

SHORT COMMUNICATION

First Report of the Genus *Retortamonas* (Sarcomastigophora: Retortamonadidae) in Birds

Rafael A Martínez-Díaz/⁺, Ana Teresa Castro, Silvia Herrera, Francisco Ponce*

Departamento de Medicina Preventiva (Parasitología), Facultad de Medicina, Universidad Autónoma de Madrid, C/ Arzobispo Morcillo s/n, 28029 Madrid, España *Departamento de Parasitología, Facultad de Farmacia, Universidad Complutense de Madrid, Madrid, España

In studies carried out on the parasites infecting ostriches (Struthio camelus) in Spain, trophozoites of Retortamonas sp. have been found in the intestinal contents of 28 out of 146 slaughtered ostriches. The species infecting ostriches could not be determined from the morphological data available. However, these findings are important as they constitute the first report of the genus Retortamonas in birds.

Key words: *Retortamonas* - birds - *Struthio camelus*

The order Retortamonadida includes flagellated protozoa living in the intestines of several invertebrate and vertebrate species. This order has only one family, the Retortamonadidae, with two genera, *Retortamonas* and *Chilomastix*. Only *Chilomastix* has been reported to date from birds: *C. gallinarum* Martin and Robertson, 1911, from poultry (Nie 1948).

Ostrich (*Struthio camelus* L) farming has become an extended activity in places where these birds did not exist previously. However, little is known about the diseases that may affect this animal. With regard to its parasites, most of the actual knowledge is about macroscopic organisms (helminths and arthropods), and few and usually incomplete data are available about its protozoa. The results we have obtained from a study started in 1997 and currently running have revealed the existence of several protozoa, including amebas (Martínez-Díaz et al. 2000b), flagellates, ciliates and coccidia (Martínez Díaz et al. 2000a). Among the flagellates, we have found trophozoites of *Retortamonas* sp.

The biological material analyzed was the intestinal contents of 146 young ostriches (12-15 months old) slaughtered at Spanish abattoirs between September 1997 and February 2000. The birds were born and raised in farms located in different provinces from the central area of Spain (Toledo, Ciudad Real, Cuenca, Guadalajara and Madrid). At sacrifice, all

animals appeared healthy and with no signs of intestinal disease. Several segments of the small and large intestine and one of the caeca were excised, and their contents kept in clean, hermetic containers. All samples were transported to the laboratory in less than 2 h after sacrifice. Fresh slides were analyzed by microscopy at 100-400x; from the samples in which live trophozoites were found, several smears were made and stained with Giemsa, chlorazole black and trichromic staining.

Among other protozoa, trophozoites of *Retortamonas* sp. were identified in the intestinal contents of 28 birds. In fresh slides, they can be distinguished on the basis of their small size, plastic body, and slow locomotion by weak movements of its two flagella. The trophozoite (Figure) is small (Table I), usually piriform, fusiform or rounded in shape, with a large cytostome and a small nucleus near the anterior end. There is one free, anteriorly-directed flagellum and a posteriorly-directed, trailing flagellum that emerges from the cytostomal groove. The cytoplasm is not very granular but a number of vacuoles and bacteria may be present.

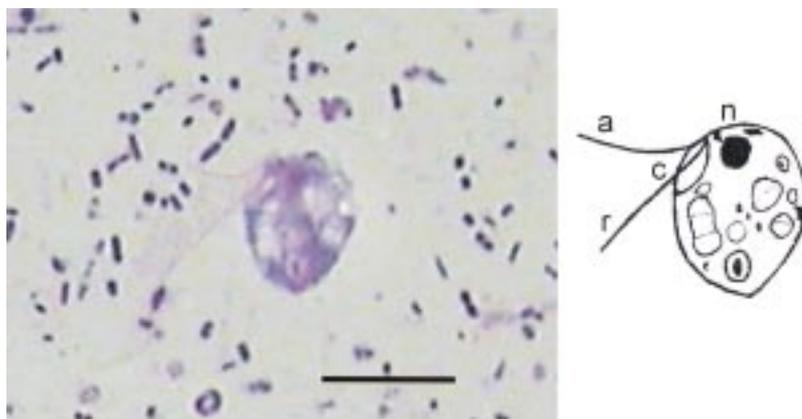
TABLE I

Morphometric data of *Retortamonas* from ostrich.
All values in μm

Parameter	Mean \pm s.d.	Range
Body length	10.3 \pm 2.2	6-14
Body width	7.7 \pm 2.2	5-13
Diameter of nucleus	1.8 \pm 0.9	1-4
Length of anterior flagellum	7.0 \pm 1.6	5-11
Length of cytostomal flagellum	5.4 \pm 1.2	4-9

N: 15 trophozoites measured

⁺Corresponding author. Fax: +341-397.5353. E-mail: rafael.martinez@uam.es
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Photograph and schematic drawing of *Retortamonas* sp. from the ostrich. Giemsa staining; r: recurrent flagellum; a: anterior flagellum; c: cytotome; n: nucleus. Bar: 10 µm

In all positive samples of *Retortamonas*, a number of division forms showing 2 nuclei, 2 cytotomes and 4 flagella were observed. The prevalence of infection was higher during the summer months (from June to September).

The described species of *Retortamonas* (including those that are now considered as syn-

onyms) have been found in insects, amphibians, reptiles and mammals (Table II) (Grassé 1952, Ansari 1954, Kudo 1972, Kulda & Nohýnková 1978, Lee 1985, Levine 1985). They are very similar in their morphology, and the different species have been established mainly on the basis of the host range. The absence of cross-transmission experiments

TABLE II
Species of *Retortamonas* described and their hosts

Species	Author(s)	Host(s)
(from insects)		
<i>R. agilis</i>	Mackinnon, 1919	<i>Tipula</i>
<i>R. alexeiiffi</i>	Mackinnon, 1912	<i>Tipula</i>
<i>R. belostomae</i>	Brug, 1922	<i>Belostoma</i>
<i>R. blattae</i>	Bishop, 1931	Cockroach
<i>R. caudacus</i>	Geiman, 1932	Aquatic coleoptera
<i>R. gryllotalpae</i>	Grassi, 1879	Mole cricket
<i>R. phyllophagae</i>	Travis and Becker, 1831	Coleoptera
<i>R. termitis</i>	Kirby, 1932	Termites
<i>R. wenrichi</i>	Stabler, 1944	Cricket
(from amphibians and reptiles)		
<i>R. boae</i>	Kulda, 1954	<i>Boa</i>
<i>R. cheloni</i>	Janakidevi, 1962	Turtle
<i>R. dobelli</i>	Bishop, 1931	Several species of amphibians and reptiles
<i>R. testudae</i>	Grassi, 1926	Turtle
(from mammals)		
<i>R. bradyi</i>	Hegner and Schumaker, 1928	Grey three-toed sloth
<i>R. caviae</i>	Hegner and Schumaker, 1928	Guinea pig
<i>R. cuniculi</i>	Collier and Boeck, 1926	Rabbit
<i>R. intestinalis</i>	Wenyon and O'Connor, 1917	Man
<i>R. kirbii</i>	Russel Gabel, 1954	Woodchuck
<i>R. mitrulae</i>	Kirby and Honigberg, 1950	Wallaroo
<i>R. ovis</i>	Hegner and Schumaker, 1928	Sheep, cattle
<i>R. ruminatum</i>	Knowtes and Das Gupta, 1931	Bull
<i>R. sinensis</i>	Faust and Wassell, 1921	Man
<i>R. wenyoni</i>	Fonseca, 1917	Monkey

and biochemical and genetic studies lead one to consider the possible existence of synonyms. From the data presented here, it is not possible to establish if *Retortamonas* from ostriches is a new species or if it corresponds to one of those previously described in other hosts. Nevertheless, the importance of the finding reported now is that this is the first time the genus *Retortamonas* has been found in birds. Further studies are needed to determine the taxonomic status of this organism from ostriches.

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