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The use of age-clustered pooled faecal samples for monitoring worm control in horses

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Abstract

A study was performed on two horse farms to evaluate the use of age-clustered pooled faecal samples for monitoring worm control in horses. In total 109 horses, 57 on farm A and 52 on farm B, were monitored at weekly intervals between 6 and 14 weeks after ivermectin treatment.

This was performed through pooled faecal samples of pools of up to 10 horses of the groups 'yearlings' (both farms), '2-year-old' (two pools in farm A), '3-year-old' (farm A) and adult horses (four pools on farm A and five pools on farm B), which were compared with the mean individual faecal egg counts of the same pools.

A very high correlation between the faecal egg counts in pooled samples and the mean faecal egg counts was seen and also between the faecal egg counts in pooled samples and larval counts from pooled faecal larval cultures.

Faecal egg counts increased more rapidly in yearlings and 2-year-old horses than in older horses. This implied that in these groups of young animals faecal egg counts of more than 200 EPG were reached at or just after the egg reappearance period (ERP) of 8 weeks that is usually indicated for ivermectin. This probably means that, certainly under intensive conditions, repeated treatment at this ERP is warranted in these young animals, with or without monitoring through faecal examination.

A different situation is seen in adult animals. Based on the mean faecal egg counts on both farms and on the results of pooled samples in farm A, using 100 EPG as threshold, no justification for treatment was seen throughout the experimental period. However, on farm B values of 100 EPG were seen at 9 and 11, 13 and 14 and 14 weeks after ivermectin treatment in pools 10, 12 and 13, respectively. This coincided with the presence of one or two horses with egg counts above 200 EPG. The conclusion is that random pooled faecal samples of 10 adult horses from a larger herd, starting at the ERP and repeating it at, for instance, 4-week intervals, could be used for decisions on worm control. However, there would be a certain risk for underestimating pasture contamination through missing high-egg excreters.

An alternative use of pooled samples would be as a cheap first screening to detect which adult horses really contribute to pasture contamination with worm eggs on a farm. All horses should be sampled and subsequently animals from 'positive' pools can be reexamined individually.

Keywords: Horses; Cyathostomins; Faecal examination; Monitoring; Worm control

1. Introduction

Worm control is an integrate part of health care of horses, in particular when they are kept under intensive grazing conditions. Repeated use of anthelmintics is

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usually the basis of worm control, with frequency of treatment often depending on the egg reappearance period (ERP) of 1 month (benzimidazoles, pyrantel), 8 weeks (ivermectin) and 12 weeks (moxidectin).

Efficacy of such intensive anthelmintic treatment programs is seriously jeopardized by the emergence of anthelmintic resistance (Kaplan, 2002, 2004). Benzimidazole resistance of the cyathostomins is widespread world wide, including the Netherlands (Boersema et al., 1991). Pyrantel resistance of the cyathostomins is widespread in the South East of the US (Kaplan et al., 2004) and has been recorded elsewhere including the Netherlands (J.H. Boersema, unpublished results). No serious resistance of the cyathostomins against the macrocyclic lactones (ivermectin and moxidectin) has been seen. However, a reduced efficacy on faecal egg counts and a decreased ERP were observed on some German horse farms (Von Samson-Himmelstjerna et al., 2007). In addition, reports on resistance of *Parascaris equorum* against the macrocyclic lactones (ML) are emerging (Boersema et al., 2002; Hearn and Peregrine, 2003; Slocombe et al., 2007; Stoneham and Coles, 2006; Von Samson-Himmelstjerna et al., 2007). In fact a recent study in the Netherlands showed that ML-resistance in *P. equorum* is widespread and that it is associated with frequent anthelmintic treatment of foals (Van Doorn et al., 2007). Problems with anthelmintic resistance in horse parasites will only increase, while it is unlikely that anthelmintic drugs with a different mode of action than the available ones will get to the market soon. The consequence is that alternative control methods of helminth infections should be considered. Of these, pasture hygiene has been demonstrated to be effective (Herd, 1986) and can be recommended, but cannot solve problems on all farms. In addition, selection pressure for anthelmintic resistance should be reduced through diminishing frequency of anthelmintic treatment and, in particular, through generating refugia (Van Wijk, 2001) by targeted selective anthelmintic treatment (TST). TST should be supported by repeated faecal examination. In a study on a Scottish farm a large variation in faecal egg output was observed between horses that were monitored at monthly intervals. The consequence was that some horses were rarely treated, while others were virtually always treated 1 month after a pyrantel treatment or 2 months after an ivermectin treatment (Duncan and Love, 1991). This variation was also reflected by the study of Comer et al. (2006) who demonstrated that 84% of thoroughbreds had zero egg counts when they received anthelmintic treatment. Studies in the Netherlands (Döpfer et al., 2004) and, over a longer period, Denmark (Nielsen et al., 2006) confirmed a consistency in faecal egg output of horses. This implies that some horses can be recognized as ‘low excreters’ and can be excluded from anthelmintic herd treatments or perhaps even from faecal monitoring. Obviously, variation of faecal egg output also depends on age and it is well known that the highest egg counts and the shortest ERP can be expected in yearlings (Boersema et al., 1996). Thus, monitoring through faecal examination could potentially be used for TST. However, a major constraint is that, at least in the Netherlands, the costs for faecal examination by far exceed the costs of anthelmintic treatment. Therefore, it is difficult to convince horse owners to restrain from ‘blind’ anthelmintic treatments. Costs for faecal monitoring would be reduced when it would be possible to use pooled samples. A study on parasites of sheep neatly demonstrated the feasibility of this approach and also that groups of 10 lambs are sufficient to get a good impression of the flock (Morgan et al., 2005). The present study was performed to determine whether the use of age-clustered pooled faecal monitoring of helminth infections could be a useful approach for the control of cyathostominosis in horses. In addition it was used to look at the ERP for ivermectin in different age classes of horses on an intensive and an extensive horse farm.

2. Materials and methods

2.1. Farms and horses

The study was carried out at two farms (Farm A and Farm B) in the province of South Holland. The characteristics of these were as follows.

2.1.1. Farm A

In total 57 horses of the farm were included in the study: three yearlings, fifteen 2-year-old, four 3-year-old and thirty-five adult horses of mixed breed and sex.

Twice a year, before turnout in April and at housing at the end of October, horses are routinely wormed with ivermectin. The last treatment before the start of the study was in April 2006.

The farm also is a dairy cattle farm and 63 ha are available for grazing horses (0.9 horses per ha), divided in 20 pastures varying in size. In principle horses are grazed on pastures that have been grazed earlier by cows and they are moved regularly. Between April and October the yearlings and 2-year-old horses are permanently grazed as a separate group. When they are moved they do not return to pastures that have been grazed by horses earlier in the grazing season. Adult