Sandhill Veterinary Services

Veterinary Care for Game Birds, Commercial Poultry and Pigeons

Trichostrongylus worms in grouse – an update

Based on a talk given to the Yorkshire Dales Moorland Group 2018 on 19th March 2018

Introduction

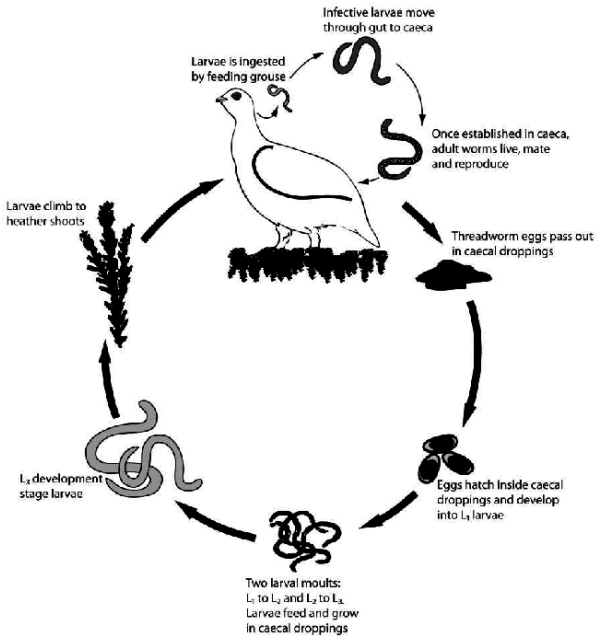
Worms are still the major focus for disease control in grouse – largely because they are the only disease for which treatment is available.

Adult Trichostrongylus tenuis worms live in the caecae of grouse and they usually live there for long periods as the birds' immune system is often not able to expel them.

The caecae are the pair of blind sacs at the lower end of the digestive system, marking the beginning of the rectum. They are used as an aid in the digestive system to help the enzymatic breakdown of materials like cellulose. They also aid the resorption of water. The caecae vary very much in size in different groups of birds - they have their greatest size in those that are herbivorous and in grouse, where the diet has a low nutritional value, they are at their largest.

The adult female worms lay eggs throughout their lives. These are passed in the caecal pats and the eggs develop into infective larvae in and around these pats.

The time taken for the eggs to hatch and the larvae to become infective varies depending upon humidity and environmental temperature. In typical winter conditions between November and mid-February the larvae are all likely to die before reaching the infective stage.



Trichostrongylus tenuis as seen under the microscope

A peak of infective larvae usually become available in late May and can infect chicks as well as adults. In hot dry summer conditions both the eggs and any developing larvae are likely to be killed by desiccation but in a mild, moist autumn weather, worm burdens can rise rapidly.

Historically, high levels of worms resulted in worm-induced crashes in grouse numbers. Less dramatic but of real concern are the detrimental effects on the breeding performance of grouse caused by non-lethal levels of worms. The worms cause damage to the lining of the caecal wall allowing protein to leach into the caecae and be passed in the faeces. The natural diet of grouse is not particularly protein rich, so birds can rapidly go into negative protein balance if there are significant levels of Trichostrongylus tenuis worms. This leads to loss of condition, a reduced ability of the birds to rear young and the possible death of birds in severe cases.

Levels of worms are monitored by worm counts

We use the following levels as indicators of infection:

Young Birds:	<650 worms per bird	Normal
	650 –2000 worms per bird	Action advised
	2000+ worms per bird	Clinical problem likely
Old Birds:	<2000 worms per bird	Normal
	2000 –5000 worms per bird	Action advised
	5000+ worms per bird	Clinical problem likely

Treatments – types of grit

There are two available medicated grit treatments both using the drug Flubendazole as the active ingredient.

1) Low strength or standard products consist of grit of a variety of sizes suitable for both young and adult birds with Flubendazole at levels to give a final concentration of 1mg / gram to 2mg / gram of finished product. Using the 5% flubendazole, the product licensed for use in the UK, this is as high a level of drug as can be practicably added to the grit.

   Low strength grit has given good control of worms on many moors over a number of years and is the product of choice in most cases where treatment is required.

2) High strength product consists of grit coated with a 100% flubendazole, imported and used with the permission of VMD to give a final concentration of 10mg / gram of finished product – five to ten times higher than the standard product.

   High strength grit may seem ideal on the principle of the stronger the better but the objective in using any medicated grit should not be to try to eliminate all the worms. If worm levels are kept too low this may well result in drug resistant strains of worms (which are always present) becoming dominant relatively quickly, after which worm control using medicated grit would no longer be effective. With sensible use we should be able to prevent resistance developing to a level that makes worming ineffective. If we ever get to that position, then commercial grouse shooting as we know it now will cease and we will return to the position we were in before wormers were available.

The objective with any worming programme is to maintain a parasite population at a level below which the grouse will not suffer clinically but high enough for there to be high levels of non-resistant worms in the population. On this basis, if autumn worm burdens are very low (possibly less than 200 worms in old and 20 worms in young birds at the end of September) the decision should be taken not to treat. This will reduce the likelihood of the development of resistant worms on the moor.

We know that in practice worming grouse works but there is still debate about just what we are achieving.

It is suggested that low strength or standard grit acts by blocking new infections occurring. The amount of drug available to the birds from low strength grit is unlikely to be sufficient to kill adult worms or to stop them from laying eggs. The suggested mechanism for the control by standard grit is that drug in the faeces is of sufficient concentration to prevent eggs developing into larvae.

We believe that like other game birds, a grouse would have to take in 20mg/kg bodyweight of drug over a 7-10 day period to get a 98% kill of worms.

By putting down grit and then returning to measure what has been used, the GWCT estimate that at best birds are consuming 12.5mg/kg and that is if all the grit that disappears is being eaten by the grouse and none is wasted and all that is consumed is released from the grit and absorbed by the birds – all of which is unlikely.

It is therefore likely that low strength grit has its greatest effect early in autumn and from mid-February onwards. In typical winters, most eggs and larvae are naturally killed but low strength grit may be beneficial in mild winters.

It works by preventing new infections occurring in adult birds and preventing infection in the young birds. Once the product is withdrawn then new infections will be possible. With use, in subsequent seasons lower levels of worms should be achieved.

The high strength grit works by killing adult worms. Hence this is the product to use if there are high worm counts in autumn that are clinically significant. High strength grit should be withdrawn by mid-March to allow modest numbers of parasites that have never experienced the drug to survive from over wintered larvae and so reduce the likelihood of resistance developing.

Failure to withdraw all low strength grit by mid-July will hasten the onset of a population of resistant worms on the moor. It would also be illegal if treated birds were to be presented to guns within 28 days of the grit being removed. This is to avoid the drug entering the human food chain.

Failure to withdraw all high strength grit by mid-March may seem beneficial as it will keep worm levels very low. But this will encourage early onset of drug resistance. As with the low strength grit there is a legal requirement for the removal of all medicated grit at least 28 days before the shooting season but if used correctly high strength grit will have been removed well in advance of shooting

Monitoring in spring

In addition to worm counts during the shoot season when samples of caecae are available, worm egg counts can also be useful. We use the Sievwright formula for converting worm egg counts into numbers of worms present.

Worm egg count result interpretation:

Using the Sievwright formula to convert the worm egg counts into worms per bird:

<5000 eggs per gram suggests <600 worms per bird

10,000 – 40,000 eggs per gram suggests 1000 - 2000 worms per bird

40,000 – 90,000 eggs per gram suggests 2000 - 4000 worms per bird

>90,000 eggs per gram suggests > 4000 worms per bird

Worm egg counts are also very useful to determine if worm counts have risen over winter, particularly if levels were low in autumn and the birds were not treated.

At Sandhill Veterinary Services we are able to do both worm counts and worm egg counts in our own laboratory. On the basis of the results we are able to advise of worming programmes and can issue scripts for low strength grit and arrange the supply of high strength grit if required.

In addition we perform post mortems on birds as required. We are able to stain conjunctival smears to detect Cryptosporidiosis and do additional tests to look for other causes of respiratory diseases in addition to general post mortem examinations to monitor levels of disease on the moors.

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