Best practice use of medicated grit

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History of disease

The presence of Trichostrongylus tenuis, a parasitic threadworm which lives in the gut of red grouse, has been known for more than 100 years, often referred to as Strongylosis or the strongyle worm. Over the past thirty-five years, research by the Game and Wildlife Conservation Trust has established that the strongyle worm can cause cyclical fluctuations in grouse numbers every 4-5 years. We have attempted to reduce the impact of worms on grouse and to prevent these cycles.

History of control

We have helped develop two methods of providing grouse with an anthelmintic (worming drug) to kill their worms.

- Catching grouse at night and treating them with levamisole hydrochloride, an oral drench anthelmintic (trade name Nilverm). This however proved labour intensive and unsuitable where terrain made night access difficult and dangerous.

- An indirect method, involving a grouse’s requirement for quartz grit in their gizzard to aid the digestion of its fibrous diet of heather shoots, which make up 80% of the diet. Grit can occur naturally on moors, but is also provided by gamekeepers. Grouse consume approximately 35g of grit per month. For reducing worms, quartz grit is used that has been treated with a thin covering of fat into which an anthelmintic drug is impregnated. This is known as ‘medicated grit’.

The Game & Wildlife Conservation Trust

For over 75 years our scientists have been researching why species like the grey partridge, corn bunting and black grouse have declined. We are continually developing practical measures to reverse these declines.

Our aim is simple - a thriving countryside rich in game and other wildlife.

We are an independent charity reliant on voluntary donations and the support of people who care about the survival of our natural heritage.

Contact

Game & Wildlife Conservation Trust
Upland Research Group,
Eggleston Coach House
Eggleston Hall, Barnard Castle,
Co. Durham, DL12 0AG
Tel 01833 651936
Email dnewborn@gwct.org.uk

www.gwct.org.uk
Medicated grit

Medicated grit was developed in the 1980s by the Strathclyde Chemical Company. The original drug used in medicated grit was fenbendazole (part of the benzimidazole group of drugs), sold by Hoechst Animal Health under the trade name of Panacur. The benzimidazole group of drugs are ideal because they are not soluble in water, do not break down in sunlight and work well as split dose drugs. Split dose drugs work by allowing the animal to take in small amounts of the anthelmintic over a period of days which then accumulates in the body. Medicated grit is only available under licence, a veterinarian prescription is required to purchase medicated grit from the manufacturers. Evidence of high strongyle burdens in the grouse population will be required by the veterinarian before they can dispense the appropriate prescription.

Original medicated grit

The original medicated grit reduced worm burdens in grouse by an average of 44% and increased grouse productivity by 40%, largely through improving chick survival. Reducing parasites helps to improve body condition in grouse and reduces scent emission, making the birds less vulnerable to mammalian predators when breeding.

To facilitate the legal requirement of withdrawing medication prior to the birds being shot and eaten, the fats used had a ‘slip point’ of 17°C, whereby the fat layer melted in summer and with it went the anthelmintic. By late-summer harvesting, the drug had gone.

Because the fat and drug it contained were temperature sensitive, unpredictable spells of mild weather, even in early spring, could result in a rapid loss of medicated grit’s ability to kill worms when it was needed most.

New medicated grit

Very little changed in medicated grit formulation until 2007, when, as a result of these short falls, a new product became available involving:

- A change in the drug used from fenbendazole to flubendazole; still part of the benzimidazole family of drugs, but now licensed for game birds.
- Transformation from a “fat” with a temperature slip point to a stable non slip “fat” with greater persistency.
- To comply with the legal requirement to withdraw the drug 28 days before grouse were harvested and consumed, the new medicated grit was placed in a box with a lid to prevent access by grouse.

Use of improved medicated grit appears to have almost stopped grouse cycles with strongyle worm levels being at all-time lows (see Figure 1) and with an almost doubling of grouse densities (see Figure 2) resulting in the record bags we are currently experiencing. This increased efficiency of medicated grit and increased grouse densities can lead to new problems:-

- Resistance to the current anthelmintic through overuse.
- Emergence of new diseases.

Figure 1

Figure 2
Assessing grouse for worms

Avoiding problems

The most crucial factor in the control of strongyle worms is knowing what worm burdens are in the birds so that parasite control can be targeted at appropriate times.

Parasitic worms should be counted from a sample of 20 adult grouse randomly selected from those shot, preferably in August and again at the end of the shooting season.

Worm “counts” can either be done by estate staff once trained by GWCT, or the guts from those grouse can be delivered to GWCT offices and we will do them for you. As a guide, we know from previous research that more than 2500 worms per adult grouse can impact on productivity and, ultimately, survival.

Levels greater than a mean of 1000 worms per bird from the autumn worm counts should “trigger” the need to put out medicated grit to control the strongyle worms the following spring. To provide better information on parasite burdens, counts of strongyle worm eggs in spring from live grouse should be considered.

Strongyle eggs are passed out in the caecal droppings produced every night whilst at roost. By collecting this material whilst it is still fresh (within 24 hours of being voided from the birds) and has not been subjected to freezing temperatures or desiccation, numbers of eggs passed can be counted and an approximation of the worm burden in the bird can be calculated.

This egg counting technique requires more technical equipment than the much simpler worm counting technique. The GWCT provides a service for counting these worm eggs and calculating these spring worm burdens.

Not only is it important to know when to provide medicated grit, but it is also equally important to know when not to medicate because over-exposure to the worming drug can cause resistance to build up in the worms, which would quickly reduce the effectiveness of the drug.

Deployment of medicated grit and grit box hygiene

A lattice of grit sites should be established across the moor either marked with small posts or the grid reference of each heap recorded with a hand-held GPS. The spacing will be dependent on spring grouse densities with the aim of providing one box per pair. A density of 50 pairs of grouse per 100ha would therefore require 50 boxes spaced every 150 metres. With densities of grouse currently well in excess of this, box density should be much higher with some moors having a grit box every 75 metres.

Conducting grouse counts in July and spring are vital to give estimates of autumn/spring densities. This, together with the number of grouse harvested and an allowance for natural mortality, allows the numbers of grit sites required to be calculated. Grit boxes should be placed in short vegetation, with proximity to standing and running water avoided.

With the recent occurrence of Cryptosporidium baileyi in grouse, the satting and density of grit boxes is more important than ever. Grouse transmit the infective stages of crypto (oocysts) via mucous expelled from their nasal cavities and in both the fibrous and caecal dropping from grouse, so preventing contamination of grit boxes with grouse faecal material is essential. Boxes no larger than 20 x 15 cm should be used, with numerous small drainage holes in the base. Raising boxes slightly off the floor will aid drainage. Preventing the boxes holding moisture is essential because crypto oocysts require moisture for survival in the environment. Placing stones around the grit boxes will help to make them more obvious to grouse. Once a gritting pattern has been established and the grouse are using it, only move boxes two to three metres annually to help prevent a build-up of crypto oocysts.

Medicated grit should be placed out on the established gritting sites in early spring and withdrawn at the end of June. By providing a limited period of access to the grit, this will help offset resistance build up in the worms to the anthelmintic.

No more than 500g of grit should be placed in each box. A grouse consumes approximately 35g of grit per month, therefore 500g will last a pair of grouse approximately seven months. Some sites may be more popular and require replenishing. All grouse faecal material should be removed from boxes on a regular basis. Fresh medicated grit should be used each year. All old medicated grit should be removed from the boxes at the end of June/early July and removed from the moor.

Do not place new medicated grit on the top of old medicated grit. This will not only dilute the effectiveness of the anthelmintic and may increase infection from crypto. The development of grit boxes more like poultry pellet dispensers may be worth considering to prevent faecal contamination of the medicated grit.

Plain grit

When medicated grit has been withdrawn from the moor, plain quartz grit should be made available to the birds. Because no drugs are incorporated this can be placed on the ground three to five metres away from the medicated site to provide “clean” ground for the birds. Again only a small quantity should be placed at each location so it is used up by the time that medicated grit is provided to the birds again.
Use medicated grit wisely to offset resistance build up in grouse

The majority of estates have been providing medicated grit as a safety precaution irrespective of whether wormers have been necessary to improve grouse health and survival. Historically, this type of overuse in domestic livestock has led to the development of drug resistance in parasitic worms. Evidence from the livestock industry shows that resistance to current wormers can occur within as little as three to five years of use, with resistance to one benzimidazole product resulting in resistance to others within that group. Over use of medicated grit may accelerate the on-set of resistance within the strongyle worm population infesting red grouse.

Avoiding resistance

Medication is not required every year, with no negative effects on production or survival in years when no medication is used if parasite burdens are low. We recommend careful monitoring of parasitic worm burdens by counting eggs in caecal material in the spring before deciding whether to use medication. By not placing medicated grit out until March and withdrawing it in late June/early July exposure to the anthelmintic is reduced but strongyle worm control is achieved, thus helping to prevent resistance. By using medicated grit wisely and only targeting the years when it is required, we should be able to keep medicated grit for longer. Once resistance becomes common, medicated grit in the form we currently use it will be ineffective and we currently have no alternative drugs to use, the grouse cycles we consigned to history will be back.

Best practice check list

1. Conduct autumn strongyle worm counts and spring egg counts to establish if medicated grit is required.
2. Do not use medicated grit when worm burdens are very low (i.e. below mean of 1000 worms in adult grouse). Over exposure to medicated grit will escalate the onset of resistance to the worming drug by the worms.
3. Monitor strongyle worm eggs in spring, especially in years when medicated grit is withdrawn.
4. Medicated grit is only available under licence administered by a veterinarian. Evidence of high strongyle burdens in grouse population is required to gain the appropriate prescription.
5. Comprehensive records of medicated grit use must be kept:-
   - Date and quantity purchased
   - Manufacturer
   - Batch number
   - Date placed on moor
   - Location of grit heaps
   - Date grit withdrawn
   - Date of first shoot
6. Provide a grit site per spring territory
   - Conduct spring and July grouse counts to establish bird densities
7. Do not place more than 500g of medicated grit in each tray (500g will last a pair of grouse 7 months)
8. Remove all old medicated grit from the box and remove from the moor; only provide medicated grit December to June, or preferably March to June.
9. To comply with the law, medicated grit should be withdrawn at least four weeks before the start of shooting to prevent the drug entering the human food chain. Once medicated grit is withdrawn ensure grouse have access to plain quartz grit with no medication.
10. Place 250g of plain quartz grit two to three metres from medicated grit box, on “clean” ground to help offset of crypto contamination at gritting sites.

More information

For further advice on medicated grit use and monitoring of strongyle worms and worm eggs contact:-

Game & Wildlife Conservation Trust Upland Research Group, Eggleston Coach House
Eggleston Hall, Barnard Castle, Co. Durham, DL12 0AG
Tel 01833 651936 Email dnewborn@gwct.org.uk

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