

Gold Standard for Gastrointestinal Parasite Control in Horses

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The emergence of widespread anthelmintic resistance in Australia demands a new way of thinking about parasite diagnosis and control. There are only a limited number of available anthelmintics available for horses in Australia. There are many brands but limited chemical actives. Chemical groups include

- Macrocyclic lactones (ivermectin, abamectin, moxidectin)
- Benzimidazoles (fenbendazole, oxfendazole)
- THPS (pyrantel, morantel)

Cyathostome resistance to ivermectin has now been reported throughout Europe, the UK and the Americas. Numerous reports exist showing *Parascaris equorum* resistance to macrocyclic lactones and fenbendazole in Australia and Europe. Most concerning are reports out of Brazil where strongyles were resistant to all three available drug classes as well as combinations (Beasley et al, 2017). There is also new evidence that once resistance has occurred it is irreversible in the population, even after nearly a decade of withholding the resistant drug class (Anziani et al, 2016).

In a recent study macrocyclic lactones (ivermectin/abamectin/moxidectin) still have 100% efficacy against cyathostomes in Australia however the egg reappearance periods (ERP) are beginning to decrease from 12-16 weeks to 6 weeks with ivermectin and 8 weeks with moxidectin (Beasley et al, 2017).

It is widely acknowledged that the judicious use of anthelmintics is key to preventing and slowing the development of resistant parasite populations. Selective deworming is the main way this is accomplished. Following the 80/20 rule, we know that 80% of pasture contamination comes from only 20% of the horses. Pasture contamination can be significantly reduced by selectively treating those high shedders. While veterinarians do not have regulatory control to prescribe anthelmintics, we can and must educate our clients on the appropriate steps to keep horses free from parasite related disease, to prevent excessive egg shedding at pasture and slow the development of anthelmintic resistance. Preventative health consultations, provision of worm egg count testing and/or packaging of wormer sales with other equine services can be a source of new business for equine veterinarians in Australia.

FEC, FECRT and Strategic Deworming

The cornerstone of modern worm control in horses is the fecal egg count test. Horses have varying susceptibilities to intestinal parasites and worm burdens can change based on the horse's location, time of year and age. By only deworming those horses who are at risk of disease and who are contributing the majority of the egg burden on the pasture, we can decrease the amount of product used and slow resistance. The MacMaster's procedure is the most commonly employed by diagnostic laboratories but newer methods such as the mini-FLOTAC have been shown to have increased sensitivity in quantifying cyathostome eggs (Britt et al, 2017). Horses can be classified by their level of shedding into low (<200epg), moderate (200-500epg) and high egg-shedders (>500epg). Ideally, horses should be tested 2-4 times per year

and dewormed as needed with every horse requiring treatment at least twice per year in Autumn and Spring.

Seasonality of worm activity can also be utilized to decrease the number of times an individual drug class is administered. Unfortunately in Australia, conditions are ideal for parasite growth all year and extreme temperatures or lack of humidity cannot be used in place of chemical products. A strategic break from the macrocyclic lactone class can often be achieved in summer because there is no need to treat for bots at this time of year as the parasite is in its fly stage. Therefore a benzimidazole combination product, can be used in the summer months. A benzimidazole combination containing pyrantel will allow tapeworm control and provide very similar efficacy against small strongyles as a macrocyclic lactone. Fecal Egg Count Reduction Tests (FECRT) are an on-farm way of detecting resistance to a certain drug class. A FEC is taken prior to administering the drug in question and then again in 14 days. There must be a >90% reduction in the number of egg per gram seen in the second FEC in order to deem a drug class effective. FECRT should be employed on farms that are having persistent problems with high shedders and parasite related disease despite appropriate strategic deworming protocols in place.

Younger horses

Foals and younger horses present a unique challenge for owners and practitioners when it comes to anthelmintic protocols. It is well known that young horses are susceptible to a different population of gastrointestinal parasites, with *Parascaris* spp. being the most dangerous. Aside from causing poor growth and ill-thrift, ascarid impactions often require surgery and carry very low survival rates (<10%). As a consequence, traditional tactics have included the excessive use of dewormers in juvenile equids. This in turn has led to widespread resistance in all parts of the world, especially Australia and New Zealand (Reinemeyer and Nielsen, 2016).

Adult horses have varying host susceptibility to parasites based on their individual immune system and our strategic deworming protocols take advantage of this fact. Foals and younger horses do not have a fully developed immune system and do not yet have a set level of susceptibility to parasites. Therefore we cannot use the test and treat method of strategic deworming with this population of horse (Wilkes et al, 2017).

In its place, we must implement age-specific management practices to prevent parasite related disease but almost more importantly, prevent the progression of parasite resistance. For example, deworming foals prior to 2 months of age has shown to be ineffective at clearing ascarids from the intestine due to their pre-patent period, however dosing foals at this age will select for a resistant worm population. A later program involving the first worming at 10-12 weeks of age then followed up at 5-6 months of age and then at 9-12 months of age is less likely to select for resistance (Leathwick et al 2017). For yearlings faecal egg count testing can be utilized to guide treatment frequency but most will need more deworming than an adult.

Proper product selection is paramount in areas where resistance is already present and equally important in preventing future development of resistance. Combination anthelmintics can slow the development of resistance and are more useful in the face of pre-existing resistant populations (Wilkes et al, 2017). Macrocyclic lactones on their own are no longer recommended

for treatment of young horses. A macrocyclic lactone or benzimidazole combined with pyrantel are recommended.

Discussing Parasite Control with Clients

Anthelmintics are available to horse owners and farm managers without a prescription in most of the world and Australia is no exception. The final control over anthelmintic administration and scheduling is often out of the veterinarian's hands. In order for the veterinary community to affect a change in the product makeup and frequency of anthelmintic administration, we must focus on educating our clients and offering the appropriate diagnostics and treatment recommendations. Veterinarians and pharmaceutical companies have been promoting the use of evidence-based strategic deworming for years however the uptake is less than ideal and new patterns of resistance continue to emerge.

Interestingly, preaching the negative health effects of gastrointestinal parasites and the dangers of anthelmintic resistance may not be the way to change owner's behaviors and uptake of FEC and strategic deworming. A recent study out of the UK showed that owner's knowledge of parasite related disease and the presence of anthelmintic resistance did not influence whether or not they would perform a FEC in the future. Many owners understood that intestinal parasites had a negative impact on horse health but did not perceive their own horse to be at risk (Vineer et al, 2017). Likewise, many were aware of anthelmintic resistance but did not feel that their horses would be impacted by this. Increased knowledge of what FEC tests are and how the results are interpreted did increase the intention to use FEC in the future. Owners were also more likely to perform FEC if they wished to have greater control over deworming protocols and if they thought that other horse owners were also using FEC and strategic deworming. Increasing education aimed at explaining how and why FEC are performed as well proper control protocols may be the most effective way to change behavior in our client base.

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