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PREVENT WORMS IN CATTLE

By G. de CHANEET, Veterinary Parasitologist.

PARASITIC gastro enteritis, caused by roundworms, is a common cause of economic loss in calves, yearlings and occasionally cows in south-western Australia. Losses could be prevented if stock owners realised the full effects of these parasites, and understood the causes of worm infestation.

The worms causing the greatest losses in cattle in W.A. are the “hair worms”, a collective term which describes the following species:—

Brown stomach worm (*Ostertagia* spp.).

Stomach hair worm (*Trichostrongylus axei*).

Small intestinal hair worms (*Trichostrongylus* spp. and *Cooperia* spp.)

Two other species found occasionally in the South-West and which may sometimes cause trouble in the far north are:—

Nodule worm (*Oesophagostomonium radiatum*).

Barbers pole worm (*Haemonchus placei*).

Calves are generally most susceptible to worms, but the brown stomach worm may also affect yearlings and lactating cows, particularly cows after their first calf. Occasionally, adult stock may be affected by the other species.

**Life history**

The hair worms all have similar life cycles that do not involve intermediate hosts. The female worm lays eggs which are passed on to pasture in dung. Under ideal conditions of humidity and temperature these eggs hatch in a few days into larvae which feed on microorganisms in the dung. (See diagram.)

The larvae grow and moult twice in 5 to 7 days to produce third-stage larvae capable of infecting cattle.

Conditions are rarely ideal and it probably takes several weeks or more for infective, third-stage larvae to be produced from eggs. The infective larvae move from the dung pad, and any that come in contact with pasture plants climb up the stems. They are then eaten along with the herbage and grow through two molts to adult worms in the digestive tract of the animal in about three weeks. The brown stomach worm and to a lesser extent the *Cooperia* spp. of small intestinal hair worm develop for part of this time in the membrane lining the stomach and small intestine.

Conditions on the pasture are most suitable for the development of the free-living stages in months having average daily temperatures between 55° and 74° F. with 2 in. to 6¼ in. of rain. Conditions are most suitable for survival of infective larvae when temperatures are between 45° and 74° F. with 2 in. to 6¼ in. of rain. Conditions will be most suitable for development in May/June and August/September in the South-West, with survival being favoured from April/May through to September/October.

Ideal conditions are rare at ground level in the paddock. The free-living stages, particularly first- and second-stage larvae are killed by dryness. Eggs that are passed on to pasture in summer and are not protected by a formed dung pad (as occurs when an animal has diarrhoea) probably never develop to infective larvae.

The infective larvae are more resistant to dryness because they do not completely lose the skins they had as second-stage larvae. Rather, the skins encase and protect the larvae. In this way the infective larvae may last for months on the pasture during winter, but during summer most on the pasture are killed by heat and dryness.

Although a pasture may be free of infective larvae during summer, there may be developing larvae trapped in dung pads that are dry on the outside, but moist and cool inside. This partly accounts for the perpetuation of infection from year to year. When the outside of the dung pad is softened by the opening rains in April/May, infective larvae may emerge in large numbers. Infective larvae can survive for up to five months over summer when trapped in dung pads. (See diagram.)
LIFE CYCLE OF CATTLE ROUNDWORMS

on pastures

in animal

INFECTIVE LARVAE EATEN WITH GRASS DEVELOP TO ADULTS IN GRAZING ANIMALS

EGGS PASSED IN DUNG ON TO PASTURE

INFECTIVE LARVAE MIGRATE FROM DUNG PAD ONTO GRASS

YOUNG WORMS DEVELOP IN EGG IN DUNG PAD ON PASTURE

LARVAE FEED ON MICRO-ORGANISMS IN DUNG PAD, GROW AND MOULT TWICE TO DEVELOP TO INFECTIVE 3RD STAGE LARVAE

1ST STAGE LARVAE HATCH FROM EGG IN DUNG PAD

EGGS IN DUNG

BEHAVIOUR OF LARVAE ON PASTURE

Dry Conditions

EGGS IN DUNG

FRESH PAD

SOME EGGS DEVELOP AND HATCH BUT PAD IS DRY ON OUTSIDE

PAD DRIED OUT AND LARVAE AND EGGS DEAD

Dry Conditions

EGGS IN DUNG

FRESH PAD

SOME EGGS DEVELOP AND HATCH BUT PAD IS DRY ON OUTSIDE

Damp Conditions

PAD MOISTENED BY 2" + RAIN

INFECTIVE LARVAE ESCAPE ON TO PASTURE

Damp Conditions

EGGS IN DUNG

FRESH PAD

EGGS AND LARVAE IN SOFT PAD

INFECTIVE LARVAE ESCAPE FROM PAD ON TO PASTURE
Types of roundworms

Brown stomach worm (Ostertagia spp.)

Brown stomach worms are slender worms found in the fourth stomach (glandular stomach or abomasum). When present, they are usually most obvious on the stomach wall where the stomach opens into the small intestine.

After being eaten, the infective larvae of this species enter the glands in the stomach lining. This damages the glands, particularly when the larvae emerge from them after moulting about 15 to 17 days after infection. By damaging the stomach glands, the larvae can interfere with protein digestion.

In animals older than six months, the larvae may become arrested in development within the glands and many retarded larvae may accumulate in the stomach wall. Dormant larvae may later resume development, causing disease when the host animal is not picking up infective larvae from pasture.

In Western Australia, larvae that become retarded are probably picked up in spring after developing from eggs dropped by calves from autumn onwards.

Disease produced by retarded larvae occurs most often in late summer and autumn in yearling stock that have been kept over summer. Cows with their first calves, and two-year-old bulls, may also be affected. Some affected animals will have picked up heavy burdens of larvae in spring which later became retarded.

Calves may suffer from stomach worms in late winter and spring from infections developed directly from eating infective larvae. Older stock rarely develop such infections. Calf infections are probably acquired by eating infective larvae that emerged from dung pads deposited over summer; or hatched from eggs produced in older stock by worms developed from retarded larvae. Retarded larvae produce eggs (and hence infective larvae) after maturing in late summer and autumn.

Stomach hair worm (Trichostrongylus axei)

Stomach hair worms are very slender worms, up to ½ in. long, found in the fourth stomach with the brown stomach worm.

They do not enter the stomach glands in the fashion of the brown stomach worm, or become retarded in their development. Because of their small size they may be easily overlooked at post mortem examination.

They cause disease in winter and spring in young stock and may be particularly troublesome during wet winters.

Small intestinal hair worms (Trichostrongylus spp., Cooperia spp.)

The small intestinal hair worms are found in the first 15 to 20 ft. of the small intestine. Trichostrongylus spp. are slender and ¼ to 1/3 in. long. They are extremely hard to see on the small intestine wall at post mortem examination.

Trichostrongylus spp. mainly infest young cattle, and fairly heavy burdens may be seen in calves. Burdens are usually very light after two years of age. They may assume greater importance when nutrition is poor.

Cooperia spp. are thicker than Trichostrongylus spp. and are about the same length. They are most common in young calves, and usually only cause disease when present in large numbers. By six months of age most calves have developed a fairly solid immunity to the small intestinal hair worms.

Signs of parasitism

The external signs of each parasite are related to its mode of development and feeding.

Cooperia spp. damage the lining of the small intestines. Heavy infestations in calves may lead to loss of condition due to interference with digestion, accompanied by diarrhoea and dehydration.

Trichostrongylus spp. may cause a similar picture in calves and weaners, and yearlings with poor nutrition. Loss of appetite may be an additional sign.

Stomach hair worm causes inflammation of the stomach lining and this may interfere with digestion. A watery scour may be present and appetite is depressed.

Brown stomach worm causes extensive damage to the stomach wall. This interferes with protein digestion and may lead to scouring. Affected animals lose condition rapidly and become anaemic.

These roundworms are rarely present as pure infections and so the signs seen are not as clear as outlined above. The most common sign of worms is a progressive loss of condition. The coat becomes dry and ruffled and the animal gets a dejected, herring-gutted appearance. Scouring is common. At the final stage the animals may become very weak and lose their appetites.

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Diagnosis

The diagnosis of parasitism depends on the signs shown by a group of cattle. The age of the affected animals and the time of the year usually give a clue as to the most likely predominant species of worms. A post mortem examination will confirm the diagnosis.

Because the signs of parasitism may be confusing, it is advisable to call a veterinarian whenever possible to establish a definite diagnosis.

Control

General recommendations that can be made to reduce the likelihood of significant worm burdens in cattle may not apply to all situations and where applicable will have to be adapted to suit a particular management scheme.

A. Where calves are raised on the bucket
- Avoid mixing young calves with older calves.
- Do not put calves through a paddock rotation system where young calves follow older calves.
- Avoid permanent calf paddocks.
- Treat calves when 3 to 4 months old.
- Maintain an adequate nutritional level, particularly after weaning.
- Treat any bought in calves if older than six weeks, or weaners, before introducing them to the herd.

B. Where calves are raised on their mothers
- Do not run cows with calves at foot on a pasture that has been grazed by yearlings. This will break part of the year to year cycle of the brown stomach worm.
- Drench and move cows and calves in August. Move on to a pasture that has not been grazed by cattle since the break of the season. Alternation with sheep for such a scheme is worth while, if pastures and fencing allow.

Treatment

Cattle affected by worms should be treated with any of the broad-spectrum cattle anthelmintics.

If brown stomach worm is involved in yearlings and older cattle, two treatments should be given at an interval of two weeks. Retarded forms of this worm are not susceptible to anthelmintics, and a single treatment will be unsuccessful where retarded larvae are resuming development. This is because the larvae that were not susceptible at the time of treatment may resume development after treatment and continue to cause inflammation in the stomach. Such animals, even if they survive are usually "poor doers" and take months to gain condition lost during the course of the disease. Prevention in these cases is much better than cure.