A convenience sample of cattle faecal egg count reduction tests in New Zealand 2021-2024

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Introduction

The results of the last comprehensive survey of anthelmintic (drench) resistance in cattle in New Zealand were published in 2006 (Waghorn *et al.* 2006).

Annual reviews of sheep faecal egg count reduction test results have been published by Awanui Veterinary (formerly Gribbles Veterinary Pathology) since 2021 (Riddy 2021-2022, 2022-2023 and 2024) and sporadically prior to this (McKenna 2018). The most recent annual reports cover the 2021 to 2024 calendar years; these have provided a comprehensive picture of the deteriorating state of drench efficacy on New Zealand sheep farms.

A similar decline in drench efficacy is likely to be happening in New Zealand cattle worms. Farm systems most at risk are those dominated by cattle under one year of age, and where drench is the main means of controlling gastrointestinal nematodes. Sporadic published reports and anecdotal evidence support this.

Macrocylic lactone resistant Ostertagia were reported by Waghorn *et al.* in 2016 and in 2024 Saurmann *et al.* report a number of farms with triple combination resistant Cooperia (Riddle).

Garth Riddle reports five out of five intensive bull units tested in Northland showing resistance in Cooperia to triple combination drenches (McKay).

It is important that a more comprehensive picture of the state of drench resistance on New Zealand cattle farms is obtained, both as a call to action for farmers and their advisors, but also to leverage support to help farmers implement systems that are less reliant on drench.

This is of particular importance to the dairy industry, where understanding and uptake of sustainable worm management messages is believed to be low, and where there will be a requirement to rear larger numbers of non-replacement calves in the future to meet market expectations of animal welfare.

Materials and methods

In September 2024, Wormwise put out a call to production animal veterinarians, via the New Zealand Veterinary Association's on-line Wormwise discussion forum, for recent faecal egg count reduction test results or post-drench faecal egg count checks from cattle.

Wormwise programme manager, Ginny Dodunski, also contacted individual veterinarians known to have collected such data in the previous four years.

Results were provided in a variety of formats including laboratory reports, Excel® spreadsheets, and written reports to farmers.

Farm locations were reported by region as per the Beef + Lamb New Zealand regions:
https://beeflambnz.com/sites/default/files/levies/files/BLNZ-Regional-Map.pdf

A 'test' was defined as any data where both pre and post faecal egg count information was available for an administered drench, and it was clear which active/s and formulation were administered. In all but one case, it was clear that individual faecal egg counts had been used both pre and post treatment.

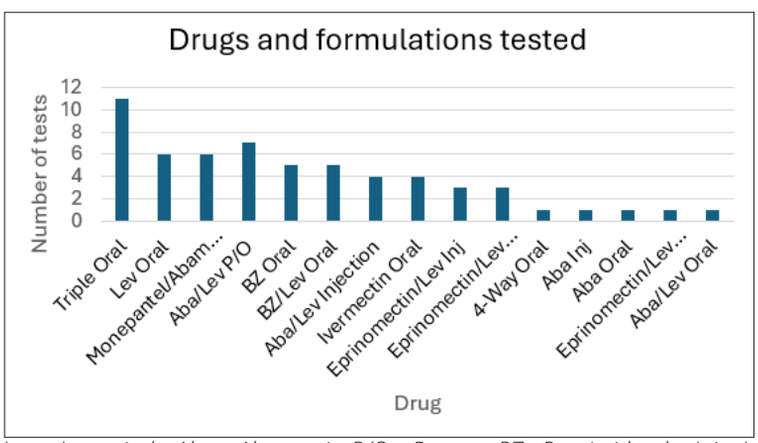
Pre and post treatment larval culture information was available for most of the treatment groups, as detailed below.

No attempt was made to determine the details of the on-farm protocols or calculation methods used; given all tests were under the supervision of veterinarians.

'Resistance' was recorded where treatment failed to reduce the mean pre-treatment egg count by 95% or more. At the genus level, a positive test for 'resistance' was only recorded where larval culture information was available both pre and post treatment, and there were at least 50 eggs per gram (epg) of the genus pre-treatment, and treatment failed to reduce the genus egg count by 95%.

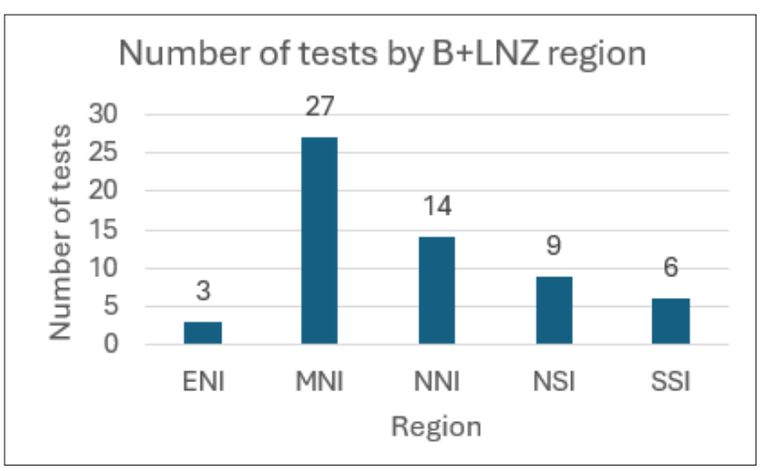
Results

Fifty-nine tests were available, from 16 different farms. Fifteen different drug/active types were tested.



Lev = Levamisole. Aba = Abamectin. P/O = Pour-on. BZ= Benzimidazole. Inj = Injection. 4-way = Monepantel, Abamectin, Levamisole and Benzimidazole.

Farms were located in the following regions:



One farm (in the SSI group) was a beef breeding enterprise and all of the remainder were dairy support or intensive young beef operations.

Fifty-five tests had information from both pre and post treatment larval cultures, four either had no or incomplete larval culture information.

Resistance in any genus, as defined by a less than 95% reduction in undifferentiated egg count, was present in 41 tests (69%) and 13 (81%) of farms.

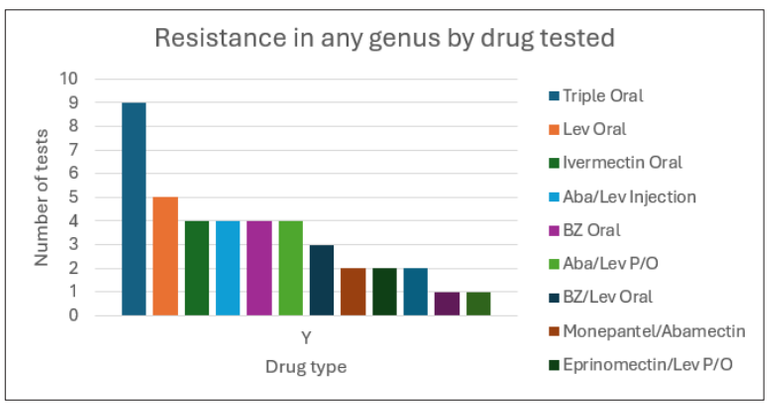
At the genus level, resistance was diagnosed in Cooperia in 33 tests (56%) and in Ostertagia in 21 tests (34%). However, Ostertagia was frequently not present at numbers required to meet the 50epg threshold:

Resistance confirmed Ostertagia	Number of tests
Y	21
NA	19
N	1
Grand Total	41

NA = Insufficient number of larvae counted or no culture data.

Resistance by drug

Undifferentiated resistance



Oral triple combinations

Nine of 11 tests showed undifferentiated resistance. Five tests showed resistant Ostertagia and six tests showed resistant Cooperia. Two of the farms had resistance in both species.

Macrocyclic lactone/levamisole combinations

Nineteen tests included combinations of a macrocyclic lactone (ML) drug, and levamisole, as below:

Drugs and formulation	No. tests
Aba/Lev Injection	4
Aba/Lev Oral	1
Aba/Lev P/O	7
Eprinomectin/Lev Inj	3
Eprinomectin/Lev Oral	1
Eprinomectin/Lev P/O	3
Total	19

Resistance to this combination was common in Cooperia, for both abamectin and eprinomectin. Four abamectin/levamisole tests showed resistance in Ostertagia, for both injection and pour-on.

Drug	No. tests	No. R Coop	No. R Oster
Abamectin/Levamisole	12	7	4
Eprinomectin/Levamisole	7	5	

Of the seven tests of eprinomectin/levamisole, five had insufficient Ostertagia larvae present to calculate reductions.

Resistance by worm genus

Resistance in Ostertagia

Of the tests which showed resistance in Ostertagia, the following prevalence was found within each drug/formulation category:

Drug	No. tests with resistant Osters	Total tests of drug	%
Aba Oral	1	1	100%
Aba / Lev Injection	2	4	50%
Aba / Lev P/O	1	7	14%
BZ Oral	3	5	60%
BZ / Lev Oral	1	5	20%
Ivermectin Oral	3	4	75%
Lev Oral	4	6	67%
Monepantel / Abamectin	1	4	25%
Triple Oral	5	11	45%

Resistance in Cooperia

Resistance in Cooperia was found in most of the drug/formulation categories tested. Of particular note was the finding that 4 out of 6 tests of oral levamisole returned resistance in Cooperia.

Other notable results for commonly used combination drenches include:
- 2 of 5 tests (40%) of a BZ/levamisole combination.
- 12 of 19 tests (63%) of an ML/levamisole combination.
- 6 of 11 tests (55%) of a triple combination.

Exceptions (where no resistance was seen in Cooperia) were:
- 4-way oral combination (1 test).
- Abamectin injection (1 test).
- Abamectin/levamisole oral (1 test).
- Monepantel/abamectin (6 tests).

Discussion

While this data is limited in quantity and by potential collection biases, it nonetheless reflects current anecdotal reports from farmers and veterinarians that worms surviving drench treatments in cattle is a common occurrence.

Biases include the possibility that the farmers who undertook tests did so because they had already seen visible signs of a problem, and that veterinarians did not report tests where drench efficacy was high. That said, conversations with the three veterinarians who submitted the most tests, indicated that the majority of their farms

tested because they knew it was good practice to do so, rather than as a response to poor performance or clinical disease.

Of particular concern is the high rate of resistance seen in Cooperia to some of the most commonly used combination drench products – overall, 63% of tests showed Cooperia resistant to a Macrocylic lactone / levamisole combination and 55% of tests showed Cooperia resistant to a triple combination.

That 4 of 6 tests of levamisole found resistant Cooperia is a clear indication that this mainstay of Cooperia control is under threat.

Of equal, or perhaps greater, concern is the relatively common finding of Ostertagia resistant to a range of drugs, combinations and formulations. Reliance on the potency of several actives (as in triple combinations) or purportedly more effective formulations (as in injectable), is not, according to this data, a guarantee of efficacy against Ostertagia anymore.

Ostertagia can cause severe clinical disease and even death in calves and adult cattle. There is a real risk of R2 dairy heifers returning to their home farms from grazing carrying Ostertagia that cannot be treated when the stress of first lactation and introduction to the milking herd compromise their immunity. This risk is also present for R2 and older cattle coming out of droughts or other situations of underfeeding. The industry has largely 'forgotten' the damage that clinical Ostertagiasis can do to adult cattle, but we may be soon to be reminded.

The one case of Ostertagia surviving monepantel/abamectin was investigated and the finding could not be repeated[10]. There are reports of similar situations in lambs where this combination appears to be ineffective when given to animals that have accumulated a large burden of worms resistant to other combination drenches. When these have been further investigated in healthy animals on the same farm, the monepantel/abamectin has been found to be effective. It would seem unlikely that genuine resistance to monepantel/abamectin has developed on New Zealand cattle farms yet, given its very limited use in these systems. However regular use of this combination without substantial management change on farms with high levels of pre-existing resistance could quickly lead to failure.

These data suggest that the risk to New Zealand cattle farms from Cooperia, and more worryingly, Ostertagia, that cannot be controlled by any currently available drenches is real, and imminent. It is imperative that the cattle industries, their advisors and suppliers, work together to enable more farmers to implement systems that are less reliant of regular drench, than is currently the case.

Acknowledgements

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