

Initial Lessons from the Sheep Parasite Control Pilot TASAH



With a large number of veterinary practitioners participating in the 2022 Parasite Control TASAH programme and having completed herd or flock visits, it is useful to reflect on some initial findings from the pilot of the programme that took place on sheep farms at the end of 2021. Natascha Meunier BVSc MSc PhD Dip.ECVPH, Parasite Control Programme Manager at Animal Health Ireland, summarises the information captured during these flock visits and how it relates to sustainable parasite control

Antiparasitic resistance, which has become a major concern for the sustainability of intensive livestock farming, is one of the main motivations for the Parasite Control TASAH programmes. The Irish sheep technology adoption programme (STAP) reported the efficacy of benzimidazoles, levamisoles and macrocyclic lactones to be 31.5 per cent, 51.9 per cent and 62.5 per cent respectively (Keegan *et al*, 2017). Liver fluke resistance to triclabendazole has also been shown to present in Ireland (Mooney *et al*, 2009). Anthelmintic resistance is a complex problem and as management practices and risk factors vary markedly between farms, there is value in tailored veterinary advice.

The Sheep Parasite Control TASAH pilot was a Rural Development Programme-funded programme initiated by the Department of Agriculture, Food and the Marine and managed by Animal Health Ireland, which saw the initial training of 70 participating veterinarians in current best practice relating to parasite control. The programme included a veterinary farm visit, with capacity for 400 total visits, and completion of a risk assessment as well as faecal testing for internal parasites. As part of the farm visit, veterinary practitioners were asked to make three recommendations to their clients to improve parasite control.

FARM SUMMARY

Parasite control visits were completed for 171 sheep flocks by 33 veterinary practitioners, largely from the west of Ireland. Commercial lowland flocks were the majority (68 per cent) production system that took part, with Suffolk the main breed on farms (41 per cent). Just over 70 per cent of farms had between 50 and 250 breeding ewes, with lambing mostly taking place between February and early April. Cattle were also present on 79 per cent of farms.

Farmers participated in the programme following nomination by their veterinary practitioners. Therefore, the results are not representative of all Irish sheep flocks and should be interpreted in this context.

The most problematic parasites, as ranked by farmers, were stomach/gut worms (53 per cent), flystrike (53 per cent) and liver fluke (47 per cent). When looking at lowland and upland flocks separately, these three concerns remain highest for both systems but ticks and *Nematodirus* were relatively of much greater concern to the upland systems, and coccidiosis of greater concern to the lowland systems.

RESULTS

The three main drivers of resistance have been described by

SCOPS (Sustainable Control of Parasites in Sheep, <https://www.scops.org.uk/>), a UK-based, industry-led group focused on sustainable and practical strategies for parasite control (Stubbings *et al*, 2020). These are: the frequency of treatments, the efficacy of treatment including correct usage, and the rate of dilution of parasites surviving treatment with parasites not exposed to this selection pressure. A number of principles, derived from these drivers, have been described to help slow the development of resistance. We report the findings of the pilot TASAH under sub-headings relating to these principles.

Frequency of treatment - use when necessary, FEC monitoring

The result of a meta-analysis of drivers of anthelmintic resistance in sheep identified a strong association between resistance and the frequency of treatments (Falzon 2014) where flocks with higher treatment frequencies were more likely to have resistance present on farm. Higher treatment frequencies increase the selection pressure to the reproductive advantage of resistant parasites. Therefore, any recommendations made by veterinarians to reduce treatments to when needed, by monitoring faecal egg counts (FECs), thrive, body condition or weight gains as the indicator for treatments, should delay resistance developing and is current best advice. It should be noted that there is risk associated with delaying or not treating animals and this should be managed to prevent production or clinical losses.

FEC monitoring, often along with other indicators, as a means of determining if treatment is necessary or to time optimal treatments, was recommended to 53 per cent of farms. Of these, 16 per cent of recommendations were specifically targeted to monitoring ewes. FEC monitoring is in line with best practice as we move to encourage farmers to adapt dosing based on evidence and environmental factors rather than set protocols.

Lamb treatments took place one to two times per year on average on 42 per cent of farms and three to four times per year on 46 per cent of farms. This is lower than previously reported (Patten *et al*, 2011) and it is not known whether there has been a genuine decrease in the number of treatments given to lambs since then or if a reporting bias is present here. Only two farms did not treat lambs for roundworms. Lambs were treated on the basis of a set-date and/or set-interval on 53 per cent of farms. Poor thrive (27 per cent) and clinical signs (46 per cent) were also frequently used as a basis of treatment. FECs were used on 15 per cent of farms.

A set date (41 per cent) or clinical signs (29 per cent) were the main bases for treatment in ewes, with 33 per cent and 31 per cent dosing around mating and/or lambing respectively; 24 per cent additionally gave a mid-season dose for stomach/gut worms, while 24 per cent of farms did not treat mature ewes for roundworms.

The basis for treatment for *Nematodirus* was a set date (30 per cent), clinical signs (24 per cent) or set age (18 per cent). Use of the DAFM *Nematodirus* forecast as a basis of treatment timing was only used in 17 per cent of cases and was correspondingly recommended for 20 per cent of farms

for more optimal timing of treatments.

Liver fluke was treated for once or twice per year in 60 per cent of farms and more than twice on 30 per cent of farms. Treatments were either given on a set date (69 per cent) or if there was a previous problem on farm (13 per cent) or high-risk pastures were present (19 per cent). Ectoparasiticides were usually given once or twice per year (84 per cent). FEC testing as part of the pilot TASAH was voluntary and carried out by 63 per cent of farms between October and January. The average FEC was 358 eggs per gram (epg) (median: 100epg, range: 0-5,200) with 38 per cent of results as 0epg and 41 per cent less than 500epg. Ewes had a higher percentage of samples with 0epg (51 per cent) than lambs (17 per cent). Where two samples were taken, these were mostly from different management groups on the same day. Few veterinarians used the opportunity for a drench test, possibly due to low egg counts making it unfeasible.

Appropriate treatment - administer effectively, underdosing, select the right product

Animal weights for dosing were for the most part estimated (62 per cent) and usually based on the heaviest animal in the group (53 per cent), although many farms dosed on the average weight (25 per cent) or individual weight (21 per cent). We would have expected more veterinarians to advise dosing to the heaviest animal in a group rather than the average, a straightforward recommendation to prevent under-dosing, but this was done for only two per cent of farms. In all, nine per cent of farms were advised to weigh their animals, although it was not always clear if this was in reference to dosing or for monitoring. It was also not clear whether weighing facilities were currently available, although in some cases scales were present but weren't being used for weighing prior to dosing. Calibrating the dosing equipment was never done by 49 per cent of farmers and regularly done by 30 per cent. This was a recommendation to 15 per cent of farmers, which is lower than expected as it is a straightforward action that ensures the desired dosage is being administered.

Mid-season stomach/gut worm doses in lambs from the following classes were reportedly used in the last year: benzimidazoles on 42 per cent of farms, levamisoles on 12 per cent, oral (39 per cent) or injectable (eight per cent) macrocyclic lactones, flukicide combination products on 11 per cent and monepantel on two per cent of farms. There was overlap in drug classes over the season on 25 per cent of farms; 84 per cent of farmers that treated for *Nematodirus* used benzimidazoles to treat lambs which is in line with current advice.

The percentage of farms on which ewes were treated for stomach/gut worm from the following classes are: benzimidazoles (37 per cent), levamisoles (six per cent), oral (11 per cent) and injectable (17 per cent) macrocyclic lactones, flukicide combination products (23 per cent), and one per cent of farms used monepantel. 18 per cent of farms used more than one class.

Liver fluke was a concern for the time of year at which the farm visits were taking place (autumn/winter) and only seven



Lamb treatments took place one to two times per year on average on 42 per cent of farms.

per cent of farms did not treat for liver fluke. Closantel (36 per cent), triclabendazole (27 per cent) and albendazole (26 per cent) were used most frequently on farms. Combination fluke/wormer products were used on 24 per cent of farms and a corresponding 17 per cent of recommendations suggested using narrow spectrum flukicide-only products, particularly for mature ewes.

Dicyclanil (68 per cent), diazinon/dimplyate (33 per cent) or cypermethrins (22 per cent) were the most frequently used ectoparasitics on farm. The widespread use of dicyclanil is in line with the high reported concern of flystrike. Dipping was recommended for 6 per cent of farms in place of avermectins for the treatment of ectoparasites.

Biosecurity

Quarantine recommendations, either advice for a full protocol or modifying existing practices, were given to 51 per cent of farms. Seemingly, this was a singular area for improvement with recommendations including the specific treatments to use (e.g., the use of two classes, preferably with monepantel), holding off pasture for 48 hours after treatment, or keeping the bought-in group separate from the main flock for a number of weeks. Guidelines indicate that the longer isolation period is important for animals that might be a high risk for scab, however this was rarely recommended to farmers, possibly because scab was not a perceived risk or compliance was less likely with a longer quarantine period. It is also advised to turn out animals onto pastures that are expected to have a high burden of worm eggs and larvae as a dilution to any potential resistant parasites, but this was seldom recommended specifically to farmers.

Anthelmintic Resistance testing - know the situation on farm

A total of 38 per cent of farmers reported that some anthelmintics were seemingly less effective than expected, with 11 per cent having stated that resistance had been confirmed on farm. Benzimidazoles were identified as less effective by 26 per cent of the farmers, while the other classes were considered less effective by fewer than 10 per cent of farmers. A lack of effectiveness is likely not noticeable until a fair proportion of the worm population is resistant, so it is plausible that the reduced benzimidazole effectiveness correlates with the high levels of proven resistance to the

benzimidazoles (Keegan *et al*, 2017, Good *et al*, 2012).

A drench test was specifically advised in 13 per cent of farms, often as part of monitoring i.e., using an FEC to guide a treatment decision, followed by post-treatment sampling. A faecal egg count reduction test was only recommended for two per cent of farms. Considering the high rate of resistance and perceived lack of efficacy, these figures for testing are lower than expected and should be recommended if not currently being done. Understanding if resistance is present on the farm can help with product choice and support actions that will slow further development. Some farms had undergone previous testing but resistance can vary according to the worm species abundance which varies with the season. Repeated pooled drench tests can confirm product efficacy for a relatively low cost and farmers may need guidance on the timing of the sampling, i.e., seven days post-treatment for levamisole, 10-14 days for benzimidazoles and macrocyclic lactones.

Refugia - preserving susceptible worms

The concept of refugia has been accepted with many veterinarians recommending practices that would increase or maintain some parasites that have not undergone selection pressure for anthelmintic treatments. Many of these were targeted selective treatments either focusing on not treating the high performers among the lambs, or only treating ewes when there was a demonstrated need, including lack of thrive, twins/triplets, body condition or based on FEC monitoring. These targeted practices should be advised where the susceptible worm populations are able to mix with the potentially resistant worms or the risk from not treating is not justified. For example, if farmers only treat ewes carrying twins or triplets but graze these animals separately from the single-birth ewes, the benefit of the refugia parasites might not be seen.

In all, 27 per cent of farmers were advised to use targeted selective treatments where the top 5-10 per cent of animals are not treated, with a further 15 per cent specifically recommending only treating ewes when there is a demonstrated need.

The protocol to dose, stay and then move animals to clean pastures was recommended to 12 per cent of farms. This tactic of keeping animals on the current pasture for a short period after treatment is advised when moving animals to a pasture that is likely to have a low level of refugia, such as reseeded pastures or aftergrass, but is not effective following treatments with persistent products. 46 per cent of farmers reported routinely leaving animals on the same pasture after dosing and 20 per cent moved animals immediately to a clean pasture.

Reduce the need for anthelmintics

Only four per cent of the possible recommendations related to pasture management. This can be difficult to advise on as it requires detailed knowledge of the management system and is often constrained due to land resources. Risk matching those animals that are most susceptible to disease

or decreased performance to pastures that are at low risk for parasite contamination can drastically reduce the need for treatments. Pasture mapping and risk assessment, for example as described by SCOPS, is a practical tool to help farmers implement non-treatment-based control measures (Stubbings *et al*, 2020).

CONCLUSIONS

While farm-specific, the vast majority of the responses and recommendations align with current best practice and the four key actions suggested by the Sheep Working Group as described by O'Shaughnessy (2022). Firstly, the use of benzimidazoles as treatment for *Nematodirus* was currently used on the majority of farms, with a few supporting recommendations by veterinarians with the same message. Secondly, the use of FEC to determine the timing of treatments and which products are effective on farm. While these were not frequently carried out on farm, FECs for monitoring, along with other indicators, were heavily advised by veterinarians in their recommendations. Drench testing alongside these, i.e., targeted post-treatment samples, could be promoted more and provide useful information on the effectiveness of the products used. Thirdly, the advice to not treat ewes for roundworms unless there is a demonstrated need is already followed by a quarter of the farmers, with no treatments given to this group. Veterinarians did recommend this to many farms, along with the FEC monitoring advice, but in some cases could provide more specific recommendations to relate this to ewes. Lastly, quarantine treatments and protocols were often recommended by veterinarians, implying that many farmers can make improvements in the area of biosecurity. These principles had already been embraced by many of the farmers by the time of the consult which is encouraging for organisations which have strongly promoted these as key messages. For those farms where current practices differed from best practice guidelines, it is hoped the targeted

recommendations encourage farmers to consider making changes that will improve sustainability over the long term and these recommendations should continue to be the focus of future communications.

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Reader Questions and Answers

1. RESISTANCE TO ANTHELMINTIC TREATMENT BY SHEEP INTERNAL PARASITES HAS BEEN SHOWN IN IRELAND FOR THE FOLLOWING:

- A. Benzimidazoles and levamisoles
- B. Triclabendazole
- C. Macrocyclic lactones
- D. All of the above

2. WHICH OF THE FOLLOWING ARE UNLIKELY TO CONTRIBUTE TO RESISTANCE DEVELOPMENT:

- A. Frequent dosing
- B. Increasing the plane of nutrition
- C. Dosing when the pasture burden is extremely low
- D. Underestimating animal weights

3. WHICH ANTHELMINTIC CLASS IS CURRENTLY BEST ADVISED FOR NEMATODIRUS DESPITE RESISTANCE IN OTHER WORM SPECIES?

- A. Benzimidazoles
- B. Levamisoles
- C. Macrocyclic lactones
- D. Any of the above

4. WHICH OF THE FOLLOWING STATEMENTS IS TRUE?

- A. Preventative fly control treatments do not seem to be routinely used on sheep farms
- B. Ticks are not a concern in most upland flocks
- C. Calibrating dosing equipment is routinely done by the majority of farmers
- D. Set dates or set intervals currently seem to be the basis for most antiparasitic treatments

ANSWERS: 1D; 2B; 3A; 4D.