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Internal Parasites of Sheep

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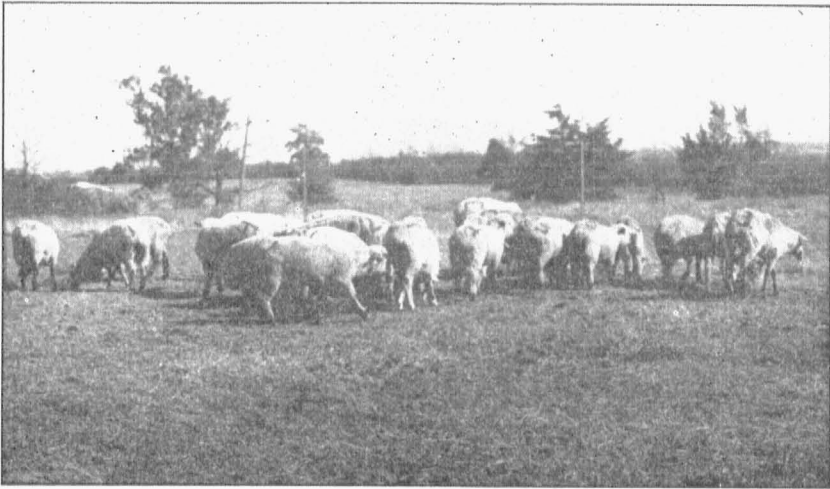


Fig. 1.—Farm flock heavily infested with stomach worms and nodular worms.

Internal Parasites of Sheep

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The parasite problem in Missouri sheep is gradually becoming more serious. Losses from internal parasites are heavier than from any other disease affecting farm flocks, and unless proper measures are taken to curb these losses there is every reason to believe that they will continue to increase. Enough information has been gathered on this problem and sufficient facts are known about treatment that it is now easily possible to cope with this situation if certain fundamental principles are adopted and followed.

Although several different species of parasites may be found in Missouri sheep, the most serious at the present writing seem to be the stomach worm (*Haemonchus contortus*), the nodular worm (*Oesophagostomum columbianum*), the tape worms (*Moniezia expansa* and *Moniezia benedeni*), and the small stomach worm (*Ostertagia circumcincta*). The numbers of small stomach worms are probably not great, but they have been observed in several cases during the past two years. It is believed that if the parasites mentioned are held to a minimum the loss from other parasites would not be of great economical importance.

The general symptoms of parasitism (and this applies in a large measure to infestations with one or more of the above species) may be very marked, especially when the infestations are heavy. Young animals, especially lambs, are more subject to the ravages of parasite infestation and when the parasites gain entrance to the body the damage is more extensive than is observed in older sheep. The symptoms generally noticed are loss of flesh, unthrifty appearance, diarrhea, and pale mucous membranes. As the disease advances and the infestation becomes heavier there is marked loss of weight, weakness, and in many cases death of the animal. Investigations at the Missouri Experiment Station show that the heaviest death losses from stomach worms and nodular worms occur during late summer and early fall months but on some farms death losses have occurred at all times of the year.

Each of the parasites affecting domestic animals has a very definite life cycle, even though all of the details of all of these life cycles are not yet known.

There is considerable difference in the life cycle of various internal parasites, some of them being more complex than others. In general, the stomach worms and nodular worms have a rather simple life cycle. The adult female worms located in the digestive tract of the sheep produce large numbers of eggs, which are eliminated with the

droppings. These eggs hatch out on the ground in from a few days to a few weeks, depending upon the weather. Development is much more rapid in warm weather than in cooler or cold weather. The eggs hatch and set free a small larval form of the parasite which undergoes further development in the ground. When they reach the so-called infective stage they crawl up on the grass when it is wet with dew or rain. Sheep grazing over this grass swallow the parasites which remain in the stomach or intestinal tract, where they undergo further development.

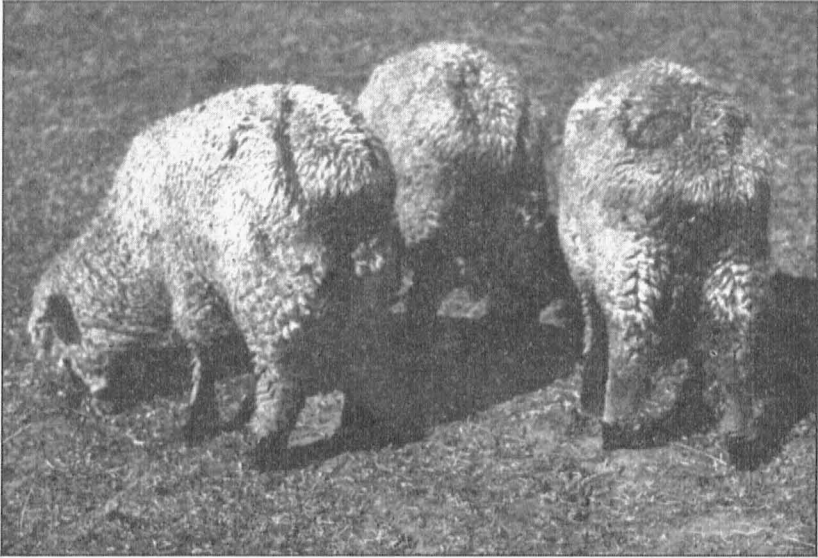


Fig. 2.—Experiment lambs heavily infested with internal parasites. Note soiled wool, due to diarrhea.

The stomach worm remains in the fourth stomach of the sheep and grows to maturity, mates, and is ready to lay eggs, thus completing the life cycle. The larvae of the nodular worm enter the wall of the intestine where they remain for varying lengths of time. A small nodule develops around the area in which this larval form is located and it is from this tissue formation that the nodular worm gets its name. After a certain amount of development the worms return to the lumen of the digestive tract, make their way to the large intestine, and start laying eggs, thus completing their life cycle.

The tapeworms are somewhat different, as part of their existence is spent in another species which is known as the intermediate host. The eggs of the tapeworm are passed in the droppings while they are still within the mature segments. These segments are flat and readily visible to the naked eye. The eggs after finding their way into

the intermediate host undergo development and remain there until they have an opportunity to get into the final host's body, where they grow to maturity and again start their life cycle. The intermediate hosts of several of the tapeworms are as yet unknown.

The control of parasites is based upon an attempt to break the life cycle, therefore efforts should be made to apply control measures at the most vulnerable spot.

TREATMENT AGAINST PARASITES IS VERY EFFECTIVE

The treatment for stomach worm infestation consists of the administration of bluestone or copper sulphate made up in solution. For many years it has been known that 1% copper sulphate solution is a very satisfactory and efficient treatment if properly administered. The copper sulphate solution is made up by dissolving 4 ounces of bluestone or copper sulphate crystals in a pint of boiling water. Care should be taken that only blue crystals are used; the white crystals should be discarded from the medicine. When the crystals have been thoroughly dissolved in the hot water sufficient cold water should be added to make a total of three gallons of solution. In preparing the solution it is preferable to use distilled water, rain water, or water that has been boiled. Since the bluestone is corrosive, this solution should be prepared in earthenware, porcelain, or glass containers. It is absolutely essential that the crystals be thoroughly dissolved and the medicine thoroughly mixed before it is administered to the sheep. This amount is a sufficient quantity of bluestone solution to dose approximately 96 adult sheep. The medicine may be given with a dose syringe, a funnel and hose, a drenching bottle, or by means of a stomach tube. The amount of medicine administered may be determined on an age or weight basis. Workers at this experiment station think the weight basis is more satisfactory because it ensures a more correct dosage. The dosage table recommended is:

- 1 ounce for sheep weighing 20 lbs.
- 2 ounces for sheep weighing 40 lbs.
- 3 ounces for sheep weighing 60 lbs.
- 4 ounces for sheep weighing 80 lbs. or over

The flock (except nursing lambs) should be fasted for 18 to 24 hours before dosing. They are allowed to have water during that time. After the medicine is administered both feed and water should be withheld for a 3 to 4 hour period. Lambs should be separated from the ewes before they are treated and nursing lambs should not be allowed to nurse their mothers for 2 or 3 hours after the bluestone has been administered, as the milk not only dilutes the bluestone but

interferes with its action in the stomach. The lambs may be permitted to stay with their mothers during the fasting period but should be separated just before the medicine is given.

In order to get the best results this treatment should be started early in the spring and continued through the summer and fall until about December 1, under average Missouri conditions. The interval between treatments should be 21 to 28 days. When a flock is heavily infested with stomach worms it may be necessary to treat every 7 to 14 days until the flock begins to improve, after which the interval between treatments may be extended to the usual 21 or 28 days. Sick or very weak sheep should not receive a full dose. It is recommended that they get a half dose and have this repeated in about 7 days. As soon as they begin to improve the interval may be increased and the full dosage may be given without danger. It should be kept in mind that proper precautions in dosing the sheep should always be taken and that the medicine be given slowly and carefully to avoid strangulation resulting from its entrance into the lungs. When sheep have been treated in this manner and reasonable precautions have been taken to protect the young lambs from exposure very satisfactory results have been obtained in the control of stomach worm infestations.

In view of the fact there has been some thought that the 1% copper sulphate solution was not doing a good job, extensive experiments were undertaken in the veterinary department of the Missouri Experiment Station a few years ago. Since then considerable work has been done with a 1½% solution of copper sulphate. This is made up by using 1½ times the amount of copper sulphate crystals indicated above. A close observation of sheep receiving 1½% copper sulphate solution on the same dosage table as outlined on a weight basis has shown results indicating that this was a safe procedure to follow and that the sheep suffered no apparent ill effects from the increased amount of copper sulphate in the solution. Care should be taken to measure dosages accurately, because too much copper sulphate is poisonous to sheep and has caused death in several instances where the dosage was too great. Work at this station indicates that the 1% copper sulphate solution, properly used and administered throughout the greater part of the year, will give good and satisfactory results. If one has reason to believe that his results have not been satisfactory it will be found a safe procedure to give up to a 1½% solution in the same dosages. Copper sulphate must be given as a drench and the sheep treated individually. The addition of copper sulphate to the salt in an attempt to control stomach worms has not been found satisfactory. The main reason for this is that the sheep needing the treatment most fail to get the required amount, while sheep needing

the treatment less are likely to be over-dosed. Many cases of copper sulphate poisoning have occurred following the use of copper sulphate in the salt.

Other treatments, including tetrachlorethylene and phenothiazine, have been found satisfactory for the removal of stomach worms, but the copper sulphate continues to be a popular treatment because of the ease of its administration and the low cost of the medicine. Phenothiazine has been found to be very efficient in the removal of stomach worms and may be given to the sheep without the necessity of fasting the animals. In fact, it appears to be more effective when the sheep are not fasted. This very distinct advantage is more or less offset by the higher cost of the phenothiazine at the present writing. Phenothiazine is a comparatively new drug on the market but its efficiency as a vermifuge must be recognized.

The treatment of tapeworms is recommended when their presence in a flock has been definitely established. If it is known that tapeworms are not present treatment for this parasite does not seem advisable. When tapeworms are present nicotine sulphate added to the copper sulphate solution will be found quite effective in their removal. Nicotine sulphate is generally used in the form of Blackleaf 40, and 1 ounce of nicotine sulphate (40%) is added to each gallon of copper sulphate solution. The dosage remains the same as indicated in the table.

Copper sulphate has not been found very satisfactory for the removal of small stomach worms, but copper sulphate in combination with nicotine sulphate has given fairly good results. Fortunately, at the present writing, small stomach worms are not nearly so common in Missouri flocks as are the common stomach worms. If they are known to be present in a flock of sheep the combination of copper sulphate and nicotine solution is recommended.

Until recently there was no satisfactory treatment for nodular worm infestation, but when phenothiazine was discovered to be effective against this parasite great interest was focused on this new product. Phenothiazine has been found to be very efficient in the removal of the adult nodular worm and in the removal of stomach worms. It is not effective against tapeworms of sheep, and in our experiments has not been very satisfactory for the removal of small stomach worms. Its efficiency in the removal of nodular worms has been a great boon to the sheep raising industry, as nodular worms are very common in Missouri. It is rare indeed to find a flock of sheep, at the present writing, that does not have some nodular worm infestation present. This drug may be given in the powder form in gelatin capsules, or may be

given in a liquid form, in which the drug is held in suspension. The dosage as given on the container is the one to be followed; usually the dosage of the liquid form is one ounce for lambs and two ounces for mature sheep.

Although phenothiazine has been heralded as an excellent worm remover, it should be kept in mind that its usage is not without danger; therefore it should be given by or under the supervision of a competent veterinarian. Investigational studies at this Station have proved the efficiency of this new drug. Results indicate that a course of treatments combining the use of phenothiazine and copper sulphate would be most satisfactory for the average Missouri conditions. On this basis it is suggested the sheep be treated once with phenothiazine in March. Starting 4 weeks later, treat the flock with copper sulphate every 28 days until about December 1, at which time the flock should receive another treatment with phenothiazine. It is believed that this plan of administration will adequately control both stomach worms and nodular worms under average conditions. If the flock has not been treated with phenothiazine in March and it is heavily infested with nodular worms it may be treated any time during the year with this drug. Experimental sheep have received phenothiazine every 28 days without any danger, but the cost of such treatment may be considered by some as prohibitive.

Following any treatment, if the sheep could be confined to a small lot or enclosure for 24 to 48 hours the amount of parasite egg contamination to pastures would be greatly lessened, because large numbers of parasites and parasitic ova are passed out of the digestive tract with the droppings during this period. It would be highly advisable to remove such material and spread it on fields that are to be cropped. Although this practice is not usually followed, it must be considered practical where infestations with parasites are extremely heavy.

IMPORTANCE OF PROPER FEED

Experiments at this station have very definitely proved that proper feed, given in abundant amounts, is very essential in the control of parasitic infestations. Where the nutrition has not been adequate and the sheep have been improperly fed losses from parasites have been correspondingly greater. Experiments tend to show that proper feeding is almost as important in the control of parasites as the treatment itself. This does not mean, however, that even though the sheep are well fed one should not administer parasite treatment where it is needed. An adequate supply of good feed not only helps the sheep to ward off heavy invasions of parasites but also puts them in a condition to better withstand the damaging effect of the parasite within the sheep's body.