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J Craig
R. Butler
M. E. Nairn

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INTERNAL PARASITES OF CATTLE

Worm parasites can have a most serious effect on cattle, even causing deaths. This article describes the main parasites of cattle, treatment with modern anthelmintic drugs and the best means of preventing and controlling worm outbreaks.

By J. CRAIG, M.R.C.V.S., Senior Veterinary Surgeon; R. BUTLER, B.V.Sc., D.A.P.E., Senior Veterinary Parasitologist; and M. E. NAIRN, B.V.Sc, M.D.A., Veterinary Pathologist.

WORM infestation (parasitic gastro-enteritis) is a common cause of serious economic loss both in calves and yearlings. It is unfortunate that many 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.

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 mainly 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; occasionally, adult cattle may also suffer ill-effects. 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 the level of nutrition falls.

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. Diarrhoea generally also 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.

DIAGNOSIS

The diagnosis of the disease depends first on the appearance of the symptoms described in several members of a group of young cattle, and second on a post-mortem examination of affected stock and the consequent identification of the parasites.

A third method of diagnosis, which provides contributary evidence, involves what is known as the egg counting technique, in which a microscopic examination is made of selected samples of the droppings from members of the affected group.
As the symptoms of parasitism in cattle are similar to those caused by some other diseases, whenever possible a veterinarian should be called in to establish a definite diagnosis.

**LIFE HISTORY**

Many kinds of worms are capable of infesting cattle and causing disease. The "hair worms" belong to the nematodes, 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 moult several times, 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 long, 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.

Small brown stomach worms 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.
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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 emaciation, anaemia, diarrhoea, and death, particularly in young stock. The small brown stomach worm 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*.

Stomach hair worms 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 worm. 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 throughout the South-West and, like the small brown stomach worm, may become troublesome 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, *Trichostrongylus* 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 infestations to build up and where pasture growth is poor. Moderate infestation may be seen in calves as young as four weeks old.

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 death.

The *Cooperia spp.* are somewhat stouter than the *Trichostrongyles*. They 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. These infestations have been associated with symptoms which include marked loss of condition and diarrhoea.

Although the foregoing are probably the main species of worms infesting calves in the South-West of the State, two further species which are known to occur should be mentioned.

**Barber’s Pole Worm**

*Haemonchus placei*

The barber’s pole worm varies from about ¾ to a little over 1 inch long and is found in the fourth stomach.

The male is red and in the female the red gut is twisted around the white ovaries and uterus, giving the characteristic appearance which gives rise to its common name.

The worms are avid blood suckers, heavy infestations causing severe anaemia, weakness and loss of condition.

This species occurs in the Moore River and Esperance areas of this State, but its prevalence in other parts of the State still has to be determined.

Externally this worm appears identical with the Barber’s Pole Worm of sheep *Haemonchus contortus* but it has been shown by Roberts *et al* (1954) that these are in fact two distinct species. These workers have also shown that while the cattle species readily establishes in sheep, the sheep species is difficult to establish in cattle.

**Nodule Worm**

*Oesophagostomum radiatum*

Nodule worms are stout white worms, ¾ to ⅝ inch long, found in the large intestine. During their development the immature worms burrow in the gut wall where they cause small shot-like nodules.

Heavy infestations cause severe diarrhoea and loss of condition.

Nodule worm is often found in cattle in the South-West. However further investigation is needed to determine how often it occurs in high enough numbers to cause disease.

**SOME FACTORS AFFECTING THE INCIDENCE OF PARASITISM**

Temperature and moisture mainly control the development and survival of the larval worms on the pasture. The wet and comparatively mild winters of the South-West provide suitable conditions for development and survival of the free-living stages of the “hair worm” group. Hot, dry summers are most unsuitable for development and survival.

Few larvae already present on the grass are likely to survive for more than a few weeks under the hot, dry conditions of summer. On low lying wet land, where there is enough moisture the period of survival may be extended.

Irrigated land can also provide suitable conditions for development and survival, even in summer. This applies especially to the barber’s pole worm, which prefers higher temperatures for its development than members of the “hair worm” group.

Experimental work in Queensland (Durie, 1961) has shown that larvae are able to survive within the dung pad without rain, for up to five months in summer and for seven to eight months in winter. After rain the larvae migrate from the pad onto the grass.

Thus, it appears possible for worm populations to survive through the summer in dung pads, the larvae emerging from the pads following the start of the autumn rains.
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Calves showing symptoms of heavy worm infestation. Note the poor condition, harsh "staring" coat, dull eyes and dejected appearance.

In view of this it follows that cattle are often exposed to the greatest number of immature larvae during late autumn, winter and spring.

Calves are most susceptible to worm infestation. Adult cattle generally have a reasonable resistance which has developed from earlier infestations.

In trials conducted in Western Australia —mainly in the coastal areas south of Perth—the worm burdens acquired by autumn-born calves have been studied to provide information on the development of resistance. Results of these trials have shown that calves develop a resistance to *Cooperia* species at about five to seven months old. Resistance to the Brown Stomach Worm and Stomach Hair Worm develops when calves reach the age of 11 to 15 months.

A point to remember is that the mere presence of a few worms will not necessarily cause trouble. Several thousand worms must be present to cause symptoms of ill-thrift and deaths.

Whether an animal gets a light immunising infestation or a heavy one causing disease, depends on the number of worm larvae on the pasture, the animal's age and its ability to develop resistance.

Good nutrition, although it probably has little relation to the actual acquisition of a parasitic infestation, is of great importance in influencing an animal's ability to withstand the effects of a worm burden.

**TREATMENT**

Research by drug companies over the past few years has resulted in the development of several new anthelmintics for the treatment of parasitic diseases in cattle. These have many advantages over the drugs previously used.

Australian and overseas trials have shown that these drugs are most efficient against the worms commonly found in cattle in Western Australia.

**These drugs are:**

1. "Kempak"

"Kempak," is generally very efficient against the main worms affecting cattle in this State except that it sometimes gives variable results against the stomach hair worm.

It is sold in a ready-to-use form and is given as a drench at a dose rate of 6 cc. per 100 lb. liveweight (1 fluid ounce = 28 cc.) Care must be taken in estimating the total dose as overdosing can cause toxicity and even death.

Calves should not be starved before or after drenching.
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2. "Neguvon"

"Neguvon" is also effective against the common worms of cattle.

This compound is available as a wettable powder which is used at a dose rate of 2.5 grams per 100 lb. body weight. The powder is mixed with water and used in accordance with the manufacturer’s instructions.

Once again care must be taken in estimating the total dose as overdosing can lead to toxic symptoms and even deaths.

The active ingredients in "Kempak" and "Neguvon" belong to the group of drugs known as organo-phosphorus compounds. Overdoses of these compounds are toxic, causing symptoms varying from mild dullness and loss of appetite, increased respiration, salivation, signs of abdominal pain, diarrhoea and muscular tremors, to severe incoordination, prostration and even death, depending on the degree of toxicity.

Mild cases usually recover without treatment but severe symptoms call for treatment with Atropine, which is the specific antidote for these compounds.

3. "Promintic" and "Mintic"

"Promintic" and "Mintic" are different formulations of one compound. "Promintic" is given either by injection under the skin or into the peritoneal cavity, or orally as a drench. "Mintic" is given only as a drench.

"Promintic" is available only to veterinarians and "Mintic" is available to stockowners.

Each of these drugs have proved highly efficient against the adult and immature forms of the worms commonly infesting cattle in this State; they are also reasonably effective against the lungworm of cattle.

"Mintic" is available as a ready drench for use at a dose rate of 1 fl. oz. per 100 lb. liveweight with a maximum dose of 6 oz. for animals weighing 600 lb. or more.

Care must be taken in estimating the total dose as the drug can be toxic in overdoses and there is not an antidote.

No pre-medication or starvation before or after treatment is needed.

4. "Thibenxole"

"Thibenxole" is very efficient against the adult and immature forms of worms affecting cattle and has an added advantage of being a safe drench.

It is available as a powder which is mixed with water according to the manufacturer’s instructions to produce a drench given at a dose rate of 1 fl. oz. per 100 lb. liveweight.

Irrespective of which drench is used, cattle should always be drenched carefully. Rough and inept handling of a drenching gun can result in part of the drench reaching the lungs where it can cause pneumonia with even the safest drenches. With some drugs this can cause asphyxiation and rapid death.

To get the best results from any drench it is best to move stock to clean pastures after treatment to prevent a rapid re-infestation with free-living worm larval forms.

If this is not possible, and especially when weather conditions are favourable for the development and survival of the larvae on the pastures, repeated treatment at intervals of 17 to 18 days might be needed for satisfactory control.

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 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.

Frequent rotation of calf paddocks cannot be relied on for satisfactory control of parasites. This is because the worm larvae are able to survive for long periods
in dung pads, and weather conditions during the late autumn, winter and spring favour the survival of the worm larvae on the pastures.

On the other hand, spelling a paddock from early summer until about five to six weeks after the break in the season would probably achieve a satisfactory reduction in the number of infective larvae on the pasture.

Pasture harrowing to break up dung pads and expose the larvae to the effects of the sun might also help to reduce the population.

Treatment of calves at selected times also helps to reduce the degree of contamination of the pastures in calf paddocks.

Treatments given when calves are three to four months old and again when they are eight to nine months old will help to control parasitic disease and pasture contamination.

Treatment of calves, especially weaners, with an efficient drench about three to four weeks after the hot dry weather begins, will reduce the worm burden at a time when the nutritional level is falling and when conditions are least favourable for reinfection.

Although further work is needed to provide information on times of treatment and management practices for maximum control, the following principles should be observed in attempting to reduce parasitism:

- Confine calves as much as possible to well drained pastures.
- Avoid overstocking.
- Arrange for periodical spelling of calf paddocks.
- Adopt routine treatment of calves to keep worm burdens at low levels.
- Supply water in suitable troughs. This is necessary because wet areas supporting some green picking are common sources of worm infestation, even in summer.
- Maintain a good nutritional level.

**CALF NUTRITION**

A satisfactory nutritional level should be maintained, especially in the first few months of life and for the period of the year when pasture feed is of poor quality.

Departmental recommendations for feeding calves with whole or skim milk and the early introduction of dry supplementary feeding, should be followed.

It is a well recognised principle that good nutrition will enable the calf to cope more ably with sub-clinical parasitic infestation. A calf in poor condition as a result of inadequate feeding or mineral deficiency will succumb more readily to internal parasitism.

A common mistake made in calf rearing is to supply satisfactory nutrition up to weaning and then turn the young animal out into a paddock of dry feed with no provision for supplementary feeding. The value of good post-weaning nutrition, especially over the summer months, cannot be over-emphasised.

**REFERENCES**


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