Faecal Egg Count (FEC) monitoring

FEC monitoring provides information about the worm status of a flock/mob of sheep and can help in the decision about the need for treatment with anthelmintics. If grazing sheep have high FECs, and the faecal samples have been collected appropriately, one can safely assume that worm burdens are high, and that treatment is justified. Unfortunately, the corollary is not always true and low FECs require careful interpretation.

To monitor FECs, you can use a suitably trained and equipped veterinary practice, a reputable commercial service or adopt a DIY approach such as using the FECPAK or mini-FLOTAC or McMaster systems. These different faecal egg counting techniques have varying diagnostic performances (e.g. sensitivity, limit of detection, accuracy and precision). The technique chosen will have an effect on the quality of the results.

Routinely and regularly performed FECs are useful in three ways:

- Indicating the most appropriate timing for treatment
- Estimating the egg output of animals, giving information on the amount of contamination going onto the pasture.
- Testing the efficacy of a treatment

However, there are some important limitations that should be remembered. The main ones are that the output of eggs is not perfectly correlated with the actual worm burden in the animal and different nematode species have different prolificacy, so without prior knowledge of the worm population on farm, interpretation of results can be difficult. There is also a non-uniform distribution of eggs in faecal samples and the FEC is only an indication of the number of egg laying adults in the gut, it does not reflect the numbers of infective larvae ingested within the pre-patent period.

Guidelines for collection of faeces

These guidelines are for the estimation of the mean FEC of a group of sheep. A ‘group’ in this context refers to a flock of sheep of the same age and reproductive status grazing together in the same field and with the same anthelmintic-treatment history. The easiest way to sample a group is to loosely gather them in the corner of the field for 5-10 minutes, then let them walk away. Fresh dung samples can then be collected from the pasture. At least 3 grams (roughly 8-10 fecal pellets) of faeces per sample are required and the number of eggs found in each sample are reported as eggs per gram (epg) of faeces.

- ❖ At least 10 sheep in the group should be sampled. The wide variation in FEC between sheep grazing together in the same field means that random sampling effects will mitigate this effect and improve the reliability of the measurement.

- ❖ The sheep should be healthy and have had full access to pasture and/or feed before sampling because faecal consistency and feed intake will affect the count. If animals have been held off feed for more than a few hours before sampling, or if any sheep included in the sample are inappetant due to illness, they should not be included in the sampling

- ❖ Samples should be fresh when collected (less than one hour old), placed in individual plastic bags and kept cool (not frozen) in an airtight container before delivery to the laboratory within 48 hours. If the faeces are too old, some eggs will have hatched and the reported egg count will be an underestimate.
- ❖ Some laboratories pool the 10 samples and report the average of the 10 animals as a single count. This is acceptable and can substantially reduce the cost, but the faecal samples should still be kept separate until they arrive at the laboratory. The technicians can then ensure the pooled sample is prepared with equal amounts of faeces from each individual sheep.

Interpretation of FECs

FECS are reported as the count of worm eggs per gram of faeces. Due to the important limitations outlined above, FECs should be viewed as a monitoring and 'additional diagnostic' tool to be considered with the farm history, management practices, clinical signs and flock performance (such as daily liveweight gain). Careful interpretation is particularly important where the FEC is low.

- The output of eggs is not perfectly correlated with the actual worm burden. The fecundity of adult female *Teladorsagia* of sheep is inversely density dependent, i.e. egg production per worm is higher when the number of worms in the gut is lower. FECs are better correlated with worm burdens of *H. contortus* and with burdens of *Trichostrongylus* spp in young animals.

- Different nematode species have different prolificacy. *H. contortus*, for example, is highly fecund, while *Trichostrongylus* might be present in considerably high numbers but produce fewer eggs. Before results can be interpreted, knowledge of the likelihood of nematode species present on farm is necessary.

- Immune status of the sheep has a significant effect on egg shedding and pathological effects. As sheep mature, they develop an immunity that reduces worm fecundity. Around lambing time, because of the Periparturient Relaxation in Immunity (PPRI) ewes have higher FECs, although the pathological effects of parasitism may not have increased. Fit, healthy sheep can be resilient to the effect of nematode parasitism, with high worm burden (and potentially high FECs) not causing any pathological effect and therefore treatment may not be necessary. On the contrary, concomitant diseases (e.g. Johnes) are often associated with high FECs and parasitism is potentially contributing to the clinical signs. FECs should therefore always be interpreted for the specific group of sheep and in conjunction with production indices and clinical signs.

- When interpreting FECs, always remember that the eggs were produced by worms picked up by the sheep three or more weeks earlier. During the prepatent period, animals are already infected with nematodes, but they are not yet shedding eggs as worms have not reached the adult stage. This is particularly true for *N. battus* infection in lambs and in acute haemonchosis in sheep of any age where the prepatent larvae can cause severe disease and death. In these cases, even a low FECs might be significant, as FECs provide no information about the numbers of pre-patent larvae present.

Despite these limitations, FECs can be used to establish the epidemiology of nematodes on farm and to help decide the timing for treatment, to allow anthelmintic treatments to be used more efficiently, rather than less frequently. On farms where anthelmintics are used excessively and without the support of diagnostic investigations, FEC monitoring may provide a farmer with the necessary additional information to reduce anthelmintic frequency, while continuing to manage the risk of disease outbreaks or lost productivity.

Guides to the Interpretation of Faecal Egg Counts (epg) in individual lambs and groups
(trichostrongyle type eggs)

The following two tables are used by APHA and provide a guide **ONLY** to interpretation of egg counts in sheep. All factors previously discussed should be taken into consideration for a meaningful interpretation of FECs results.

Table 16. Worm egg count interpretation of individual samples in lambs

Worm egg count	Comment	Action
50-350 eggs per gram	Light infestation	Treatment not necessary
400-600 eggs per gram	Moderate infestation	Anthelmintic treatment may be beneficial
650-1000+ eggs per gram	Heavy infestation	Anthelmintic treatment necessary

Table 17. Monitoring sample, worm egg count interpretation of a group of lambs (composite)

Worm egg count	Comment	Action
<200 eggs per gram	Low egg count	Treatment probably not justified. Continue monitoring.
200-500 eggs per gram	Some clinical disease could be present	Anthelmintic treatment should be beneficial in individuals.
500-1000 eggs per gram	Clinical disease likely in a large proportion of the group.	Anthelmintic treatment necessary to a large proportion of the group
1000 + eggs per gram	Clinical disease likely in the whole group with some individuals heavily infested.	Anthelmintic treatment necessary to a large proportion of the group.