Assessment of equine anthelmintic resistance in New Zealand

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A summary from a recent study of anthelmintic efficacy results in strongyles- it is not too late for New Zealand

Equine helminth parasites pose significant health risks to horses worldwide. Acute larval cyathostominosis cases result in a mortality rate of up to 55% (Lawson *et al*.2023). Parascaris fatalities in foals and Anoplocephala implications in ileocaecal pathology also contribute to significant internal parasite related disease and death worldwide. In New Zealand we still rely on anthelmintic control of these pathogens as a mainstay of equine treatment and control (Bolwell *et al*. 2015) however with reports rising of anthelmintic resistance (AR) globally and extreme examples of AR in production animals already in New Zealand, it is necessary to develop and adhere to more effective deworming strategies. Addressing our use of anthelmintics has become one of the most urgent issues threatening equine welfare in our country to mitigate the associated risks of helminth pathology. The Faecal Egg Count Reduction Trial (FECRT) is pivotal for evaluating the efficacy of anthelmintic drugs and informing deworming protocols moving forward.

From August to December 2023, a national FECRT surveying 1200 horses was performed. This is the first large-scale study of anthelmintic efficacy in horses enrolled from multiple properties in New Zealand. The study looked at strongyle infections and anthelmintics measured were ivermectin, moxidectin, oxfendazole and a combination pyrantel product. Results ranged from 100% efficacy on some farms to zero on some properties, with some faecal egg counts (FEC) increasing after product administration. This study is yet to be published, but validated interim results will be discussed to provide an example of a structured approach to using FECRT for the equine practitioner. Discussion will highlight differences obtained for the South and North Islands of New Zealand and resistance trends nationally, compared to individual farms. Importantly this work will provide impetus for updated horse owner education and product stewardship of equine anthelmintics in New Zealand.

The methodology behind the FECRT is critical for obtaining meaningful data but is a straightforward process and should not dissuade practitioners from implementing them as part of an annual or biennial farm health management plan. The World Association for the Advancement of Veterinary Parasitology (WAAVP) have recently outlined a straightforward practitioner and research level process which formed the basis of the present study. Administration of product, sample collections and egg counting methodology all influence the quality of results and are explained in this highly comprehensible publication.

This interim analysis has revealed several useful observations. Higher pre-treatment FECs were seen in South Island horses and there was a wide range between farms. The reason for a difference between islands is unclear but may reflect farm management, anthelmintic control, animal movement, or climatic factors.

The percentage reduction in FEC was variable between treatment groups, with oxfendazole alone showing substantial resistance while the ivermectin, moxidectin and oxfendazole plus pyrantel showed median efficacies greater than 99%. However, the 95% credible intervals of

these latter treatments included the expected efficacy, showing that some resistance may be emerging. This was borne out by the farm-level analysis, which showed clear evidence of poor efficacy on a small number of farms. For oxfendazole, there was a spectrum of efficacy across farms, from zero to almost 100%. For the other groups, the situation was more binary, with five to seven farms showing obviously reduced efficacy while the rest showed high efficacy. Interestingly, farms with poor efficacy to one group did not always show poor efficacy to other groups.

The efficacy of the ivermectin plus praziquantel group differed between islands (the credible intervals did not overlap), but there were no differences between islands for the other treatments.

The study has shown significant evidence of anthelmintic resistance for oxfendazole at the national level, and inconclusive results for macrocyclic lactones and oxfendazole combined with pyrantel. There was evidence of anthelmintic resistance to all actives on many individual farms.

On select farms where day fourteen samples were negative, egg reappearance periods on horses treated with ivermectin and moxidectin were explored. Positive counts reappearing at week four post treatment were measured and, in most cases, returning to pre-treatment FEC levels by week 6 to 8 which may suggest we are observing emerging resistance. Further work is required in this space but does raise the urgency of addressing AR in our equine population and calls to question the previously accepted egg reappearance periods of 12-16 weeks for some anthelmintics.

Using FECRTs on farm as a health management tool is simple, cost-effective and allows a targeted selective therapy plan for individual farms. In many cases for adult horses this will involve single active anthelmintics that have demonstrated efficacy against strongyles.

This study underscored the importance of collaboration between veterinarians, researchers, and horse owners in executing FECRTS effectively. The collection of data exemplifies successful partnerships forged between industry, the equine community and academia it also highlighted the value of stakeholder engagement in advancing parasite management practice in New Zealand.

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