

Sheep endoparasites: types, life cycles and treatments

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A number of challenges arise from endoparasites in the sheep industry – their effect on production, anthelmintic resistance and, from a practice point of view, farmer engagement in the subject.

Controlling parasites in a flock is a balance between minimising negative effects on growth rates and production, while reducing the risk of anthelmintic resistance developing. There is high dependence on the anthelmintics we have and we must think outside the box to ensure these drugs remain effective in the future.

A study by the University of Bristol showed only seven per cent of farmers were consulting their vet on control strategies of parasites in their flock (Morgan et al, 2012).

Nematodes

The main pathogenic nematodes are listed in [Table 1](#), but there are several others with lower pathogenicity. Those that cause parasitic gastroenteritis (PGE) are often seen as a mixed infection, the clinical signs of which are diarrhoea, poor growth rates, weight loss, dehydration and death.

Life cycle

The typical nematode life cycle has a prepatent period of 16 to 21 days, with the third larval stage, L3, being the infective stage on the pasture.

Nematodirus species are an exception ([Figure 1](#)), with a prepatent period of only 14 days and larval development occurring within the egg; L3 hatch only when the conditions are right (typically a cold period followed by a mean temperature of more than 10°C).

In the case of *Dicytocaulus*, it is not eggs but L1 that are shed in the faeces.

The abomasal worms have the ability to enter a state of hypobiosis as inhibited larvae to survive over winter within the stomach lining. This typically occurs when weather conditions change and larvae are unlikely to survive on pasture, before emerging again in spring when conditions improve. Inhibited larvae in ewes can contribute to pasture contamination in spring, which is a risk to lambs.

Diagnosis

Diagnosis is largely based on history, clinical signs and faecal egg counts (FECs).

The correlation with number of worms present and eggs in faeces is poor in some species, for example, *Nematodirus*, and so although extremely useful, FECs must be interpreted with caution in some cases.

At Westpoint, we encourage farmers to carry out FECs and assess risk, rather than treat at standard times each year. This can help us avoid unnecessary treatments and, where treatment is necessary, target its timing to gain the most benefit ([Table 2](#)).

Interpretation of FECs

It must be known whether haemonchosis is present on the farm to interpret FECs correctly, or this service can be requested of the lab to know if haemonchus eggs are present. Nematode PCR is now being offered to aid differentiation of species present in FECs.

Treatment

The decision to treat cannot be based on any one thing – history and clinical signs must be considered alongside FEC results, and a discussion is needed with the farm ([Table 3](#)).

Several steps can reduce the risk of anthelmintic use when treating sheep:

- Dose accurately – either weigh sheep or dose to the heaviest in the group to avoid underdosing. Calibrate guns to ensure correct amount is being given.
- Measure daily liveweight gains and only treat those not meeting targets.
- Use narrow spectrum products where possible.
- Maintain a population of susceptible worms – this can be achieved by leaving 10 to 20 per cent of the group untreated.

- Do not move animals straight on to clean pasture after treatment – move back on to contaminated pasture for a few days to allow the sheep to pick up a small, mixed worm burden before moving on to less contaminated pasture.
- Unless there are clinical signs of PGE or haemonchus, only treat adult ewes at lambing or those in poor body condition pre-tupping. At lambing, ewe immunity is temporarily reduced, which allows an increase in the number of eggs shed, resulting in pasture contamination for the lambs. Therefore, treatment at this time of year is appropriate.
- Use group four and group five wormers appropriately.

Control

Steps other than treatment must be taken on farm and incorporated into health planning to reduce dependence on anthelmintics. A pasture risk assessment is very useful to plan where sheep should be grazed throughout the year to avoid grazing high-risk pastures where possible, for example, having young lambs on the same fields each year poses a high *Nematodirus* risk. Mixed grazing with cattle can reduce pasture burden, but goats and sheep should never be grazed together.

Knowing the farm's anthelmintic resistance status by carrying out individual faecal egg count reduction tests (FECRT) can greatly aid your treatment decisions and management of the farm.

Trematodes

Liver fluke or fasciolosis is caused by *Fasciola hepatica*. This parasite has a complex life cycle involving an intermediate host, *Galba (Lymnaea) truncatula* (mud snail).

The prepatent period is 10 to 12 weeks, with eggs being shed in the faeces and developing through several stages, both on pasture and in the snail, before becoming the infective stage of metacercariae. This stage can take five weeks to several months, depending on the weather conditions ([Figure 2](#)).

Clinical signs

Fluke can present as acute, subacute or chronic depending on conditions at the time of infection ([Table 4](#)).

Traditionally, acute fluke is seen from August to December, and chronic fluke from January to April, and although these are still peak times for the disease, the risk period has extended so we see it throughout the year in some areas.

Diagnosis

Diagnosis is largely made on clinical signs and history of the farm. Postmortems can be extremely useful. In the case of chronic fluke, FECs can be used to detect the presence of adult fluke, but this is not appropriate in acute fluke where an FEC would be negative because it is the larvae that are causing the damage.

Treatment

All animals in the group should be treated as they are all at risk and it must be remembered none of these products are persistent. Therefore as soon as animals start grazing contaminated pasture again, they are at risk of disease.

There are reports of triclabendazole resistance in the UK, but no validated method of diagnosis ([Table 5](#)).

Cestodes

The main significance of the cestodes group is that sheep are the intermediate host of various carnivore tapeworms that encyst and cause carcass damage. *Moniezia* is the only tapeworm of sheep and is often diagnosed as white segments can be seen in the faeces.

Treatment is usually unnecessary due to its low pathogenicity, but white wormers or praziquantel are suitable treatments.

Protozoa

Coccidiosis is an important disease of lambs, which can present very similarly to PGE. There are several types of *Eimeria* species seen in sheep, but *E. crandallis* and *E. ovinoidalis* are the only two pathogenic ones.

In addition to history and clinical signs, FECs can be used to detect oocysts in the faeces and distinguish from PGE.

Speciation is available if required, which can be useful when there are high cocci counts in the absence of clinical signs, to see whether there are any pathogenic coccidia present.

Treatment options include decox or toltrazuril, and management is important to avoid overcrowded, dirty conditions.

Conclusion

To summarise, there are several endoparasites of economic significance affecting the UK sheep

flock. To successfully treat as well as manage them, you must firstly diagnose them correctly and then follow various steps to decide on the most appropriate course of action.

As always, prevention is better than cure and so detailed health planning for the year ahead can help to maximise the productivity of the farm by allowing early detection and appropriate treatment.

Acknowledgment

This article was reviewed by Ian Nanjiani BVMS, MSc, MRCVS, head of clinical research at Westpoint Veterinary Group.

References and further reading

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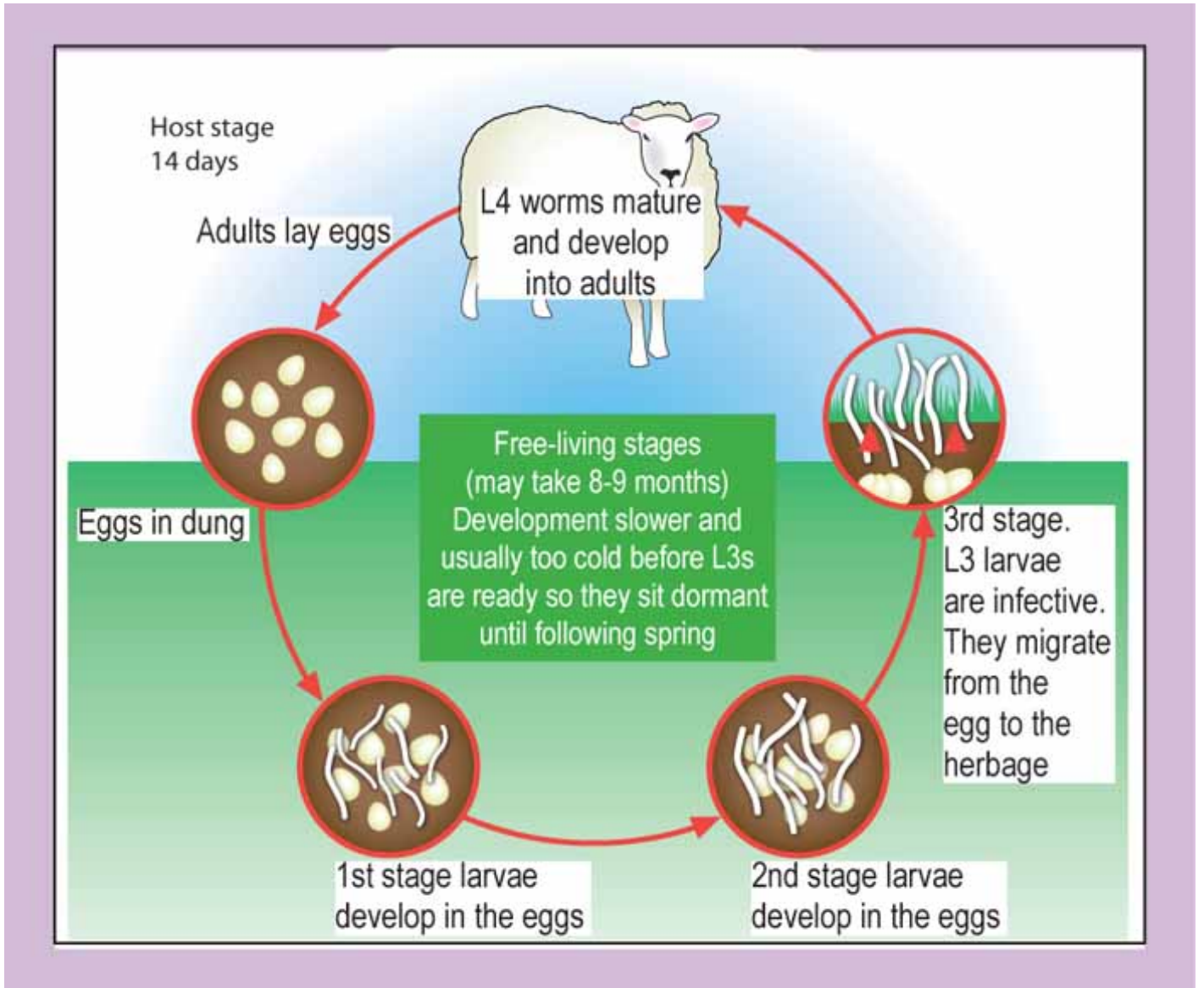


Figure 1. *Nematodirus* life cycle (SCOPS, 2012).

IMAGE: Oldham, Jacobs and Fox.

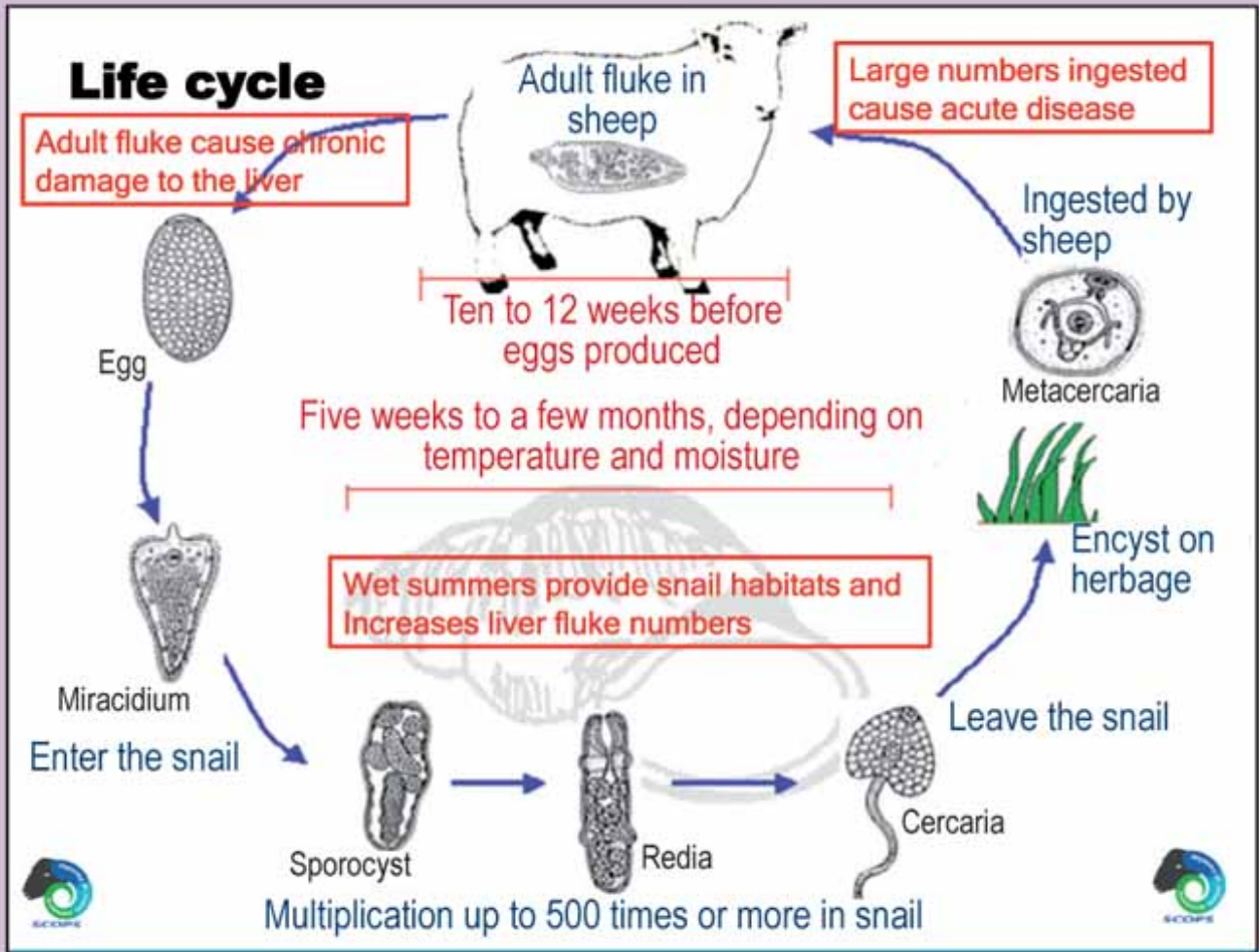


Figure 2. Fluke life cycle (SCOPS, 2012).

Species	Site	Clinical signs
<i>Teladorsagia (Ostertagia) circumcincta</i>	Abomasum	PGE. Typically affects young lambs in their first season.
<i>Haemonchus contortus</i>	Abomasum	Sudden death, anaemia, sub-mandibular oedema. Diarrhoea is not a feature. Affects ewes and lambs.
<i>Trichostrongylus</i> species	Abomasum/ small intestine	PGE. Typically affects lambs from autumn onwards.
<i>Nematodirus</i> species	Small intestine	PGE. Disease of lambs only, mainly seen in spring but can be seen in autumn.
<i>Dictyocaulus filaria</i>	Lungs	Coughing, dyspnoea. Mainly seen in autumn, can affect all ages.

Table 1. Nematodes species: clinical signs

Parasite	Low (epg)	Medium (epg)	High (epg)
Trichostrongyle ¹	<250	250-750	>750
<i>Haemonchus</i>	<500	500-5,000	>5,000
<i>Nematodirus</i>	50-150	150-300	>300
<i>¹Trichostrongyle count refers to a mixed infection – not speciated. More detailed, species-specific counts can be interpreted with more accuracy.</i>			

Table 2. Interpreting FECs (SCOPS Manual 4th edn)

Group	Drugs	Formulation	Treatment information
Benzimidazoles (white)	Albendazole, fenbendazole, oxfendazole, ricobendazole	Oral	Roundworms, tapeworm, lungworm. Effective against inhibited larvae. Adult fluke – albendazole and ricobendazole only.
Levamisole (yellow)	Levamisole	Oral	Roundworms, lungworm. Not effective against inhibited larvae.
Macrocyclic lactones (clear)	Ivermectin, doramectin, moxidectin	Oral or injectable	Roundworms, lungworm. Effective against inhibited larvae. Injectables also effective against scab.
Amino-acetonitrile derivatives (orange)	Monepantel	Oral	Roundworms. Effective against inhibited larvae. Recommended quarantine treatment. POM-V.
Spiroindole (purple)	Dual active – derquantel and abamectin	Oral	Roundworms, lungworm. Effective against inhibited larvae. Recommended quarantine treatment. POM-V.

Table 3. Anthelmintic groups

Type	Caused by	Clinical signs
Acute	Ingestion of high number of larvae migrating through the liver	Sudden death, anaemia, ascites, abdominal pain.
Subacute	Mixed burden of larvae and adult fluke	Weight loss, anaemia, ascites, sub-mandibular oedema, death.
Chronic	Adult fluke	Weight loss, poor body condition, sub-mandibular oedema, death.

Table 4. Fluke presentations

Drug	Treats	Type of fluke treated	Formulation
Triclabendazole	Fluke from two days old	All stages	Oral
Closantel	Fluke from five weeks old. <i>Haemonchus</i>	Subacute and chronic	Oral
Nitroxynil	Immature and mature fluke. <i>Haemonchus</i>	Subacute and chronic	Injectable
Albendazole Ricobendazole	Adult fluke only	Chronic	Oral

Table 5. Fluke treatment options

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