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prevent WORMS



TO INCREASE SHEEP PROFITS

Extension Service
University of Nebraska College of Agriculture and Home Economics
and U. S. Department of Agriculture Cooperating
E. F. Frolik, Dean E. W. Janike, Director

PREVENT WORMS..... to increase sheep profits

By George W. Kelley, Jr. and E. Crosby Howe ^{1/}

WORMS BECOME PROBLEMS WHEN:

1. Pasture is overgrazed.
2. Forage is fed on the ground.
3. Lambs are grazed on marshy pastures.
4. Lambs are run with worm-carrying ewes.

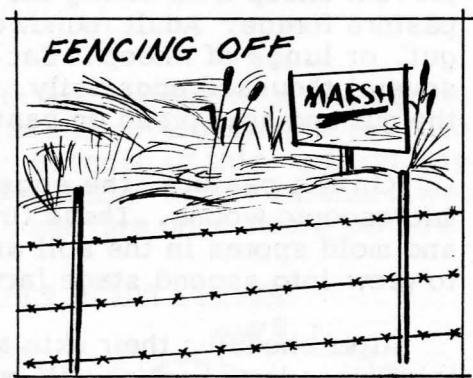
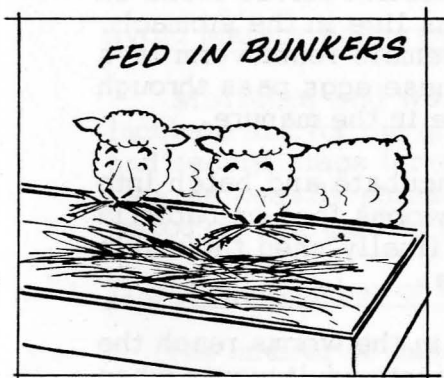
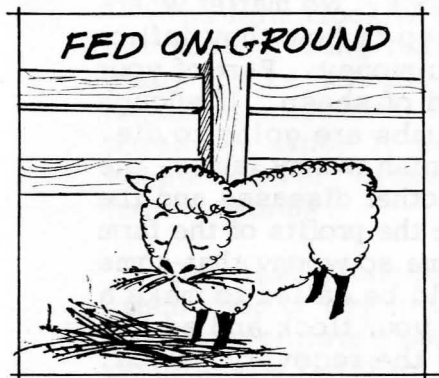


REMEDY THESE BY:

1. Frequent moving to uncropped pastures (avoid overgrazing).
2. Feeding in bunkers.
3. Fencing off marshes.
4. Remove worms from ewes prior to pasture season.
5. Use pasture only for older sheep - keeping lambs in dry lot.
6. Low level phenothiazine to kill worm eggs.



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INTRODUCTION

Parasite worms may be eating the profit from your farm sheep flock. Several different kinds of worms can live in the stomach, intestine, liver and lungs of sheep. Some of these suck blood, others eat the animal's food, and still others irritate tissues in which they live.

Keep the worms out of your flock. No matter where the worms are found in your sheep or how they inflict damage their presence costs you money. Part of your feed goes to raise worms instead of sheep. If enough worms are there some of your lambs are going to die. The additional feed required to finish wormy lambs, the susceptibility of wormy lambs to other diseases and the deaths due to worms all come from the profits of the farm sheep flock. If your lambs become so wormy that some of them die, a veterinarian should be called to make a proper diagnosis, properly treat your flock and advise you on care and feeding during the recovery period.

Sheep Become Parasitized on the Pasture

To keep worms out of your farm flock, you must prevent sheep from eating the infective larvae found on pasture forage. Adult roundworms live in the stomach, gut, or lungs of sheep. Each female roundworm lays several thousand eggs daily. These eggs pass through the gut and are spread on pasture in the manure.

On the pasture, the eggs incubate and hatch into microscopic worms. These tiny worms feed on bacteria and mold spores in the soil and finally shed their skin to grow into second stage larvae.

After shedding their skin again the worms reach the third stage larvae which will grow into adult worms when eaten by sheep. The third stage larvae keep the skin of the second stage about them and thus have two envelopes to protect them against heat and drying.

The third stage larvae are stimulated by moisture and light to crawl up grass blades. This habit increases their chances of being eaten by grazing animals.

Avoid Overgrazing

The farm flock is particularly susceptible to internal parasites because it is often kept on a limited pasture. The sheep pasture is frequently made up of rough terrain not suitable for other uses. More often than not a part of the pasture is marshy and cannot be used for anything else.

The farm flock is an ideal way to harvest this land but such grazing practices favor internal parasites. Many flocks harvest all the forage by midsummer and require supplemental feeding. This is fine for the worm parasites since it means the sheep are cropping the vegetation very close, making it easier to pick up infective worms.

Careless producers sometimes feed supplemental green chop or hay in the same windrows day after day. This concentrates the flock even more than usual and results in a build up of droppings which contain worm eggs. The sheep in turn eat close to the ground around the windrows and pick up numerous worms. If you must feed in the pasture area, worms can be avoided by providing feed bunkers.

Avoid Marshy Pastures

Moisture and warmth are required for the egg to incubate and for the growth and development of the first and second stage larvae. Because of this, a flock may become heavily parasitized following an extended wet period or after grazing for some time on a marshy pasture.

Lower the Number of Worms in the Pasture

The number of infective larvae on the pasture can be reduced by removing adult worms in the sheep or by interfering with the hatching of eggs.



Periodic treatment will lower the number of adult worms within the sheep. Nebraska winter weather kills almost all of the infective larval worms on the pastures. It is very important to see that all adult worms are removed from the sheep when the spring pasture season starts

Drench to Remove Adult Worms

Drenching will remove most adult worms. Phenothiazine is the drug to use in the spring drench. A drenching suspension yielding a dose of 37.5 grams phenothiazine for adults and 25 grams for lambs will effectively eliminate most worms from the gut. Fine particle phenothiazine kills more worms than the ordinary product. It will be worthwhile to buy drenching suspension or powder bearing the name Micronized phenothiazine.

Thiabendazole is a new drug that eliminates more worms than previous remedies. It is less poisonous to sheep and may replace phenothiazine in the future.

Many producers drench again later in the season with a mixture of copper sulfate and nicotine sulfate (black leaf 40). Some of the organic phosphates presently being used to treat cattle grubs appear to effectively remove sheep worms. Consult your veterinarian on the use of any drugs to be administered.

A new drug, Thiabendazole, removes worms more effectively than the finest phenothiazine and is less toxic to the sheep. It does not depress the appetite, discolor the wool, or produce photosensitization.

A dose of 50 mg Thiabendazole per 2.2 lbs. body weight removes most of the worms, but research workers have found that the dose has to be doubled to be completely effective. Wormy lambs treated with 100 mg Thiabendazole per kg body weight rapidly recovered from the effects of parasitism without supplemental feed or medication. The cost is two to four times more to treat lambs with Thiabendazole than with phenothiazine, but the benefits outweigh the additional cost.

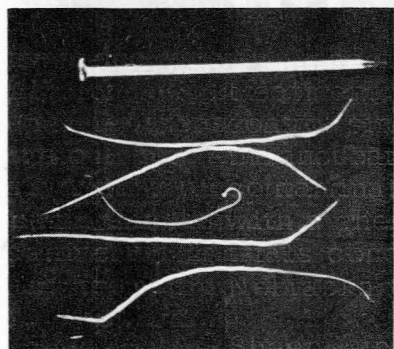
The salt-phenothiazine mixture must be put in boxes which will protect it from rainfall and sunshine since both of these elements will decompose the phenothiazine, making it worthless. With this type of treatment, the sheep will consume a gram or two of phenothiazine daily. This is not enough to kill worms in the gut of the sheep but it lowers egg laying and prevents those eggs that are laid from hatching. Thus, low level phenothiazine salt mixture helps keep the pasture free of infective larvae.

Keep Lambs in Dry Lot to Prevent Worms

The worms of sheep live best on the pasture, thus you can prevent your lambs from becoming wormy by keeping them in dry lot. Ewes can be turned to pasture each morning without their lambs. They have to be driven back into the lots at noon to allow the lambs to nurse but are turned on pasture again in the afternoon. Lambs pick up very few worms when raised this way and the additional labor involved is offset by the reduced cost of drugs and loss due to worms.

TYPES OF WORMS

The Blood Sucking Stomach Worm

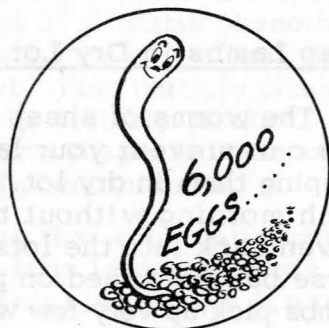
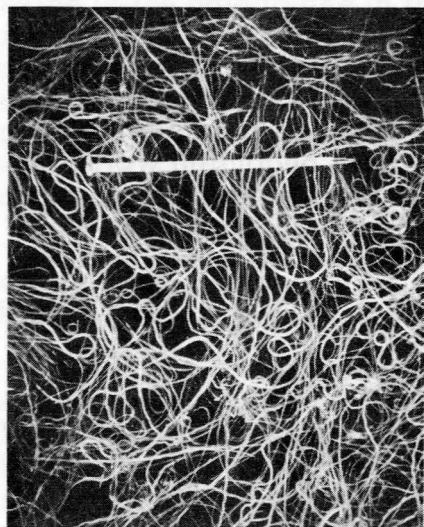


The males are smaller than the females (center worm) and have a knob on the tail end. The worms are seen here compared to a straight pin (above).

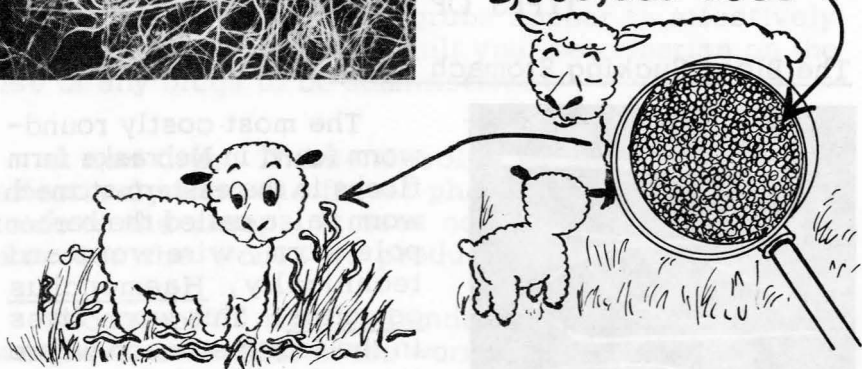
The most costly round-worm found in Nebraska farm flocks is the eastern stomach worm, also called the barber pole worm, wire worm and technically, Haemonchus contortus. This worm lives in the fourth stomach where it sucks blood from the stomach wall. Each worm devours a few drops of blood daily. When the parasite occurs in abundance this consumption of a few drops by each worm produces a severe anemia.

The parasite population can build up rapidly when conditions are right. The following example shows how this is possible.

Each female stomach worm lays 6,000 eggs daily. Assume that each ewe carries 50 worms. If 10 such ewes with their suckling lambs are grazing a 10-acre pasture the ewes are spreading 3 million eggs each day over the entire pasture, or about 60 eggs per square yard.



**50 WORMS LAY
3,000,000 EGGS**



Only a fraction of these eggs hatch but within a few days the infestation becomes so great that almost any place the lamb takes a bite of grass he picks up a few worms. Each adult worm sucks enough blood daily so that in a short time more blood is being removed than can be made. Sometimes lambs become parasitized so quickly that they die without showing the usual signs of parasitism - coarseness, scouring, bottle jaw and pale gums and eyes.

Wormy sheep have coarse stringy wool. They are poor doers and when severely parasitized have an accumulation of water under the jaw -- bottle jaw.



Control - Stomach worms can be controlled by periodic drenching and low level phenothiazine treatment. The infective larvae are all killed by Nebraska winter weather and pastures are worm free in the early spring.

The pasture becomes contaminated by eggs laid by worms carried in the ewes. It is essential to eliminate worms from the ewes before spring pasture. This can be done by drenching. Copper sulfate and phenothiazine and thiabendazole are effective.

A few of the worms will escape the drench. Their egg contamination of the pasture must be prevented. Low level phenothiazine checks the worms at this stage. The phenothiazine consumed from a salt-box containing 1 part phenothiazine to 9 parts salt will keep the worm eggs from hatching and prevents contamination of the pasture by the reservoir of worms in the old ewes.

The Thread-Necked Gut Worm

One worm causes considerable damage in Nebraska farm sheep flocks because it is resistant to phenothiazine drenches, and cold weather. This is the thread-necked gut worm, Nematodirus.

Nematodirus lives in the gut with its head deeply buried in the intestinal wall. It doesn't produce severe damage unless present in large numbers. Lambs seldom die when heavily parasitized with Nematodirus, but they are very poor doers. Their fleece loses its luster, becoming coarse, straggly and unthrifty looking. The lambs scour and do not fill out as they should.

Spread - Lambs pick up Nematodirus parasites from contamination left by lambs of the preceding year. After sheep become two years old they carry very few Nematodirus because of an immunity they have developed. This immunity prevents the older sheep from contaminating pastures with Nematodirus eggs.

Nematodirus eggs and larvae are very resistant to cold winter weather and will survive from fall until the pasture season of the following spring. The larvae are ready and waiting to parasitize the lambs as soon as they enter spring pasture.

Control - Control Nematodirus by rotating pastures so that spring lambs do not graze pastures used by lambs the preceding fall. Spring lambs can safely graze pastures which were occupied by old ewes the preceding fall because the old ewes are immune to Nematodirus and do not shed Nematodirus eggs.

Phenothiazine is not generally recommended as a treatment. Low level administration will give some control since phenothiazine taken in this manner stops the incubation of the eggs and will cut down on pasture contamination. The English are treating Nematodirus with a chemical compound called Bephenium. Limited trials conducted with Bephenium at the University of Nebraska were disappointing.

Sheep Lungworms

Some roundworms live in the lungs of sheep. One such worm, called Dictyocaulus, is sometimes found in Nebraska flocks. Heavy infection with Dictyocaulus results in damage to the lungs and may produce a chronic pneumonia. The adult worms live in the air passages within the lungs where the females lay their eggs. They hatch in a short time.

The newly hatched worms are coughed up into the throat and swallowed. They pass through the intestine and can be found living in the feces. After growing and molting to the third stage on the ground, these larvae crawl up grass blades and are eaten by sheep.

Control - Dictyocaulus generally require moist conditions for survival on the ground and are most often found in sheep which have been confined in low lying marshy pastures. Control consists of developing drier pastures.

There is no very good treatment for Dictyocaulus.

Dictyocide supposedly will give some relief but there are reports that this product is not always effective. If the sheep are removed from the contaminated pasture and placed on adequate nutrition, they will usually lose their lungworms without treatment.

The Nodular Worm

The nodular worm of sheep (Oesophagostomum) lives in the large intestine. Eggs are produced which pass out and hatch on the pasture in the same manner as the parasites mentioned earlier. The larva of the nodular worm penetrates the gut wall after it is eaten. Many become trapped in the gut wall where they produce an irritation. The sheep grows a wall of scar tissue around the trapped larvae. This walling off results in the formation of hard knots throughout the large intestine. Such condition spoils the use of the intestine for casings or surgical cat gut.

Control - Phenothiazine is effective against nodular worm. Following the general recommendations given for controlling stomach worm will keep it in check.

Other Roundworms Which Frequently Parasitize Sheep

Sheep are infected by a hookworm (Bunostomum) seldom found in Nebraska lambs, probably because of cold winter weather.

In addition, there are several other roundworms which live in the intestinal tract of sheep. These include

worms commonly called bankrupt worms (Trichostrongylus), cooperid worms (Cooperia), and western stomach worm (Ostertagia).

Under favorable conditions each of these can become a severe pest but they are seldom found in abundance in Nebraska sheep. The treatment measures given for stomach worm will keep them under control.

The Sheep Tapeworm

Most native Nebraska lambs are infected with the broad sheep tapeworm (Moniezia). This white, ribbon-like worm lives in the small intestine and will grow to be more than 15 feet long and one-half inch wide. The broad segments near the end of the worm are sacs of eggs. These segments break off and pass out with the waste products.

On the pasture the sacs rupture, spreading their egg contents onto the soil. Here the eggs are eaten by near-microscopic grass mites. Inside the mite, the tapeworm egg hatches into a tiny worm armed with six hooks. With these hooks the worm cuts through the gut wall of the mite to penetrate the body cavity. Here it grows and changes into a miniature tapeworm. When the mites carrying these worms are accidentally eaten by grazing sheep the larva is released in the intestine to grow into an adult tapeworm.

Damage - Some investigators think that the tapeworm is nearly harmless. Others have found that infection with the tapeworm interferes with the function of the intestine and blood making mechanism. If tapeworms are present in large numbers they can block passage of food through the intestine.

Control - Lead arsenate in doses of 0.5 grams to 1 gram is an effective treatment for the broad tapeworm. Most commercial phenothiazine has lead arsenate added to provide this treatment. Although medication removes the tapeworms it has limited value because the lambs get new worms again just as soon as they eat the infective mites.

Tapeworm control is difficult because the infective larvae are protected by living within the hardy grass mites. These mites can be collected in abundance at all times of the year and can apparently withstand severe cold and heat. The mites migrate up grass blades during the very early cool dim light of dawn. They crawl back into the protective soil as the day becomes hotter. These habits provide the means for a limited control measure. Keep the lambs off pasture until the sun has driven the mites from the grass blades.

Fringed Tapeworm

Lambs imported from ranges west of Nebraska may be parasitized with a smaller tapeworm which lives in both the small intestine and the liver. This is the fringed tapeworm (Thysanosoma). It rarely grows more than 10 inches in length and 1/4-inch across. It lives in the gall bladder and bile ducts of the liver and the fore part of the small intestine.

This tapeworm sometimes blocks the bile ducts, causing bile to be spread throughout the flesh of the animal. The greatest damage results from spoiling of the liver for food.

The United States Department of Agriculture meat inspector makes a thorough examination of all sheep livers. When a wormy one is found, the liver is condemned as food. Over 35 percent of the livers from all the sheep killed at a western Nebraska packing plant were destroyed one year because of fringed tapeworm infection. Life history of the fringed tapeworm is not known.

Control - Work in progress at the University of Nebraska Scotts Bluff Experiment Station indicates that hygromycin B removes a large percent of the fringed tapeworms from feed lot lambs. Hygromycin B has been fed to feeder lambs at the Scotts Bluff Station for three years. Condemnations of livers have been greatly reduced when 19.2 mg. hygromycin B per lamb were mixed into the ration for the first 30 days of the feeding period.

Hygromycin B is an antibiotic used principally for treating large roundworm infections in swine. Its use has not yet been approved for sheep by the U.S. Food and Drug Administration. This report should in no way be considered a recommendation to feed this product to sheep until proper approval is granted.

Liver Fluke

Several regions of the United States, where rainfall is high and winters mild, have the problem of liver fluke infection in sheep. Native Nebraska sheep do not have this problem. Liver flukes are about the size of a thumb tack head and live in the bile ducts of the liver. They are carried by certain snails and are thus more apt to be found where sheep are grazed near water. The parasite has not been found in Native Nebraska sheep, probably because the right snail cannot live here.

Coccidiosis

Coccidia are very tiny animals that live within the intestinal wall of lambs and other animals. When a certain stage is reached they burst out of the intestinal wall, causing considerable bleeding. This stage passes out of the sheep with the manure and after a few days on the ground can infect other lambs. The stage on the ground requires moisture.

Farm flock lambs are infected with coccidia during the early part of their lives and become immune to it whereas western lambs from drier areas with less intense grazing are not infected until they come into the feed lot. When bunched together in the feed lot they may develop coccidiosis.

There is no good treatment for coccidiosis of lambs. It is recommended that western range lambs be bedded in dry lots with occasional rotation to clean paddocks during the fitting period prior to full feeding. After a month, the lambs will have developed immunity.

SUMMARY

Worm parasites and their sheep hosts have lived together for many thousands of years. During this long association each has become modified so that they can best tolerate each other. When left in nature's balance the sheep and worms live together with very little loss. When man tips this balance to favor the parasite (by careless management) the parasites produce extreme harm.

Sensible stocking and frequent rotation on good pastures free of low-lying wet areas, in conjunction with a program of spring drenching and low level phenothiazine, will usually hold the balance in favor of the Nebraska producer.

Be safe, consult your veterinarian on the use of any drugs to be administered.

* Plans for salt box and other sheep equipment found in circular, E. C. 60-712, SHEEP AND EQUIPMENT PLANS.

