

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

MANTER: Journal of Parasite Biodiversity

Parasitology, Harold W. Manter Laboratory of

7-25-2025

A New Species of *Viscachataenia* (Cestoda: Anoplocephalidae) from the Southern Mountain Viscacha, *Lagidium viscacia* (Hystricomorpha: Chinchillidae), in Boliva

Terry R. Haverkost

University of Nebraska - Lincoln, haverkost@gmail.com

Scott Gardner

University of Nebraska - Lincoln, slg@unl.edu

Follow this and additional works at: <https://digitalcommons.unl.edu/manter>



Part of the [Biodiversity Commons](#), [Parasitology Commons](#), and the [Zoology Commons](#)

Haverkost, Terry R. and Gardner, Scott, "A New Species of *Viscachataenia* (Cestoda: Anoplocephalidae) from the Southern Mountain Viscacha, *Lagidium viscacia* (Hystricomorpha: Chinchillidae), in Boliva" (2025). *MANTER: Journal of Parasite Biodiversity*. 38.

<https://digitalcommons.unl.edu/manter/38>

This Article is brought to you for free and open access by the Parasitology, Harold W. Manter Laboratory of at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in MANTER: Journal of Parasite Biodiversity by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

A New Species of *Viscachataenia* (Cestoda: Anoplocephalidae) from the Southern Mountain Viscacha, *Lagidium viscacia* (Hystricomorpha: Chinchillidae), in Boliva

Terry R. Haverkost and Scott L. Gardner

Harold W. Manter Laboratory of Parasitology, University of Nebraska–Lincoln, Lincoln, Nebraska, USA

Corresponding author – Scott L. Gardner, Harold W. Manter Laboratory of Parasitology, University of Nebraska–Lincoln, W529 Nebraska Hall, Lincoln, NE 68588-0514, USA, email slg@unl.edu (Terry R. Haverkost, email haverkost@gmail.com)

Abstract

Anoplocephalid cestodes collected from the southern mountain viscacha, *Lagidium viscacia*, in Boliva in 1986 are here examined, and a new species of *Viscachataenia* is described. The new species has numerous body measurements that are larger than the existing species, *V. quadrata*, but the eggs and corresponding structures of the new species are all smaller than those of *V. quadrata*.

Keywords: Anoplocephalidae, *Viscachataenia*, southern mountain viscacha, *Lagidium viscacia*, parasite, cestode, Boliva

Introduction

The southern mountain viscacha, *Lagidium viscacia* (Molina, 1782), is parasitized by anoplocephalid cestodes representing two genera: *Viscachataenia* Denegri, Dopchiz et al., 2003 and *Monoecocestus* Beddard, 1914. *Bertiella finleyi* Mazza et al., 1932, originally described from *Lagidium viscacia*, has not been reported since its original description. Species of *Monoecocestus* and *Viscachataenia* are likely closely related via a synapomorphy, as the key taxonomic character (the vagina entering the genital atrium anterior to the cirrus) is found in these species to the exclusion of all other anoplocephalines (Beveridge, 1994; Denegri et al., 2003). However, species in these genera can be easily distinguished from one another. *Viscachataenia quadrata* (von Linstow, 1904), the sole representative of the genus, has duplicated genitalia in each proglottid, and all species of *Monoecocestus* have a single set of genitalia per proglottid.

Viscachataenia quadrata has been reported from *Lagidium viscacia* in Argentina by Denegri et al. (2003) and Joyeux and Dollfus (1931), and from *Lagidium peruanum* Meyen, 1833 collected in Peru by Tanteleán et al. (2009). Anoplocephalid cestodes collected from *Lagidium viscacia* in Boliva in 1986 have been examined and are presented here as a new species of *Viscachataenia*.

Materials and Methods

Mammals collected in the field were immediately killed with chloroform and quickly examined for both ecto- and endoparasites (Gardner, 1996). In this specific case, cestodes found were relaxed in fresh spring water, killed, preserved in either 10% hot formalin or 70% ethanol, and transported and stored until study in the solutions used for fixation/preservation. In the laboratory, specimens were stained in Semichon's acetic carmine, dehydrated in an alcohol series, cleared in cedarwood oil, transferred to

xylene, and permanently mounted on slides in Damar gum. Superficial tissues, including tegument and muscles, were removed from the dorsal or ventral surface of last mature segments to observe internal organs. Measurements of the strobila were made with an ocular micrometer. Measurements of segments were made by drawing the segment with the aid of a drawing tube and measuring the subsequently scanned picture with SigmaScan 5.0 (SPSS, Chicago, Illinois). From each strobila studied, 1–3 segments were drawn and measured. Eggs were studied by freeing them from gravid segments, clearing in lactophenol, and mounting temporarily on a microscope slide. Some eggs were released from gravid segments just prior to permanent mounting in Damar gum. Measurements of eggs were made from digital photographs.

Scolex length was measured from the anterior extremity to the posterior margin of the suckers. Neck length was measured from the posterior margin of the suckers to the first visible sign of segmentation. Distribution of testes in segments was measured as the distance between the 2 distal extreme testes (Haukisalmi et al., 2004). Measurements provided include range, mean, and number of measurements, if different than that given initially. When possible, 5 testes were measured per segment and 5 eggs were measured per specimen. Since genitalia are duplicated

in each segment, measurements were taken from only one set of these genitalia, and the sinistral or dextral side was chosen for these measurements more or less at random. All measurements are provided in micrometers unless otherwise specified.

Type specimens were acquired from the Museo de La Plata, Argentina (CHMLP 5066C, D, E) and the Museum d'Histoire Naturelle, Genève (INVE 33493, 22494) and measured using the above methods.

***Viscachataenia boliviensis* n. sp.**

LSID urn:lsid:zoobank.org:act:A20A8AC1-C909-41F0-99C0-022153FC69DA

(Figure 1)

Diagnosis: (Based on 3 specimens and 3 segments): Cestode total length 103–211 mm (154 mm). Maximal width 6,000–7,500 (6,833). Scolex 155–236 (204) long, 537–589 (557) wide. Suckers directed laterad or antero-laterad, 147–177 (163) in diameter. Neck 589–604 (594) long, minimal width 604–707 (646). Adult cestodes have 210–297 (246) segments per strobila. Segments craspedote. Immature segments 115–259 (192) long, 2,070–3,594 (2,885) wide. Length:width ratio of immature segments 0.06–0.07. Mature segments 546–575 (556) long, 6,296–6,411 (6,357)

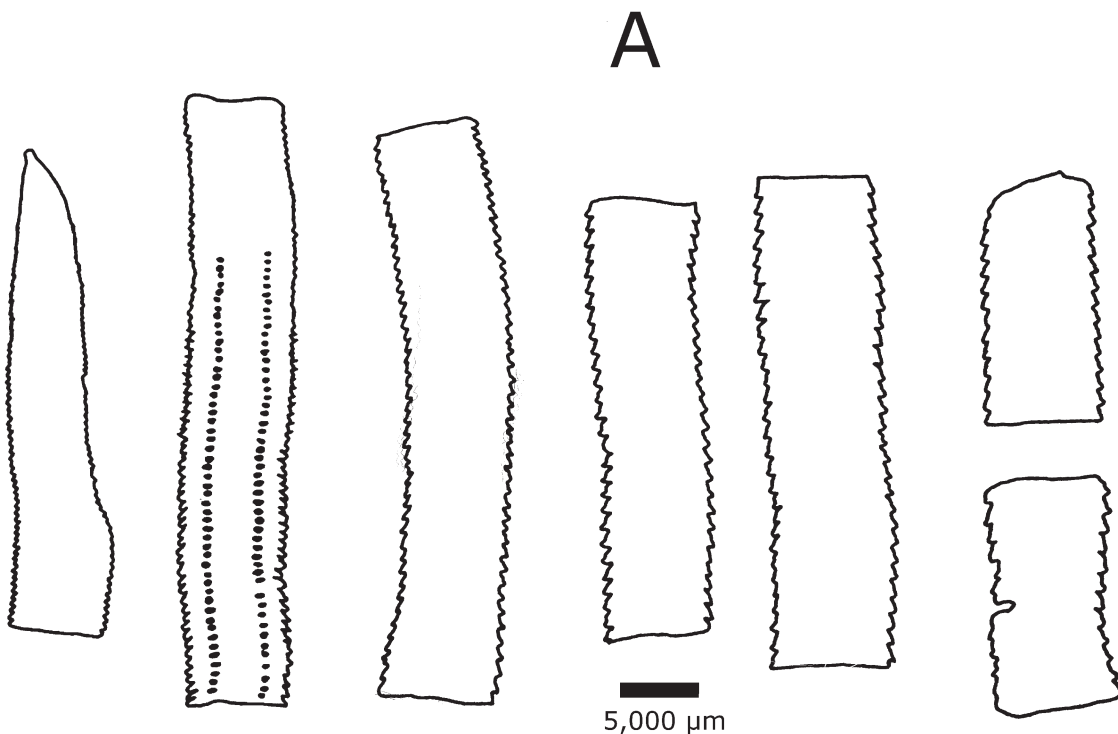
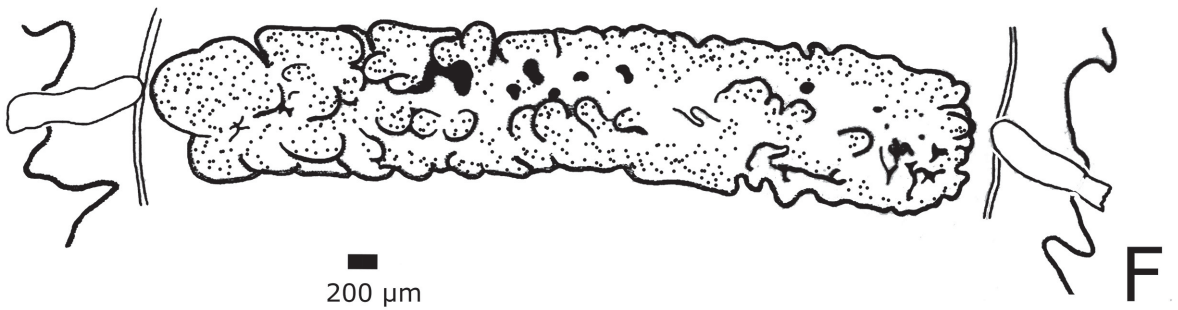
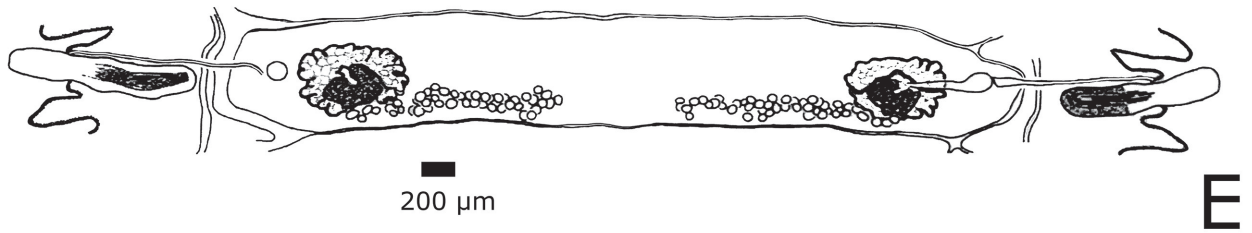
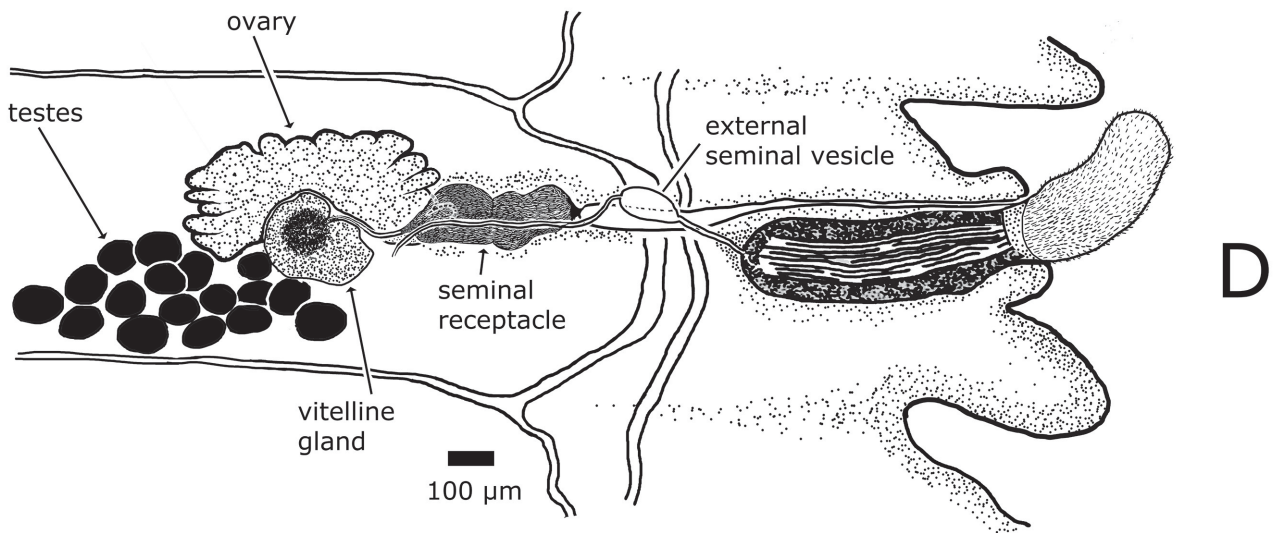
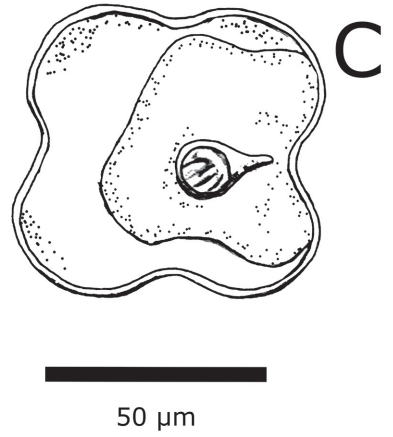
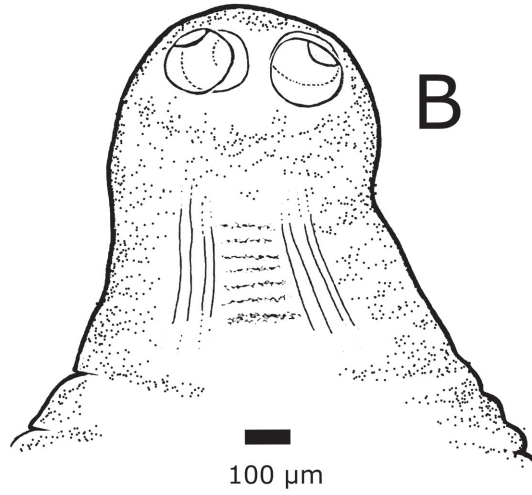


Figure 1. *Viscachataenia boliviensis* n. sp. **A** Full strobila, **B** scolex, **C** egg, **D** genitalia, **E** mature proglottid, and **F** gravid proglottid. Scale bars: A: 5 mm; B, D, E, F: 0.1 mm; C: 0.05 mm



wide. Length:width ratio of mature segments 0.09. Gravid segments 1,121–1,294 (1,208, n = 2) long by 5,003–6,756 (5,880, n = 2) wide. Length:width ratio of gravid segments 0.17–0.26 (0.21). Dorsal osmoregulatory canal distal to ventral canal, 29–33 (30) wide. Ventral osmoregulatory canal 7–70 (32) wide; transverse canal extending across the posterior of the segment at 7–18 (12) wide. Additional anastomoses may project from ventral and transverse canal. Testes number 63–66 (65) for each set of genitalia per segment, each testis 44–66 (57, n = 15) in diameter. Testes posterior in segment, may occasionally intersect transverse osmoregulatory canal; testes proximal to ovary, do not cross midline of proglottid. External seminal vesicle reduced, often absent. Internal seminal vesicle present in immature and mature segments, not seen in later segments. Cirrus spined, often everted. Cirrus highly muscular. Cirrus sac extends proximally to overlap dorsal osmoregulatory canal, rarely extending to ventral osmoregulatory canal. Genitalia paired in each segment. Genital ducts cross osmoregulatory canals dorsally. Ovary 383–427 (398) long, 611–655 (631) wide. Vitelline gland 228–236 (233) long by 287–309 (294) wide; vitelline gland globular. Seminal receptacle ovoid, 110–169 (130) long, 81–132 (100) wide in mature segments. Vagina enters genital atrium anterior to cirrus sac. Vagina visible in segments throughout entire strobila. Vaginal dilation absent. Developing uterus forms a reticulum, fills with eggs to become saccate. No uterine diverticulae observed. Gravid uterus proximal to osmoregulatory canals, rarely extending distally beyond ventral osmoregulatory canal. When uterus does cross ventral canal, it crosses ventrally or dorsally. Eggs 63–77 (69, n = 10) in diameter. Embryophore in the form of pyriform apparatus 18–23 (22, n = 10) long. Oncospheres 7–11 (8, n = 10) in diameter.

Taxonomic summary

Host: *Lagidium viscacia* (Molina, 1782) (Hystricomorpha: Chinchillidae)

Locality: 22 km south, 40 km east of Sajama by road, Estancia Agua Rica, Departamento de Oruro, Bolivia. 3,850 m elevation. Lat. 18°19'53.775"S, long. 68°36'5.04"W. Collected 09-Sep-1986 by S. L. Gardner.

Symbiotype designation: Holosymbiotype: MSB 57185, Division of Mammals, Museum of Southwestern Biology, Albuquerque, New Mexico, USA, field collection numbers: SG122-86, NK14538 for HWML60460A, HWML60460B. Parasymbiotype: MSB 237422, Division of Mammals, Museum of Southwestern Biology, University of New Mexico, Albuquerque, New Mexico, USA, field collection numbers: SG123-86, NK14539 for HWML60462A, HWML60462B.

Prevalence and intensity: 2 of 2 hosts infected with 2 cestodes per host.

Specimens deposited: Harold W. Manter Laboratory of Parasitology, Parasite Collection: HWML60460 B (holotype), HWML60460A, HWML60462B (paratypes), HWML60462A (voucher).

Etymology: This species was named after the country of Bolivia, where the specimens were collected.

Remarks

Viscachataenia boliviensis n. sp. can be distinguished from *V. quadrata* by having a greater scolex diameter (537–589) than *V. quadrata* (400–430), a greater ovary width (611–655) than *V. quadrata* (350–450), a greater vitelline gland width (287–309) than *V. quadrata* (170–220), a lesser pyriform apparatus length (18–23) than *V. quadrata* (33–38), and a smaller oncosphere diameter (7–11) than *V. quadrata* (15–19). While eggs of *V. boliviensis* n. sp. may have 3 or 4 lobes as described from Denegri et al. (2003), most eggs of *V. boliviensis* n. sp. are rounded and do not have the filamentous projections as described from *V. quadrata*.

We agree with Denegri et al. (2003) that the internal seminal vesicle is present in species of *Viscachataenia* but can be slender or unapparent. The internal seminal vesicle was least likely to be seen in mature and post-mature proglottids, especially when the cirrus was everted. Whereas the seminal receptacle in *V. quadrata* was reported to have a highly variable shape (Denegri et al., 2003), the seminal receptacle in *V. boliviensis* is consistently ovoid. The vagina does become dilated prior to the seminal receptacle, reminiscent of the vaginal dilation of several *Monoecocestus* species (Haverkost and Gardner, 2010). This character is further evidence that species of *Monoecocestus* and *Viscachataenia* share a common ancestor.

Measurements of the type specimens were consistent with those taken by Denegri et al. (2003), with the exception of total length. We estimate total length to be 152–161 mm, while Denegri et al. (2003) reports total length to be 185–320 mm. Each specimen is mounted on multiple slides, and it is uncertain which slides belong to each individual based on the labels. Because of the maturity of the proglottids on the additional slides, we conclude that the strobila measured likely belongs to multiple individuals, and a scolex is likely missing from the collection. However, we do not base any of our conclusions on the measurements of total length, and this difference in measurement does not detract from the work done on these specimens. This conclusion does support the idea that more work should be conducted on this group.

As describing new species based on a limited number of specimens can be considered controversial, we briefly offer the following reasons why our work should be recognized. Our specimens are in excellent condition, having been properly relaxed, fixed, and stored in accordance with the protocol written by Gardner (1996) and adopted by the broader scientific community. We have chosen the measurements provided in our differential diagnosis carefully, as our diagnostic measurements have not been shown to vary with fixation methods or show wide variation among individual proglottids. Having 7 absolute measurements to distinguish new species of anoplocephaline cestodes has been adequate in previous studies (Haverkost and Gardner, 2008, 2010a, 2010b). Molecular analysis (Haukisalmi et al., 2004, 2006, 2014) has consistently resulted in the splitting of species (and genera) in this subfamily, indicating that morphological analysis is a conservative approach to species delineation in this group. The type localities of these species are separated by 2,000 km and the Andes Mountains. It is likely that the type locality of *V. quadrata* and *V. boliviensis* has been altered by human agricultural practices, making the collection of additional new specimens unlikely. Thirty-nine years have passed since the collection of the type specimens of *V. boliviensis*, and no new collections have been reported in South America from this genus since. Our intention in publishing this description is to inspire future collections and to encourage further study of these cestodes and of Neotropical helminth taxonomy in general.

Acknowledgments – This work was partially supported by grants (DEB-0717214, BSR-9024816, DEB-0097019, and DBI-0646356) from the National Science Foundation to S. L. Gardner.

Literature Cited

- Beveridge, I. 1994. Family Anoplocephalidae Cholodkovsky, 1902. In: Keys to the Cestode Parasites of Vertebrates. L.F. Khalil, A. Jones, and R.A. Bray (eds.). CAB International, Cambridge. 315–366 p.
- Denegri, G., Dopchiz, M.C., Elissondo, M.C., Beveridge, I. 2003. *Viscachataenia* n. g., with the redescription of *V. quadrata* (von Linstow, 1904) n. comb. (Cestoda: Anoplocephalidae) in *Lagidium viscacia* (Rodentia: Chinchillidae) from Argentina. *Systematic Parasitology* 54: 81–88.
- Gardner, S.L. 1996. Field parasitology techniques for use with mammals. In: Measuring and Monitoring Biological Diversity: Standard Methods for Mammals. D.E. Wilson, F.R. Cole, J.D. Nichols, R. Rudran, M.S. Foster (eds.). Smithsonian Institution Press, Washington, DC. 291–298 p.
- Haukisalmi, V., Hardman, L.M., Hoberg, E.P., and Henttonen, H. 2014. Phylogenetic relationships and taxonomic revision of *Paranoplocephala* Lühe, 1910 sensu lato (Cestoda, Cyclophyllidea, Anoplocephalidae). *Zootaxa* 3873: 371–415.
- Haukisalmi, V., Henttonen, H., Hardman, L.M. 2006. Taxonomy and diversity of *Paranoplocephala* spp. (Cestoda: Anoplocephalidae) in voles and lemmings of Beringia, with a description of three new species. *Biological Journal of the Linnean Society* 89: 277–299.
- Haukisalmi, V., Wickström, L.M., Henttonen, H., Hantula, J., Gubányi, A. 2004. Molecular and morphological evidence for multiple species within *Paranoplocephala omphalodes* (Cestoda, Anoplocephalidae) in *Microtus* voles (Arvicolinae). *Zoologica Scripta* 33: 277–290.
- Haverkost, T.R., Gardner, S.L. 2008. A new species of *Lentiella* (Cestoda: Anoplocephalidae) from *Proechimys simonsi* (Rodentia: Echimyidae) in Bolivia. *Revista Mexicana de Biodiversidad* 79: 99S–106S.
- Haverkost, T.R., Gardner, S.L. 2010a. New species in the genus *Monoecocestus* (Cestoda: Anoplocephalidae) from Neotropical rodents (Caviidae and Sigmodontinae). *Journal of Parasitology* 96: 580–595.
- Haverkost, T.R., Gardner, S.L. 2010b. Two new species of *Andrya* (Cestoda: Anoplocephalidae) from sigmodontine rodents in the Neotropics. *Comparative Parasitology* 77: 145–153.
- Joyeux, C., Dollfus, R.P. 1931. Sur quelques cestodes de la collection du musée de Munich. *Zoologische Jahrbücher. Abteilung für Systematik, Ökologie und Geographie der Tiere* 62: 109–118.
- Tanteleán, M., Sánchez, L., Salízar, P. 2009. *Viscachataenia quadrata* Denegri, Dopchiz, Elissondo & Beveridge, 2003 (Cestoda: Anoplocephalidae) in Peru. *Peruvian Journal of Biology* 16: 129–130.