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MISSISSIPPI AGRICULTURAL EXPERIMENT STATION.

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SOME INSECTS INJURIOUS TO STOCK AND REMEDIES THEREFOR.

—
GLENN W. HERRICK.
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HORN-FLY.

(*Haematobia serrata*, Rob.—Desv.)

With this insect we have an example of the importance of carefully guarding against the introduction of pests and noxious diseases from foreign countries. Prior to 1885, the Horn-fly was unknown in this country. Probably during the year 1886, or 1887, it was introduced into America from Europe, and was first reported in this state in 1891.

The damages caused by the insect have been much misunderstood and exaggerated. It injures stock principally by constantly irritating and worrying them, which causes a loss in vitality, a falling off in weight and lessening of growth in young stock, and in the case of milch cows a decrease in the flow of milk. Because the flies are seen in great numbers on the horns of cattle, it has been thought that the horns were injured by the maggots boring through and entering the head of the animal. This is not true. In fact, quite the reverse is true, because so long as the insects rest on the horns, the animal

is free from the worry and torment caused by the bite of the fly.

Preventives.—Repellants applied externally to stock is the best method of combatting the Horn-fly. Rather extensive experiments have been carried on at this Station, by Mr. H. E. Weed, to ascertain the best substance for repelling this insect.

Of the many substances used, a mixture of two parts of crude cotton-seed oil to one part of pine tar was considered the most effective. It should be applied to the animal with a large paint brush at milking time. If the cotton-seed oil is not procurable, fish oil may be used in its stead. One application is said to last from 4 to 6 days. It takes but a very short time to make the application, and the material costs but a trifle.

Another preparation, called Gnat Oil, and applied in the same manner as the tar and oil, gives quite as good results. It is made as follows:

Crude carbolic acid, 1 ounce.

Pennyroyal, $\frac{3}{4}$ ounce.

Sulphur, $\frac{1}{4}$ pound.

Crude cotton-seed oil, 1 gallon.

A thorough coating, completely covering the body of the animal, should be applied once in 4 to 6 days.

THE SOUTHERN BUFFALO GNAT.

(*Simulium pecuarum*. Riley.)

The Southern Buffalo Gnat is one of the most serious pests known to owners of stock in the Southern Mississippi Valley. It usually appears soon after the first continuous warm spell in early spring, varying in its time of appearance according as the spring is early or late. All the counties of this state bordering on the Mississippi, and even some inland counties, are subject to invasion by this insect.

***Preventives.**—Various remedies have been tried for the prevention and destruction of this insect, most of which, however, have proved impracticable. The most satisfactory way of dealing with it, is to use some repellent or preventive. Smudges have thus far proved the best method of protecting animals against the Buffalo gnat. Many planters, during the year, collect all sorts of materials which will produce a dense and stifling smoke, such as leather, clothing, dried dung, etc. As soon as the gnats appear they begin burning these materials and keep the fires going until the insects disappear. Smudges are located in the fields to protect the working teams, and in cities, fires are kept before the doors of livery barns.

A coat of mud or syrup has been found to protect animals to some extent. It has also been observed that short-haired animals, and those which have shed their winter coat of hair and have become smooth, are not so much troubled as those covered with long hair. Hence it is of advantage to clip horses in early spring. Keeping stock in darkened stables during an invasion of gnats, is also of great aid in protecting the animals, because the insects will not enter a dark room to a great extent. If the spring cultivation can be postponed until the gnats disappear, the danger will be averted by keeping the horses and mules in dark stables.

For the planters who cannot wait until the swarms have gone, various decoctions have been devised for coating the animals externally in hopes to repel the insects. Many of these have been found useful, but they necessitate frequent application in order to be effective. It is impracticable to use these remedies on stock at large. Such stock should either be confined in a darkened stable or driven to high open ground.

It has been found that grease of various kinds is the best preventive. Cotton-seed oil alone, or mixed with tar, kerosene, crude coal oil, or axle grease, are among the

*The above methods of prevention have been condensed from the U. S. Agricultural Report for 1886.

best. These should be applied twice a day. All of these remedies are more or less injurious to the animal, but their effect is small as compared with the gnat and soon passes away when the use of them is discontinued.

A mixture of oil and tar has been found very effective against a closely related fly, and on account of its simplicity and inexpensiveness is strongly recommended. A quantity of coal tar is placed in the bottom of a large shallow receptacle, and a small quantity of oil of tar, or oil of turpentine, is stirred in. The receptacle is then filled with water and allowed to stand for several days until well impregnated with the odor. The animals to be protected are then washed with this water as often as seems to be necessary.

Animals that are allowed to run at large during the winter and have no shelter from the weather, are sure to suffer severely from the gnats. Cut, bruised, and ill-fed mules are the first to die. Intelligent planters say that if mules are well fed and cared for and greased twice a day while working in the field, they scarcely ever die when attacked.

Remedies for the Bites.—The remedy most highly recommended for the injuries caused by the bites, is to rub the animal thoroughly with water of ammonia and give internally a mixture of 40 to 50 grains of carbonate of ammonia to one pint of whiskey, repeating the dose every three or four hours until relieved.

Stock is said to have been cured by repeated doses of whiskey alone, at the same time confining the animal in a cool, dark place.

The immersion of animals in streams will often allay the fever and save them from death.

HORSE BOT-FLY.

(*Gastrophilus equi*. Fab.)

There is much diversity of opinion among both veterinarians and stock raisers as to the injuries caused by the Bot-fly. Probably all horses are infested with these para-

sites to a greater or less extent, and it would seem that the injuries inflicted depend upon the number of bots present in the horse. It is probable that the presence of a few bots causes no serious trouble, while in those cases where the whole inside of the horse's stomach is coated with the parasites the effect may be serious.

Methods of Prevention.—There are two ways to fight the Bot-fly. First by destroying the eggs and thus preventing the larvæ from entering the horse's stomach and intestines. Second, by using some remedy to expel the bots from the alimentary canal of the horse.

The first method is the safer, and we believe the most practicable. The eggs are glued to the hairs and are often found in abundance on the forelegs of horses. From some investigations carried on by Prof. Osborn, it would seem that the eggs hatch with some difficulty in ten days, while the greater part are probably hatched about fourteen days after being deposited. Moreover, they hatch only when the horse licks them with his tongue. It is then that they are conveyed to the mouth. From these facts it will be seen that if the eggs are removed once in ten days or two weeks not enough larvæ will enter the horse's mouth to do any harm.

The most satisfactory way to remove the eggs is to scrape them off, at least once in two weeks, with an old razor or a very sharp knife. This can be easily and thoroughly done in much less time than would at first be supposed. Although no great harm is done if all the eggs are not removed, yet it is best to take sufficient time to do it thoroughly.

The legs and body of the horse, wherever eggs occur, may be washed with a mixture of 1 part of carbolic acid to 30 parts of water. This should also be done once in two weeks at least.

Kerosene is sometimes used as a wash for this purpose, but it is liable to remove the hair along with the eggs.

There is another kind of bot-fly that deposits its eggs upon the lips and margins of the nostrils and on the hairs

beneath the throat. To remove the eggs from the lips and edges of nostrils, the carbolic acid and water should be used. The eggs beneath the throat can be scraped off.

SCREW-WORM FLY.

(*Comptosmyia (Lucilia) macellaria*. Fab.)

The Screw-worm Fly deposits its eggs in cuts, bruises, scratches, or in fact in wounds of any kind, on the bodies of animals. Even the blood which has exuded from a crushed tick furnishes a place for the fly to deposit its eggs. In many cases eggs are frequently found in the sheathes of mules and horses and in the navels of young stock. The injuries inflicted by the maggots which hatch from these eggs have caused the insect to be looked upon as a serious pest.

Preventives.—In the first place all garbage and refuse matter, such as dead carcasses of animals and dead vegetable material, should be burned or buried, because these substances furnish breeding places for the fly and food for the maggots. In the second place, stock should be carefully examined every day to see if they are cut or bruised. If so, the cuts and bruises should be covered with a coat of pine tar, which will prevent the fly from depositing its eggs and also assist in healing the wound. If the wound is situated so that a cloth can be wound about it, this should be done. In most cases the wounds will need more than one application of the tar. If possible stock should be kept away from all barbed wire fences. Finally it is very important that the stock be free from ticks, because the puncture made by the ticks afford an opening in the skin in which the fly will deposit its eggs.

Remedies.—For sores infested with the maggots crude carbolic acid, 1 part to 30 parts of water, is the best remedy known. It not only kills the maggots, but it aids greatly in healing the wound. After having thoroughly washed out the wound with the mixture of water and carbolic acid, apply a coat of pine tar, which will prevent a later deposit of eggs. In case of a deep hollow wound,

some lint cotton coated with tar might well be inserted in the cavity. Calomel has also proved a good remedy. But care should be taken not to apply it in too large quantities, else it will retard if not prevent the wound from healing by over-stimulating it. Moreover, if within reach of the animal's tongue, the calomel will be licked off and may cause mercurialism.

Dr. Francis says that creoline, or any of the carbolic sheep dips, forced into the wound by a common machine oil-can, holding about 4 ounces, is a very cheap and satisfactory method of killing the maggots.

Animals can be protected from the adult fly by being coated with a mixture of tar and grease or fish oil alone. So long as the odor lasts the fly does not seem to deposit her eggs.

SHEEP BOT-FLY OR HEAD MAGGOT.

(*Oestrus ovis*. Linn.)

Although for a long time it was thought that this fly deposited only eggs, it is now well established that in most cases it deposits living maggots in the nostrils of the sheep, which ascend to the small intricate cavities of the head.

Methods of Prevention.—It is a common practice for sheep-raisers to bore holes 2 inches in diameter and 5 or 6 inches apart, in logs which are placed in some convenient part of the pasture. The holes are just deep enough for the sheep to reach the salt which is placed therein. Tar is then placed about the edges of the holes so that the nostrils of the sheep are smeared with it as they eat the salt. The tar, the odor of which seems to repel the fly, should be applied to the logs once in 4 or 5 days.

Others have a practice of plowing a small part of the pasture so that the sheep may thrust their noses into the fresh dirt and thus prevent the fly from depositing the maggots. This might be effectual if the sheep could stand in this position all the time, but as soon as it leaves the plowed ground the persistent fly finds its opportunity.

Dislodging the Grubs.—A feather dipped in turpentine may be run up the nostrils and quickly turned two or three times. This will dislodge the grubs within its reach.

The sheep should be forced to sniff dry lime up the nostrils which will cause them to sneeze violently and thus dislodge some of the grubs.

A wire should never, under any circumstances, be run up the nostrils of the animals. But very few of the grubs could be hit in this way, and besides it will cause the most excruciating pain to the animal. If one has ever had a dentist bore away at the free end of a nerve in a tooth, he can get some idea of the awful pain that will be produced by a wire penetrating the delicate membranes of a sheep's nostrils.

OX BOT-FLY OR WARBLE FLY.

(*Hypoderma bovis*. DeG.)

The larva or maggot of this fly is the one so often found beneath the skin along the backs of cattle. They are the little lumps found along each side of the backbone and are known as "warbles" or "wolves." There is no doubt but that this insect causes more damage than is generally supposed. The hides which are perforated by the "warbles" sell for less on that account, and also the beef of cattle affected by these maggots does not command so high a price. The expense of holding this pest in check would be infinitely small compared with the financial loss by damage to hides and beef, to say nothing of the annoyance to cattle.

Methods of Destroying the Maggots.—The maggots can be squeezed out in the spring with the thumb and forefinger. If the hole leading from the "warble" to the outside is too small, it may be enlarged by a blunt round stick. Cattle which are kept in stables should be examined and whenever a lump is found along the back the warble should be squeezed out. If this is done during late spring, the maggots should be killed after they are pressed out so as to be sure they do not turn to flies.

Another and simpler method is to smear the back of the animal with any thick greasy substance. Fish oil, lard oil, or even kerosene, rubbed into the places where the "warble" occurs will kill it. The thick substances fill up the holes leading to the maggot, and this excludes the air until finally the maggot dies.

If every farmer in a neighborhood would practice these methods thoroughly and persistently the pest could be almost exterminated in that particular region.