

# Cold Resisting Sheep Parasites

By

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IN a recent survey conducted by means of questionnaires to veterinarians and county agents in North Dakota 39 out of 47 reporting considered the control of parasites of the intestines and stomach as the most serious problem confronting the sheep-raisers. During the past eight years there have been many improvements in the methods and types of drugs used in combating internal parasites. It appears, however, that if control of the parasites is to be achieved it is necessary to consider some of the less apparent means of survival and distribution of the parasites. We have been advising a year around program for the control of internal parasites of sheep. This system is based on (1) a more or less continuous use of the phenothiazine salt lick to prevent the distribution of infective material over the pastures, (2) a fall and spring treatment of the ewes with drugs effective against both round worms and tapeworms, (3) the feeding of a liberal ration, (4) the frequent rotation of pastures, and (5) the use of water troughs.

## Winter Survival of Parasites

At this time we wish to report briefly on the survival of the different types of parasites on a pasture in the Red River Valley of North Dakota and to show the danger of winter infestation of sheep maintained on contaminated lots and fed hay by distributing it on the ground.

Table 1 shows the parasite load of two lambs maintained for four months on a pasture heavily seeded with parasite ova during the summer and fall of 1944. No sheep were allowed on the pasture from December 1944 until June 1945. At this time a ewe, her lamb, and an orphan lamb were placed on the pasture. The ewe was checked at frequent intervals and at no time were parasite ova found. At approximately weekly intervals she was treated with either the alkaline worm-killer which we have previously described (Eveleth & Goldsby 1945) or by

the use of phenothiazine. These lambs were both badly stunted although the feed supply was adequate.

These data show that the broad tapeworm, *Moniezia*; the medium stomach worm, *Ostertagia*; and the intestinal worms, *Trichostrongylus* and *Nematodirus*, survived the winter in sufficiently large numbers to cause a heavy infestation of the lambs. This pasture had been "seeded" to the ova of sheep-infesting worms by exposing it to sheep heavily infested with the parasites listed in Table 2. The data of other investigators have been included to aid in further defining the areas in



Sheep fed hay on the ground may pick up round worms in the early winter.

which different types of parasites will not overwinter on the pastures.

As shown in Table 1 and 2 certain parasites were able to survive the winters of a pasture located at Fargo, N. Dak. Prior to and subsequent to the use of

**Table 1.—Infestation of Lambs by Parasites Overwintering on Pasture**

	Number of Parasites	
	Lamb No. 1	Lamb No. 2
<i>Ostertagia</i>	390	1029
<i>Strongyloides*</i>	600	—
<i>Trichostrongyles</i>	602	280
<i>Nematodirus</i>	8280	280
<i>Trichuris</i>	5	32
<i>Moniezia</i>	239 gm.	.5 gm.

\* May have been barn infestation.

the pasture for the winter survival studies sheep have been more or less constantly maintained on this pasture. These sheep have been killed for post-mortem examination at various times and the parasite load determined. In most instances there have been immature forms of parasites found.

The results of examination of 114 sheep and lambs killed during the fall and winter months are given in Table 3. These data show that in early winter the number of larvae (young worms) picked up by the sheep may approach a number that would cause some symptoms of parasitism. In one case where a group of lambs was placed on the pasture in late September and fed oats and prairie hay on

Table 2.—Overwintering on Pastures of Ova, Larvae, or Intermediate Hosts of the Common Gastro-Intestinal Parasites of Sheep

Name of Parasite	Survival Over winter unless otherwise stated	Reference
<i>Ostertagia</i> sp.	Survives at Beltsville, Maryland	Shorb (1942)
Western or medium stomach worm	Survives at Canada	Griffith (1937)
	Survives at McDonald College, P.Q.	Swales (1940)
	Survives at Fargo, North Dakota	Authors
	Survives three months (July to Oct.) Kentucky	Doll & Hull (1946)
<i>Haemonchus contortus</i>	No survival at Beltsville, Maryland	Shorb (1942)
Large stomach worm	Some survival at Beltsville, Maryland	Shorb (1944)
Wire worm, etc.	No survival at McDonald College, P.Q.	Swales (1940)
	No survival at Fargo, North Dakota	Authors
	Survive three months (July to Oct.) Kentucky	Doll & Hull (1946)
<i>Trichostrongylus</i> sp.	Survives at Beltsville, Maryland	Kates, (1943)
Small stomach worm	Survives at Fargo, North Dakota	Authors
Bankrupt worm		
<i>Nematodirus</i> sp.	Survives at Beltsville, Maryland	Kates (1943)
Thread-neck strongyles	Survives at Fargo, North Dakota	Authors
	Survives at McDonald College, P.Q.	Swales (1940)
	Survives three and one-half months (July to October) in Kentucky	
	Location not given	Doll & Hull (1946)
<i>Cyathostoma</i> sp.	No survival at Fargo, North Dakota	Authors
No common name	No survival at Beltsville, Maryland	Kates (1943)
<i>Oesophagostomum</i> sp.	No survival at Beltsville, Maryland	Kates (1943)
Nodular worm	No survival at Fargo, North Dakota	Authors
<i>Bunostomum</i> sp.	No survival at Beltsville, Maryland	Kates (1943)
Hookworm	No survival at Fargo, North Dakota	Authors
<i>Trichuris</i> sp.	Survives at Beltsville, Maryland	Kates (1943)
Whipworm	Survives at McDonald College, P.Q.	Swales (1940)
	Survival at Fargo, North Dakota	Authors
<i>Chabertia</i> sp.	Did not survive 3½ months of fall weather at East Lansing, Michigan	Hawkins, Cole & Kline (1944)
Large mouth bowel worm		Authors
<i>Thysanosoma</i> sp.	No survival at Fargo, North Dakota	
Fringed tapeworm	No winter carry over at Fargo, N. Dak.	Authors
	May be absence of intermediate host.	
	Intermediate host not established.	Authors
<i>Moniezia</i> sp.	Survives at Canada	Griffiths (1937)
Broad tapeworm	Survives at Fargo, North Dakota	Authors
	Survives 3½ months (June to October) Kentucky	Doll & Hull (1946)

the ground they readily picked up a rather heavy parasite load and lost an average of 4.4 pounds in sixteen days.

Table 4 gives the length of time required after eating larvae before these parasites mature and start depositing ova. In all cases the sheep harboring immature parasites were known to have been on fall or winter pastures long enough for any previous infestation of worms to have matured.

The data which have been given show that Eastern stomach worm, *Haemonchus*; the nodular

worm, *Oesophagostomum*; the hookworm, *Bunostomum*; the large mouth bowel worm, *Chabertia*; and the fringed tapeworm, *Thysanosoma*; do not survive the winters at Fargo. The broad tapeworm, *Moniezia*; the western stomach worm, *Ostertagia*; the gastrointestinal worms, *Trichostrongylus*, *Nematodirus* and *Trichuris*; all survive the winters here.

Sheep and lambs do become infested with worms by feeding on the ground during the winter.

The data which we have presented show that it is a wise

precaution to feed phenothiazine in the salt during the entire time that the sheep are on the pastures. It is only after one or two years of vigorous efforts at parasite control that the beneficial effects will be noticeable.

**Table 3.—Immature Round Worms Found in Sheep During the Fall and Winter**

Month	No. of Sheep Examined	No. of Sheep Having Immature Round Worms	Ave. No. of Immature Round Worms Per Infested Sheep
September	21	9*	3451
October	50	21	2460
November	12	4	818
December	8	3	439
January	10	5	692
February	6	1	216
March	7	1	3

\* One of the nine was a goat.

**Table 4.—Length of Time After Eating Larvae Before Parasites Mature**

Parasite	Length of Time Required to Mature	Reference
<i>Haemonchus</i>	Two to three weeks	Ransom (1907)
<i>Ostertagia</i>	Fifteen days	Threlkeld (1934)
<i>Strongyloides</i>	Eleven days	Authors
<i>Thichostrongylus</i>	Approximately three weeks	Monnig (1934)
<i>Cooperia</i>	Fourteen days	Andrews (1939)
<i>Bunostomum</i>	(No available data)	
<i>Nematodirus</i>	Less than twenty-seven days	Marsh (1936)
<i>Oesophagostomum</i>	One to six months	Freeborn & Stewart (1937)
<i>Trichuris</i>	Approximately one month	Monnig (1934)
<i>Chabertia</i>	Nine weeks	Ross & Kauzal (1933)

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James I. Hambleton, Apiculturist of the U. S. Dept. of Agriculture introduces a most interesting discussion of the honeybee (11 pages, 4 plates) appearing in the Smithsonian Report for 1945, by stating that, "Of all insects in the world probably no one species is more widely distributed than the honeybee. Its habitat ranges from Alaska to the Tropics. It is found in all the intervening places in that great stretch of latitude—in the mountains, in the sultry valleys below sea level, in the deserts, plains, in fact wherever flowering plants occur. Honeybees are not indigenous to all continents of the world, but they have become introduced and established essentially in all parts occupied by man."

The article stresses the relationship of honeybees to the production of seed and fruit crops and is convincing evidence of the importance of these insects to the welfare of humanity. (J.A.M.)