Internal parasites of cattle

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WORM infestation (Parasitic Gastro-Enteritis) is frequently a cause of serious economic loss both in calves and yearlings. It is unfortunate, however, that stock owners do not realise until too late the full extent of the effects of these worm parasites—for the cost can be counted not only in the actual deaths sustained, but in the resultant check in the animal's growth and development.

Recent investigations of mortalities in young stock in the South-West of the State have focussed attention on some of the internal parasites of cattle. The parasites we are concerned with and those which exert the most severe effects are commonly and collectively termed "hair worms," and include the following species:

- Small Brown Stomach Worm (Ostertagia ostertagi)
- Stomach Hair Worm (Trichostrongylus axei)
- Small Intestinal Hair Worms (Trichostrongylus spp. and Cooperia spp.)

Calves are most susceptible to worm infestation, while young cattle up to the age of 18 months may become affected as well. Such infestation usually occurs following autumn rains, and symptoms are most commonly seen during the late autumn, winter, and early spring. However, evidence of infestation may be seen at any time of the year, especially when a falling off in the standard of nutrition takes place.

WHAT ARE THE SYMPTOMS OF PARASITISM?

The most common symptom is a progressive loss of condition. This, however, is often overlooked especially if the disease occurs at a time of the year when the animals are subsisting on a poor diet incapable of maintaining body weight. In addition, diarrhoea generally becomes a noticeable symptom. In severely affected animals, this loss of condition proceeds to the point of emaciation, but before this stage is reached, the coat becomes dry and harsh, and the animal has a dejected, hide-bound appearance. The animal usually continues to feed until a very late stage in the disease when weakness becomes so marked that when driven, the animal may stumble and fall to the ground, and for a time be unable to rise.

The diagnosis of the disease depends firstly upon the appearance of the symptoms described, in several members of a group of young cattle; and secondly on a post-mortem examination of affected stock, and the consequent identification of the parasites. A third method of diagnosis, which provides contributory evidence, involves what is known as the egg counting technique, in which a microscopical examination is made of selected samples of the droppings from one or more members of the affected group.

LIFE HISTORY

Many kinds of worms are capable of infesting cattle and causing disease. The "hair worms" belong to the nema-
todes, or round worm group, and their life cycle is as follows:—

The female worm lays her eggs, which are passed out in the dung. Under suitable conditions of temperature and moisture, the egg hatches to give rise to a tiny larval worm. During this free-living stage the larva moults twice, and is then capable of infecting cattle. This "infective larva," as it is called, crawls up the blades of grass, is eaten by the grazing animal, and so reaches maturity again in the digestive tract of the host animal.

**Small Brown Stomach Worm (Ostertagia ostertagi).**

These are slender brownish worms about half an inch in length which are found in the abomasum (fourth stomach). They are generally most numerous near the opening of the stomach into the small intestine, but owing to their small size, may easily be overlooked. These parasites are most readily seen by scraping the stomach wall and examining the scrapings in a glass dish held over a dark background.

These parasites are probably the most dangerous of all the "hair worm" species mentioned. Following ingestion, the infective larvae penetrate into the walls of the stomach and lie coiled up in small nodular areas. The lining of the stomach becomes inflamed, and shows small pinpoint haemorrhages. The larvae soon leave the nodules, and complete their development to maturity in the mucosa. These worms suck blood and heavy infestations lead to emacia-

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Fig. 1.—Life cycle of Round Worm, showing how cattle become infested.
tion, anaemia, diarrhoea, and death, particularly in young stock. It is essentially a parasite of the cooler areas, and wet periods during every winter may lead to heavy infestations with these "hair worms" and consequent mortalities.

**Stomach Hair Worm** (*Trichostrongylus axei*).

These are extremely slender, reddish, hair-like worms which rarely attain a length of more than a quarter of an inch. They are found in the fourth stomach in the same situation as the Small Brown Stomach Worms. Because of their small size they are easily missed and should be looked for in light scrapings from the walls of the stomach.

This is an important parasite of temperate countries. In this State it may be found in the South-West, and like the Small Brown Stomach Worm, may become important during wet winters.

**Small Intestinal Hair Worms.**

These parasites fall into two groups, the *Trichostrongylus* spp. and the *Cooperia* spp.

The *Trichostrongylus* spp. inhabit the first part of the small intestine, being extremely small and slender and measuring a quarter to a third of an inch in length. They may be overlooked unless careful examination is made. Their economic importance in Western Australia has not been fully determined.

There is a close relationship between infestation and nutrition, *Trichostongylosis* being seen chiefly from weaning to about two years of age, although symptoms may be manifested by older cattle if conditions have been such as to allow heavy infestation, and the pasture growth is poor. Moderate infestation may be seen in calves as young as four weeks old, while at times only certain animals in the herd may show evidence of the disease.

Symptoms include lack of development, dejected appearance, and the passage of greenish-black, liquid faeces, offensive in odour. With this scouring, condition is rapidly lost, although animals may linger for weeks in an emaciated condition before succumbing. Attention to nutrition cannot be too strongly advocated, and the practice of using permanent paddocks without taking any steps to combat infestation should be avoided.

The *Cooperia* spp. are somewhat stouter than the *Trichostrongylus*, and may be seen in intestinal wall scrapings examined in a glass dish held over a dark background. The worms have a
reddish colouration when fresh. This parasite penetrates the lining of the small intestine and sucks blood.

Young calves are chiefly affected, and may carry heavy infestations by the time they are three to four months old. However, this infestation is only temporary, and is usually thrown off a few months later. In general, these worms are not considered to cause disease unless present in very large numbers, such infestation being usually acquired on wet pastures. These infestations have been associated with symptoms which include marked loss of condition and diarrhoea. As with Trichostrongyles, more work is necessary to assess their economic importance.

**TREATMENT**

Since very little critical work has been done on the study of anthelmintics for cattle, the majority of the drenches used have their recommendations based on their efficiency against sheep round worms.

Generally speaking, phenothiazine is the best drug for cattle round worms as a whole, but it is known to be only moderately efficient against the smaller stomach worms (Ostertagia spp. and T. axei), nor is it always efficient against the small intestinal worms (Trichostrongylus spp. and Cooperia spp.). For this reason bluestone-nicotine sulphate drenches have been commonly used against hair worms; in addition, the repeated treatments necessary tend to favour bluestone-nicotine sulphate both on account of the higher cost of phenothiazine, and its sometimes lack of availability.

Before drenching with bluestone-nicotine or phenothiazine give each animal about a quarter of a pint of a five per cent. solution of baking soda (sodium bicarbonate). This is made by dissolving 1 oz. sodium bicarbonate in a pint of water.

This closes the oesophageal groove and directs the drug into the abomasum or fourth stomach instead of allowing it to enter the rumen or paunch.

**Bluestone-Nicotine Sulphate.**

The solution is made as follows:

- **Bluestone**: 1 pound.
- **Commercial nicotine-sulphate, 40%**: 16 fl. oz.
- **Water**: 5 gallons.

This forms a 2% solution of both bluestone and commercial nicotine sulphate, which is administered to calves at the rate of 2 ounces per 100 lb. of body weight. The maximum dose should not exceed 4 fluid ounces. Some authorities recommend the above formula, but with the nicotine sulphate at half strength, i.e., 8 fluid ounces instead of 16 fluid ounces.

**Phenothiazine.**

Phenothiazine is not soluble in water, and for that reason the suspension should be kept well stirred. Starvation prior to treatment is unnecessary. The urine of treated calves is coloured red for several days following drenching. Phenothiazine should be administered at the following rates:

- **2-4 months**: $\frac{1}{4}$ oz.
- **4-6 months**: $\frac{3}{4}$ oz.
- **6-12 months**: 1 oz.
- **12-18 months**: $1\frac{1}{2}$ oz.
- **Over 18 months**: 2 oz.
An eye condition, opacity of the membrane covering the eye, sometimes follows the use of phenothiazine, but this soon disappears. The condition is a type of photo-sensitisation, and is due to the action of bright sunlight on a phenothiazine derivative present in the eye 12-36 hours after drenching. The condition may be prevented by keeping the treated animals in the shed the day after drenching.

Whether the bluestone-nicotine sulphate or phenothiazine is used, the treatment should be repeated after 14 days, and thereafter if necessary every three to four weeks. In addition, the herd should be removed from infected pastures, e.g., low lying areas which remain green and moist during the summer, and the general nutritional level improved by hand feeding or the provision of good pasture.

PREVENTION AND CONTROL

In order to put into effect logical control measures it is first necessary to know something of the life cycles of the parasites it is hoped to control.

The period spent outside the host is the weak link in the life cycle of a parasite, and everything possible should be done to prevent an animal picking up large numbers of infective larvae, and thus becoming heavily parasitised. Adult cattle are reasonably resistant to worms but calves and yearlings are more susceptible, and the latter should therefore receive primary attention when considering preventive measures.

It must be remembered that the greatest source of infestation is the small permanent calf yard, where heavy concentrations of infective larvae are built up. This is especially so when these paddocks are low-lying and damp, favouring the infective larvae which may survive several months under such conditions. Thus, frequent shifts and rotations of paddocks will allow these infective forms to die out before calves come back again to ingest these parasites. Further, it is clear that the more stock that are grazing a given area, the greater are the chances of re-infestation.

The following principles should therefore be observed to control and prevent parasitism in cattle:

1. Confine young stock as far as possible to well-drained pastures.

2. Practise rotation of paddocks, or at least arrange for periodical spelling of pastures occupied by young stock. Spelling for as short a period as one month will assist greatly in reducing pasture infestation. If it is impossible to spell, burning off may help to minimise larval forms, although the latter practice is not always practicable or desirable.

3. Avoid overstocking.

4. Supply water in suitable troughs. This is necessary because stagnant pools with some green picking around them are common sources of worm infestation.

5. Maintain a good nutritional level. This is extremely important, and cannot be over-emphasised. On weaning, a good supplementary ration should be supplied, especially where pastures are incapable of supplying an adequate standard of nutrition. A suitable lick, e.g., salt and bonemeal, and copper and cobalt in the areas where these are deficient, should be placed out separately. The best supplements consist of whole or crushed cereal grains, oats being a popular constituent, while wheaten bran adds to the palatability of a ration, and is much used for this reason.

Commonly used supplements which may be recommended are:

1. Crushed or whole oaten grain.

2. Equal parts crushed oats and crushed wheat.

3. Equal parts crushed oats and wheaten bran.

4. Nine parts crushed oats, three parts crushed wheat, and one part linseed meal.

Calves should be taught to eat grain as soon as possible, and by the third week should be tried with a handful of
dry grain placed in the bottom of the bucket after each animal has drunk its milk. At six weeks old the calf will eat about half a pound of grain a day; at the end of two months one pound per day and at the end of three months two pounds a day. This daily ration will be quite sufficient until the calf is six months old. It must, however, be remembered that well cured, good quality meadow hay and good pasturage are additional and necessary components in the ration, and should always be available for young growing stock.

Fig. 5.—Calves showing evidence of heavy worm infestation. Note the poor condition, harsh "staring" coat, dull eyes and dejected appearance

ALSATIAN DOGS

Because of their size, intelligence and potential ferocity, if they become sheep-killers, Alsatian dogs may not be kept in Western Australia unless they have been effectively sterilised.

The ban applies to both male and female Alsatian dogs and also to part-bred Alsatians, and the only evidence of sterilisation recognised by the Department is a certificate from a registered veterinary surgeon. Local authorities are not permitted to issue licenses for these dogs unless such a certificate is produced.

Persons having Alsatian dogs or bringing them into the State without the certificate are liable to a daily penalty of 10s. and a fine of £20, with the possibility of the dogs being destroyed.

There is ample reason for these precautions, as an Alsatian which was destroyed a few years ago in the middle of a killing spree had killed 40 sheep in one night.