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A NEW SPECIES OF *AQUANIRMUS* CLAY AND MEINERTZHAGEN, 1939 (PHTHIRAPTERA, PHILOPTERIDAE) PARASITIC ON *ROLLANDIA ROLLAND CHILENSIS* (LESSON, 1828) (AVES, PODICIPITIDAE), WITH REMARKS ON THE EXTERNAL CHORIONIC MORPHOLOGY OF THE EGGS

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ABSTRACT

The authors describe the new species Aquanirmus rollandii *sp. n. based on specimens collected on* Rollandia rolland chilensis *(Lesson, 1828), from Argentina, which belongs to the "*bahli *species group" (sensu Edwards, 1965). Characters of the male, female, and of the external architecture of the eggs have been used for the descriptions.*

KEYWORDS: *Aquanirmus*, Philopteridae, Phthiraptera, Podicipitidae, eggs.

INTRODUCTION

The genus *Aquanirmus* Clay & Meinertzhagen 1938 is the only Ischnoceran genus known to parasitize grebes of the family Podicipitidae. A revision of the genus was carried out by Edwards (1965), but this pioneer paper unfortunately does not cover all representatives of this genus in Argentina, remaining a few species undescribed. Being so, in this paper the authors describe the new species *Aquanirmus rollandii* collected on *Rollandia rolland chilensis*

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(Lesson, 1828) from Buenos Aires and Santa Cruz Provinces, Argentina. In addition to male and female descriptions we give the features of the external chorionic architecture of the eggs, because the current literature does not offer details of any species of this genus.

Material and Methods

Most of the adults specimens were obtained alive from *Rollandia rolland chilensis*, also trapped alive.

Lice were fixed in ethanol-acetic 1:1 vol/vol mixture. Most of them were mounted on slides following the procedure described by Castro & Cicchino (1978), using Eosin W for staining. The measurements of male and female specimens are in millimeters.

For the studies at the scanning electron microscope (SEM), the eggs were cleaned during 20-30 seconds in acetone 100 by means of an ultrasonic vibrator. After this treatment, they were mounted on several stubs in different positions, coated with gold-palladium in a Jeol vacuum metallizer and subsequently examined with a Jeol T-100 Scanning Electron Microscope.

Measurements: under the SEM, by means of the digital scale given automatically at different magnifications. Under the light microscope, using an appropriate callibrated eyepiece. All measurements are given in micrometers.

Pictures: for the SEM micrographs a Kodak Verichrome Pan R VP 120 (ASA 125/22 DIN) film was used.

Nomenclature used for description of the egg chorionic structures follows Abrahamovich & Cicchino (1980), and for the male genitalia to Edwards (1965).

Aquanirmus rollandii sp. n.

(figs. 1-4)

Male: pigmentation pattern, general habitus, body measurements and cephalic index much as for *A. bahli bahli* Tandan, 1951 (see Edwards, 1965, fig.5), differing as follows: a) antenna and antennal segment I longer and also noticeable longer than the second (ratio 1,16-1,37) (see table I and fig.1-2), b) last abdominal tergite less extended beyond the sternal margin (fig. 3) and c) genitalia longer and wider and the tube shorter, not reaching the tip of the endomeres of the mesosomal complex (table I and fig. 4).

Female: reminiscent of *A. bahli bahli.* Except for head and antennal lengths, the remaining body measurements match those of that species (see

table I). Vulva (sternite VIII) with 13 setae in outer row and 13 in inner row.

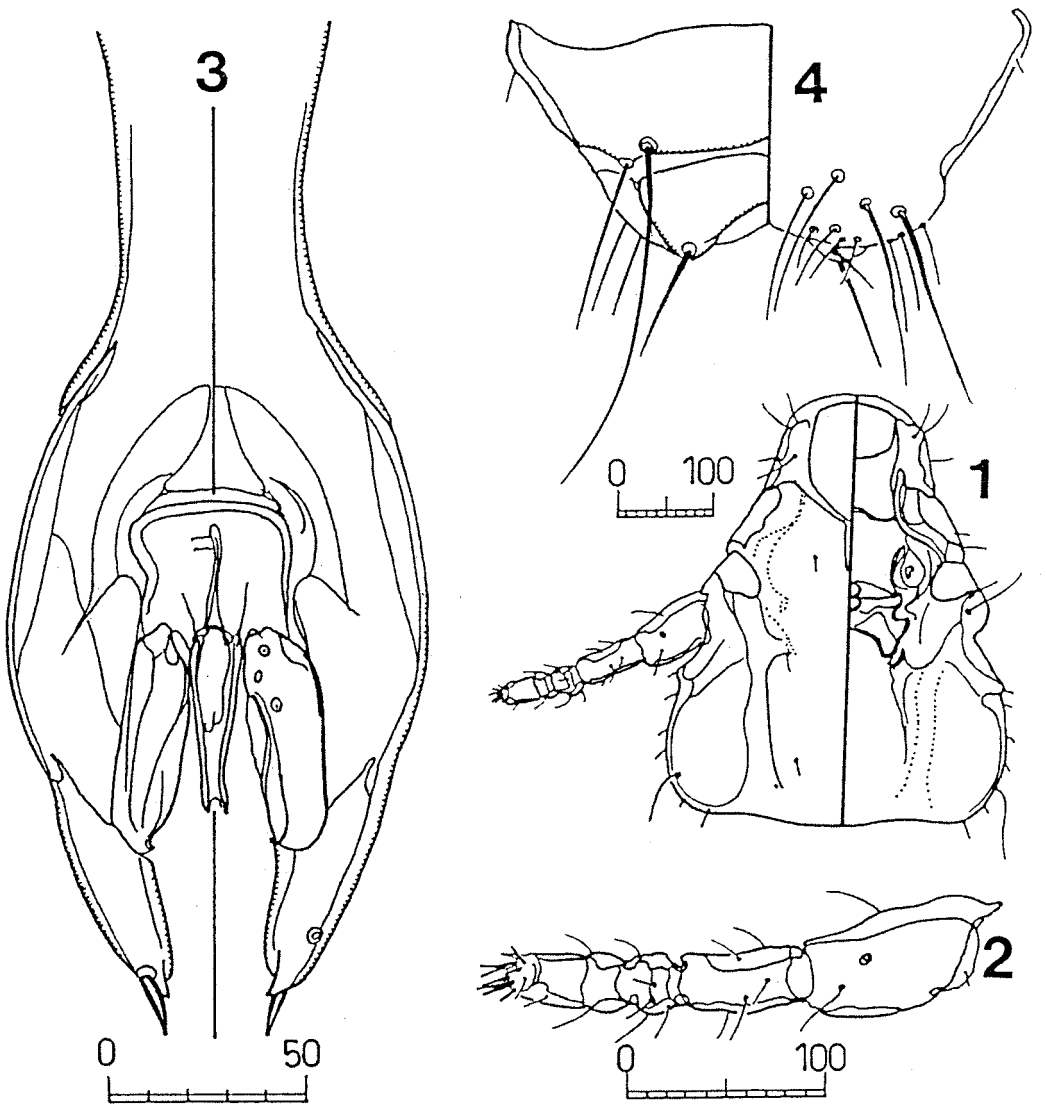
Type host: *Rollandia rolland chilensis* (Lesson, 1828).

Specimens examined: male holotype, and one male and eight females paratypes, ex *Rollandia rolland chilensis*, Laguna Guaminí, Buenos Aires Province, 23-V-1994, A. C. Cicchino coll., one male and three female paratypes, same host, Lago Pueyrredón, Santa Cruz Province, Argentina, 10-VI-1987, A. C. Cicchino coll.. Specimens deposited in the collections of the Museo de La Plata, and the Museo Argentino de Ciencias Naturales "Bernardino Rivadavia".

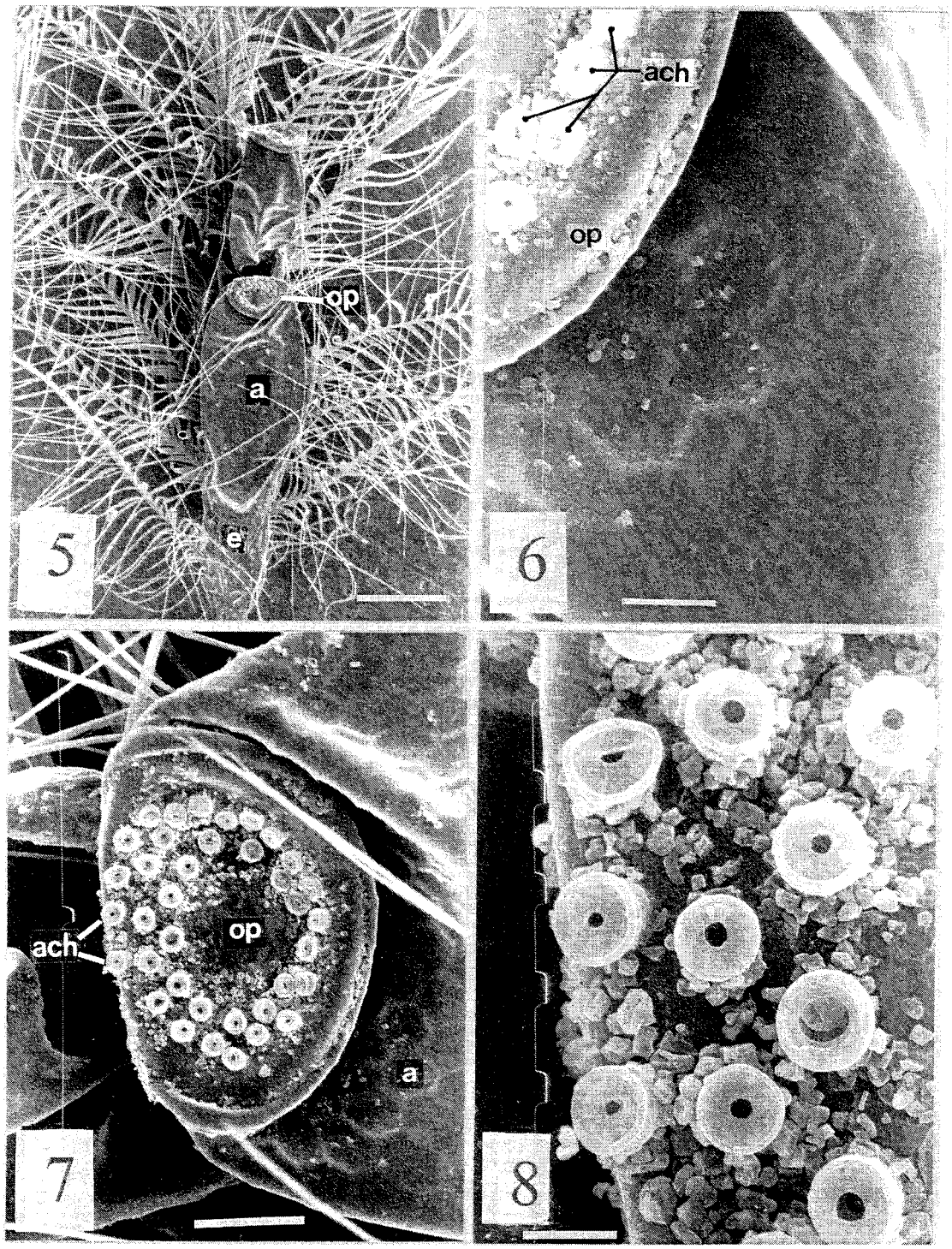
Discussion

Aquanirmus rollandii sp. n. belongs to the *"bahli* species-group" (*sensu* Edwards, 1965). This species shares with the four previous described species and subspecies (*A. bahli bahli* Tandan, 1951, *A. bahli chamberlini* Edwards, 1965, *A. bucomfishi* Edwards, 1965 and *A. americanus* (Kellogg & Chapman, 1899) the following characters: a) pigmentation as in *A. colymbinus* species-group (distribution pattern of pigment not uniform, with butresses and tergal bands variously accentuated), b) male genitalia greatly modified, unlike those of the *A. colymbinus* and *A. emersoni* species-groups, c) "keel" of mesosome relatively short and lacking distinctive sclerotized structure at the point it joins tube, and d) male terminal tergite extends noticeably beyond the sternal margin.

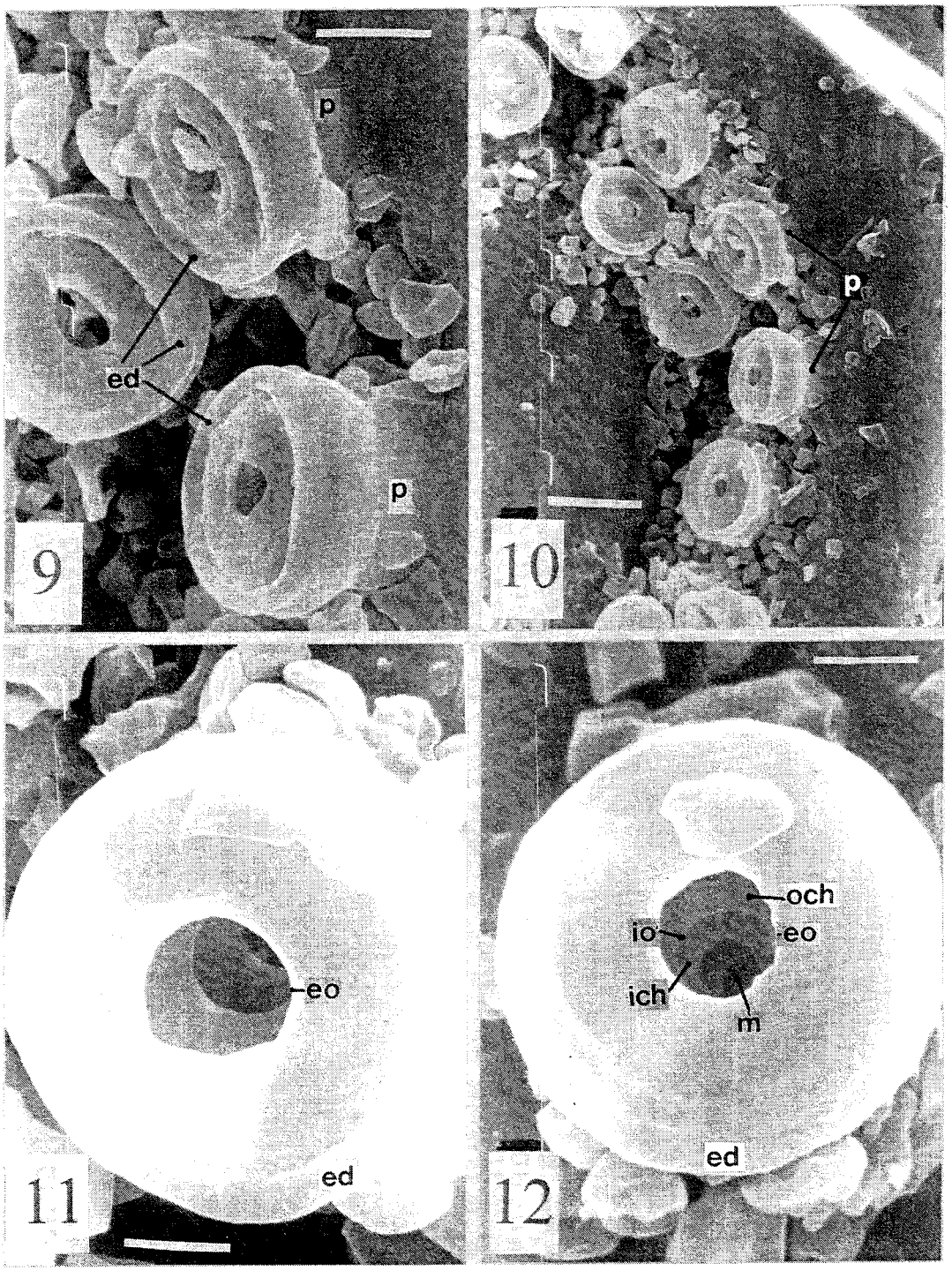
As we pointed out, its closest relative is *A. b. bahli,* differing the male in proportions of the first antennal segment, lesser degree of protrusion of the last abdominal tergite beyond the sternal margin and the genitalia, being larger and the "tube" of the mesosomal complex noticeable shorter than the endomeres. The female differs by the tendence to present a larger body and larger proportions of the antennal segments I and II, and number of setae in the inner and outer row of the VIII sternnite. There are suggestive differences in almost all body measurements between the Laguna de Guaminí (Buenos Aires Province) and Lago Pueyrredón (Santa Cruz Province) host populations (see table I), probably indicating that some kind of differentiation may be taking place within the neotropical populations of this species. Similar results has been achieved by Edwards (1965: 931) regarding two widely separated populations of *A. bucomfishi* Edwards 1965 in the United States.



Figures 1-4: *Aquanirmus rollandii* sp.n., male, dorsal (left) and ventral views (right): 1, head, dorsal and ventral views ; 2, antenna; 3, external genitalia, dorsal and ventral views; 4, abdominal terminalia, dorsal and ventral views. Bars in µm.



Figures 5-8: *Aquanirmus rollandii* sp.n.: eggs: 5, two eggs glued on the shaft of a head feather (bar = 250 µm); 6, edge of the operculum with air chambers, and upper third of the amphora showing the hexagonal mesh (bar = 25 µm); 7, operculum with two irregular rows of air chambers, and upper portion of the amphora (bar = 50 µm); 8, detail of the arrangement of air chambers (bars = 10 µm).



Figures 9-12: *Aquanirmus rollandii* sp. n.: eggs: 9-10, lateral views of air chambers showing the cup-like silhouette due to the stalk or pedicel (bar = 5 μm (fig. 9) and 10 μm)); 11-12, two air chambers seen from above (bar = 2 μm). Abbreviations used: **a**: amphora; **ach**: air chamber; **e**: spumaline, **ed**: thickened external edge of the air chamber; **eo**: external opening of the air chamber; **ich**: internal chamber, **io**: internal opening; **m**: micropylar opening; **och**: external chamber; **op**: operculum; **p**: stalk or pedicel of the air chamber; **x** : external wall of the air chamber.

TABLE I: *Aquanirmus rollandii*, sp. n.: measurements (in millimeters) of male and female features cited in the text. A indicates measurements of Laguna de Guaminí population, B Lago Pellegrini population.

	Males A (n = 2)	Male B (n = 1)	Females A (n = 7)	Females B (n = 3)
Head length	0,465-0,479	0,452	0,532-0,582 (0,562 0,020)	0,529-0,558 (0,541 0,015)
Head width	0,362-0,366	0,355	0,413-0,465 (0,436 0,016)	0,426-0,442 (0,432 0,009)
Length of antennal segment I	0,086-0,097	0,084-0,090	0,048-0,061 (0,055 0,004)	0,048-0,052 (0,049 0,002)
Length of antennal segment II	0,066-0,074	0,052-0,068	0,065-0,074 (0,069 0,003)	0,065-0,071 (0,067 0,003)
Ratio of antennal segments I/II	1,16-1,34	1,32-1.61	———	———
Antennal length	0,239-0,248	0,225-0,231	0,194-0,213 (0,206 0,006)	0,194-0,213 (0,202 0,007)
Genitalia length	0,186-0,190	0,174	———	———
Genitalia width	0,114	0,100	———	———
Total body length	1,714	1,701	2,358-2,692 (2,510 0,116)	2,359-2,444 (2,390 0,047)

TABLE II: measurements, (in micrometers) of the different egg features of *Aquanirmus rollandii* sp. nov., detailed in the tex.

Maximum diameter of the operculum:	167
External diameter of the air chambers:	8,6-10,0
Height of air chambers, including the stalk:	4,7-5,6
Diameter of the external opening:	2,0-2,8
Diameter of the internal opening:	1,8
Diameter of the micropyla:	0,98-1,20
Diameter of the hexagons of the mesh:	17-26
Total length of the egg:	565

Chorionic morphology of the egg

(figs. 5-12 and table II)

The eggs are laid on the feathers of the cephalic, chin and upper neck pterilae, glued by means of a moderate amount of hygroscopic spumaline (Hinton, 1977) to the shaft of the feather (fig.5). Operculum (fig. 7) with a thickened external edge, and bearing two irregular rows of ca. 38 air chambers (figs. 8-10). The air chambers are produced from the opercular surface by means of a strong and short stalk or pedicel, showing a cup-like silhouette (figs. 9-10). The external edge is noticeably thickened and strongly marginated (fig 9-12), and the external opening nearly round. Apparently, as seen from above, each air chamber is composed by two superposed chambers, here called external and internal chambers, the former communicates with the environment by means of the external opening and with the internal chamber through an internal opening (fig. 12). An orifice opens on the floor of the internal chamber, and is here interpreted as micropyla (see Hinton, 1977 for possible roles of opened micropyles). The upper third of the amphora (figs 6-7) shows a hexagonal and nearly isodiametric mesh, gradually less conspicuous toward the middle portion of the amphora. Because of the limited number of eggs available, we did not attempt to study the external morphology of the chorionic hydropyla. Measurements of the different features here explained are shown in table II.

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* Nota dos Editores

As marcas existentes nas figuras 5-12 são devidas a problemas dos originais pelos quais a revista não se responsabiliza.

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