Treatment of ewes around lambing

Healthy adult ewes, in good body condition, can control their worm burden using acquired immunity. Generally any treatment of adult ewes is either to assist a small number of animals that may be compromised by parasitism (e.g. lean or immature pre-tupping) or, during the peri-parturient period, to reduce the amount of contamination going on to pasture in the spring. Work published recently (Learmount et al 2018) demonstrates that it is possible to significantly reduce the number of ewe treatments in a flock without any detrimental effect on performance.

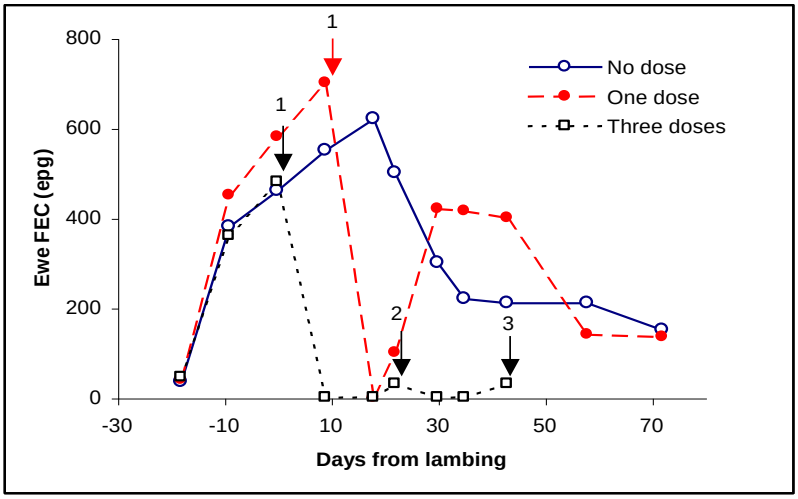
Dosing of ewes around lambing (peri-parturient period).

Worming ewes around the time of lambing remains a common practice in the majority of UK sheep flocks. The reasoning behind this relates to the peri-parturient relaxation of immunity (PPRI), which allows the immune system to wane as the ewe approach lambing. This results in the worms in the ewe's gut producing a lot more eggs, which are then passed out in their dung, contaminating pasture which is then grazed by their lambs. Evidence suggests that ewes in low body condition and/or underfed protein in late pregnancy are most affected by this reduction in their immune response. The figure below demonstrates a typical PPR in egg output (blue line) which starts around 2 weeks before lambing and persists for about 6 weeks afterwards, when the immune response returns to normal. A recent published paper Hamer et al 2020 concurs with previously published reports on the extent of the PPR.

Treatment given at this time may have less serious consequences for the development of AR if ewes are turned on to pasture with an overwintered larval population, but both the timing of the dose relative to the PPRI and the choice of anthelmintic are both important:

Faecal egg counts of ewes grazing infective pastures after turn-out

Peri-parturient rise in FEC is delayed by one treatment but is not necessarily eliminated unless a treatment with a persistent action or prolonged period of protection is given



Timing of treatment

If ewes are still within the PPRI when the effect of anthelmintic administered ceases, they are likely to become re-infected quickly, particularly if pastures are reasonably infective. Under these conditions, selection for AR is minimal, but the benefit of treatment in terms of pasture contamination (see Figure above) is also minimal for ewes treated with a non-persistent product. If they are treated early in the period of the PPRI (red line, one dose) there is only a short duration of reduced egg output before resuming the expected, but slightly delayed, peri-parturient rise in egg output (FEC).

Choice of treatment

In the past, to combat the situation outlined above, repeated treatments have been suggested in order to eliminate the rise in FEC altogether (three doses, black line). This strategy will reduce pasture infectivity for the lambs later in the season as shown, but it also means that the end of the PPRI coincides with anthelmintic treatment resulting in a prolonged period before ewes re-establish a nematode infection from the *in refugia* population. This is highly selective for AR worms and is no longer recommended as a sustainable strategy

The advent of moxidectin, which has a persistent effect, allows the potential to mimic the repeated dosing strategy shown above and in recent years there has been increasing use, in particular of the 2% LA product for this purpose. While this offers the potential to reduce contamination and subsequent treatments for lambs, this needs to be considered carefully to minimise the impact on selection for AR in the worm population. Concern over increased use of this product in ewes around lambing, coupled with rising levels of resistance to moxidectin being reported (both in nematodes and sheep scab mites), led to a workshop between the MAH (Zoetis) and SCOPS in September 2019. The full report can be found on the link below. The advice is summarised below and is designed to provide a sustainable compromise:

- **Year on year use of moxidectin in ewes around lambing is unadvisable in any flock.** Simply rotating with other wormer groups within a season is not enough.
- **If ewes are treated with moxidectin, some must be left untreated.** It is essential to leave at least 1 in 10 of the ewes untreated (and preferably more than that) and these need to be spread between different grazing mobs. It is not enough to simply leave singles as they may be grazed in separate fields to twins. Use body condition as a guide with the fittest ewes left untreated.
- **Moxidectin 2% should not be used more than once in any flock in any one year.** In practice this means that if moxidectin 2% is used in ewes at lambing then moxidectin should not be used again in that flock in the same season.
- **Where moxidectin 2% has been used in ewes** to suppress the spring rise then it should not be used to treat sheep scab (or vice versa). An OP plunge dip is an appropriate alternative for scab treatment.
- **Check the dose rate and administration method.** Underdosing remains a major risk factor in the development of anthelmintic resistance. Sheep farmers should know the weight of their sheep and dose to the heaviest (if a wide range of weights is expected, batch and dose accordingly). The correct technique for administration and maintenance/calibration of equipment is also vital.

- https://www.scops.org.uk/workspace/pdfs/zoetis-scops-conference-on-moxidectin-2-september-2019.pdf

Which ewes to treat?

The crux of our advice for treating ewes around lambing is to find the best compromise between reducing contamination and avoiding unnecessary treatments, thereby minimising any selection pressure for AR.

Historically, it was assumed that the extent of the PPRI was mainly linked to litter size; the more lambs a ewe is carrying the greater the strain on her ability to maintain her immune response. This has formed the basis for practical advice for many years, with single bearing ewes being those left untreated on many sheep farms. This advice was linked in particular to protein requirements and our ability to satisfy these for ewes carrying multiple lambs in commercial production systems. Reports suggested that egg output in ewes was reduced where additional protein was supplied in late pregnancy (ref). As a result, it was recommended that metabolisable protein was fed at significantly higher levels than AFRC standards.

However, responses were variable and where ewes are in good body condition, the response to protein supply over and above the AFRC recommendations was not evident, even where multiple lambs are *in utero*. In a review published in 2017 (link to Feeding the Ewe), it was recommended that the AFRC recommendations should be considered a minimum for ewes in late pregnancy. In practice this is a challenge for a significant number of flocks and advisers need to assess the adequacy of the diet and take action to correct any deficiency below AFRC recommendations, as a key part of the management of ewes in the peri-parturient period.

Body condition (BCS) is now seen as the main indicator of the magnitude of the PPRI in ewes and current evidence from sheep farms supports this conclusion. Not only does this offer a practical means as leaving only singletons leads to mobs of multiples being blanket treated, but it also addresses the fact that many ewes carrying singles are doing so because their BCS is low, and are therefore going to see a significant rise in FEC around lambing. Feeding the Ewe AHDB

Previous advice was that 10-20% of ewes should be left untreated around lambing to reduce selection pressure for AR by providing a sufficient worm population *in refugia.* While this is still a standard target, it is clear that for flocks where ewes are in good BCS and the diet satisfies nutritional requirements, this proportion can be increased, with many now only treating a relatively small proportion of younger and leaner ewes. Variance between flocks means that FEC monitoring and BCS scoring can be used to formulate a strategy that provides the best compromise for individual flocks.