



A survey of parasitic nematode infections of chickens in rural Zimbabwe

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ABSTRACT

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A survey to determine the nematode species in rural chickens reared extensively was carried out in six districts of Zimbabwe. Two-hundred-and-seventy chickens were randomly collected from the districts and processed for helminth recovery. One genus and 10 species were identified from the gastrointestinal tract but no parasites were found in the respiratory tract and eyes. *Skrjabinocerca* sp., *Capillaria obsignata*, *Capillaria contorta* and *Trichostrongylus tenuis* are new records in Zimbabwe. *Allodapa brumpti* and *Tetrameres americana* were the most common species with a prevalence of 64.8% and 64.1%, respectively.

Keywords: Nematodes, parasitic infections, rural chickens, survey, Zimbabwe

INTRODUCTION

As in other developing countries, Zimbabwe produces a considerable number of rural chickens as a source of meat, eggs or income (Kelly, Chitauru, Rohde, Rukwava, Majok, Develaar & Mason 1994) and the total number of chickens is estimated at approximately 15.5 million (Anon 1998). An average of 5–100 birds per household are kept extensively with very little financial or labour input. The birds are generally set free to scavenge around human dwellings during the day. As a result, they are directly exposed to environmental factors and the scarcity of feed limits their density in all geographical regions. Their dispersion in the environment increases the probability of

contact with the other avian fauna and thus the possibility of cross-infection with parasites from wild birds.

Limited work has been published on the helminth fauna of rural chickens in Zimbabwe (Jansen & Pandey 1989). Kelly *et al.* (1994) reported that intestinal parasitism was rare in backyard poultry in the Chitungwiza urban area of Zimbabwe. However, studies in East Africa (Ssenyonga 1982; Negesse 1993; Permin, Magwisha, Kassuku, Nansen, Bisgaard, Frandsen & Gibbons 1997), Nigeria (Fabiya 1972; Fatihu, Ogbogu, Njoku & Saror 1991), the Central African Republic (Graber 1981) and Zambia (Ziela 2000) have shown high parasite burdens.

The aim of this study is to provide information on the nematode species found in chickens in the rural areas of Zimbabwe.

MATERIALS AND METHODS

Study area

The study was conducted in six districts namely Goromonzi, Mazowe and Zvimba from the highveld

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of Zimbabwe and Chikomba, Mberengwa and Zvishavane from the lowveld (see Fig. 1).

The highveld is 1 000–1 500 m above sea level and covers most of the northern half of Zimbabwe. Its climate is characterized by temperatures ranging from 25–30 °C during the rainy season and 15–20 °C during the dry season. The area receives a mean annual rainfall of between 800 and 1200 mm. The lowveld is 900 m above sea level and comprises most of the south-east of Zimbabwe. The area is hot throughout the year with temperatures ranging from 29–34 °C during the rainy season (November to April) and 23–28 °C during the dry season (May to October). The mean annual rainfall is between 400 and 650 mm.

Study animals

A random sample consisting of a minimum number of 25 chickens was collected from different households in each of the six districts during the period which spanned from January 1997 to December 1998. The chickens sampled included both young and adult birds of an indigenous breed commonly found in Zimbabwe and had no history of treatment against gastrointestinal helminths.

Recovery and identification of nematodes

The digestive tract of each chicken was divided into oesophagus, crop, proventriculus, gizzard, small and large intestines and caecum. Each part was opened in separate containers. The mucosae of the various parts of the intestines were scrapped off using a microscope slide, and thoroughly washed in tap water over a 200 µm sieve. Nodules on the gizzard, when present, were opened under a stereoscopic microscope and worms removed. The respiratory tract and eyes were also examined for nematodes. Nematodes were recovered from the washings and scrapings using a stereoscopic microscope. All nematodes collected were preserved in 70% alcohol for later identification. Nematodes were identified using the keys of Chabaud (1975) and Gibbons, Jones & Khalil (1996), or the descriptions by Soulsby (1982) and Kaufmann (1996).

Recording of data

A record was made on the prevalence of infection of each nematode species per district. Prevalence of each nematode species was calculated as the number of infected chickens out of the total number of chickens examined per district.

RESULTS

From the 270 indigenous chickens collected from six districts, 11 species of gastrointestinal nematodes

were recorded (Table 1). No nematodes were found in the respiratory organs or the eyes. Birds harbouring light or moderate burdens were apparently healthy. Those with heavy infection, especially with *Tetrameres americana*, invariably were in poor condition. Infection with *T. americana* was classified as light, when up to three adult female parasites per chicken were present, moderate when 4–10 adult female parasites per chicken were present and heavy; when > 10 adult female parasites were recovered per chicken.

The nematode species together with their prevalence by district is shown in Table 1. Goromonzi and Zvishavane districts had the highest number of species recorded (nine) followed by Chikomba and Mberengwa districts with eight species. Mazowe and Zvimba districts had the least species, six and seven being recorded, respectively.

Skrjabinocerca sp., *Capillaria obsignata*, *Capillaria contorta* and *Trichostrongylus tenuis* are new parasite records for Zimbabwe. From Table 1, it is apparent that *T. americana*, *Allodapa brumpti* and *Gongylonema ingluvicola* were the most frequently encountered species in the survey. *Ascaridia galli* and *Heterakis gallinarum* occurred at the intermediate level between the two extremes and were found in 32.9% and 15.2% of the birds examined. *Cheilospirura hamulosa*, *C. contorta* and *Dispharynx nasuta* occurred at low prevalence (1.5–4.8%).

C. obsignata, *T. tenuis* and *Skrjabinocerca* sp. were relatively rare. *Capillaria obsignata* occurred in Goromonzi and Zvishavane and *Skrjabinocerca* sp. only in Chiweshe.

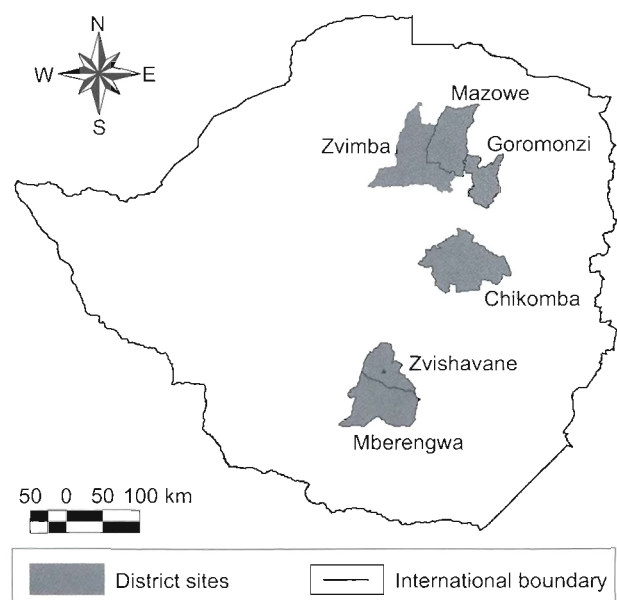


FIG. 1 Map of Zimbabwe showing the six districts at which rural chickens were sampled

TABLE 1 Number infected and prevalence (%) of nematode species of chickens from six districts of rural Zimbabwe

Species	Location	Mazowe <i>n</i> = 50	Goromonzi <i>n</i> = 110	Zvimba <i>n</i> = 25	Chikomba <i>n</i> = 30	Zvishavane <i>n</i> = 25	Mberengwa <i>n</i> = 30	Overall prevalence
<i>Allodapa brumpti</i>	Caecum	31 (62)	84 (76.3)	13 (52)	12 (40.0)	14 (56)	21 (70.0)	175 (64.8)
<i>Ascaridia galli</i>	Small intestines	24 (48)	40 (36.3)	5 (20)	4 (13.3)	5 (20)	11 (36.7)	89 (32.9)
<i>Cheilospirura hamulosa</i>	Gizzard	0	5 (4.5)	2 (8)	3 (10.0)	1 (4)	1 (3.3)	12 (4.4)
<i>Tetrameres americana</i>	Proventriculus	31 (62)	73 (66.3)	18 (72)	10 (33.3)	17 (68)	24 (80.0)	173 (64.1)
<i>Gongylonema ingluvicola</i>	Oesophagus	34 (68)	46 (41.8)	19 (76)	20 (66.7)	20 (80)	25 (83.3)	164 (60.1)
<i>Skjabinocerca</i> sp.	Oesophagus	1 (2)	0	0	0	0	0	1 (0.4)
<i>Capillaria obsignata</i>	Small intestines	0	7 (6.4)	0	0	1 (4)	0	8 (3.0)
<i>Capillaria contorta</i>	Oesophagus and crop	0	1 (0.9)	0	1 (3.3)	1 (4)	1 (3.3)	4 (1.5)
<i>Dispharynx nasuta</i>	Crop and proventriculus	6 (12)	0	1 (4)	1 (3.3)	2 (8)	3 (10.0)	13 (4.8)
<i>Heterakis gallinarum</i>	Caecum	10 (20)	20 (18.2)	3 (12)	2 (6.7)	4 (16)	2 (6.7)	41 (15.2)
<i>Trichostrongylus tenuis</i>	Small intestines	0	2 (1.8)	0	0	0	0	2 (0.7)
Total number of species	–	6	9	7	8	9	8	–

n = Total number of chickens collected per district

DISCUSSION

Parasitic diseases are accorded low priority in rural poultry development (Pandey, Demey & Verhulst 1993). Heavy mortality caused by infectious diseases masks the effects of the less dramatic parasitic diseases. The findings of this survey show that nematodes are common in rural chickens in Zimbabwe and it is considered that their health and productivity might well be affected.

Several species of nematodes have been reported in indigenous rural chickens in tropical countries (Graber 1981; Fatihu *et al.* 1991; Permin *et al.* 1997; Poulsen, Permin, Hindsbo, Yelifari, Nansen & Bloch 2000). The findings of this study are similar to those reported in other countries in Africa (Fabiyl 1972; Buriro, Wagan & Kumbhar 1992; Permin *et al.* 1997). Jansen & Pandey (1989) reported six nematode species from poultry in Zimbabwe, five fewer than the number encountered in this study. Permin *et al.* (1997) reported 19 species in a survey in Tanzania and Poulsen *et al.* (2000) recorded 11 species, the same number of species as recorded in this study.

Tetrameres americana was the most frequent and predominant nematode species among the list identified by Fatihu *et al.* (1991) in Nigeria and *H. gallinarum* among the list identified by Permin *et al.* (1997) in Tanzania.

The variation in the prevalence rates reported in this study can be ascribed to variation in geographical location and climate of the different districts from which birds were sampled. Variations in temperature, rainfall and humidity could have an effect on the bionomics of the parasites (Buriro *et al.* 1984). While the absence of *T. tenuis* from five of the six districts may be due to the sensitivity of the species to one or more common factors in the five districts. There was no geographical pattern with regard to the overall distribution of the species.

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