An Investigation into Worming Protocols and Anthelmintic Resistance in Panamanian Working Equids

Anthelmintic resistance is a significant problem within equine medicine, with the misuse of anthelmintics leading to an increased risk of widespread resistance developing within parasite populations globally[1]. Several species of gastrointestinal parasites infect equids with large parasite burdens causing colic, reduced growth rates and body condition scores[2]. High parasite burdens greatly impact working equids, affecting their ability to work, negatively impacting communities which rely upon them to generate in-farm and off-farm income[3]. Widespread anthelmintic resistance will limit treatment options, leading to a higher prevalence of severe disease[2]. Evaluating worming protocols and the presence of resistance globally will be important in guiding more sustainable anthelmintic use[4,5]. Within Panama, there is little data surrounding anthelmintic use, especially within horses. During this investigation, we carried out a faecal egg count reduction test (FECRT) to identify whether there was anthelmintic resistance present against Fenbendazole, Ivermectin and Pyrantel within the Coclé region of Panama. Two samples were collected from 39 working equids: a pre-treatment sample and a post-treatment sample 14 days after anthelmintic administration. The horses were split into 3 treatment groups (Fenbendazole: 17 horses; Pyrantel: 12 horses; Ivermectin: 10 horses) through random administration of treatment by the veterinarian. The mini-FLOTAC technique was used to calculate the faecal egg count (FEC) for each sample. To calculate the mean faecal egg count reduction (FECR) for each treatment group, we used the hierarchical Bayesian "eggCounts" package on R software to account for individual variation and poisson error[6]. The results from the FECRT were 45% (CI:26%,59%) reduction for Fenbendazole, 84% (CI:76%,89%) reduction for Pyrantel and 99% (CI:98%,100%) reduction for Ivermectin. According to the WAAVP guidelines, the target efficacy of the FECRT if there was no resistance present would be 99% for Fenbendazole, 98% for Pyrantel and 99.9% for Ivermectin[7,8]. If resistance is present, the results from the FECRT would show an efficacy of <90% for Fenbendazole, <80% for Pyrantel and <95% for Ivermectin[7,8]. This creates a grey-zone of 99-90% for Fenbendazole, 98-80% for Pyrantel and 99.9-95% for Ivermectin. Results falling within the grey-zone suggest the wormer did not perform at the expected efficacy and could suggest emerging resistance. Hence, our results suggest there is resistance to Fenbendazole, potential emerging resistance to Pyrantel but no resistance to Ivermectin. In addition to the FECRT, we carried out cross-sectional exploratory interviews with 22 owners, 11 agrovets (agricultural pharmacy owners) and 6 veterinarians. These highlighted the limited access to veterinarians, with Agrovets or Neighbours acting as the main source of information. This resulted in confusion surrounding drug dosages and poor compliance. There was a lack of understanding surrounding pasture management and manure removal as a method to prevent parasites. Targeted selective treatment was not commonly understood/practiced, with no mention of FECs routinely carried out. Notably vets and agrovets identified rotational worming as the only method to prevent the development of resistance. Both aspects of this preliminary study highlight the importance of further research within this area and the need for greater support and education to encourage more sustainable anthelmintic use in Panama.

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