

A new species of *Ferrisella* (Phthiraptera, Anoplura, Hoplopleuridae) parasitic on the desert-adapted rodent *Typanoctomys barrerae* (Rodentia, Octodontidae)

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With 20 figures

Summary

The genus *Ferrisella* EWING, 1929 is revalidated. The species of this genus parasitic on Octodontidae are analyzed and a new species, *Ferrisella barrerae*, parasitic on *Typanoctomys barrerae* (LAWRENCE, 1941) from Mendoza province, Argentina, is described. The significance of *Ferrisella* for the assessment of the systematics of its hosts is discussed.

Zusammenfassung

Eine neue *Ferrisella*-Art (Phthiraptera, Anoplura, Hoplopleuridae) von der deserticolen Trugratte *Typanoctomys barrerae* (Rodentia, Octodontidae)

Die Gattung *Ferrisella* EWING, 1929, bisher synonymisiert mit *Hoplopleura* ENDERLEIN, 1904, wird revalidiert und zwar aufgrund von morphologischen Merkmalen an Ei, Larve und Imago. Dabei wird die neue Art *Ferrisella barrerae* n. sp. aus der argentinischen Provinz Mendoza beschrieben. *Ferrisella* gehören bisher 5 Arten an, die nur aus Argentinien, Bolivien und Chile wirtsspezifisch von vier Trugrattenarten (Octodontidae) und *Graomys griseoflavus* (WATERHOUSE, 1837) (Muridae, Sigmodontinae) bekannt sind. Auf Kammratten (Ctenomyidae) scheint *Ferrisella* zu fehlen.

Keywords: Phthiraptera, Anoplura, Argentina, *Ferrisella* EWING revalidated, *Ferrisella barrerae* n. sp., distribution, morphology of egg, nymph, and adult.

Introduction

In this paper a new species of the genus *Ferrisella* EWING, 1929 parasitic on a desert-adapted rodent is described. The new species, *Ferrisella barrerae*, is described and illustrated based on specimens collected from *Typanoctomys barrerae* (Rodentia, Octodontidae) from Mendoza province, Argentina. *Ferrisella* is distributed in Argentina and Chile, and includes 5 species, 4 of them parasitic on octodontid rodents (*F. chilensis* WERNECK, 1937; *F. disgrega* FERRIS, 1921; *F. octomydis* CASTRO, GONZALEZ & CICCHINO, 1998 and *F. barrerae* n. sp) and the remaining species on a phyllotine rodent of the family Muridae (*F. griseoflavae* CASTRO, 1980). In this paper this genus is revalidated

on the basis of the egg, nymph and adult morphology, which are clearly different from those of the species of *Hoplopleura* ENDERLEIN, 1904 (CASTRO *et al.* 1998). The new species of the genus is compared with the others parasitic on octodontids, and the significance of these species for the assessment of its hosts' systematics is discussed.

Materials and methods

Specimens were directly obtained from their hosts by exhaustive brushing. They were processed for observation in conventional light microscopy following techniques by CASTRO & CICCHINO (1978). For scanning electron microscopy observation, samples were separated after dehydratation in acetone (30°, 60°, 90° and 100%).

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These samples were taken to the crucial point and mounted on metallic stubs and subsequently coated with gold-palladium and observed under JEOL SLM 1000 SEM. Likewise, the eggs were fixed in glutaraldehyde at 3% and processed for study in an SEM following the techniques applied by CASTRO *et al.* (1991). They were studied and photographed in the scanning electron microscopy service (SEMS) of Museo de La Plata (MLP). The samples were deposited in the collections of Museo de La Plata, Argentina, as MLP 2676.

Corporal measurements are expressed in millimeters and like those of the figures of the new species were made with a camera lucida. Measurements of ultrastructural characteristics are expressed in micrometers and were taken from the digital scale generated by the SEMS present in every image.

***Ferrisella barrerae* new species**

(Figs. 1–18)

Type host: *Typanoctomys barrerae* (LAWRENCE, 1941)

Type specimens: male holotype; 3 males, 5 females, 1 nymph II and 3 nymph III, paratypes (11/11/1999, coll. D. CASTRO) from Trinrrica site (30 km south of El Nihuil), Mendoza Province, Argentina.

D i a g n o s i s: species morphologically close to *F. griseoflavae* and *F. octomydis*. It differs in form, size and chaetotaxy of paratergal plates, form of sternal thoracic plate, length of paramera, chaetotaxy of female genitalia, and number of abdominal tergal and sternal setae.

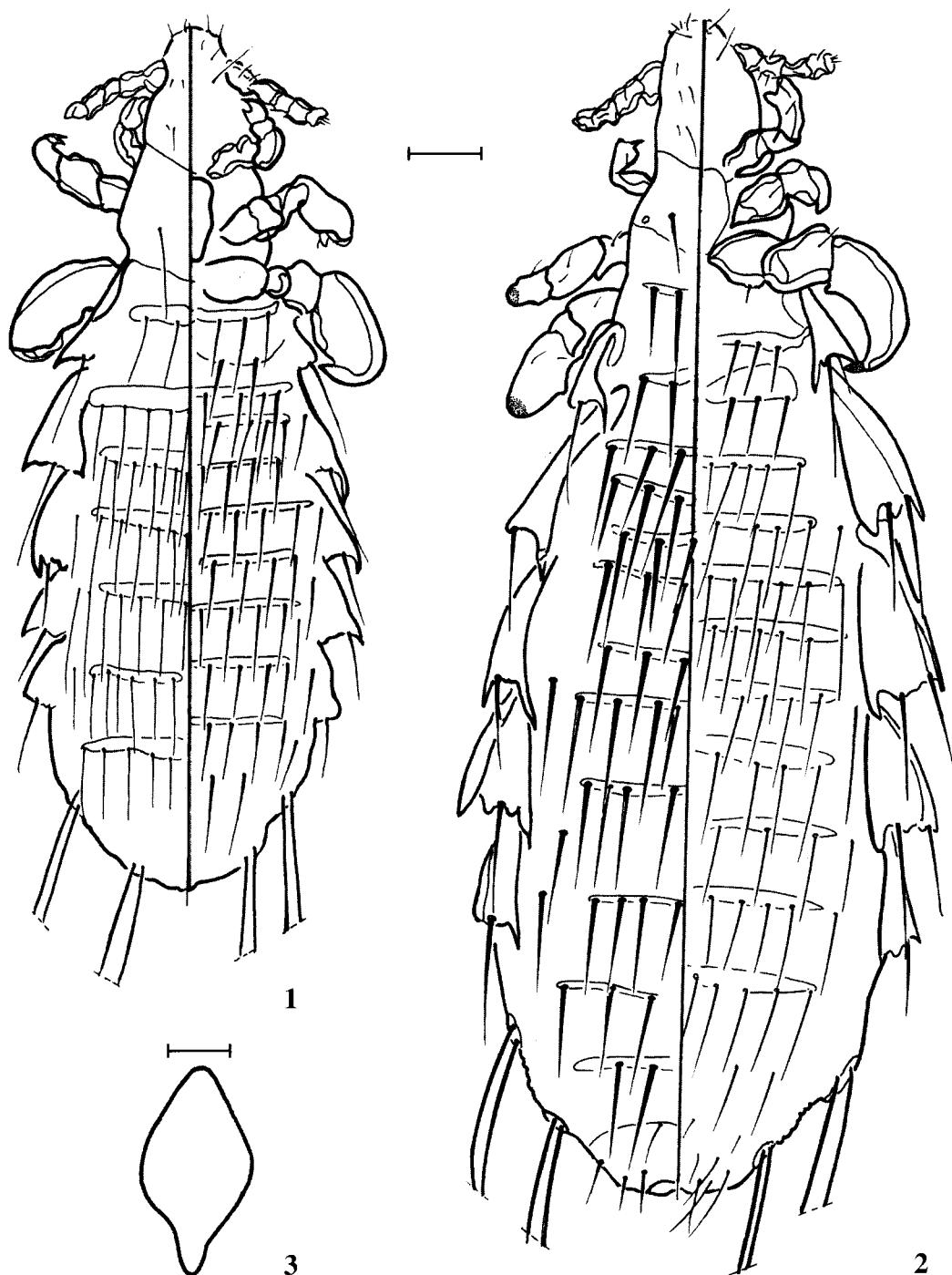
D e s c r i p t i o n - m a l e: General habitus as in Figure 1. Head rather longer than wide with anterior border slightly acuminate and lateral borders slightly convex; rounded postantennal angles. Dorsal chaetotaxy: dorsal principal setae thin but not reaching the caudal end of head; 2 very tiny and thin sutural setae; 2 short apical setae. Ventral chaetotaxy: thin ventral principal setae, extending beyond the cephalic edge; thin and short preantennal ventral setae; very short and thin central anterior setae; 2 thin apical ventral setae. Thorax rather wider than long, long thoracic tergal seta, extending well beyond the caudal edge of thorax; sternal thoracic plate strongly marked (Figs. 3–4). Abdomen with tergal and sternal plates well

developed, second sternal plate broadly developed, and never laterally touching paratergal plates (Fig. 6); uniform chaetotaxy, with 5–11 setae in addition to a lateral seta appearing between the pleurites IV–VII; tergal setae thinner than sternal ones. Paratergal plates with the following characteristics: plates II–VI with two acuminate broadly developed lobes and broad along their length, with two setae of equal length on the central neckline, which extend up to the end of the following plate; two marked denticle processes at the end of the implantation of the setae, very evident on plates II–IV and less marked on plates V–VI; plates VII and VIII imperceptible with two macrochaetae each (Figs. 5 and 7). Well developed spiracles, with several chambers with an internal three-dimensional perforation (Fig. 8). External genitalia with basal plate well developed, narrow paramera with terminal borders rounded and broad along its length; pseudopenis broad, without any kind of denticleform and slightly longer than the end of the paramera (Fig. 9). Total body length 1.03 mm.

F e m a l e (Fig. 2): General characteristics similar to those of male, differing in measurements, abdominal terminalia and greater number of tergites and sternites; gonapophysis with a small number of setae, as shown in Fig. 10. Total body length 1.37 mm.

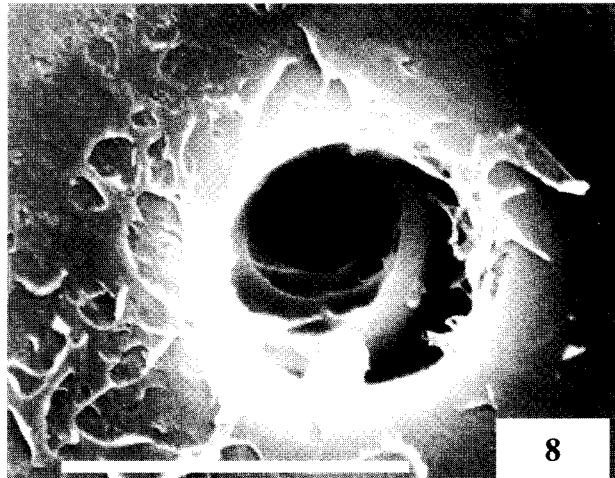
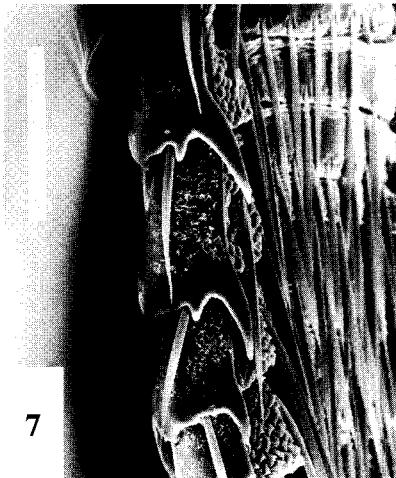
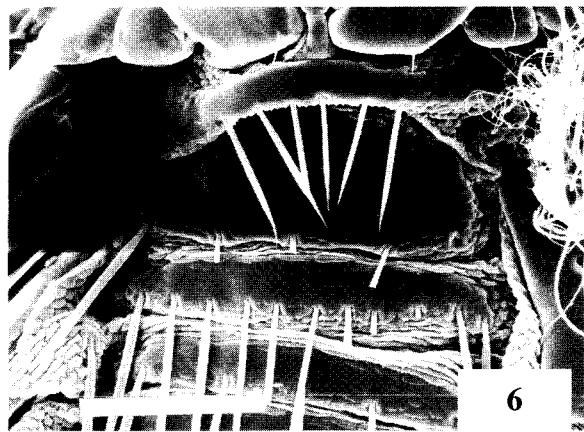
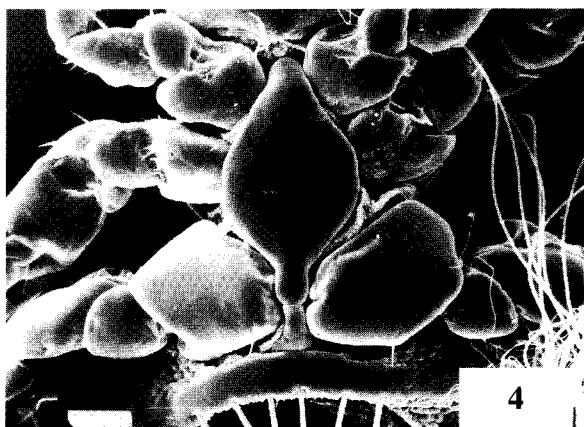
N y m p h a l s t a g e s: 2nd stage (Fig. 11), ventral principal seta well developed, thoracic seta evident, abdomen with marked and forked anal lobe having two pairs of terminal macrochaetae on each side. Total body length 0.66 mm. 3rd stage (Figs 12–15) differs in size, presence and distribution of a greater number of cephalic and abdominal setae. Total body length 0.94 mm.

E g g: Shape elongated (Fig. 16); type of ornamentation of amphora: smooth along all its length; type of air chamber: ampullacea, hardly visible and small; relation among air chambers: isolated; number of air chambers: 13–15. (Figs. 17–18); type of oviposition: one egg per hair, fixed with a little intercellular substance (spumaline) only on distal end and at the base of the hair.



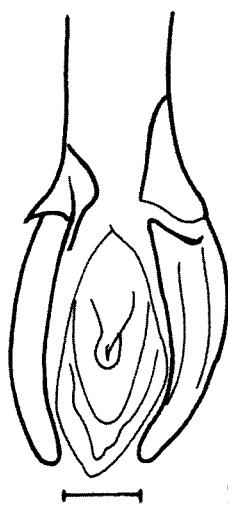
Figs. 1–3.

Ferrisella barrerae n. sp.: 1. Male, dorsal and ventral view; 2. Female, dorsal and ventral view; 3. Thoracic sternal plate (scale 0,1 µm. – Drawings by D. del CARMEN CASTRO.)



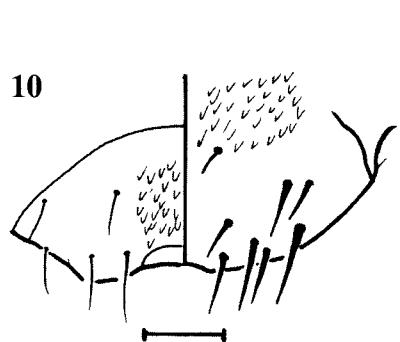
Figs. 4–8.

Ferrisella barrerae n.sp.: 4. Scanning electron micrograph of thoracic sternal plate, $\times 1500$ (scale 100 μm); 5. Paratergal plates of male; 6. Scanning electron micrograph of sternal plates, $\times 500$ (scale 100 μm); 7. Scanning electron micrograph of paratergal plates, $\times 500$ (scale 100 μm); 8. Scanning electron micrograph of abdominal spiracle, $\times 7500$ (scale 5 μm). – SEM-photos by SEMS – MLP.

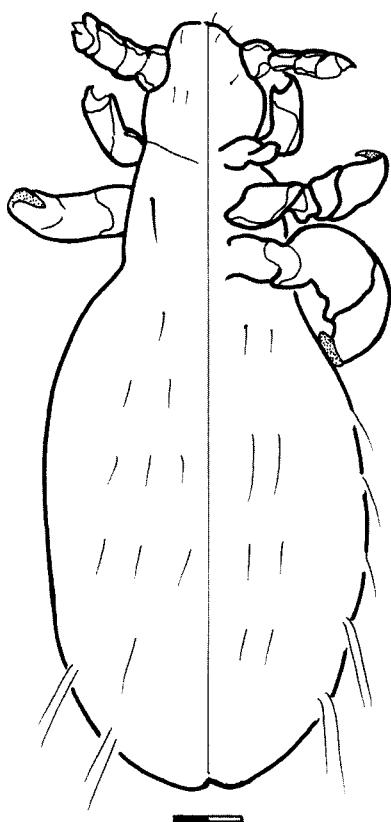
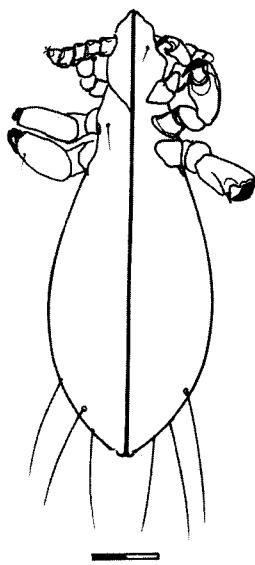


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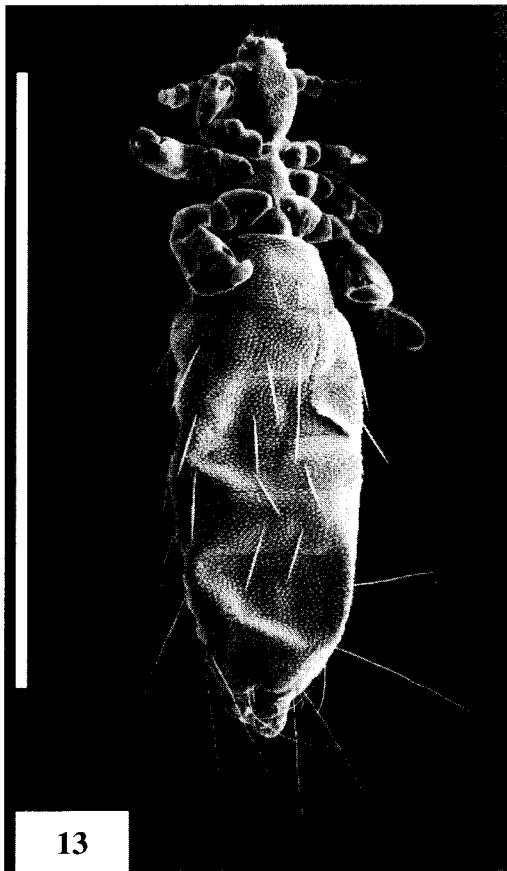
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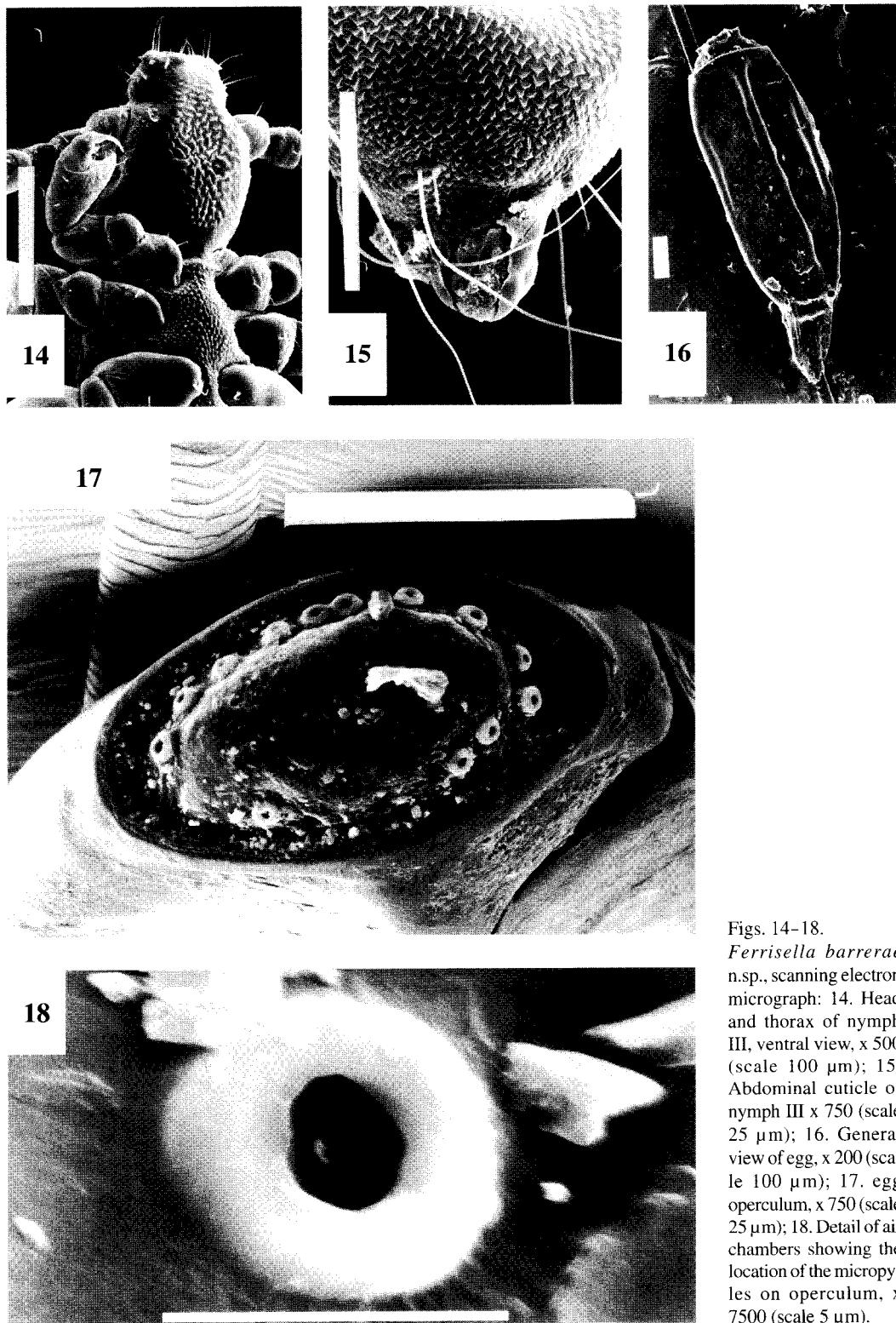
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Figs. 9–13.

Ferrisella barrerae n.sp.: 9. Male genitalia; 10. Female terminalia; 11. Nymph II; 12. Nymph III; 13. Scanning electron micrograph of nymph III, x 100 (scale 100 µm).



Figs. 14-18.
Ferrisella barrerae
n.sp., scanning electron
micrograph: 14. Head
and thorax of nymph
III, ventral view, x 500
(scale 100 μ m); 15.
Abdominal cuticle of
nymph III x 750 (scale
25 μ m); 16. General
view of egg, x 200 (sca-
le 100 μ m); 17. egg
operculum, x 750 (scale
25 μ m); 18. Detail of air
chambers showing the
location of the microcrys-
tallites on operculum, x
7500 (scale 5 μ m).

Sites of oviposition on the host: 3 examples of the same population were examined, 2 of which were parasitized, displaying similar sites of oviposition, i.e. always on the flanks of thorax and abdomen (Fig. 19).

Host: *Tympanoctomys barrerae* is the most strongly adapted to arid environments among South American rodents (BOZINOVIC & CONTRERAS 1990; MARES 1975, 1993; OJEDA *et al.* 1996, 1999). It inhabits the Monte biome and marginally the Patagonia steppe in the west and center of Argentina (Fig. 20) (OJEDA *et al.* 1999). This species is semifossorial and has a patchy distribution in small populations restricted to salty environments and dunes.

Derivatio nominis: The specific new name is referred to the host's name.

Discussion

Ferrisella represents a very homogeneous genus consisting of 5 species. EWING (1929) proposed the inclusion of the species *Hoplopleura disgreta*. WERNECK (1937) described *H. disgreta chilensis*, pointing out that »according to the opinion of some authors to be included in the genus *Ferrisella*«. In contrast, FERRIS (1951) included *H. disgreta* and *H. chilensis* in the genus *Hoplopleura*. CASTRO (1980) described *H. griseoflavae*, suggesting that the peculiar characteristics of the three species would justify their inclusion in the genus *Ferrisella*. Later, CASTRO *et al.* (1998) described *H. octomydis* and included the four species within the *disgreta*-group supporting the idea of the separation of these species from those of the genus *Hoplopleura*.

The finding of *F. barrerae* n. sp. reinforces the idea that the genus *Ferrisella* represents a very homogeneous group with a particular cephalic and abdominal chaetotaxy of the nymphs, morphology of the sternal plates I-II and paratergalia of adults, as pointed out by CASTRO *et al.* (1998).

Geographical distribution of the species of this genus comprises northern and western

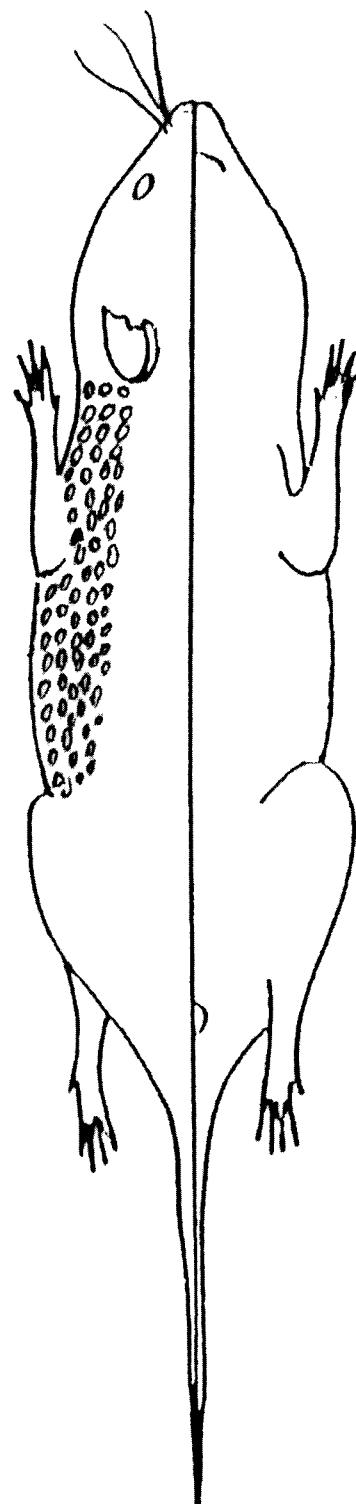


Fig. 19.
Sites of oviposition of *Ferrisella barrerae* n. sp.

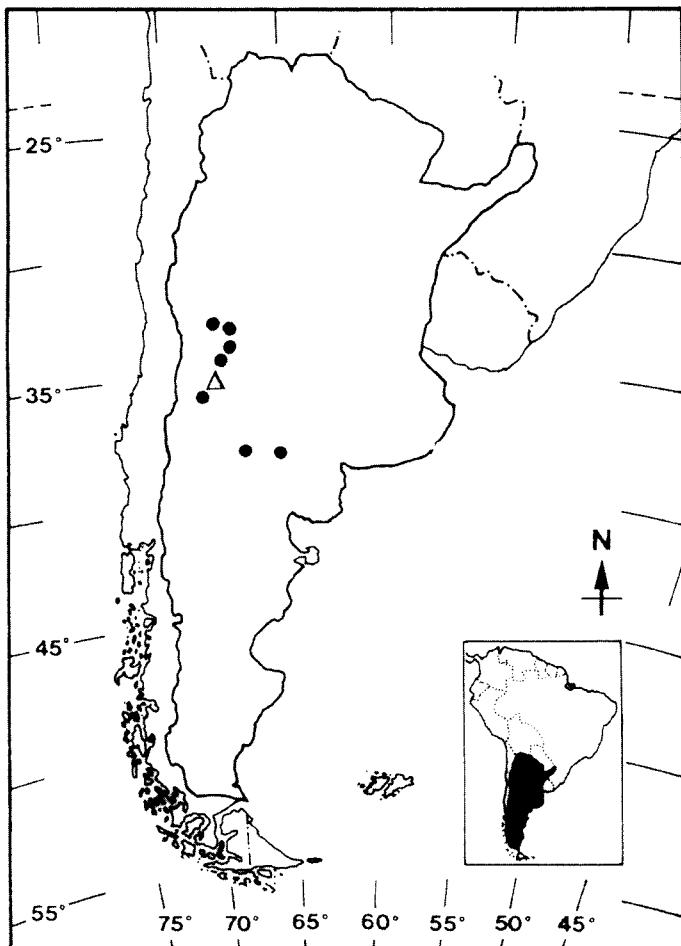


Fig. 20.
Distribution of the octodontid rodent *Typanoctomys barrerae* (after OJEDA *et al.* 1996). Open triangle indicates Trinrica site, the finding locality of *Ferrisella barrerae* n. sp.

Argentina, southern Bolivia and northern Chile. *F. chilensis* has been described on *Octodon degus* from Chile; *F. disgruga* on *Octodontomys gliroides* from Oruro, Bolivia and Pucará de Tilcara, Jujuy province, Argentina; *F. octomydis* on *Otomys mimax* from Ischigualasto, San Juan province, Argentina; *F. griseoflavae* on *Graomys griseoflavus* from Antofagasta, Catamarca province, Argentina; *F. barrerae* n.sp. is described on *Typanoctomys barrerae*, this host having a distribution restricted to Mendoza and La Pampa provinces, Argentina (Woods 1993).

Octodontids of the subfamily Octodontinae have been poorly diagnosed (SPOTORNO 1979). Especially the species *Octodontomys gliroides* has uncertain affinities. It has classically been considered an Octodontinae (e.g. REIG 1989),

but morphological, chromosomal and molecular data are either uncertain or suggest affinities with the sister subfamily Ctenomyinae (CONTRERAS *et al.* 1994, GALLARDO 1992, 1997, GEORGE *et al.* 1972, ROSSI *et al.* 1990, VERZI 1994, 2000, VERZI *et al.* 1999, VERZI & CARRIN IGLESIAS 1999); *Ferrisella* is present on *O. gliroides* and other species of Octodontinae, but it was absent on 20 analyzed species of Ctenomyinae. Anyway, the presence of *F. griseoflavae* on *Graomys* suggests that the specificity of *Ferrisella* can be also due to ecological reasons, derived from similar habits and partial sympatry of their hosts.

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Resumo

Nova especie de *Ferrisella* (Phthiraptera, Anoplura, Hoplopleuridae) parasita do roedor de região arida *Typanoctomys barrerae* (Rodentia, Octodontidae). Revalidamos no presente trabalho o gênero *Ferrisella* EWING, 1929. Nos ocupamos das espécies do mencionado gênero parasita de Octodontidae e procuramos caracterizar a nova espécie *Ferrisella barrerae*, parasita de *Typanoctomys barrerae* (LAWRENCE, 1941) do estado de Mendoza, Argentina. Facemos a discussão da importância da *Ferrisella* em a sistemática dos hospedeiros.

Resumen

Una nueva especie de *Ferrisella* (Phthiraptera, Anoplura, Hoplopleuridae) parásita del roedor adaptado a zonas áridas *Typanoctomys barrerae* (Rodentia, Octodontidae). Revalidamos en este trabajo el género *Ferrisella* EWING, 1929. Analizamos las especies de este género parásitas de Octodontidae y describimos una nueva especie *Ferrisella barrerae* parásita de *Typanoctomys barrerae* (LAWRENCE, 1941) de la provincia de Mendoza, Argentina. Discutimos la importancia de las especies de este género en la sistemática de sus hospedadores.

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