Emerging threats in equine parasite control

ANTHELMINTIC DRUGS HAVE BEEN USED EXTENSIVELY in the horse over the past 40 years. During this time their widespread use has led to the development of anthelmintic resistance, particularly in cyathostomin populations.

With no new anthelmintic compounds on the horizon, the responsible and strategic use of those compounds currently available is imperative to maintain their effectiveness.

There are three groups of anthelmintic drugs available to treat endoparasites in the horse: benzimidazoles, such as fenbendazole, tetrahydropyrimidines, such as pyrantel, and the macrocyclic lactones, which include moxidectin and ivermectin.

Resistance occurs when parasites develop adaptations that evade the action of that particular drug. When these adaptations confer an evolutionary advantage, the prevalence of the resistant gene will increase.

There are many factors that increase the selection pressure for resistant worm, such as treatment frequency, the proportion of the population exposed to the treatment, exposure to sub-lethal doses when drugs are under-dosed and husbandry practices.

Highest prevalence

While horses are exposed to several nematode species, the cyathostomins are by far the most prevalent (Relf et al, 2013). There are over 50 species of cyathostomins that infect the horse.

Third stage larvae (L₃) are ingested from the pasture by the horse and these penetrate the wall of the large intestine. Within the wall of the large intestine the larvae develop further and emerge to form adult worms within the intestinal tract.

In some situations the L₃ arrest their development or hypobiose, encysted within the wall of the intestine. The precise triggers for this are unknown, although climate, worm burden and immunity have all been suggested.

Re-emergence of encysted L₃ results in extensive intestinal inflammation, which can be associated with subclinical disease or severe colitis, known as larval cyathostommosis – a condition with a mortality rate of up to 50% (Love et al, 1999).

Pyrantel and ivermectin are effective against adult cyathostomins and ivermectin is also effective against the non-encysted larval stages. Moxidectin and fenbendazole, however, are the only two anthelmintics with efficacy against the encysted larval stages of cyathostomins.

Benzimidazole resistance in cyathostomin populations is widespread in the UK, with studies demonstrating resistance in 80-100% of the population (Rossano et al, 2010). There is also growing evidence that moxidectin resistance is emerging. A recent publication documented an egg re-appearance period of five weeks following moxidectin administration (Daniels and Proudman, 2016), while a reduced faecal egg count reduction test has been observed in a UK donkey population (Trawford et al, 2005).

The incorporation of faecal egg counts into herd management programmes has led to the development of strategic worming regimes for horses. By identifying and targeting treatment at horses with significant adult worm burdens, the overall use of anthelmintics has been reduced. By allowing a significant portion of the worm population to remain unexposed to the drug, or in refugia, this has reduced the pressure for the development of resistance in continued overleaf