Annals of Parasitology 2024, 70(2),119–124
doi: 10.17420/ap7002.529

Short note

Thubunaea acostai sp. nov. (Nematoda: Physalopteridae) from the lizard *Liolaemus gracielae* (Squamata: Iguania: Liolaemidae) in Argentina

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ABSTRACT. *Thubunaea acostai* sp. nov. is described and illustrated here, based on specimens found in the digestive tract of *Liolaemus gracielae* in the province of San Juan, Argentina. The new species differs from all other species assigned to *Thubunaea* by the number of caudal papillae. *Thubunaea acostai* sp. nov. has 30–31 papillae (12 pedunculated and 18–19 sessile), differing from other Neotropical species such as *Thubunaea eleodori* with 26 papillae (12 pedunculated and 14 sessile) and *Thubunaea parkeri* with 20 papillae, all pedunculated. The new species represents the third species for the Neotropics and the second described for Argentina.

Keywords: nematodes, *Thubunaea acostai*, *Liolaemus gracielae*, parasitism, lizards, San Juan, Argentina

http://zoobank.org/urn:lsid:zoobank.org:pub:407D3DFC-F182-4858-B2EA-BDFA6288A1A8

Introduction

The Physalopteridae family is divided into three subfamilies: Proleptinae, Physalopterinae and Thubunaeinae. The Thubunaeinae subfamily differs from the rest by the absence of a cephalic collar and numerous caudal papillae with caudal ornamentation [1]. The genus *Thubunaea* Seurat, 1914 is mainly characterized by a symmetrical oral opening, the lateral pseudolabia bear three teeth each [1,2].

Currently 19 species are assigned to *Thubunaea*, all parasites in reptiles [2]; 1 from the Afrotropical region, 5 from the Nearctic region, 2 from the Neotropical region, 6 from the Oriental region, 4 from the Palearctic region and 1 from the Saharo-Arabian region. In the Neotropical region, *Thubunaea parkeri* Baylis, 1926 was described in *Tropidurus occipitalis* Boulenger, 1885 (=*Microlophus occipitalis*) and *Dicrodon calliscelis* Cope, 1876 collected in Peru [3] and *Thubunaea eleodori* Ramallo, Goldberg, Bursey and Castillo, 2016 described in *Liolaemus eleodori* Cei, Etheridge and Videla, 1985 from the province of San Juan, Argentina [2].

Liolaemus gracielae Abdala, Acosta, Cabrera, Villavicencio and Marinero, 2009 is distributed in the provinces of San Juan and La Rioja, Argentina. This species inhabits altitudes above 4000 meters, areas located in the Andes mountains of Argentina. It is an average-sized lizard, about 76 mm long. It is omnivorous and viviparous, with a tendency to frugivory of *L. chañar* and flowers of *Ephedra* sp., with a unimodal pattern of daily activity. The lizards bask during the still cold sunny hours of the morning, and seek shelter below *Lycium chanar* bushes during the warmer time of day [4,5].

The purpose of this paper is to describe a new species of *Thubunaea*, the third species of the genus

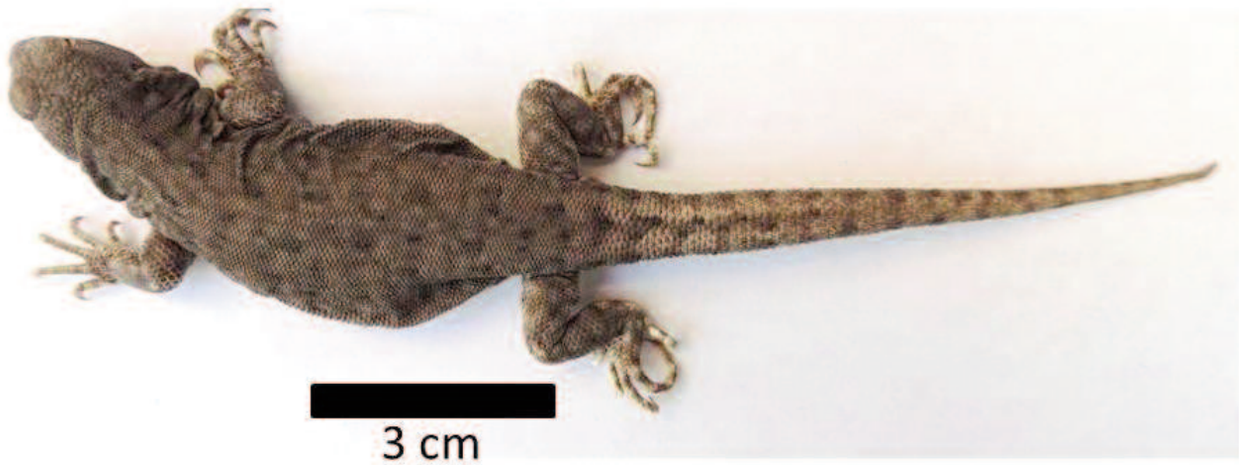

Figure 1. *Liolaemus gracielae*, collected on the way to San Guillermo Provincial Reserve, San Juan Province, Argentina

to be described from the Neotropical region and the second one described for Argentina.

Materials and Methods

Five specimens of *Liolaemus gracielae* (1 male and 4 females) were captured by the loop method, at a road to San Guillermo Provincial Reserve, Province of San Juan (Iglesia Department), during March 2022.

The body cavity was opened by a longitudinal incision from vent to throat, and the gastrointestinal

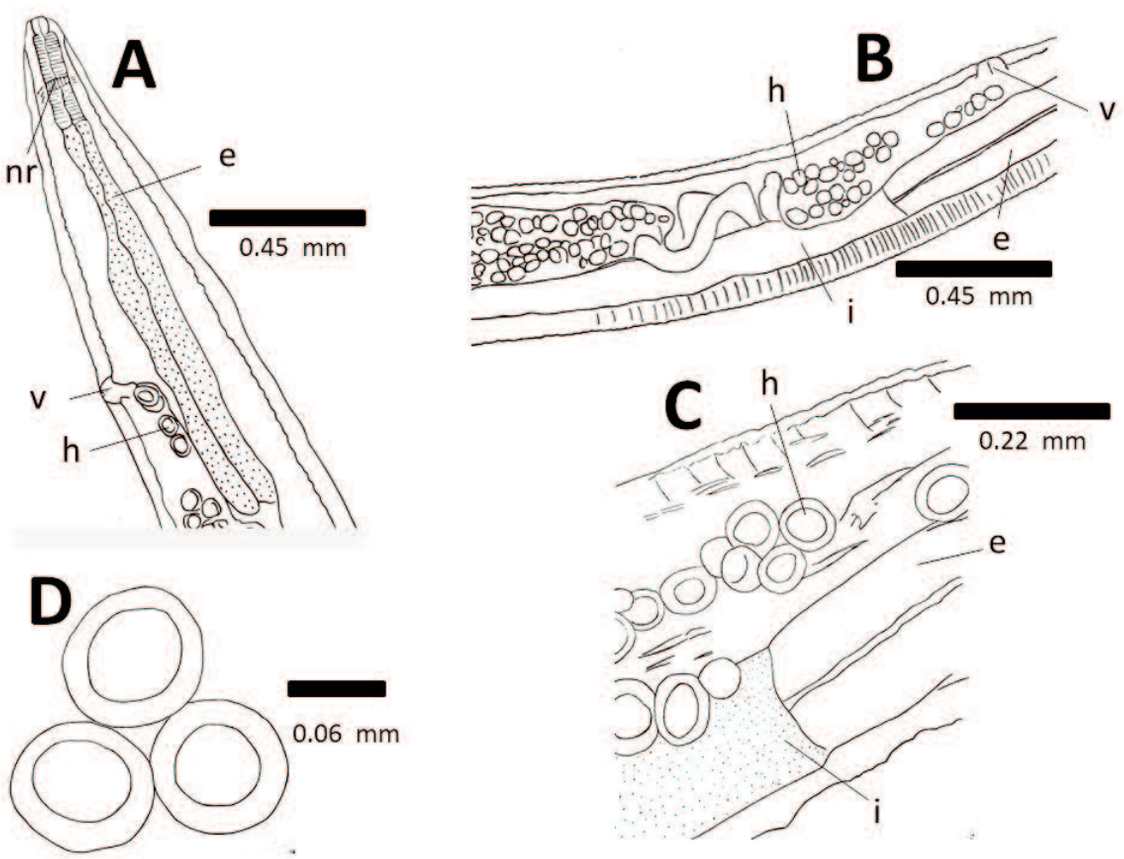

Figure 2. *Thubunaea acostai* sp. nov., gravid female. (A, B and C) anterior view, the vulva and eggs is observed; (C) detail of muscular and glandular esophagus; (D) eggs. nr = nerve ring, e = esophagus, v = vulva, h = eggs, i = intestine

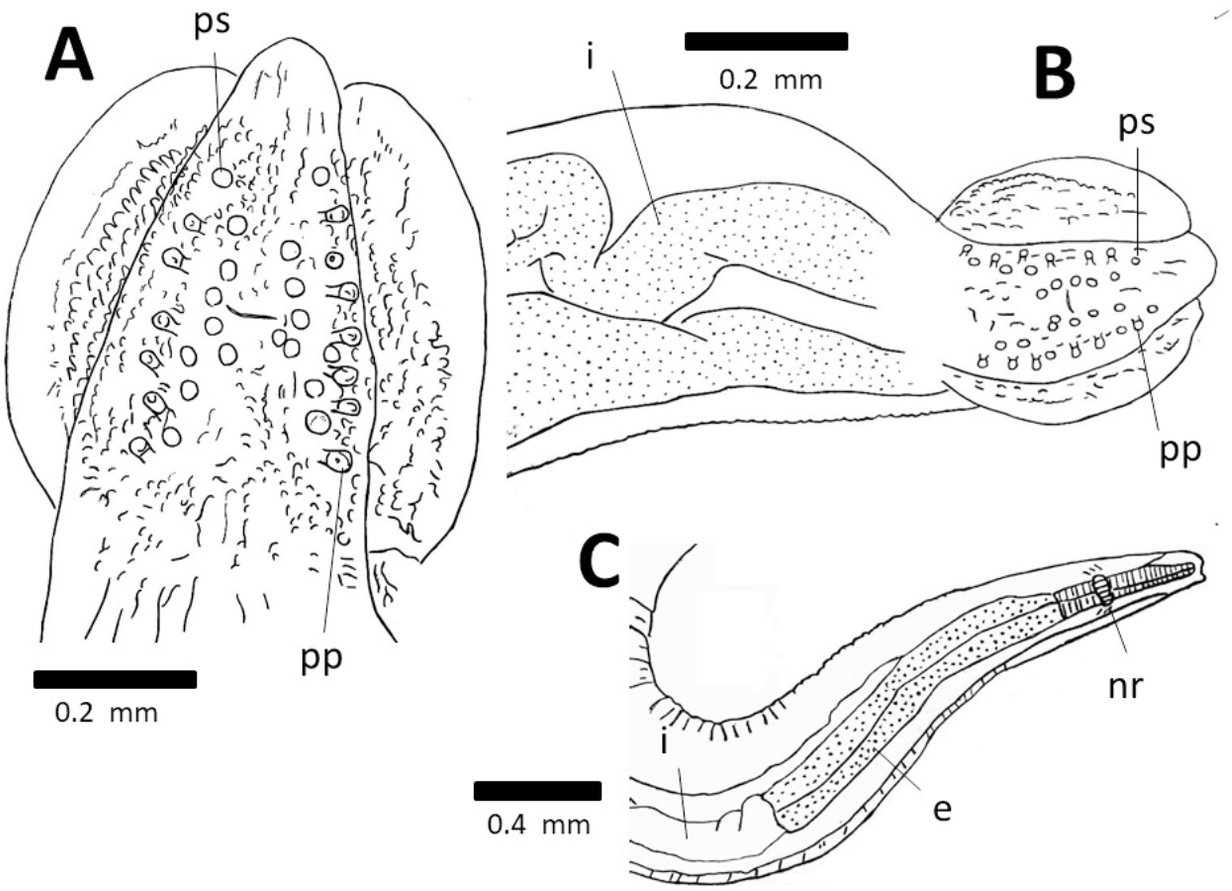

Figure 3. *Thubunaea acostai* sp. nov., male. (A and B) posterior part, ventral view, 12 pedunculated and 18 sessile papillae are observed; (C) anterior view. pp = pedunculated papillae, ps = sessile papillae, i = intestine, e = esophagus, nr = nerve ring

tract was removed and opened longitudinally. The stomach, intestines, cloaca, liver, lungs, gonads, and peritoneum of each specimen were searched for helminths using a stereoscopic binocular loupe. The nematodes found were preserved in 70° ethanol. Subsequently, nematodes were placed in lactophenol, allowed to clear and examined under a light microscope. Drawings were made using a camera lucida. Prevalence and mean intensity were calculated based on the definitions of Bush et al. [6]. Measurements are in mm, with mean ± 1 SD and range in parentheses unless otherwise stated. Nematodes were deposited in the parasitological collection of the Department of Biology, National University of San Juan (UNSJPar 286, 287).

Results

A total of 11 adult nematodes (7 gravid females, 4 males) were collected in the stomach of one specimen of *L. gracielae* (Fig. 1) assignable to *Thubunaea*, but dissimilar to any current species.

Description

Thubunaea acostai sp. nov. (Figs. 2–4), Table 1)

General: Nematodes are medium sized compared to others of the Physalopteridae family. Anterior cephalic region coincides with that mentioned by Baylis [3] and Ramallo et al. [2] for Neotropical species; cephalic end rounded, oral opening with two pseudolabia, each provided with a pair of papillae, a lateral amphid and three teeth. Esophagus is composed of short pharynx, anterior muscular portion, and posterior glandular portion. Nerve ring is encircling muscular portion of the esophagus. Excretory pore opens to exterior just posterior to nerve ring. Vulva is situated in anterior 5.5% of body and slightly swollen lips are clearly observed.

Male (based on 4 adult specimens) (mm): Length (lip to posterior pair of papillae; excludes tail filament) 11.46±0.05 (11.4–11.5); width at level

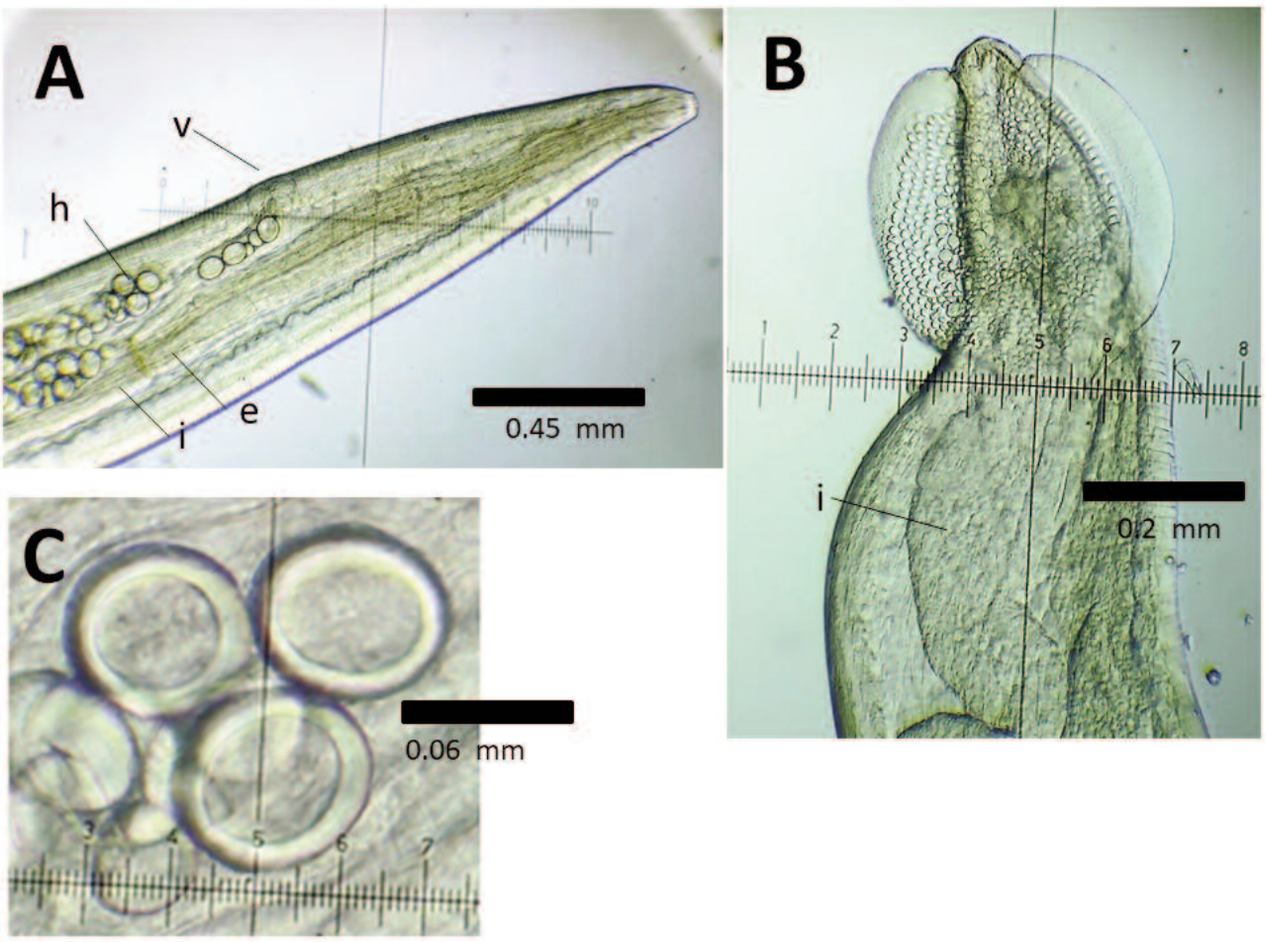

Figure 4. High resolution optical microscope photographs**.** (A) anterior view; (B) posterior part, ventral view; (C) eggs. e = esophagus, v = vulva, h = eggs, i = intestine

of excretory pore 0.39±0.01 (0.38–0.4); muscular esophagus length 0.21±0.01 (0.20–0.22); glandular esophagus length 1.06±0.05 (1–1.1); nerve ring 0.188±0.07 (0.18–0.19) from anterior end; excretory pore 0.20±0.05 (0.19–0.21) from anterior end; spicules not observed. Presence of 30–31 papillae (12 pedunculated and 18–19 sessile).

Female (based on 4 gravid specimens) (mm): Length (to tail spike) 18.17±0.14 (18–18.3); width at level of excretory pore 0.45±0.004 (0.45–0.46); muscular esophagus length 0.25±0.01 (0.24–0.26); glandular esophagus length 1.36±0.05 (1.36–1.37); nerve ring 0.19±0.003 (0.19–0.196) from anterior end; excretory pore 0.21±0.04 (0.20–0.21) from anterior end, vulva 0.97±0.002 (0.97–0.98) from anterior end. Egg width 0.05±0.002 (0.05–0.055); egg length 0.06±0.002 (0.06–0.07).

Taxonomic summary
Type host: *Liolaemus gracielae*
Type locality: Road to San Guillermo Provincial Reserve (28°56'12.3"S, 69°15'31.6"W), Iglesias Department, San Juan Province, Argentina
Site of infection: Stomach
Type specimen: Holotype male, UNSJpar 286
Prevalence: 20%
Mean intensity: 11
Mean abundance: 2.2
Etymology: The specific epithet is given in honor of a Dr. Juan Carlos Acosta (Biólogo/ herpetólogo) researcher at the National University of San Juan, Argentina.

Diagnosis

Thubunaea acostai sp. nov. is the second species described in Argentina. *Thubunaea acostai* is characterized and differentiated from the rest of the species of the genus in possession of 30–31 papillae (12 pedunculated and 18–19 sessile).

Table 1. Comparative measurements of males and females of the three Neotropical species of *Thubunaea*

	Thubunaea parkeri (mm)	*Thubunaea eleodori* (mm)	*Thubunaea acostai* sp. nov. (mm)
Male			
Length (mm)	10.5	10.25	11.46
Width	0.3–0.34	0.36	0.39
Muscular esophagus	0.22–0.38	0.17	0.21
Glandular esophagus	1.1–1.75	0.99	1.06
Nerve ring	0.19–0.24	0.18	0.18
Excretory pore	0.3–0.35	0.21	0.20
Spicule	not observed	not observed	not observed
Tail length	0.25	0.24	0.24
Papillae number	16–20	26	30–31
Female			
Length (mm)	14.5–18	17.20	18.17
Width	0.4–0.44	0.39	0.45
Muscular esophagus	–	0.23	0.25
Glandular esophagus	–	0.98	1.36
Nerve ring	–	0.19	0.19
Excretory pore	–	0.20	0.21
Vulva	3–3.5	1.33	0.97
Egg length	0.0625	0.048	0.06
Egg width	0.0575	0.041	0.05
Egg form	–	oval	oval
Author	Baylis, 1926	Ramallo, Goldberg, Bursey, Castillo and Acosta 2016	Castillo and González-Rivas
Country	Perú	Argentina	Argentina
Host	*Tropidurus occipitalis* and *Dicrodon calliscelis*	*Liolaemus eleodori*	*Liolaemus gracielae*

Discussion

Currently, 2 species of *Thubunaea* are known in the Neotropical region; *Thubunaea parkeri* collected in Peru [3] and *T. eleodori* collected in Argentina [2]. However, Pérez et al. [7] recorded *Thubunae iguanae* Telford, 1965 in *Microlophus peruvianus* Lesson, 1826 and *Microlophus thoracicus thoracicus* Tschudi, 1845 lizards in Peru, although these species were originally described in the United States and Mexico [8].

Species of *Thubunaea* are distinguished on the basis of the pattern and numbers of caudal papillae (pedunculated and sessile), position of the vulva and

geographical distribution [2]. The described species *T. acostai* is similar to *T. iguanae*, *T. eleodori* and *T. schukurovi* Annaev, 1973 by the presence of 12 pedunculated papillae, however, it differs in the number of sessile papillae: *T. acostai* 18–19, *T. iguanae* 10–18, *T. eleodori* 14 and *T. schukurovi* 16 sessile papillae, correspondingly [2,8]. *Thubunaea acostai* differs from *T. eleodorí* in the position of the vulva: in *T. eleodori* vulva is situated in anterior 10% of body and *T. acostai* vulva is situated in anterior 5.5% of body.

In addition, these species correspond to different biogeographical regions; Neotropical (*T. acostai* and *T. eleodori*), Nearctic (*T. iguanae*) and Palearctic (*T. schukurovi*) [2]. *Thubunaea acostai* is similar to *T. eleodori* and *T. parkeri*, in which spicules are not observed.

Our paper describes third *Thubunaea* species for the Neotropical region, second species of genus described for Argentina and first record of parasitism in *L. gracielae* in the San Juan province.

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Received 23 November 2023
Accepted 24 July 2024