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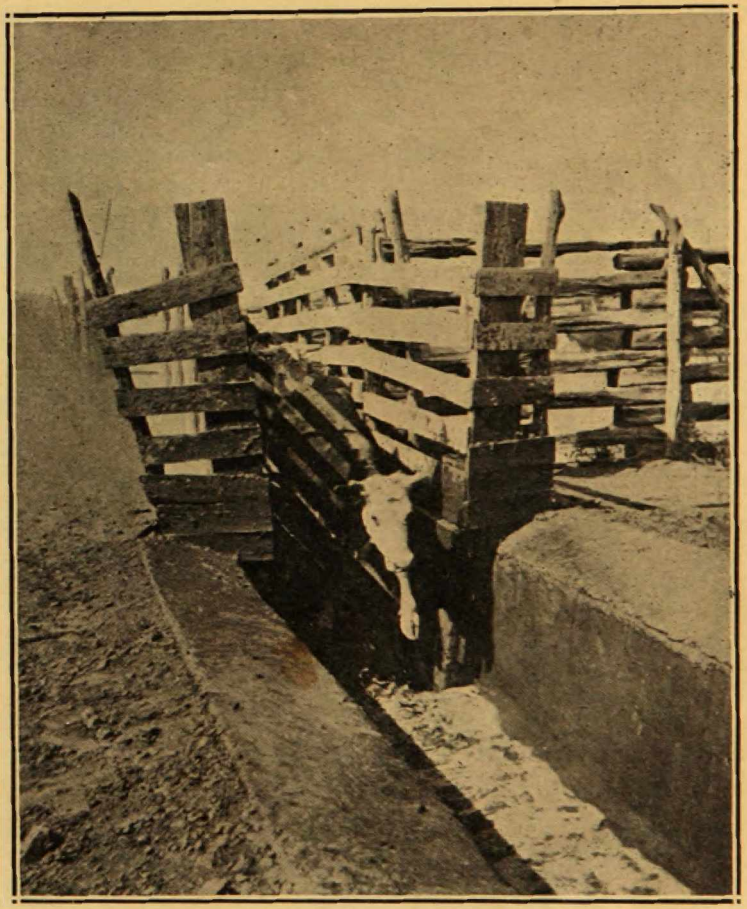
SOME COMMON PARASITES OF LIVE STOCK IN COLORADO

By O. G. BABCOCK, U. S. Bureau of Entomology



Cow Ready to Plunge Into Dipping Vat

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SOME COMMON PARASITES OF LIVE STOCK IN COLORADO

By O. G. BABCOCK, U. S. Bureau of Entomology
(Prepared through Cooperation of U. S. Bureau of Entomology and Extension Service, Colorado Agricultural College)

More and more are Colorado farmers and stockmen giving attention to the parasites affecting their animals.

Hundreds of thousands of dollars are lost yearly directly or indirectly by the ravages of animal parasites. These losses are brought about in a number of ways. Some insects and ticks convey dangerous diseases; others suck blood and annoy the animals by their bites; still others in certain stages burrow about in the tissues or attach themselves in the digestive tract. The effects of the attacks of these parasites may be seen in retarded growth, reduced flesh, diminished milk flow, reduced capacity for work, lowered resistance to diseases, and actual death loss.

Colorado is free from some of the worst pests of live stock, such, as, for instance, the North American fever tick which carries Texas or splenetic fever of cattle; yet there are twenty or more parasites which must be reckoned with continuously or occasionally.

CATTLE PESTS

The lice attacking cattle may be grouped under two headings, namely, those with biting mouth parts which feed on skin scales, hair, etc., and those with sucking mouth parts which are used to pierce the skin and suck blood. The latter remain attached to the skin while feeding and are the most difficult to destroy.

Red or Biting Cattle Louse[1]

This is a rather small louse which when mature is reddish in color with an apparent banding on the body. The eggs or nits are whitish in color and are attached near the base of the hair. They hatch in about ten days into tiny, light-colored lice. Oftentimes cattle, especially calves, are so severely infested that if the hair is separated thousands of eggs may be seen. This louse feeds upon the scurf or dandruff and other material that may be present. It is constantly causing an immense amount of irritation and worry. So great are the injurious effects of this louse that cattle, especially calves, become poor and do not do well when infested by them. Heavily infested calves will not develop nearly as rapidly as cattle free from lice, and this stunting of growth may be permanent.

Fortunately cattle lice do not have wings, and yet they spread very rapidly by contact of animals. They spend their entire life

[1]Trichodectes scolaris.

upon the host and if removed cannot live longer than a very few days.

As a rule lice are few in number during the summer months, but upon the approach of winter, when the hair increases in length, conditions become favorable and the lice begin to increase rapidly.

Control

Since this red cattle louse is a biting insect and since it remains upon cattle throughout its entire life it is the easiest louse of all cattle lice to completely destroy. Furthermore, it can be destroyed at any time during the cold winter months by the use of a stomach poison applied in powder form. The poison recommended is a white powder known as sodium fluoride. Local dealers can supply sodium fluoride or can obtain it.

The chemical should be dusted lightly into the hair over all parts of the animal by means of a good dust gun. It will require approximately one pound to treat from 16 to 25 head, according to the size of the animals. Information as to where dust guns may be obtained will be sent on request by The Extension Service, Colorado Agricultural College.

If the work is thoroughly done, all of the lice and all the young hatching from the eggs will be destroyed in one application. However, this does not insure the animal from reinfestation if allowed to come in contact with untreated cattle. If in doubt as to the louse being a biting or a sucking species send specimens to the entomologist of the Agricultural College for determination, or see your county agent.

Too much emphasis cannot be laid upon the use of sodium fluoride as a winter treatment for the red or biting cattle louse when it predominates, but when sucking lice are numerous other measures are necessary.

Blue or Long-Nosed Ox Louse[1]

This louse is quite common in the State. It may be easily distinguished from the red or biting louse by the bluish color of the body. It is rather long and slender and feeds entirely by sucking the blood. It is found attached to the skin about the withers, shoulders and neck, and upon the nose, but when numerous it often occurs upon all parts of the body, the lower portions of the legs, and under side of the body being least infested. When numerous, if the infested parts are rubbed, hundreds of the lice often release themselves and crawl about on the hair.

The eggs or nits are attached to the base of the hair usually next to the skin. They hatch in 10 to 14 days.

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[1]Lignogthanus vituli.

Control

Owing to the blood-sucking habits of the blue lice, what is known as a contact insecticide must be used against them. Probably the best and cheapest material for this purpose is the standard arsenical dip consisting of

4 lbs. caustic soda (85% pure)
8 lbs. white arsenic (99% pure) in fine powder
8 lbs. salsoda crystals
1 gal. pine tar
Water sufficient to make 500 gallons.

A large number of companies are making concentrated arsenic dips which are very satisfactory. Only those brands recognized by the United States Department of Agriculture should be used. The use of these prepared products obviates much trouble in mixing the dip. Those who prefer to make their own dip should get a free copy of Farmers' Bulletin No. 909 from the Department of Agriculture, which will give full instructions.

The dipping of cattle is much to be preferred over any other method. In dipping, a good vat should be constructed. For directions see Farmers' Bulletin No. 909, p. 19. Every part of the animal should be well dipped, including the ears and nose.

As it requires from 11 to 18 days for the short-nosed ox louse eggs to hatch, and less time for eggs of the other species, it is absolutely necessary that a second dipping follow 16 days later. Then if the short-nosed ox louse still predominates a third dipping may be necessary to accomplish complete destruction. If there are only a few cows the expense of a dipping tank may not be warranted. In such an event a spray pump may be used. A good bucket pump will do, a barrel pump is much better, but the small cheap atomizers so often sold at seed stores should never be used. Thoroughly treat every part of the animal, using a good nozzle and strong pressure.

Arsenical dip will destroy the red or biting louse as well as the others and if properly applied all may be eradicated from a herd and will not reappear unless lousy cattle come in contact with the animals.

As has been stated, the lice do not usually become very abundant until winter or spring and at that time dipping in Colorado is hazardous. It is therefore best to treat all cattle in the fall whether many lice are seen or not and put them into the winter free of this pest. If this fall treatment is neglected and lice become numerous they may be kept in check among dairy cattle by applying reliable creosote dips or raw linseed oil to the infested

parts by means of a brush. However, in using raw linseed it is best to keep the animals out of the sun and not expose them to very cold weather for a few days after treatment, as burning or chilling may result.

Short-Nosed Ox Louse[2]

Although not so common, the short-nosed ox louse is present and when numerous it is a severe pest. This louse is most commonly found on grown cattle, while the long-nosed louse is more confined to calves. The head is short and the body broad and somewhat grayish in color. It is not necessarily confined to any particular part of an animal. The lice often occur in patches, their location apparently depending upon where an infestation is started from contact with an infested animal. For instance, dense masses may be present on the neck, the dewlap, the shoulder, the head and other areas, while the rest of the animal is practically free. From these patches the lice spread to other parts of the animal. The eggs are attached to the hairs and frequently the coarse hairs bear many eggs placed end to end. The lice, being sucking insects, are attached to the tender skin beneath the hair, thus having ample protection.

In severe cases animals may be almost black with lice. In such cases the animals will lose flesh, fall off in milk flow, and, especially when feed is short, death may result unless proper control measures are undertaken promptly.

Control is the same as for blue or long-nosed ox louse.

Horn Fly[1]

This fly is an important pest which is found in every state in the Union. It is very annoying to cattle in Colorado during the summer and early fall months. In this state it usually begins to appear about the middle of May in the lower altitudes, remains and increases in numbers until the first cold weather of the fall appears, when the flies begin to die off rapidly.

The horn fly is dark grayish in color and rather small in size. Its wings usually spread enough to give it a triangular appearance.

The name is somewhat of a misnomer as they are almost always found upon the sides of the animals, only clustering around the base of the horns when the weather is cool or at night. Horses are attacked to a limited extent, the fly prefering the belly or neck.

If struck at the flies simply arise and alight on the other side of the host. They always rest or feed with the head earthward. They are provided with a well-developed, horny beak which is used in puncturing the skin and sucking blood.

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[2]Haematopinus enrysternus.
[1]Haematobia irritans.

The horn fly breeds exclusively in cow droppings, whether in the barnyard or out on the pasture. Immediately after the cow excreta is dropped, the fly darts down and deposits a few brownish red eggs on it. Within about two days the eggs hatch into typical fly maggots somewhat yellowish in color. At the end of about four or five days the maggots become mature, and transform to the pupae or resting stage beneath the manure. It requires from about ten to twenty days, depending upon temperature and moisture conditions, for the fly to develop from the egg stage to maturity.

On account of the habit of depositing eggs in fresh cow droppings, it becomes difficult to control the pest under range conditions. On farms and dairies, however, even though there may be large pastures adjoining, it can be greatly reduced in numbers.

As with other flies, the primary method of repression is to reduce the breeding ground to a minimum. Knowing that the horn fly breeds only in fresh cow droppings and not in the general barnyard manure, and that the maggots are destroyed by direct sun and drying, breaking up and scattering the manure is immediately suggested. It is advised that the manure be hauled away every second or third day, preferably in a manure spreader, and scattered over a pasture or on land soon to be plowed. In addition to this it is advisable to use a brush drag every two or three days on the pasture where the cattle concentrate so as to tear to pieces the cow droppings. This not only checks horn fly breeding but improves the pasture.

Another aid to dairy cattle is the use of good repellants, but they should be depended upon only as an aid and not as a control measure. Repellents only last a day or so at the very best and never stop fly breeding.

In Farmers' Bulletin No. 540, Mr. F. C. Bishopp states that "Many malodorous mixtures, particularly of an oily nature, have some value as repellents, but in preparing these care should be taken that they are not made too strong, particularly when animals are being worked in the hot sun, as they are likely to cause overheating and often produce shedding of the hair."

The following formulas are fairly satisfactory and will repel the horn fly, stable fly and the house fly for a few hours. The repellent effect on the horn fly and house fly is most marked and many of them are killed when hit by the spray.

For the horn fly:

1 part fish oil,

1 part oil of tar.

For the horn fly and stable fly:

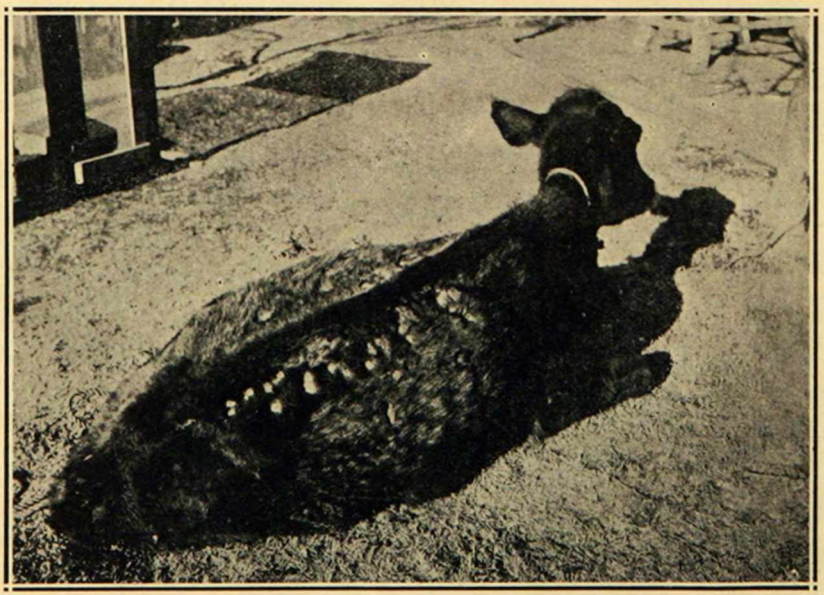
1 gallon fish oil,
2 ounces oil of tar,
2 ounces oil of pennyroyal,
½ pint kerosene.

To be effective these mixtures should be applied very lightly but thoroughly.

Ox Warbles or Heel Flies

These insects are sometimes known as gadflies, grubs in the back, or wolves. The grub in the back and the heel fly is in reality the same insect, differing only in the stage of development.

There are two different forms occurring in this country which may be called the northern ox warble and the common ox warble.[1] Probably both of these insects were originally imported from Europe, although the common species is found throughout the entire United States, and has been known to occur here for many years. The northern form is very common throughout the Northeastern states, extending southward to southern Ohio, northward into Canada, and westward to approximately the Mississippi river, and is undoubtedly slowly spreading. It prefers the cooler areas



Cow with holes cut thru by warbles

[1]Hypoderma bovis and H. Lineatum.

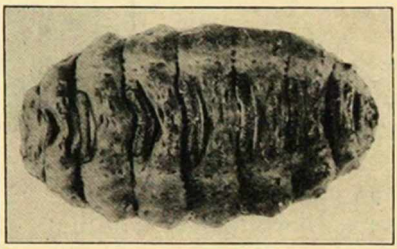
and may some day follow the Rocky Mountains southward.

The warbles are usually first noticed as prominent bumps on the animal's back. If pressure is applied on each side, pressing downward and outward, the grub will be forced out. When fully grown these grubs or warbles are black and come out of their own accord. They fall to the ground and under any protection at hand transform to a pupa or resting stage where they remain until the warm days of spring, generally about the time green food begins to appear and the cattle are first turned out on pasture. At this time the adult heel fly emerges. After mating, the female fly is ready for action. She usually flies within six to eighteen inches of the ground and will presently alight upon the ground a few inches from the heels or will strike the animal, usually below the dewclaws on the hind legs. About this time the cow will either stamp her foot and then run or else immediately twist her tail over her back and with a horrified look run to some nearby water or mud hole, or to the barn for protection. Oftentimes animals go down in the mud and perish, run into barbed wire fences and cut themselves, or if heel flies are numerous a stampede may follow. The cattle never feed much during the day when the flies are active. Thus a considerable loss in milk and flesh results.

The eggs are deposited usually near the base of the hair, from one to many in a row. Each egg is fastened at one end and hatches within three to four days into a very small spiny maggot that actually penetrates the skin at the base of the hair. It is during the penetration of the larvae that the cattle are seen licking the heels.

When cattle are lying down the heel flies sometimes deposit eggs upon the hairs of the escutcheon or other parts of the body. At the points where the minute grubs penetrate, lesions are formed and swellings often appear. A large percentage of the eggs are laid on the hairs of the heels of the hind legs. From here the tiny warbles work their way upward through the tissues of the body until after a period of about seven or eight months they appear under the skin along the back of the animal. During this time they have grown considerably and changed somewhat in form. A hole is cut through the hide, which supplies the insect with air and serves as an exit when it is fully grown. The grubs continue to come up under the skin along the back for several weeks.

These grubs appear under the skin in late winter and early spring and remain there several weeks, increasing rapidly in size until about one and one-fourth inches long. At this time, if not destroyed, they work their way out and transform to heel flies as previously described. During this time irritation and other in-



Full grown warble removed from back of cow.

juries actually keep beef cattle down in flesh and reduce the milk flow from 2 per cent to 20 per cent or more, depending upon the severity of the infestation. Cattle killed at this time show large, yellowish, jelly-like areas along the back known as licked beef which have to be trimmed away. There is also a loss to the hides resulting from the holes, amounting to from one to two cents per pound.

As many as 105 warbles have been removed from the back of a single animal in America and 300 or more are recorded from animals in Europe.

Control

The only satisfactory method of combatting this pest now known, but not entirely practicable with range stock, is by squeezing the grubs out. This is not a difficult task after a little practice. It is necessary to go over the entire herd about four times during the spring at intervals of about three weeks. Every grub should be extracted if possible and the very dark ones crushed, otherwise they will sometimes produce flies. While concerted action on the part of all cattle raisers in a community will give best results an individual will reduce the number of grubs materially if extraction is practiced conscientiously for a few years. Co-operation, thoroughness and systematic work is what is needed to abate this important pest.

When importing cattle from the northern states or Canada one should always be on guard for the ox warble grubs which have been taken from such stock as late as July. These are usually the northern ox warble which is not known to be established in Colorado.

Ticks

Little attention has been given to the ticks attacking animals and man in Colorado. The fact that the common wood tick has been proved to carry the serious disease of man known as Rocky Mountain spotted fever and that this same tick is frequently very abundant on live stock should cause the tick question to receive serious consideration. There are several different kinds of ticks that are native to the state and others are brought in on stock very frequently.

Spinose Ear Tick[1]

Although the spinose ear tick is native to the southwestern states yet it occurs in Colorado upon infected stock shipped in from infected territories, and is apparently well established in southeastern Colorado. Beef cattle shipped in in January have been found to be quite heavily infested in May.

This tick attaches itself deep in the ears of cattle, horses, mules, donkeys, and occasionally man. The large ticks as found in the ears, when examined with a hand lens, are seen to be quite spiny and the sides somewhat depressed about the middle. When fully engorged they are nearly three-eighths of an inch long. They detach from the host, crawl into a crack in a post, manger or tree and after a few days shed their skin, mate and begin depositing masses of eggs. The young ticks, called seed ticks, have only six legs. They are quite active and when an animal brushes against an object where they are congregated they cling to the hair and find their way deep into the ears. There they attach themselves and suck blood, later shedding their skins, at which time they gain a fourth pair of legs and their spiny coat.

The ear canal may become a solid mass of ticks, producing sores and considerable irritation and worriment, and occasionally suppuration which may result in the death of the animal if control measures are not resorted to in time.

As dipping cattle in arsenical solution does not destroy this pest satisfactorily it is necessary to treat the ears of the animal individually. The cattle should be driven into a chute and about one-half of a fluid ounce of the following mixture injected into each ear. A longspouted oil can or a hard rubber syringe may be used for this purpose:

Pine tar, while warm, two parts by volume.

Cottonseed oil, one part by volume.

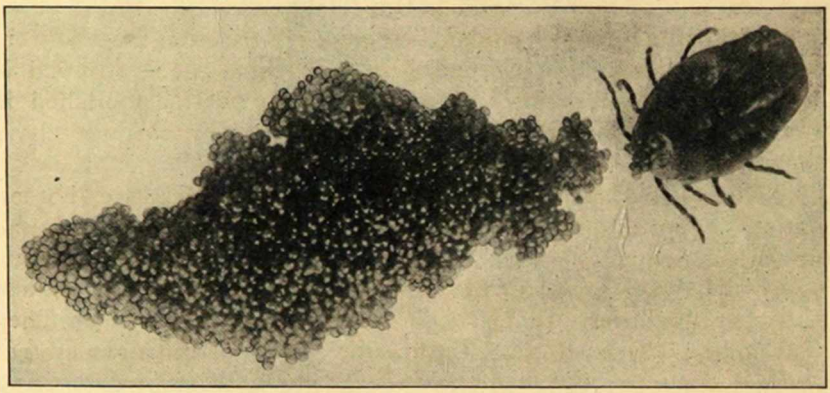
Add the cottonseed oil to the pine tar and stir until uniform. While this treatment is rather laborious it will destroy all ticks and insure the animal from reinfestation for about thirty days.

Rocky Mountain Spotted Fever Tick or Common Wood Tick[2]

This is the tick that is so commonly met with in the mountains in the spring and early summer.

For several years the state of Montana and the federal Government co-operatively have been fighting this serious pest. Since this tick is the carrier of the dreaded disease known as Rocky Mountain spotted fever it becomes highly important that it be given serious consideration in Colorado.

[1]Ornithodoros megnini.
[2]Dermacentor venustus.



Rocky Mountain Spotted Fever Tick depositing eggs

The distribution ranges from the foothills along the eastern slope of the Rockies westward to central Washington, Oregon, eastern California and southward to the northern mountain area of New Mexico. This pest occurs in greatest numbers in Colorado in the mountains in the northern part.

Unlike some ticks, this species lives naturally upon a number of animals; hence control is difficult. However, work now being carried on is proving quite satisfactory. This consists of systematically dipping all cattle, horses, mules, and donkeys every seven days during the late spring until the flat ticks cease to infest the host. In conjunction with the dipping, cultivate more mountain land, rotate pastures, and practice rodent destruction systematically throughout the season.

PESTS OF HORSES, MULES, DONKEYS

Lice

Two types of lice may be found on horses, the biting and the sucking. The sucking louse, however, is quite rare and ordinarily need not be considered. The biting louse[2] is fairly common, many horses suffering from louse injury every winter. Like other lice, the nits or eggs are fastened to the hair near the base, the young developing into mature lice without leaving the host.

Horses and colts that become very lousy do not do as well as those animals that are free from lice; the coat will become rough and shaggy and the hair is frequently rubbed off in patches, thus presenting a very unattractive appearance. Range colts suffer most.

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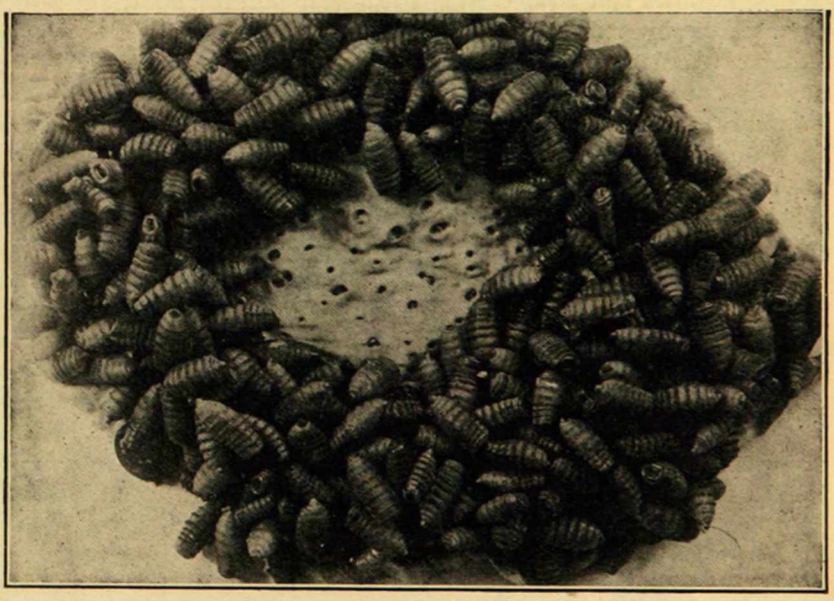
[2]Trichodectes parumpalosus.

The application of sodium fluoride in dust form, one ounce for a grown animal, will give complete control as recommended for the red louse of cattle. Horses may be dipped in arsenical solution or sprayed with creosote dips exactly as are cattle. These methods should be followed if sucking lice are present.

Bots

There are at least three different species of bots known to infest horses; namely, the common bot fly, the throat bot, and the nose fly. The first two occur commonly in Colorado. The latter is probably not present in the state, but occurs in large numbers in the Dakotas, Minnesota, Montana, and portions of adjoining states including northeastern Wyoming. The nose fly is spreading and may be introduced into Colorado at any time.



Portion of stomach of horse covered with bots and pits made by them.

In the case of the common bot[1] the eggs or nits are deposited near the end of the hair on the forelegs and shoulders. Here they remain until the young larvae are taken into the mouth. The young bots will then work their way downward and attach themselves to the walls of the stomach, where they continue to feed and develop during the fall, winter, and spring. The fully developed bots will then pass out with the feces and generally pupate just beneath the droppings. After a period of rest the adult flies emerge,

[1]Gastrophilus intestinalis.

mate and deposit fresh eggs, thus completing a cycle in a year.

The throat bot or chin fly[2] lays its eggs mainly under the jaw and usually close to the base of the hairs. Just how the young bot reaches the stomach is still unknown. This species is more abundant at high altitudes and annoys horses more while depositing eggs than does the common bot fly.

The nose fly[3] is very quick and strikes the horse directly on the lips. At this point the black egg is firmly attached to the very short hair that is barely longer than the egg. As these hairs are set in small pits they look very much as though imbedded in the flesh.

No matter where the horse is nor to what it is hitched, it will throw up its head, probably rear up on the hind legs, toss its head and sometimes run away. Nor is it uncommon for horses to injure themselves by rubbing their lips upon barbed wire fences, or other convenient place to produce friction.

The nose fly eggs are also hatched by the aid of friction and moisture, and the young bots attach themselves to the stomach wall and there develop. When these bots are fully grown they pass to the rectum and may be seen protruding from the anus where they remain for a few hours until hardened, then drop, pupate and emerge later as the nose fly. While the bots are attached to the rectum the host is quite sensitive about the tail.

The kind of fly that is about can often be detected by the action of the horses, as for instance when attacked by the common bot fly the horses have a great tendency to bunch and stamp their feet; but when the throat fly is active it is common to see two horses standing together, each horse with its lower jaw resting upon the back of the other; while if the nose fly is present the horses will stand with their lips resting on each other or the animals may place their noses on the ground or go across the pasture violently nodding their heads.

Oftentimes the horse bots are so numerous as to obstruct the free passage of food, and otherwise greatly interfere with digestion. This is often quite serious in colts and yearlings which may become poor, make a slow growth or occasionally die.

Horses kept in stables are seldom attacked, those worked daily have only a few, while those on pasture are usually heavily infested.

Control Measures

Since it requires at least seven days for the eggs of the common bot to incubate it is a good plan to destroy them by washing

[2]G. nasalis.
[3]G. haemorrhoidalis.

the egg areas with a two-per-cent carbolic acid solution. Since carbolic acid as ordinarily bought in drug stores contains 86.4 percent phenols, one part of this should be mixed with forty parts of water. Use weekly during the entire fly season.

Avoid using the carbolic acid diluted with less than twenty parts of water for fear of skin injury.

It has been found that while the bots are small they can be destroyed in the stomach by giving the horse carbon disulphide internally. This treatment will destroy all three species of bots. The treatment should be given late in the fall but not after December 10th, if best results are to be obtained. When the horses are treated it is advisable to wash the legs with carbolic solution as before mentioned to prevent reinfestation.

The best results are secured and the cost reduced by having all horse owners in a community work together. The services of a good veterinarian should be secured and the horses treated by him in the following way:

The day before treatment the horses are fed lightly, all food being withheld that evening and a purgative given consisting of one to one and one-half ounces of aloes or a pint of raw linseed oil to a mature horse. On the following morning, with the aid of closely fitting gelatin capsules and a standard balling gun, administer to each mature horse at six o'clock three drams of carbon disulphide. At seven o'clock give the second dose and at eight o'clock administer the third dose, or in all nine drams of the carbon disulphide. This will give a three to four hour fumigation which is necessary and will cause all bots attached to the walls of the stomach and the duodenum to release their hold. If the purgative has not acted by twelve or one o'clock one pint of linseed oil should be given, otherwise the gas may produce injury.

So-called four-dram capsules actually hold about three drams of carbon disulphide, and two-dram capsules 1½ drams. The capsules must fit tightly and no capsule allowed to break within the mouth of a horse for serious consequences are likely to result.

HOG PESTS

Hog Louse

So common is the hog louse[1] that we only too often neglect the damage that is done by it. It is an enemy of the hog wherever the hog has gone. This louse, so far as is known, infests only the hog (wild and domestic), and often develops in enormous numbers before man is aware of its presence.

[1]Haematopinus suis.

The eggs or nits are large, white in color when fresh, and are fastened to the hair near the base. Eggs may be found upon almost any part of the hog. However, fully 95 percent of them are deposited behind the ears, on the jowl, between the legs, on the belly and the area below the tail. The eggs hatch, according to Watts, in from thirteen to twenty days, while the lice mature in ten to twelve days; hence there may develop from nine to twelve generations in a year.

When numerous, these lice greatly irritate the animals by feeding many times a day. As the hog louse is a blood-sucking insect the irritation is intense and considerable blood is lost. Scales often form and raw sores are not uncommon; the hogs are unthrifty and often do not put on the flesh they would otherwise. The injury to young pigs is often very severe.

Control

It is a common practice where only a few hogs are raised to treat them with a sprinkling can, rubbing post or some other appliance. Kerosene oil, crude petroleum or saponified creosote dips are used in the sprinkling method. The kerosene or crude oil may be applied pure but the creosote dips should be reduced according to the directions on the container. The material is applied while the hogs are eating or while held in a corner.

Rubbing posts are made by setting a long post in the soil at an angle and with the outer end braced from the ground. The lower part should be wrapped with heavy rope or burlap and kept saturated with petroleum.

Hog wallows are used to some extent in louse control but if not regularly cleaned and oiled may be a source of disease.

While these methods if conscientiously carried out will keep the lice in control, they will not eradicate the pest from the farm.

Dipping, if properly done, is the solution of the hog louse problem. A very cheap and economical vat can be made of matched lumber. A galvanized iron vat is even more satisfactory and a concrete vat is best of all, though slightly more expensive. Fill the vat with water about forty-two inches deep, add two to three inches of crude petroleum to the surface of the water. This material is sometimes called hog oil, fuel oil, or black oil. If a sliding board is not desired hogs can be forced to enter the vat by fitting it with a tilting board eighteen to twenty inches wide and seven to eight feet long, so fastened near the middle that the end projecting over the vat will tip down when the hog walks upon it. By this arrangement the hogs plunge into the solution, completely under, as with the standard sliding platform, and after

swimming a short distance walk out at the other end into a draining pen.

Every part of the hog must be well coated with the oil from the nose to the tip of the tail. As the young lice develop in ten to thirteen days the hogs should be put through the vat again in ten days in order to destroy the infestation.

In dipping hogs choose a cloudy day or dip late in the evening and do not excite or run them before dipping. If hogs are dipped during bright sunshine sun scald may result and if overheated other severe consequences may follow. They should not be thirsty at dipping time.

PESTS OF MANY ANIMALS

Stable Fly and House Fly

Unfortunately the stable fly[1] and the house fly[2] are more or less confused. However, their habits are quite distinct. While the stable fly is more important as an annoyer of live stock, the house fly, on account of its intimate association with man and domestic animals and its well known ability to carry disease, will also be discussed.

The stable fly, sometimes called the biting house fly, does not visit houses freely. It is a blood-sucking insect as an adult and its attack is persistent and painful. The mouthparts are especially adapted for piercing the skin of animals. When a stable fly is at rest the beak protrudes directly in front of the head from its lower side.

This pest after having secured the first meal from some unfortunate animal, including man, will fly away and rest upon any object at hand. Here it remains to digest its meal only to again attack some animal, engorge and digest this meal. Three and sometimes four or five such feedings are necessary before the stable fly is capable of laying eggs.

The eggs are small, creamy in color, and are laid in manure or decaying vegetable material of some kind. This may be accumulated barnyard manure, especially when mixed with straw, moist corral scrapings, and fermenting straw piles. New straw piles are very attractive to the stable fly when sufficiently wet to produce heating. Oat straw is preferred, but the flies will breed in the straw of rice, wheat, barley or other grains. In from one to three days the eggs hatch into maggots which mature in from eleven to thirty days or more, depending upon temperature and moisture conditions. After the maggots become full fed they migrate to the soil and there pupate or transform to adult flies.

[1]Stomoxys calcitrans.
[2]Musca domestica.

During seasons when excessive rains follow threshing or when a large amount of straw barnyard manure is added to the manure pile regularly, large numbers of this fly will soon breed. It is then that the heavy losses to live stock occur. It is a common thing for animals to be so heavily infested that they often give up the fight or take to a water hole, and horses are known to run away while being worked. Practically all domestic animals are attacked, even the hog and sheep are not entirely immune.

Control

As the stable fly is rarely attracted to fly traps, this method of control can not be relied upon. The only practical method is to practice cleanliness and combine this with good farm methods. Clean out the barns thoroughly every day and haul away and spread the manure every third day on a pasture or land that is to be plowed.

Not only does the stable fly breed in such places, but the common house fly also chooses similar material. Horse manure seems to be the favorite breeding ground for this insect. It will also breed in scrapings from dairy barns or in the excreta of hogs, chickens, rabbits and pigeons, especially if the manure remains wet for a few days.

In controlling the house fly it must be remembered that the eggs will hatch within a few hours and the maggots usually mature within five to six days except when the weather is cool. Hence it is absolutely necessary that all animal matter be cleaned out of barns and chicken houses at least every third day.

Pigeonries and rabbit hutches should be kept clean and dry and hog houses built with solid floors, the feeding trough and a part of the feeding floor to be preferably of concrete. Besides this the feed trough should be cleaned at regular intervals, all bones, orange and lemon peelings, coffee grounds and other inedible hog food removed, otherwise fly breeding is encouraged. If shade is provided and each hog allowed 200 square feet of pasture the hog pens would be more easily kept free from fly breeding and in a more sanitary condition.

Of late years fly traps have become very popular in fly control. However, fly traps alone are not sufficient, but if run in conjunction with control of the breeding grounds they are very beneficial and are to be recommended.

For years the United States Bureau of Entomology has been carrying on fly-trap and fly-bait experiments. During these tests traps of various types and forms have been tried. As a result a

trap was designed that would catch the maximum number of house flies, blow flies and various other kinds of flies except the horn fly and the stable fly, both of which are blood-sucking pests of cattle and other live stock.

This trap is a cylinder of wire screening two feet high by eighteen inches in diameter. The cone is twenty-two inches high, about seventeen and one-half inches at base and the opening of the cone at top from one to one and one-half inches. The legs should be one to one and a quarter inches high. The top of the trap may be all screen wire or a wooden top with a screen door six to eight inches square and directly above the opening of the cone. This feature is absolutely essential, thus allowing the light to draw the flies out of the cone.

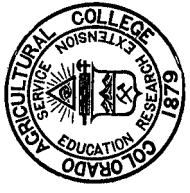
This trap can be made at home at a very low cost as barrel hoops may be used for the top and bottom and laths for the legs.

The bait pan should be large in diameter and not over one inch deep. The lid from a twenty-pound lard bucket is excellent. As a general rule fly traps work best when placed in light or partial shade.

A proper choice of baits is very essential as the species of flies caught will depend largely upon the bait used and the attention given the trap. Stale meat scraps or fish scraps are excellent for blow flies and screw worm flies, whereas a molasses bait after fermentation has set in is excellent for house flies, but will catch large numbers of blow flies as well. Spoiled bananas are also excellent, but bananas and milk are still better. Probably the best general purpose molasses bait is one part of cheap cane molasses mixed with three parts of water.

If dead flies are allowed to pile up in the trap its efficiency will be reduced; hence it is best to scald with hot water or fumigate the flies with sulphur every few days and empty the trap.

For further information see Farmers' Bulletin No. 734, which may be obtained free from the United States Department of Agriculture, Washington, D. C.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