Journal of Veterinary Medicine and Health

Research Article Open Access

Prevalence and Factors Associated with Anthelmintic Resistance in Gastrointestinal Nematodes of Cattle: A Systematic Review and Meta-analysis

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Abstract

A systematic review and meta-analysis was conducted with the aim to measure the prevalence of anthelmintic resistance (AR) in cattle gastrointestinal nematodes (GIN) and potential management factors associated with development of such resistance. A search algorithm was constructed and a comprehensive search of the primary literature was conducted in: CAB abstracts (1990-2016), Medline (1860-2016), Agricola (1924-2016) and Lilacs (1985-2016). Prevalence estimates were combined through meta-analysis (MA) using the logit prevalence and between-study heterogeneity was quantiýed. Twenty-nine publications (5 cross-sectional studies; 14 prevalence surveys and 10 ýeld trials) were included in this review. Random effects MA resulted in an overall AR prevalence of 72.0% (95% CI=58.4% to 80.0%). However, a high heterogeneity was observed (I^2=55.9%). From studies reporting the nematode genera involved in the AR, *Cooperia* spp were present in 91.7% of the studies (n=24); *Ostertagia* sp. in 44.5% (n=22); *Haemonchus* sp. in 47.8% (n=23); *Trichostrongylus* sp. in 36.4% (n=22) and *Oesophagostomum* spp. in 23.8% (n=21). The included cross sectional studies suggested that frequency of treatments, age of cattle and type of management were potential management factors associated with AR in bovine GINs. However, more detailed studies are necessary to fully evaluate management guidelines for implementation of sustainable GIN control strategies.

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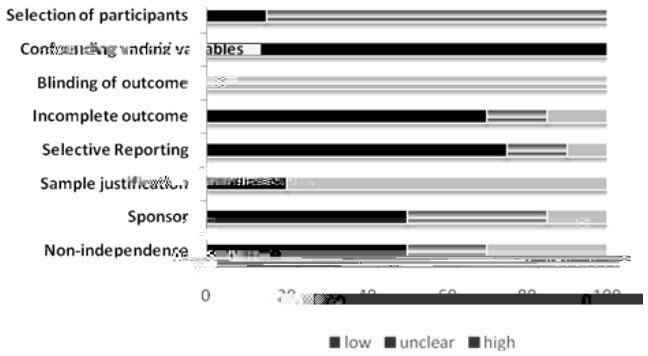

Figure 2: Overall risk of systematic bias (classiýed as low, unclear or high) of 19 publications describing 20 observational studies included in the systematic review-meta-analysis of cattle anthelmintic resistance farm proportion.

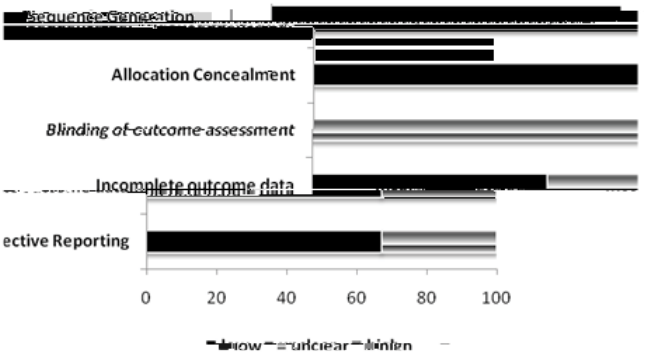

Figure 3: Overall risk of systematic bias (classiýed as low, unclear or high) of 10 publications describing nine ýeld trials included in the systematic review-meta-analysis of cattle anthelmintic resistance farm proportion.

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