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Original Research

A Questionnaire Survey on Intestinal Worm Control Practices in Horses in Italy

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ABSTRACT

Since cases of anthelmintic resistance (AR) have been reported in horses in Italy, a survey on intestinal worm control was carried out in 225 equine facilities in this country. A questionnaire with three open-ended questions, 18 close-ended questions, and the opportunity to include additional comments was developed. This included data about the facility, access to grazing and pasture management, use of anthelmintics, attitude toward intestinal worms, and information sources. Results showed that 54.6% of respondents performed some pasture management practices, 94.7% dewormed horses routinely, 61.3% used mass treatment, 68% dewormed with frequency >2–≤6 months, 85.3% did not ask for prior fecal examination, 48% did not deworm new horses, 57.8% estimated the weight by eye measurement, 77.3% had not experienced problems with intestinal worms risk, and 76% used single-drug regimens. The importance of intestinal worms was scored 4.1 (mean) and 5 (median). Because veterinarians were scored as the most important information source (4.5 and 5), they have the power to play a key role in delaying further development of AR.

1. Introduction

Intestinal parasitism is a widely recognized problem in horses, and its control commonly relies on anthelmintics [1]. However, this strategy has become a subject of discussion because of the spread of anthelmintic resistance (AR) in horses and in other livestock species worldwide [1–5]. Major factors involved with development of AR include high treatment frequency, use of the same group of anthelmintics, underdosing, single-drug regimens, and prophylactic mass treatment [2,5]. In general, the number of treatments should be minimized to extend the life span of the available anthelmintics [3]. Moreover, specific measures to manage pasture hygiene (i.e., pasture rotation, mixed grazing, fecal removal) can keep low the intestinal helminth load in horses decreasing the need of anthelmintics, which in turn plays an important role to prevent the development of AR [6–8]. This knowledge makes it possible to investigate the occurrence of factors contributing to the development of AR in different kinds of horse facilities. Some studies have surveyed control practices for equine intestinal worms in different countries [9–13]. *Parascaris equorum* and small strongyles (cyathostomes) have been reported to have developed resistance to at least one class of anthelmintics in horses in Italy [14,15]. However, to the best of our knowledge, only one study on intestinal worm control practices in 26 horse farms has been performed in this country so far [16]. To enhance our current knowledge, the aim of this questionnaire survey was to further investigate strategies for intestinal worm control in horses in Italy.

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2. Materials and Methods

2.1. Study Design

A questionnaire on management and control practices for intestinal worms in horses was developed (Table 1). This included three open-ended questions, 18 close-ended questions, and the opportunity to include free-form additional comments at the end of each answer. Close-ended questions included 10 dichotomous questions (nine asking for a simple "yes" or "no") with three filter questions, six multiple-choice questions with three or more reply options, and two Likert-scale questions with 1–5 range (1 = unimportant, 2 = of little importance, 3 = moderately important, 4 = important, 5 = very important). Three multiple-choice questions accepted more than one answer, whereas other three multiple-choice questions asked for the best possible answer. Questions included data about the facility (n = 4), access to grazing and pasture management (n = 6), use of anthelmintics (n = 7), and attitude toward intestinal worms and information sources (n = 3). To select a sample of the target population, equine veterinarians were recruited by snowball sampling method. Then, they were asked to give us a list of some equine facilities, chosen at random among their clients, to be enrolled for the study purpose. All the facilities included in the lists provided by recruited equine veterinarians were identified and considered as potential participants. Equine facilities were first contacted telephonically explaining the purpose of the questionnaire, asking for their willingness to participate and arranging a meeting. Between June 2012 and November 2013, a study representative was given the task of visiting 225 facilities to assist with the completion of the questionnaire. Respondents declared their willingness to answer questions, thus they were directly administered a paper version of the questionnaire. When a question was perceived as unclear, its meaning was explained and personally discussed with the respondents. These were informed that the results of the survey would be published but that their identities would remain confidential.

2.2. Descriptive Statistics

Number, percentage, and 95% confidence interval (CI) for each reply option were calculated using the total number of facilities. Range, mean, and median for numeric reply as well as mean and median values for scores of Likert-scale questions were also determined.

3. Results

3.1. Data on Equine Facilities

All questionnaires were filled out completely. A paper version of the questionnaire was directly completed by equine facility managers (60.4%), facility owners (27.5%), or staff workers (12%) in the presence of the representative and returned by himself. Fifteen of 20 Italian regions were

Table 1
Questionnaire on intestinal worm control practices administered to equine facilities (n = 225) in Italy.

Questions	Reply Options
Section I: data about the facility	
Region	
Type of facility	
Type of horses according to size[a]	Light horses, heavy horses, ponies
Total number of horses	
Section II: access to grazing and pasture management	
Access to grazing	Yes, no. If you answered "yes," please reply to the following questions n this section.
Grazing time	Year-round, in the spring and early summer
Is pasture rotation performed?	Yes, no
Is mixed grazing performed?	Yes, no
Is manure removed from pasture?	Yes, no. If you answered "yes," please reply to the following question in this section.
How often?	At least once a week; at least once a month; at least once a year
Section III: Use of anthelmintics	
Are horses dewormed on a routine basis?	Yes, no. If you answered "yes," please reply to the following questions in this section.
Are all horses dewormed together?	Yes, no
Frequency of deworming[a]	≤4 wk, >4–≤6 wk, >6–≤8 wk, >2–≤6 mo, >6–≤12 mo
Are horses usually dewormed after fecal examinations?	Yes, no
Are new horses dewormed?	Yes, no
How is the dosage calculated?	By visual inspection, by weighing horses, by age, a paste tube per animal, other
Which of the following drugs was used during the preceding 12 mo?[a]	Fifteen anthelmintic brands marketed for horses in Italy were shown to the respondents
Section IV: attitudes toward intestinal worms and information sources	
Have you experienced problems with intestinal worms in horses?	Yes, no
Are intestinal worms an important problem in horses? State their importance on a 1–5 scale.	
How important are the following sources of information? State their importance on a 1–5 scale.	Package inserts, colleagues, pharmacists, books, Internet, veterinarians, horse magazines

[a] Possibility to choose more than one reply option.