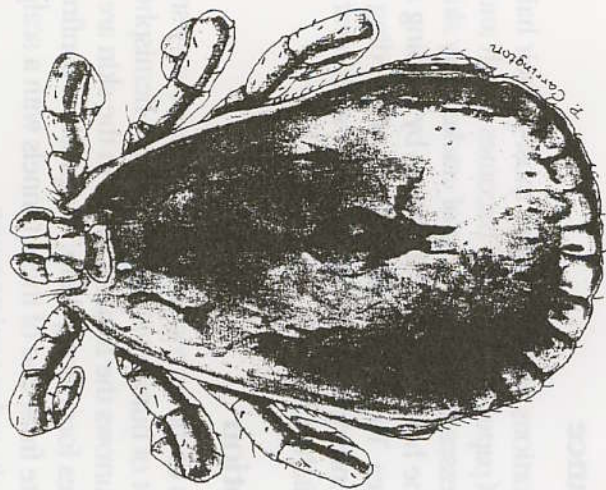
D. variabilis may overwinter as either adults or larvae. In the spring the

larvae move out from concealment and attach themselves to small rodents, usually field mice (*Microtus* sp.). They attach and feed on the mouse for about 4 days, then drop to the ground and molt. This stage takes 1 week or more. Then the next stage of the tick—the nymphs—again attach themselves to small rodents to feed for about 6 days. They again drop to the ground and molt. This stage lasts from 3 weeks to several months. At the end of this time, adults emerge and attach themselves to horses, dogs, or humans. Both sexes feed on blood. The females feed for 1 to 2 weeks. Mating occurs on the host. The fed and mated female drops to the ground, where she deposits up to 6,000 eggs. Adults and immature ticks that have not fed can survive up to 2 years.

D. albipictus eggs are laid on soil in the spring. They hatch in 3 to 6 weeks and the larvae bunch tightly together in ground cover and remain there until fall. At the onset of cold weather, they become very active and seek hosts. Immature stages feed on the host and molt there, also. When they become adults, females feed and mate on the host before dropping off to lay eggs. The time elapsed from the attachment of the larvae ("seed ticks") to the females' dropping off the host is about 6 weeks. Egg laying is delayed until the following spring. Immatures and adults can be present on horses from October through April. Adult females are frequently found in March.

Controls

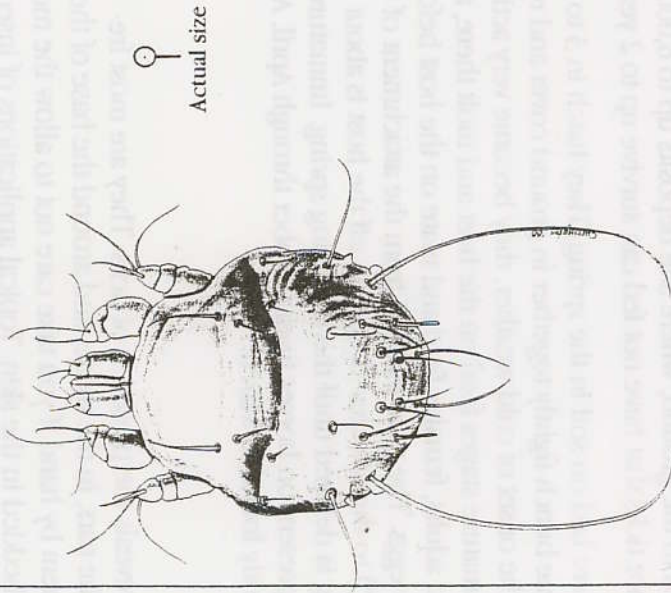
Careful grooming reveals the presence of ticks. They are most frequently found on the ears, in the mane, and around the base of the tail. You may remove them by hand if you take care not to allow the mouthparts to remain embedded in the skin. Topical applications of insecticides will kill ticks and prevent horse infestations.



Tick
Dermacentor albipictus



Actual size



Sarcoptes Mange Mite
Sarcoptes scabiei equi

Sarcoptic Mange Mite

Sarcoptic mange of horses is caused by the mite *Sarcoptes scabiei* var. *equi*.

Importance

Infested portions of the skin lose most of their hair and form pimplelike structures (papules). The skin becomes rough and scaly as the infestation progresses, and large areas of cracked, dry skin with scabs are formed. The horse reacts to the mites by rubbing and scratching the affected area. This leads to weeping and bleeding of the skin, which favors secondary bacterial infections. *S. scabiei* var. *equi* can also cause a transitory itch in humans.

Description

The adults of the sarcoptic mange mite are very small, at or near the lower limit of human visibility. They are hemispherical and whitish. The twisting burrows the females make in the skin are up to 1¼ inches long and papules form along them. Diagnosis is confirmed by excavating a female mite from one of these tunnels with a scalpel or needle and examining it under a microscope.

Life History

Eggs are laid by the females in the long tunnels that they inhabit. The eggs hatch in 3 to 5 days. The resulting larvae move about the skin surface and are found in hair follicles. Adults develop in 5 to 6 days and mating occurs in temporary galleries excavated in the skin.

Sarcoptic mange mites are spread from horse to horse by close contact or common use items, such as combs, brushes and tack articles. The mites remain on the horse year round, but seem most noticeable as a problem in the winter.

Controls

Careful examinations of areas being rubbed are necessary to determine the presence of the mites. Check all new additions to the herd carefully for this problem. If any animal is suspected, isolate it from the group for examination and treatment, if necessary, by your veterinarian.

Hay & Grain Mites

The hay itch mite or grain itch mite (*Pyemote ventricostis*) can cause a transient irritation in horses.

Importance

This species is not primarily a pest of horses, but of insects that infest hay and grain. As these feedstuffs are harvested and brought into barns, the insect hosts of these mites frequently die. Thus denied their natural food source, they will seek out any available animal and feed upon them. Humans and most domestic animals, including horses, are included. Such infestations of animals and humans are normally transient, because warm-blooded animals are poor hosts for these mites. Infestation of horse or human can result in a severe itch and small red wheals.

Life History

Both the immature and adult stages of these mites normally feed on the beetles and other insects living in hay and grain. All life stages and reproduction occur on these insect hosts. Reproduction does not normally occur on warm-blooded animals.

Control

In cases where feedstuffs are severely infested, disposal by burning or deep burying is often recommended. Application of appropriate insecticides to the horses affected will control the mites on the animal, but reinfestation will occur if the source is not eliminated. Preventing insect infestation in feedstuffs by regular, complete cleaning of feed storage bins is a major step in control of these pests.

Chorioptic Mange Mites

Chorioptic (leg) mange of horses is caused by *Chorioptes bovis*.

Importance

Chorioptic mange in horses is often called "foot mange" or "itchy leg." The infestation by *C. bovis* of the fetlock region produces itchy, scablike lesions, most common in breeds with long feathery hair in this area. The irritation results in rubbing, scratching and licking of the area as well as an increase in stamping and kicking. Infestation of the hind leg pasterns is most common.

Description

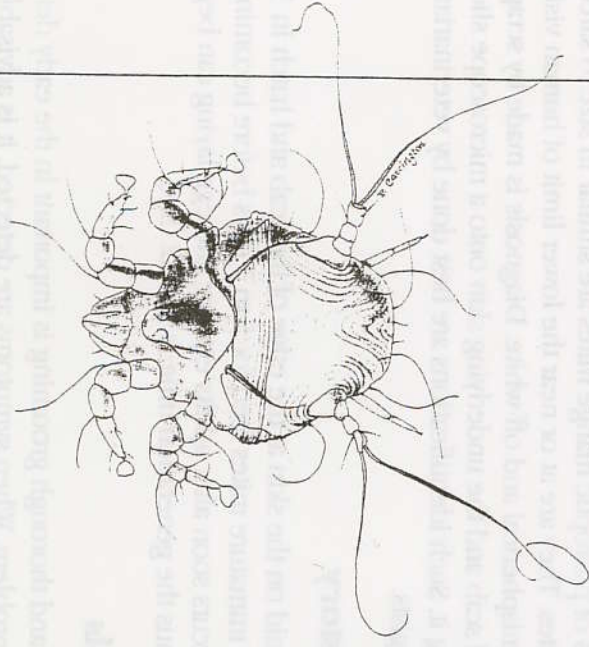
Adult chorioptic mange mites are similar in size to the other mange mites described in this publication. All are almost impossible to see with the naked eye. Diagnosis is made by examining skin scrapings under a microscope. Feeding by this species is limited to the skin surface and consists of limited punctures of skin cells for lymph and serum. The symptoms are similar to those of psoroptic mange (a soft scab) but less severe and slower spreading. This mite is apparently present on many animals with no visible symptoms.

Life History

Eggs are laid on the margins of scabs, if present; otherwise, on the skin surface. These mites are usually found in communal groups within a limited area. Feeding on skin debris seems to be the rule and puncturing of the skin to feed on lymph and serum the exception. Generation time is presumed to be similar to that of *Psoroptes* mites, about 10 days.

Controls

Early detection of all mange mites is important to prevent their spread to other horses or the development of a severe infestation on an individual animal. Detection of these mites and their identification is best done by a veterinarian or entomologist.



Chorioptic Mange Mite
Chorioptes bovis

Actual size

Psoroptic Mange Mites

Psoroptic (ear) mange is caused by the mite *Psoroptes equi*.

Importance

Psoroptic mange is frequently limited to the ears, although these mites can occur on any portion of the body. Psoroptic mites feed through the surface of the skin on lymph and serum. This results in irritation of the skin and a serum exudate that forms a moist scab covering the mites. The majority of the mites feed at the edge of the scab, causing it to enlarge. Feeding causes an intense itching, and secondary infections of the area are possible. These mites are easily passed from horse to horse by casual contact, rubbing, and common grooming tools and tack.

Description

The adults of psoroptic mange mites are similar in size to sarcoptic mange mites. They are at or near the lower limit of human visibility, nearly hemispherical and off-white. Diagnosis is made by scraping a portion of scab and the underlying skin onto a microscope slide and examining it. Such identifications are best done by veterinarians and entomologists.

Life History

Eggs are laid on the skin at the edge of the scab and hatch in 1 to 3 days. The immature mites feed for 5 to 7 days before becoming adults. Mating occurs soon after adults emerge and egg laying can begin within 2 days. Thus the generation time is 9 to 12 days.

Controls

Frequent and thorough grooming is important in the early detection of any mite problem. When symptoms are detected, it is advisable to consult a veterinarian for confirmation of the problem and treatment.



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