

## Coping with Anthelmintic Resistance in Ruminants (CARES)

Gut worms can cause ill-thrift and disease in lambs, and good worm control is currently highly dependent on effective worming products (anthelmintics). However, a direct and unavoidable result of continuous use of wormers is the selection of worms that are resistant to anthelmintics. The EMIDA ERAnet CARES project had three objectives

1. To determine the failure rate of anthelmintic treatments on Irish sheep farms.
2. To investigate if macrocyclic lactone (ivermectin) resistance was present on Irish sheep farms
3. To assess if weight was a suitable indicator for targeted selective anthelmintic treatment of lambs.

The extent of anthelmintic treatment failure with each of the three commonly used anthelmintics (benzimidazole, levamisole and macrocyclic lactone) on Irish sheep farms was determined using data from the Sheep Technology Adoption Programme (STAP). As part of STAP a total of 4,221 drench tests were carried out, which involved submitting lamb faecal samples pre and post-anthelmintic treatment for the assessment of worm egg counts to an approved laboratory. In total 1446 tests were available for analysis and the anthelmintic treatment failure rate was 49%. There was a significant difference in efficacy between the anthelmintic classes with benzimidazole (1-BZ) least effective and macrocyclic lactone (3-ML) most effective.

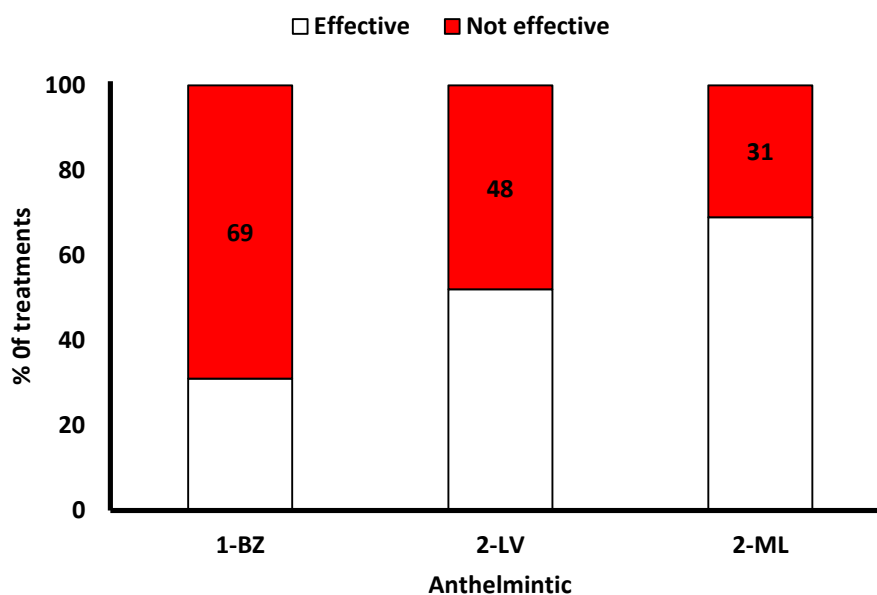


Fig. 1 Failure rate (%) of anthelmintic treatment with 1-BZ, 2-LV and 3-ML on Irish sheep farms 2013-2015.

In order to determine if ivermectin resistance was present on Irish sheep farms and determine if the 3-ML resistant worms were multidrug resistant four farms with a suspected history of ivermectin resistance were recruited for this study. A faecal egg count reduction test

(FECRT) was conducted on each farm and two farms were found to show evidence of ivermectin resistance. Lambs were purchased from the two ivermectin resistant farms to characterise the isolate. The resistant species in both instances was *Teladorsagia circumcincta*. Both isolates were additionally found to be resistant to benzimidazole and levamisole demonstrating multidrug resistant sheep stomach worms in Ireland for the first time.

In order to assess if weight was a suitable indicator for targeted selective anthelmintic treatment of lambs an on-farm trial was conducted over a 28 day period on 4 farms over 2 years with 444 lambs in total. Post weaning lambs (Day 0) were classified according to their weight into one of 3 weight groups; 'light' 'medium' 'heavy'. Lambs in the light and heavy groups were randomly assigned to anthelmintic and no anthelmintic treatment. All lambs in the 'medium' weight group received anthelmintic treatment. At Day 28 lambs were weighed, condition and dag scored and faecal sampled to determine FEC. At the start of the trial light lambs had a higher FEC than heavy lambs, indicating they would benefit more from treatment. However, treated lambs grew significantly faster than untreated lambs (109 v 59 g/day) and there was no interaction with weight class (heavy or light). As weight class did not affect FEC and since heavy lambs are likely to be sold earlier, and taking account of withdrawal period, it would be appropriate to selectively choose lighter lambs for treatment.

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### **Further reading**

Keegan JD, Keane OM, Good B, De Waal T, Denny M, Hanrahan JP, Fitzgerald W, Sheehan M. A nationwide survey of anthelmintic treatment failure on sheep farms in Ireland. *Ir Vet J*. 2016. Accepted.

Keegan JD, Keane OM, Farrell L, Byrne W, De Waal T, Good B. Characterisation of ivermectin and multi-drug resistance in two field isolates of *Teladorsagia circumcincta* from Irish sheep flocks. *Vet Parasitol: Regional Studies and Reports*. 2016. 1-2: 3-9.

Keane OM, Keegan JD, Good B, de Waal T, Fanning J, Gottstein M, Casey M, Hurley C, Sheehan M. High level of treatment failure with commonly used anthelmintics on Irish sheep farms. *Ir Vet J*. 2014. 67(1):16.

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