Two remarkable species of *Phtheiropoios* (Phthiraptera: Gyropidae) from Tucumán Province, Argentina

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Abstract—This study deals with two species of the genus *Phtheiropoios*, redescribing *P. tucumanus* Cicchino, 1990, previously known from five specimens collected on *Ctenomys tucumanus* Thomas, 1900, and describing *P. inaequalis* **sp. nov.** from *C. tuconax* Thomas, 1925, both from different localities in Tucumán Province, Argentina. Diagnostic features for the new species include proportion of the male forficula, male external genitalia, and counts of setae and body measurements in both sexes. Brief comments on the morphological affinities of these species with other species of *Phtheiropoios*, and a key to males of all species of the genus *Phtheiropoios* known to parasitize rodents of the genus *Ctenomys*, are included.

Résumé—Ce travail porte sur deux espèces du genre *Phtheiropoios* provenant de deux localités différentes de la province de Tucumán, Argentine : il inclut une nouvelle description de *P. tucumanus* Cicchino, 1990, connu jusqu'à maintenant de cinq spécimens récoltés sur *Ctenomys tucumanus* Thomas, 1900 et la description de *P. inaequalis* **sp. nov.** récolté sur *C. tuconax* Thomas, 1925. Les caractères diagnostiques de la nouvelle espèce comprennent les proportions des harpagones des mâles, les génitalias externes mâles, ainsi que les dénombrements de soies et les mesures corporelles chez les deux sexes. Une courte discussion traite des affinités de ces deux espèces avec les autres espèces de *Phtheiropoios*. Une clé permet l'identification des mâles de toutes les espèces du genre *Phtheiropoios* qui parasitent les rongeurs du genre *Ctenomys*.

[Traduit par la Rédaction]

Introduction

The genus *Phtheiropoios* Eichler, 1940 includes 14 species, 12 of which are known to parasitize rodent species included in the genus *Ctenomys* Blainville (Rodentia: Octodontidae). The other two species parasitize species of *Chinchilla* Bennet (Rodentia: Chinchillidae) (Price *et al.* 2003) and, therefore, do not belong to the genus *Phtheiropoios* as suggested by Castro and Cicchino (2001) but to the genus *Gyropus* Nitzsch, 1818.

The genus *Ctenomys* includes more than 60 described species distributed exclusively in southern South America (*e.g.*, Contreras *et al.* 1999), and many undescribed species are still under study. Therefore, additional *Ctenomys* species are expected to be identified as hosts of *Phtheiropoios* species, and additional new species of *Phtheiropoios* are expected to be found on them.

After collecting abundant material from several localities in Tucumán Province, Argentina, we aimed to redescribe and illustrate *P. tucumanus* Cicchino, 1990, previously known from only five specimens, and describe a new species from *Ctenomys tuconax* Thomas, 1925 collected in two localities in Tucumán Province. Brief comments on the morphological affinities of these species with their closest relatives and

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a key to males of all species of *Phtheiropoios* known to parasitize *Ctenomys* hosts are also given.

Materials and methods

Specimens were collected from freshly trapped hosts, stained, and mounted on slides following the procedures of Castro and Cicchino (1978). The holotype, some paratypes, and most of the specimens are in the collection of the Museo de La Plata (MLP), La Plata, Buenos Aires Province, Argentina.

Body measurements are in millimetres and include maximum head length and width, maximum abdominal width, and total length of the body. Terminology, including counts and notation of abdominal setae, follows that of Cicchino and Castro (1998). The key to males presented below is based on the examination of more than 190 males belonging to all identified species of *Phtheiropoios* known to parasitize *Ctenomys* species in Argentina, Brazil, and Uruguay (Cicchino *et al.* 2000).

Phtheiropoios tucumanus Cicchino, 1990

(Figs. 1–3)

Material examined

One male and four females (the type series of this species) near San Miguel de Tucumán (26°51′S, 65°13′W), Tucumán Province, 31.x.1967 (MLP Nos. 1128/1, 1128/3–6); 10 males and 4 females, same locality, 3.x.1995, J.R. Contreras collection. All specimens are from the type host.

Diagnosis

This species is morphologically close to *P. centralis* Castro and Cicchino, 2001, but it differs in shape of male forficulae, shape of basal plate, pseudopenis, and paramera, and it lacks the penial sclerite in the external genitalia. Both sexes are much stouter and differ significantly in body measurements and setal counts on abdominal tergites and sternites.

Redescription

Male (Fig. 1)

Body shape elongated, reminiscent of *P. gracilipes* (Ewing, 1924). **Measurements.** Head length: 0.300–0.304; head width: 0.319–0.324; maximum abdominal width: 0.614–0.638; total body length: 1.804–1.818. Forficulae with "toe" projected beyond level of second tarsomere (Fig. 2). **Abdominal chaetotaxy.** Tergal setae: I, 13–14; II, 18–35; III, 24–28; IV, 25–32; V, 28–33; VI, 29; VII, 16–25; VIII, 4; IX, 2; sternal setae: I, 8–10; II, 30–34; III, 30–31; IV, 32; V, 26–31; VI, 20–22; VII, 11–14; VIII, 4–5. **External genitalia.** Basal plate gradually tapered posteriad; shape of pseudopenis like a deep "V", endomeres and ventral sclerite as shown in Fig. 3. No obvious genital sclerite nor any differentiation of the genital sac in these specimens.

Female

Similar to male except for larger size and counts of abdominal setae. **Measurements.** Head length: 0.314–0.324; head width: 0.343–0.348; maximum abdominal width: 0.695–0.714; total body length: 1.795–1.961. **Abdominal chaetotaxy.** Tergal setae: I, 14–18; II, 22–28; III, 26–31; IV, 30–37; V, 36–49; VI, 33–43; VII, 19–28; VIII, 3–6; sternal setae: I, 8–9; II, 30–32; III, 29–53; IV, 34–37; V, 31–39; VI, 26–41; VII, 28–31. **External genitalia.** Vulvar margin not differing from that of *P. mendocinus* (see Cicchino and Castro 1998).

Host and distribution

Ctenomys tucumanus Thomas, 1900. This is the only host known; its distribution is restricted to the vicinity of San Miguel de Tucumán city, northwest Argentina.

Remarks

All morphological affinities between *P. tucumanus* and *P. centralis* seem to be consistent with the currently accepted evolutionary diversification of the lineages of *Ctenomys* proposed by Contreras and Bidau (1999). Both *Phtheiropoios* species are derivatives of the "*C. mendocinus* complex", some of which are associated with one or more *Phtheiropoios* species (Contreras *et al.* 1999).

Phtheiropoios inaequalis sp. nov.

(Figs. 4–7)

Material examined

Holotype male: El Infiernillo (26°46′S, 65°44′W, 3040 m above sea level), Tafí Department, Tucumán Province, 16.ii.1998, J. Contreras collection. **Paratypes:** 17 males, 3

Figs. 1–3. *Phtheiropoios tucumanus*: 1, male, dorsal-ventral view; 2, male left forficula; 3, male external genitalia. Scale bars = 500 μm (Fig. 1) and 100 μm (Figs. 2, 3).

females, same data as those for holotype; one male, La Calera, Chicligasta Department, Tucumán Province, Argentina, 16.ii.1998, J. Contreras collection. The holotype and most of the paratypes are in the Museum of La Plata.

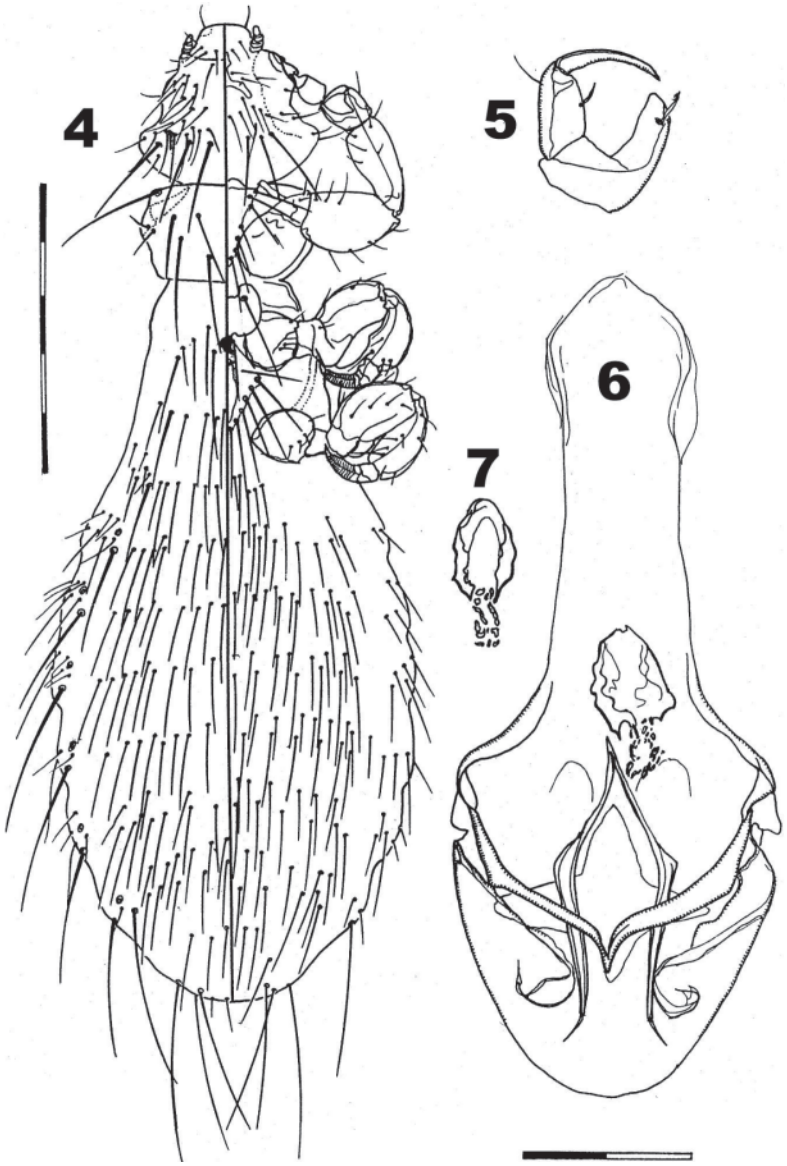
Etymology

The epithet *inaequalis*, from the latin root, means "not equal"; it refers to the distinctness of the male genital sclerite conformation in relation to that of *P. wetmorei* (Ewing, 1924).

Diagnosis

This species is morphologically close to *P. forficulatus* (Neumann, 1912), but males largely differ in shape and structure of the

Figs. 4–7. *Phtheiropoios inaequalis* sp. nov.: 4, male, dorsal-ventral view; 5, male left forficula; 6 and 7, male external genitalia and genital sclerite (from another specimen). Scale bars = 500 μm (Fig. 4) and 100 μm (Figs. 5–7).



genital sclerite. Also, both sexes have significant differences in abdominal chaetotaxy, body silhouette, and measurements.

Description

Male (Fig. 4)

Body shape shortened, reminiscent of *P. forficulatus*. **Measurements.** Head length: 0.286–0.295; head width: 0.305–0.324; maximum width of abdomen: 0.609–0.643; total body length: 1.695–1.718. Forficulae with "toe" not projected beyond level of second tarsomere (Fig. 5). **Abdominal chaetotaxy.** Tergal setae: I, 14–15; II, 18–21; III, 19–23; IV, 21–24; V, 20–26; VI, 18–22; VII, 19–22; VIII, 6–9; sternal setae: I, 8–10; II, 22–24; III, 25–28; IV, 24–28; V, 23–27; VI, 21–25; VII, 20–21; VIII, 6–8. **External genitalia.** Basal plate and general structure reminiscent of *P. wetmorei* but

differing in shape of genital sclerite and shape of pseudopenis (Figs. 6–7).

Female

Similar to male except for larger size and counts of abdominal setae. **Measurements.** Head length: 0.314–0.333; head width: 0.333–0.348; maximum width of abdomen: 0.700–0.705; total body length: 1.937–1.999. **Abdominal chaetotaxy.** Tergal setae: I, 15–17; II, 19–22; III, 25–33; IV, 25–33; V, 20–21; VI, 24–30; VII, 20–24; VIII, 6–8; sternal setae: I, 9–11; II, 28–33; III, 33–39; IV, 24–39; V, 21–37; VI, 24–31; VII, 20–22. External genitalia: vulvar margin not differing from that of *P. mendocinus* (see Cicchino and Castro 1998).

Host and distribution

Ctenomys tuconax Thomas, 1925. This is the only host known to date for this species; its distribution is restricted to the oriental slope of the Aconquija mountain range near the western limit with Catamarca Province and it occurs from 500 to 3000 m above sea level (Cabrera 1961; Woods 1992).

Remarks

The close morphological affinities between *P. inaequalis* and *P. wetmorei* seem to be consistent with the main evolutive scenario given by Contreras and Bidau (1999). Both species parasitize hosts in the "Chaquean lineage" in the "central stem" of the evolution of *Ctenomys* (Contreras *et al.* 1999).

Key to males of the genus *Phtheiropoios*, parasites of *Ctenomys* species

1. Pseudopenis deeply V-shaped, noticeably widened, thickened, and produced posteriorly in middle. Apical part of basal plate slightly widened. No traces of sclerite in genital sac . . ***P. tucumanus*** Cicchino, 1990
1′. Pseudopenis otherwise: slightly widened and produced posteriorly and sometimes also at sides. Apical part of basal plate noticeably widened. Sclerite, or at least discernible differentiation at apex of genital sac, present 2
2. Genital sclerite an unpigmented or slightly pigmented differentiation of apex of genital sac 3
2′. Genital sclerite well differentiated and pigmented 9
3. Genital sclerite tubelike and partially contorted, unpigmented. Lateral edges of pseudopenis produced caudally . . . . . ***P. centralis*** Castro and Cicchino, 2001
3′. Genital sclerite otherwise: always slightly pigmented. Lateral edges of pseudopenis variable, caudally produced or not 4
4. Genital sclerite V-shaped or U-shaped, its lateral sides almost straight. Pseudopenis slightly produced mesially. 5
4′. Genital sclerite otherwise: not V- or U-shaped. Pseudopenis strongly produced mesially 12
5. Genital sclerite V-shaped. 6
5′. Genital sclerite U-shaped 7
6. "Thumb" of forficula short, not reaching level of second tarsomere. Body silhouette slender: maximum width of abdomen 0.52–0.58 mm . . . . . ***P. mendocinus*** Cicchino and Castro, 1998
6′. "Thumb" of forficula long, exceeding level of apex of second tarsomere. Body silhouette stout. . . . 8
7. Maximum width of abdomen 0.63–0.67 mm. . . . . ***P. cordobensis*** Castro and Cicchino, 2002
7′. Maximum width of abdomen 0.73–0.78 mm . . . . . ***P. forficulatus*** (Neumann, 1912)
8. Tibia almost as wide as profemur. Metafemur almost as wide as mesofemur. Thumb of forficula greatly enlarged, its apical third somewhat curved inwards . . . . . ***P. latipollicaris*** (Ewing, 1924)
8′. Tibia 1 more slender than profemur. Metafemur noticeably more slender than mesofemur. Thumb of forficula neither enlarged nor curved inwards . . . . . ***P. gracilipes*** (Ewing, 1924)
9. Genital sclerite short and stout, cornposed of two subtriangular, superimposed pieces. Pseudopenis very narrow . . . . . ***P. wetmorei*** (Ewing, 1924)
9′. Genital sclerite elongated, composed of single piece 10
10. Genital sclerite short (length 68–75 mm), bacilliform . . . . . ***P. pollicaris*** (Ewing, 1924)
10′. Genital sclerite very long (over 200 mm), with basal end widened 11
11. Genital sclerite almost straight, with base slightly dilated . . . . . ***P. nematophallus*** (Weneck, 1935)
11′. Genital sclerite deflexed, with base widely dilated, spoonlike . . . . . ***P. ewingi*** (Werneck, 1936)
12. Genital sclerite pear-shaped, caudally round. Pseudopenis greatly thickened . . . . . ***P. rionegrensis*** Cicchino and Castro, 1994
12′. Genital sclerite rounded, caudally produced, and forming a double series of small sclerites. Pseudopenis slender. . . . . ***P. inaequalis*** **sp. nov.**

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References

Cabrera, A. 1961. Catálogo de los mamíferos de América del Sur. Revista Museo Ciencias Naturales Bernardino Rivadavia, **4**(2): 309–372.

Castro, D.C., and Cicchino, A.C. 1978. Contribución al conocimiento de los Malófagos argentinos III. Sobre algunos Menoponidae de la avifauna bonaerense: *Menacanthus eurysternus* (Burmeister) y *Menacanthus pici* (Denny) (Insecta: Mallophaga). Revista de la Sociedad Entomologica Argentina, **37**(1–4): 77–83.

Castro, D.C., and Cicchino, A. 2001. New species of the genus *Phtheiropoios* (Phthiraptera: Gyropidae), parasitic on *Ctenomys* (Rodentia: Octodontidae). The Canadian Entomologist, **133**(1): 87–92.

Castro, D.C., and Cicchino, A.C. 2002. Una nueva especie de *Phtheiropoios* (Phthiraptera, Amblycera) parásita de *Ctenomys* sp. (Rodentia, Octodontidae) de la provincia de Cordoba. Gayana (Zoología), **66**(2): 89–96.

Cicchino, A.C. 1990. A new species of the genus *Phtheiropoios* Eichler 1939 (Phthiraptera: Amblycera: Gyropidae) parasitic on *Ctenomys tucumanus* Thomas 1900 (Mammalia: Rodentia: Ctenomyidae). Spheniscus, **8**: 27–28.

Cicchino, A.C., and Castro, D.C. 1998. *Phtheiropopios mendocinus* sp. nov. y estado del conocimiento de las demás especies del genero *Phtheiropoios* Eichler, 1940 (Phthiraptera: Gyropidae) en la provincia de Mendoza, Argentina. Gayana Zoología, **62**: 183–190.

Cicchino, A.C., Castro, D.C., and Baldo, J.J. 2000. Elenco de los Phthiraptera (Insecta) hallados en distintas poblaciones locales de Ctenomys (Rodentia: Octodontidae) de la Argentina, Uruguay, Paraguay, Bolivia y Brasil. Papeis Avulsos do Departamento de Zoología de Sao Paulo, **41**(5): 197–211.

Contreras, J.R., and Bidau, C.J. 1999. Lineas generales del panorama evolutivo de los roedores Excavadores sudamericanos del género *Ctenomys* (Mammalia, Rodentia, Caviomorpha: Ctenomyidae). Fundacion Bartolome Hidalgo, Ciencia Siglo XXI, Buenos Aires, Argentina, **1**: 1–22.

Contreras, J.R., Castro, D.C., and Cicchino, A.C. 1999. Relaciones del los Phthiraptera (Insecta, Amblycera, Gyropidae) con la evolución taxonómica del genero *Ctenomys* (Mammalia: Rodentia: Ctenomyidae). Fundacion Bartolome Hidalgo, Ciencia Siglo XXI, Buenos Aires, Argentina, **2**: 11–32.

Price, R.D., Hellenthal, R.A., Palma, R.L., Johnson, K.P., and Clayton, D.H. 2003. The chewing lice: world checklist and biological overview. Illinois Natural History Survey Special Publication 24. Illinois Natural History Survey, Champaign, Illinois.

Woods, C.A. 1992. Family Ctenomyidae. *In* Mammal species of the world. *Edited by* D.E. Wilson and D.M. Reeder. 2nd ed. Smithsonian Institution Press, Washington and London. pp. 783–787.