Archivos de Medicina Veterinaria
ISSN: 0301-732X
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Universidad Austral de Chile
Chile

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Archivos de Medicina Veterinaria, vol. 33, núm. 2, 2001
Universidad Austral de Chile
Valdivia, Chile

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Archivos de medicina veterinaria

ISSN 0301-732X *versión impresa*

Arch. med. vet. v.33 n.2 Valdivia 2001

Parasitological findings of lesser rhea, *Pterocnemia pennata* (D´ ORBIGNY) in faeces from northern patagonia, Argentina *

Hallazgos parasitológicos en deposiciones de Lesser Rhea, Pterocnemia Pennata (D'orgiby), del norte de la patagonia, Argentina

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RESUMEN

La información acerca de parásitos que afectan a la producción de choiques criados en granjas en Argentina es escasa. El objetivo de este estudio fue determinar la prevalencia de enfermedades parasitarias en granjas de choiques. Durante un año se realizaron muestreos periódicos en 10 granjas de choiques (*Pterocnemia pennata*) localizadas en el norte de la Patagonia Argentina. Un total de 310 muestras de materia fecal fresca de pichones, juveniles y adultos fueron recolectadas y analizadas por las técnicas de Willis y McMaster. De 310 muestras de material fecal analizadas, 31.3% de las muestras presentaron ooquistes de *Eimeria* spp, 1.9% huevos de *Capillaria* sp y 8.7% huevos de *Trichostrongylus* sp. Los recuentos de huevos y ooquistes por gramo de materia fecal resultaron bajos en la mayoría de los análisis. Se registró infección por *Capillaria* sp (Nematoda) en 32% de las aves de una granja. De acuerdo a nuestros resultados, las infecciones parasitarias en

***Key words*:** bird, ratite, helminth, protozoan.

***Palabras claves*:** ave, ratite, helminto, protozoario.

INTRODUCTION

The lesser rhea, *Pterocnemia pennata*, is a flightless bird naturally distributed in Argentina and Chile. This species has only been raised on farms in recent years; therefore information about parasitic diseases of farmed lesser rhea is scant.

Several parasites, such as the nematodes *Deletrocephalus dimidiatus*, *Syngamus trachea*, *Libyostrongylus dentatus*, and the protozoans *Crystosporidium* sp, and *Eimeria* sp have been reported in other ratites species (Jensen, 1993; Penrith and Burger, 1993; Penrith *et al.*, 1993; Gajadhar, 1994; Stewart, 1994; Hoberg *et al.*, 1995; Wit, 1995; Taylor *et al.*, 2000). However, to the best of our knowledge, the only reference to parasitism in lesser rhea is a report of infection by *Deletrocephalus dimidiatus* in an adult lesser rhea (Ewing *et al.*, 1995).

The aim of this study was to determine the prevalence of parasitic diseases in lesser rhea farms.

MATERIAL AND METHODS

Faecal sampling was conducted over a 1 year-period in ten lesser rhea farms located in Bariloche (S 41º 07' - W 71º 15'), Los Menucos (S 40º 50' - W 68º 05'), Lonco Vaca (S 40º 07' - W 69º 12'), Cervantes (S 39º 02' - W 67º 28'), Colonia Valentina Norte (S 38º 56' - W 68º 10') and Plottier (S 38º 56' - W 68º 15'), Rio Negro and Neuquen Provinces, Northern Patagonia, Argentina. All the birds of these farms had been raised from eggs artificially incubated and originated from animals born and reared in captivity. The birds were housed in small open paddocks and fed a mixture of fresh alfalfa (*Medicago sativa*), alfalfa hay and concentrate feed. In five farms, the pens also contained pastures of alfalfa, ryegrass (*Lolium perenne*) and weed herb (*Polygonum aviculare*). The juveniles and adults were housed together in the same pens. Water was available *ad libitum*. No new lesser rheas were introduced to these pens during this study, although chickens and turkeys were present in most farms and had free access to the lesser rhea pens. Antihelmintic treatment was not carried out in any of the farms.

A total of 310 fresh faecal samples from chicks (n = 98), juveniles and adults (n = 212) were collected. All faecal samples were examined for eggs and oocysts by Willis and McMaster techniques (Thienpont *et al.*, 1979; Urquhart *et al.*, 1990). The length and width of oocysts of Eimeria spp (n = 75), and eggs of *Capillaria* sp (n = 16) and *Trichostrongylus* sp (n = 15) were measured. Mean value, standard deviation and range, were calculated.

Prevalences of infection for chicks, juveniles and adults were compared using the Chi-square test (EPI-INFO, Ver 6.04b, USA). Statistical difference was always considered to be $P < 0.05$.

Table 1. Coprological findings of nematode eggs and *Eimeria* spp oocysts in faecal samples of lesser rhea.
Huevos de nematodos y ooquistes de *Eimeria* spp encontrados en muestras de materia fecal de choiques.

		Prevalence of infection		
Lesser rhea	Examined	*Eimeria* spp	*Capillaria* sp	*Trichostrongylus* sp

Chicks	98	39	39.8	0	0	7	7.1
Juveniles / Adults	212	58	27.4	6	2.8	20	9.4
Total	310	97	31.3	6	1.9	27	8.7

RESULTS AND DISCUSSION

A total of 130 (42%) out of 310 faecal samples examined were positive. In 97 (31.3%) out of 310 faecal samples, *Eimeria* spp oocysts were observed; eggs of *Capillaria* sp and *Trichostrongylus* sp were found in 6 (1.9%) and 27 (8.7%) out of 310 samples, respectively (Table 1). Infection by *Capillaria* sp was found in 6 (32%) out of 19 faecal samples examined in one farm. Out of 130 positive faecal samples, 46 (35%) were from chicks and 84 (65%) were from adults and juveniles. No significant difference was found between positive faecal samples percentage of chicks (47%) and older birds (39%) (c^2, $P > 0.05$).

The length and width of oocysts and nematode eggs is presented in Table 2. The measures of oocysts of the *Eimeria* spp and nematode eggs from these lesser rheas were similar to the known species of avian *Eimeria*, *Capillaria* and *Trichostrongylus*. However, the length and width of *Trichostrongylus* like-eggs were smaller than those (*T. tenuis*) reported for others domestic and wild birds (Soulsby, 1968; Thienpont *et al*., 1979).

Table 2. Measurements (in micrometers) of parasite eggs from lesser rhea.
Medidas (en micras) de huevos de parásitos de choiques.

Measurement	*Eimeria* spp oocysts (n = 75)		*Capillaria* sp eggs (n = 16)		*Trichostrongylus* sp eggs (n = 15)	
	Mean ± SD	Range	Mean ± SD	Range	Mean ± SD	Range
Length	26,0 ± 2,0	24 - 28	48.5 ± 3.5	44 - 56	59.5 ± 6.2	48 - 72
Width	23,7 ± 2,7	20 - 28	21.5 ± 2.9	20 - 28	26.7 ± 2.9	20 - 32

Most faecal samples were positive by the Willis technique and only 11 samples were positive to the McMaster technique. As shown in Table 3, egg count per gram (epg) showed low values of *Trichostrongylus* sp. Likewise, oocyst counts showed a low mean value of 315, with the highest individual count being 620.

Table 3. Nematode eggs and coccidian oocysts per gram (epg) in faecal samples of lesser rhea.
Numero de huevos de nematodos y ooquistes de coccidios por gramo de material fecal (epg) en muestras de choiques.

	Epg		
	Samples (n)	Mean ± SD	Range
Capillaria sp	5	740 ± 238.7	380 -1020
Trichostrongylus sp	2	15 ± 7.1	10 -20
Eimeria spp	4	315 ± 216.2	120 -620

The number of oocysts of *Eimeria* spp required to produce clinical diseases has been reported in other avian species (Soulsby, 1968). In chickens of 1-2 week-old, more than 200,000 oocysts were registered to reduce weight gains or to produce mortality, while 50,000 to 100,000 led mortality in older birds (Soulsby, 1968). Also, heavy infection by *Trichostrongylus* sp may occur in animals with 2000 worms producing marked clinical signs and mortality (Soulsby, 1968). However, the detection of a helminth or coccidian infection by examination of faecal samples depends on the egg/oocyst production of the parasites, the specific host-parasite relationship, and the management (Permin and Hansen, 1998). In this study, egg and oocyst counts were low in most faecal samples and these results may have been influenced by several factors: the number of adult parasites in the gastrointestinal tract, age and fecundity of the parasites, stages of the infection, host properties (i.e. immunity, age and sex), feed composition and consistency of the faeces.

The low amount of egg and oocyst counts registered, were also attributable to the unfavourable environment for the parasites as a consequence of farms location. In addition, all the birds of these farms had been raised from eggs artificially incubated, and no new birds were introduced in the paddocks. These conditions usually help avoiding the infestation and transmission of parasitic diseases and keeping the paddocks clean.

The infection by *Capillaria* sp detected in our study could have been produced by cross-infection with other avian species, such as chickens and turkeys, present in the farm. Also, the careless management, the high animal density, as well as the poor hygiene observed inside the pen, must have contributed to the parasitic infection. Nematode infection was described in rhea farms with high animal density and cohabitation of chicks, juvenile and adult birds (Ewing *et al*., 1995). Our observations showed a similar pattern: the only farm with heavy burden of eggs was the most carelessly managed. Besides, species of avian parasites are capable of infecting several species of birds, including chickens, turkeys, and geese (Soulsby, 1968; Gajadhar, 1994; Hoberg *et al*., 1995). However, the infectivity of these parasites in ratites is not yet demonstrated.

Coccidiosis has been described in ostriches and emus; however, the infection was not confirmed as a clinically important problem in ratites (Jensen, 1993; Stewart, 1994). Our findings showed that the amount of oocysts of *Eimeria* spp in faecal samples was low and no obvious clinical sign of disease were observed. Further studies have to be done to know the specific determination of parasites, the pathogenesis and the epidemiology of infections in the host.

SUMMARY

There have been scanty studies to determine what parasites are present in lesser rhea farms from Argentina. The aim of this study was to determine the prevalence of parasitic diseases in lesser rhea farms. Ten lesser rhea (*Pterocnemia pennata*) farms located in Northern Patagonia, Argentina, were visited over a 1-year period. A total of 310 fresh faecal samples from chicks, juvenile and adult lesser rhea were collected and processed by Willis and McMaster techniques. Out of 310 faecal samples examined, *Eimeria* spp oocysts were found in 31.3%, *Capillaria* sp in 1.9% and *Trichostrongylus* sp in 8.7%. A low number of nematode eggs and oocysts were found in most faecal samples. Infection by *Capillaria* sp (Nematoda) was found in 32% of the birds in one farm. According

ACKNOWLEDGMENTS

We are grateful to Mr Raúl Cabrera for technical assistance, and to Dr. Francisco Uzal for critical revision of the manuscript.

Supported by The National Institute of Agricultural Technology (INTA), Wildlife Management Program from Centre of Applied Zoology (University of Cordoba), Patagonian Association for Rhea Breeding (APACÑA) and FONCYT Grant Nro. 8-3568.

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Aceptado: 06.09.2001