

**A DETAILED DESCRIPTION OF A NEW SPECIES OF THE
HOPLOPLEURA AITKENI GROUP
(PHTHIRAPTERA: ANOPLURA: HOPLOPLURIDAE)
PARASITIC ON SOUTH AMERICAN RODENTS
(MAMMALIA: RODENTIA) IN ARGENTINA¹**

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ABSTRACT: *Hoplopleura paranaensis* sp. nov. is described from specimens collected from *Deltamys kempi* Thomas, 1917, on the Delta del Paraná, Buenos Aires Province, Argentina. Detailed descriptions of sexes, the three nymphal instars, external architecture of eggs (by scanning electron microscopy), and sites of oviposition are provided. Differences from *Hoplopleura aitkeni* Johnson, 1972 are included. A key and discussion of the distribution of the ten species of the *aitkeni*-group on their hosts, and their respective geographical ranges in Argentina is also given.

KEY WORDS: Phthiraptera, Anoplura, Hoplopluridae, parasitism, eggs, nymphs, adults, new species, Argentina, South America, mammalian, Rodentia, new species, key

We describe herein a new species of anopluran lice, *Hoplopleura paranaensis*, based on specimens collected from *Deltamys kempi* Thomas, 1917 from Campana, Paraná de Las Palmas River, Buenos Aires Province, Argentina. This new species resembles *Hoplopleura aitkeni* Johnson, 1972 and is included in the "*aitkeni*" species-group, which contains nine species known from Argentina (Castro 1984, 1988, 1997, Castro et al., 1998, Castro and González, 2003).

METHODS

Studied specimens were obtained directly from museum host skins. Lice were cleared and mounted on conventional microscope slides following the procedure described by Castro and Cicchino (1978). Procedures for scanning electronic microscopic study included hydration with decreasing ethanol, cleaned in physiological solution by means of an ultrasonic vibrator, rinsed in distilled water, fixed in 70% ethanol solution, dehydrated with increasing ethanol solutions. They were then mounted in stubs, coated with gold/palladium, and observed and photographed at different magnifications in a Jeol/RO 1.1 scanning electron microscope at the Electronic Microscopy Service of Museo de La Plata, Buenos Aires

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Province. Nomenclature of the different structures of the egg follows Castro et al. (1991). Body measurements, given in millimeters, were taken directly from mounted specimens using a calibrated eyepiece and are identified in the text by the following abbreviations: HL, head length; HW, maximum head width; THL, thorax length; THW, maximum thorax width; AL, abdomen length; AW, maximum abdomen width; TL, total body length. Scale: the figures are represented in millimeters. Measurements include the range of the available specimens. Magnifications for SEM pictures were obtained directly from the automatic scale. Figure scales are represented in micrometers.

Cephalic chaetotaxy follows Kim and Ludwig (1978). Illustrations were drawn with the aid of a camera lucida. Holotype, allotype and most of the paratypes are deposited in Museo de La Plata collections, Buenos Aires province, Argentina (MLP).

SYSTEMATIC ENTOMOLOGY

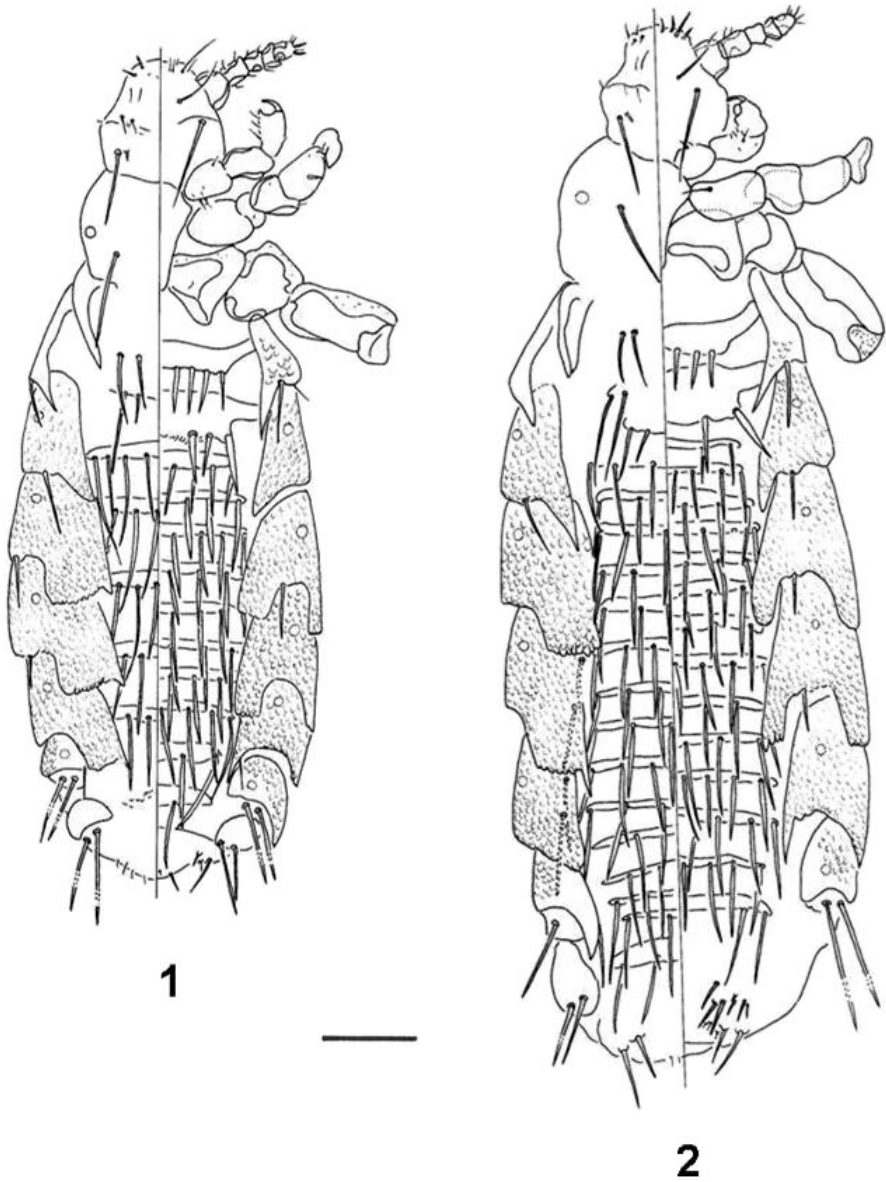
Hoplopleura paranaensis sp. nov.

(Figs. 1-10, 11j, 12-15)

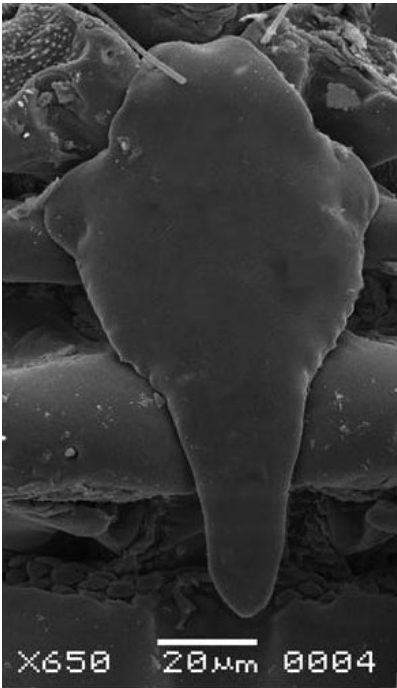
Male Holotype: Fig. 1. Head slightly longer than broad, with anterior border rectilinear and lateral borders convex; postantennal angles rounded. Cephalic chaetotaxy: dorsal principal head seta long and robust; accessory small and robust; sutural 2 thin; preantennal 2 thin; anterior marginal 1 thin; apical 1-2 thin; ventral principal head seta long and robust; preantennal long and thin; anterior marginal 3-4 small and thin, 1 long. Thorax slightly broader than long, seta medial to mesothoracic spiracle long and robust, sternal plate twice longer than broad, with its posterior margin rounded in contact with coxa III (Fig. 3). Abdomen with sternal plates well developed and with remarkably uniform setae on each. Tergal plates well developed starting with tergite IV. Number of setae on tergite I: 4 thin and of same length; tergite II: 4 external ones much longer than central ones; tergite III: 8-10 thin and of same length; tergites IV-V: 6-7 thin and of same length; tergites VI-VII: 4 thin and of same length. Paratergal plates with the following characteristics: II: with 2 unequal acute lobes, ventral much longer and thinner than dorsal, and with 2 different sized setae, with scaly appearance in medial third; III: with 2 rounded subequal lobes, with 2 much longer setae of the same length, with markedly scaly appearance in all its length; IV-V: with 2 lobes, ventral one narrow, with 2 setae, one of them tiny, and markedly scaly appearance in all its length; VI: with 2 lobes, ventral much thinner than dorsal, with 2 setae, one of them tiny and markedly scaly appearance in all its length; VII: with 2 lobes, ventral short and rounded and dorsal longer and thin, with 2 macrochaetae; VIII: without lobes, with 2 macrochaetae (Figs. 7, 11j). Abdominal terminalia as in Figure 5.

Genitalia: well developed, long and narrow basal plate, parameres moderately developed and rounded apically; pseudopenis well developed and serrate in medial third, narrowed to acute apex (Fig. 4).

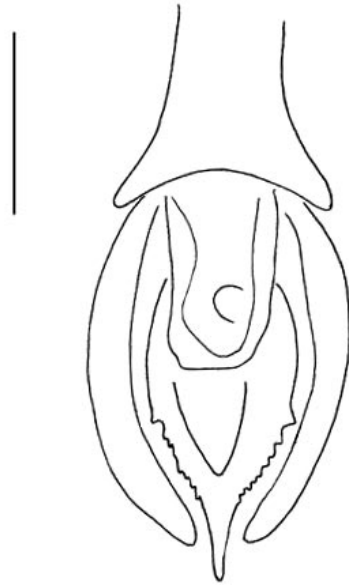
Female Allotype: Similar to male, differing in measurements, abdominal terminalia, and greater number of tergites and sternites. Gonapophysis: with longer and robust setae (Figs. 2, 6).



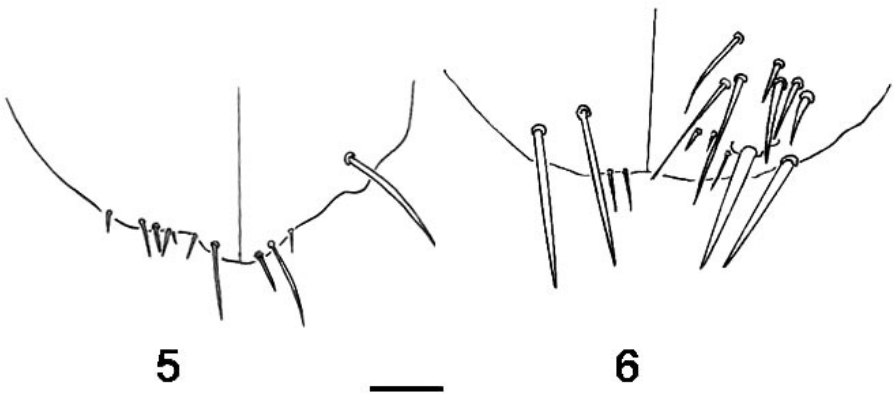
Figs. 1-2. *Hoplopleura paranaensis* sp. nov. 1. Male, dorsal and ventral view. 2. Female, dorsal and ventral view. Scale 0.1mm.



3



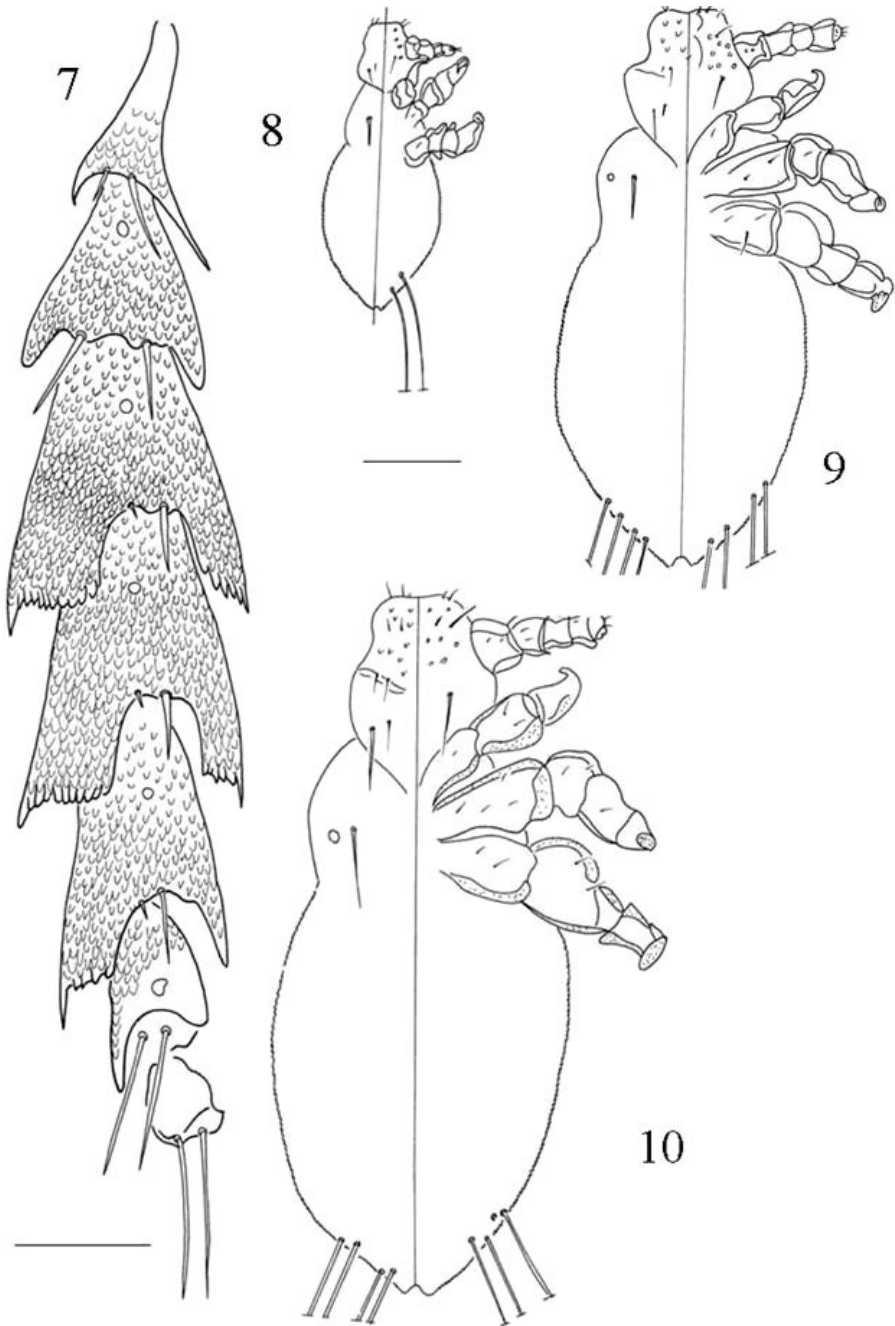
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5

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Figs. 3-6. *Hoplopleura paranaensis* sp. nov. 3. Scanning electron micrograph of thoracic sternal plate, x650, scale 20 μ m. 4. Male genitalia. 5. Male terminalia. 6. Female terminalia, scale 0.05mm.



Figs.7-10. *Hoplopleura paranaensis* sp.nov. 7. Female paratergal plates, scale 0.1mm. 8. Nymph I, scale 0.1mm. 9. Nymph II, scale 0.1mm. 10. Nymph III, scale 0.1mm.

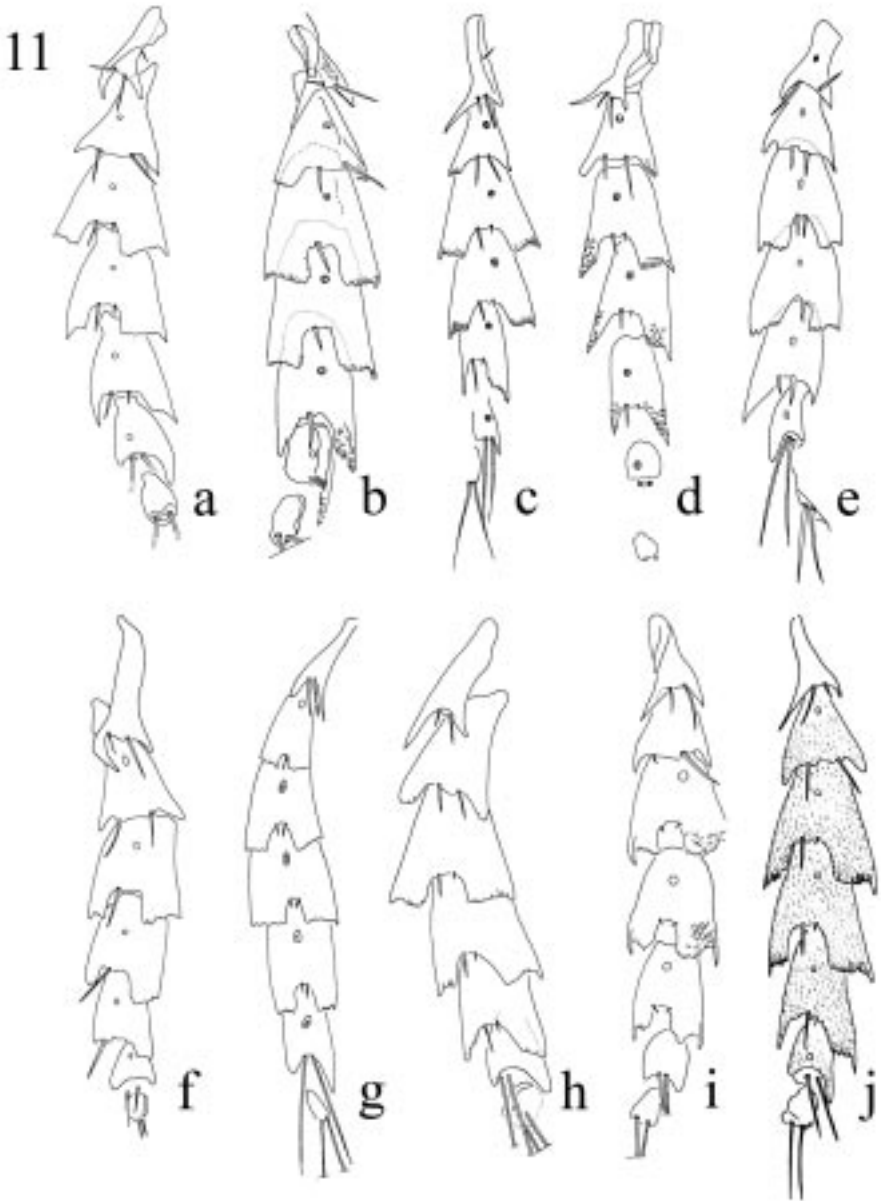


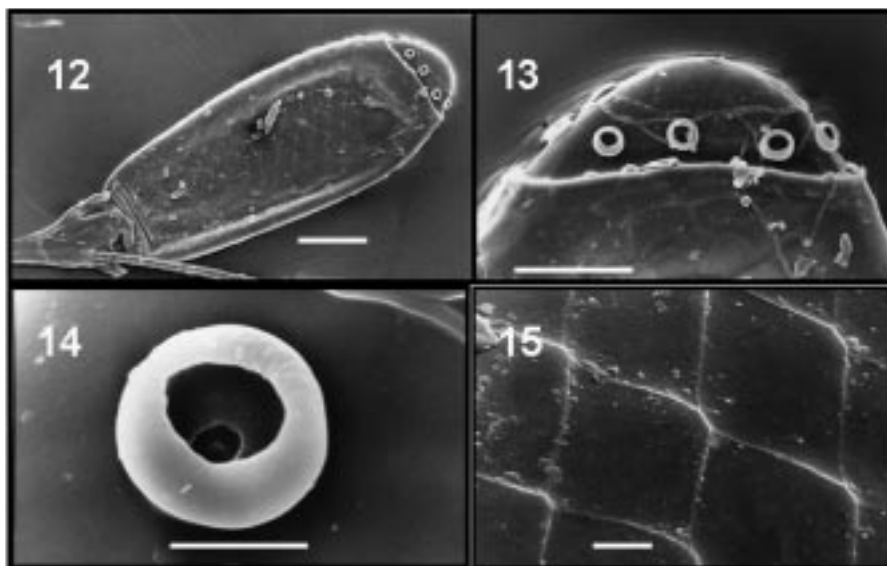
Fig. 11. Paratergal plates of the species of the "aitkeni" group: a. *H. aitkeni*; b. *H. imparata*; c. *H. mendozana*; d. *H. nicolai*; e. *H. serrulata*; f. *H. varia*; g. *H. riojensis*, h. *H. misionalis*; i. *H. massoi*; j. *H. paranaensis* sp. nov. All figures were taken from original descriptions.

First nymphal instar: Dorsal principal head seta well developed and short; accessory poorly developed and thin; ventral principal seta long and thin; abdomen with marked and forked anal lobe, with 2 macrochaetae on each side (Fig. 8).

Second nymphal instar: Dorsal principal head seta well developed, long and thin; accessory well developed and thin; sutural 2 poorly developed; ventral principal seta long and thin; preantennal long and thin; abdomen with marked and forked anal lobe, with 4 macrochaetae on each side (Fig. 9).

Third nymphal instar: Dorsal principal head seta well developed, long and robust; accessory long and thin; sutural 2 well developed, of equal size and thin; preantennal 2 short and thin; ventral principal seta long and robust; central anterior 1 short and thin; preantennal long and thin; abdomen with marked and forked anal lobe, with 4 macrochaetae on each side (Fig. 10).

Measurements. Males (n = 5) HL= 0.15-0.16; HW= 0.13- 0.14; THL= 0.13-0.14; THW= 0.17-0.18; AL= 0.67-0.4; AW= 0.34-0.37; TL= 0.93- 1.05. Females (n= 7) HL=0.16-0.17; HW= 0.14; THL= 0.13-0.15; THW= 0.17-0.17; AL= 0.77-0.87; AW= 0.34-0.38; TL= 1.05-1.15. Nymphs I (n= 4) HL= 0.11-0.12; HW= 0.10-0.11; THL= 0.05-0.07; THW= 0.12-0.15; AL= 0.16-0.27; AW= 0.11-0.27; TL= 0.29-0.44. Nymphs II (n= 3) HL= 0.12-0.13; HW= 0.120-0.21; THL= 0.06-0.06; THW= 0.16-0.17; AL= 0.33; AW= 0.27-0.28; TL= 0.49-0.60. Nymphs III (n= 3) HL= 0.13-0.14; HW= 0.12; THL= 0.09-0.11; THW= 0.17-0.20; AL= 0.40-0.54; AW= 0.30-0.38; TL= 0.65-0.77.



Figs.12-15. Scanning electron microphotograph of the egg of *Hoplopleura paranaensis* sp.nov.: 12. General view x 200 (Scale 100 μm); 13. Operculum, showing air chambers and adjacent region of amphora x 750 (Scale 50 μm); 14. Detail of air chamber showing the location of the micropyle x 5000 (Scale 10 μm); 15. Detail of ornamentation of amphora x 1500 (Scale 10 μm).

Egg: Silhouette ellipsoidal (Fig.12), type of ornamentation of amphora: pavementose, strongly impressed (Fig.15), kind of aerial chamber: ampullacea normal (Figs. 13, 14), relationship among aerial chambers: isolated; number of air chambers: 9-10 (Fig. 13).

Total length: 596µm.

Taxonomic Summary

Type Host: *Deltamys kemp* Thomas, 1917 (Rodentia, Muridae, Sigmodontinae) MBR. N° 15612 and 15613: Buenos Aires, Delta, Paraná de las Palmas. 23-IV-1964; 28-VII-1964, Coll. Massoia; Museo Bernardino Rivadavia (MBR); N° 18668: Buenos Aires, Delta INTA. 03-V-1988; 04-V-1988 Coll. Piantanida. (MBR).

Type locality: Estación Experimental INTA, Campana (34° 12'S; 58° 56'W), Delta, Paraná de las Palmas River, Buenos Aires Province, Argentina.

Type specimens: Male holotype, female allotype; 4 male; 6 female and 7 nymph I; 3 nymph II; 3 nymph III paratypes, 9-V-1998, Castro Coll. in MLP.

Ethymology: *Paranaensis* is named after the region in which the host was collected: Paraná de Las Palmas River.

Sites of oviposition on the host: We examined eight host individuals; six of them were parasitized, although in low density, by *H. paranaensis* sp. nov. Each had a similar infestation pattern, always on the flanks of the thorax and cephalic posterior dorsal region. All the eggs were fixed with a little spumaline only at the base of the hair.

Host: *Deltamys kemp* Thomas, 1917. Type locality: "Isla Ella, in the delta of the Rio Paraná at the top of the La Plata Estuary." The Delta del Paraná is a large area of islands, marshes, and small rivers and creeks of the Paraná River estuary, between the provinces of Buenos Aires and Entre Ríos (about 34°S and 59°W, Argentina) (González and Pardiñas, 2002). *Deltamys kemp* has 2 subspecies (González and Massoia, 1995): *D. k. kemp* and *D. k. langguthi*. In Argentina *D. k. kemp* is known from the Delta del Paraná area and from several localities bordering the Rio de La Plata estuary (from islands of the Ibicuy in Entre Ríos province and La Balandra in the Buenos Aires province) (González and Pardiñas, 2002). Sauthier et al. (2005) extend the rank of their distribution 40 Km South of La Balandra.

Remarks

Hoplopleura paranaensis sp. nov. is morphologically similar to *H. aitkeni*, differing in the shape and dimensions of the thoracic plate, structure of the paratergal plates, male external genitalia, body shape and measurements.

DISCUSSION

In Argentina, *Hoplopleura* Enderlein, 1904 includes 27 species (including *H. paranaensis* sp. nov.), all are parasites of rodents from Sciuridae and Muridae families, excluding the four species assigned to *Ferrisella* Ewing, 1929 by

Castro and Verzi (2002). Distribution of the 10 members species of “aitkeni” group in South America includes Venezuela, Brasil and Argentina.

Of those 10 species, one (*H. aitkeni*) of them has been described from Venezuela and recorded from Argentina, (*H. imparata* Linardi, Teixeira and Botelho, 1984) from Brazil, and the remaining eight from Argentina (*H. mendozana* Castro, 1984; *H. varia* Castro, 1988; *H. misionales* Castro, 1988; *H. riojensis* Castro, 1997; *H. serrulata* Castro, 1997; *H. nicolai* Castro et al., 1998; *H. massoi* Castro and González, 2003 and *H. paranaensis* sp. nov.). In Argentina the “aitkeni” species-group distribution includes the northwestern provinces of Catamarca, La Rioja and Jujuy, the northeastern provinces of Chaco and Misiones, the central western provinces of Mendoza and San Luis, the central eastern province of Buenos Aires and the southwestern province of Neuquen.

The known species of the “aitkeni” group parasitize Muroidea rodents, from Muridae family, Sigmodontinae subfamily. Most of “aitkeni” group are parasites of Akodontini rodents.

Key to the *Hoplopleura aitkeni* species-group

- 1. Paratergal plate II with two lobes of similar length2
- 1' Paratergal plate II with two lobes of different length.....3
- 2. Paratergal plate VII narrow, with ventral lobe longer than the dorsal one. Plates IV-V with dorsal lobe narrower than the ventral one
.....*H. serrulata* Castro (Fig. 11e)
- 2' Paratergal plate VII wide, with dorsal lobe longer than the ventral one. Plates IV-V with dorsal lobe wider than the ventral one
.....*H. aitkeni* Johnson (Fig. 11a)
- 3. Paratergal plate II with long dorsal lobe and short ventral lobe.....
.....*H. riojensis* Castro (Fig. 11g)
- 3' Paratergal plate II with short dorsal lobe and long ventral lobe.....4
- 4. Paratergal plate VII without lobes.....*H. nicolai* Castro et al. (Fig. 11d)
- 4' Paratergal plate VII with one or two lobes5
- 5. Paratergal plate VII with one lobe6
- 5' Paratergal plate VII with two lobes.....7
- 6. Paratergal plate VII wide, with long and thin dorsal lobe
.....*H. imparata* Linardi et al. (Fig. 11b)
- 6' Paratergal plate VII narrow, with short dorsal lobe
.....*H. mendozana* Castro (Fig. 11c)
- 7. Paratergal plate VII with dorsal and ventral lobes subequal in length.....8
- 7' Paratergal plates VII with dorsal and ventral lobes very different in length..9

8. Paratergal plate VII with ventral lobe slightly longer than the dorsal one. Paratergal plates IV-VI with one much longer setae*H. varia* Castro (Fig. 11f)
- 8' Paratergal plate VII with dorsal lobe slightly longer than the ventral one. Paratergal plates IV-VI with evident lateral denticle and 2 short and similar setae*H. massoi* Castro and González (Fig. 11i)
9. Paratergal plate VII wide, with rounded dorsal lobe. Paratergal plates IV-VI with reduced lateral denticulation.....*H. misionalis* Castro (Fig. 11h)
- 9' Paratergal plate VII narrow, with thin dorsal lobe. Paratergal plates IV-VI with noticeable lateral denticulation.....*H. paranaensis* sp. nov. (Fig. 11j)

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LITERATURE CITED

- Castro, D. del C. and A. C. Cicchino. 1978. Contribución al conocimiento de los malófagos argentinos III. Revista Sociedad Entomológica Argentina. Buenos Aires 37: 77-83.
- Castro, D. del C. 1984. Contribución al conocimiento de los Anopluras neotropicales II. Revista Sociedad Entomológica Argentina, Buenos Aires 43 (1/4): 159-163.
- Castro, D. del C. 1988. Sobre dos nuevas especies del género *Hoplopleura* Enderlein, 1904 (Phthiraptera, Anoplura) parásitas de roedores (Rodentia, Cricetidae). Revista Iberica de Parasitología, Madrid, España 48 (1): 63-70.
- Castro, D. del C., A. C. Cicchino, and L. C. De Villalobos. 1991. A comparative study of the external architecture of the eggs of some neotropical species of the genus *Hoplopleura* Enderlein, 1904 (Phthiraptera, Anoplura). Revista Brasileira de Entomologia, São Paulo, Brasil 35: 663-669.
- Castro, D. del C. 1997. Dos nuevas especies del género *Hoplopleura* Enderlein, 1904 parásitas de roedores Miomorfos. Iheringia, Serie Zoología, Porto Alegre 83: 23-30.
- Castro, D. del C., A. González, and E. Caviedes Vidal. 1998. *Hoplopleura nicolai* sp. nov. (Anoplura, Hoplopleuridae), parásita de *Andalgalomys* sp. (Muridae, Rodentia). Revista de la Academia de Ciencias, Zaragoza, 53: 297-306.
- Castro, D. del C. and D. Verzi. 2002. A new species of *Ferrisella* (Phthiraptera, Anoplura) parasitic on desert adapted Rodent *Tympanoctomys* (Rodentia, Octodontidae). Rudolstädter Naturhistorische Schriften 4: 113-123.
- Castro, D. del C. and A. González. 2003. Una nueva especie de *Hoplopleura* (Phthiraptera, Anoplura) parásita de tres especies de *Bibimys* (Muridae, Sigmodontinae, Rodentia). Iheringia, Série Zoología, Porto Alegre 93 (2): 183-188.
- González, E. M. and E. Massoia. 1995. Revalidación del género *Deltamys* Thomas, 1917, con la descripción de una nueva subespecie de Uruguay y Sur del Brasil (Mammalia, Rodentia: Cricetidae). Comunicaciones Zoológicas del Museo de Historia Natural de Montevideo 12 (182): 1-8.
- González, E. M. and U. F. J. Pardiñas. 2002. *Deltamys kemp*. Mammalian Species. The American Society of Mammalogists 711: 1-4.