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Taxonomy and systematics

A new species of *Heteromyoxyuris* (Nematoda: Oxyuridae), parasite of *Dipodomys* spp. (Rodentia: Heteromyidae) from Mexico

Una nueva especie de Heteromyoxyuris *(Nematoda: Oxyuridae), parásito de* Dipodomys *spp. (Rodentia: Heteromyidae) de México*

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Abstract

A new species of *Heteromyoxyuris*, parasitic on the caecum of *Dipodomys merriami* and *Dipodomys ordii* from the Mexican Plateau, is described and illustrated. This species differs from the other 3 species by the absence of lateral alae in both sexes and resembles males of *Heteromyoxyuris deserti* by the presence of a pair of caudal cuticular inflations. The distribution of the 4 species of *Heteromyoxyuris* coincides with the geographical distribution of the heteromyid rodent subfamilies Dipodomyinae and Perognathinae across the deserts and arid lands of USA and Mexico. A key to the species of *Heteromyoxyuris* is provided. *Heteromyoxyuris garciaprietoi* n. sp. is the fourth species described for the genus and the second described for Mexico.

Keywords: Chihuahua; Guanajuato; Semi-arid regions; *Heteromyoxyuris garciaprietoi* n. sp.; *Dipodomys* spp.; Parasites

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Resumen

En el presente estudio, una especie nueva del género *Heteromyoxyuris*, parásita del ciego intestinal de *Dipodomys merriami* y *Dipodomys ordii* del Altiplano mexicano se describe e ilustra. Esta especie se diferencia de las otras especies por la ausencia de alas laterales en ambos sexos y se asemeja a los machos de *Heteromyoxyuris deserti* por la presencia de 1 par de inflaciones cuticulares en la región caudal. La distribución del género *Heteromyoxyuri*s coincide con la distribución de las subfamilias de roedores heterómidos Dipodomyinae y Perognathinae en los desiertos y tierras áridas de EUA y México. Se presenta una clave para las especies del género *Heteromyoxyuris*. *Heteromyoxyuri*s *garciaprietoi* n. sp. es la cuarta especie del género y la segunda descrita para México.

Palabras clave: Chihuahua; Guanajuato; Regiones semiáridas; *Heteromyoxyuri*s *garciaprietoi* n. sp.; *Dipodomys* spp.; Parásitos

Introduction

The genus *Dipodomys* (Heteromyide: Dipodomyinae) includes 20 species of kangaroo rats occurring throughout the arid and semi-arid regions of western North America, including both warm and cold deserts, grasslands, and chaparral, reaching semi-desert habitat at the Tehuacán–Cuicatlán Valley of southern Puebla and northern Oaxaca, Mexico (Alexander & Riddle, 2005; Fernández et al., 2012, 2014).

Ten valid species of *Dipodomys* have been recorded in Mexico (Fernández et al., 2014); however, their parasitic helminths have been neglected. To our knowledge, *Dipodomys merriami* Mearns, 1890, *Dipodomys ordii* Woodhouse 1853, and *Dipodomys phillipsi* Gray, 1841 are hosts of 2 species of cestode and 10 species of nematodes; it is noteworthy that the specific composition of these parasite communities varies among the 3 host species (further details on their parasites can be found in Preisser & Falcón-Ordaz, 2019). Notably, these 3 kangaroo rat species ecogeographically coincide within the tropical subtropical desert environment North and Central American ecosystems; *D. merriami* and *D. phillipsii* are exclusively inhabitants of the tropical and subtropical desert. In contrast, *D. ordii* is found in this ecoregion and extends its range to include the temperate steppe, temperate desert, and tropical and subtropical steppe (Alexander & Riddle, 2005).

To date, *Heteromyoxyuris* Quentin, 1973 (Nematoda: Oxyuridae) is distributed in deserts and arid lands of North America (Table 1), and comprises 3 species: *Heteromyoxyuris deserti* (Read and Millemann, 1953), with a primary distribution in the Chihuahuan Desert (localities detailed in Table 1); *Heteromyoxyuris longejector* (Hannum, 1943), found mainly in the Mexican Plateau; and *Heteromyoxyuris otomii* García-Prieto, Falcón-Ordaz, Lira-Guerrero, and Mendoza-Garfías, 2008, which is endemic to the Mexican Plateau. Within the family Heteromyidae, 3 rodent genera — *Chaetodipus* (pocket mice), *Dipodomys* (kangaroo rats), and *Perognathus* (silky pocket mice— are parasitized by these species of nematodes (García-Prieto et al., 2008; Table 1). *Heteromyoxyuris longejector* is the most widely distributed species in Mexico (Martínez-Salazar et al., 2016; Iturbe-Morgado et al., 2017), although both *H. longejector* and *H. otomii* have been found parasitizing 3 genera across the country (Table 1).

During a monitoring of Heteromyid rodent helminth parasites in the Mexican Plateau, many nematodes of an undescribed *Heteromyoxyuris* species were found in the caecum of *D. merriami* and *D. ordii*. The aim of this study is to describe a new species of the mentioned genus. In addition, a key to the species of *Heteromyoxyuris* is provided.

Materials and methods

In December 2015, 4 *D. merriami* and 1 *D. ordii* were trapped and collected in Sherman live-trap and subsequently euthanized following the standard procedures and techniques of the guidelines of the American Society of Mammologists (Kelt et al., 2010; Sikes & The Animal Care and Use Committee of the America Society of Mammalogists, 2016), under permit FAUT-0306 (issued to JAF), from 4.6 km S Ejido Mayran (25º37’48” N, 102º50’5.1” W; 1,091 m asl), municipality of San Pedro de las Colonias, Coahuila, Mexico. The viscera of the rodents were taken out and were fixed in 4% formalin. Intestinal samples were examined for helminths in June 2019. The skins and skulls of the specimens were deposited in the Colección de Mamíferos of the Universidad Autónoma de Chihuahua (UACH-M), with the numbers UACH-M152 for *D. ordii* and UACH-M153 for *D. merriami*.

In addition, specimens of *Heteromyoxyuris* sp. isolated from *D. merriami* and deposited at the Colección Nacional de Helmintos (CNHE), Instituto de Biología,

Table 1
Distribution of the genus *Heteromyoxyuris* in deserts and arid lands of North America (DALNA).

Species	Host	Locality and Country	DALNA*	Reference
H. deserti	*Dipodomys deserti*	Lincoln County, Nevada, USA	MD	Quentin, 1973
				King & Babero, 1974
	D. merriami	Victorville, California, USA	SD	Read & Millemann, 1953
		Lincoln County, Nevada, USA	MD	King & Babero, 1974
				Quentin, 1973
		Socorro County, New Mexico, USA	ChD	Decker et al., 2001
		Otero County, New Mexico, USA	ChD	Fedynich et al., 2001
	Dipodomys heermanni morroensis (Merriam, 1907)	Morro Bay, California, USA	ODA	Read & Millemann, 1953
	D. ordii	Ward County, Texas, USA	ChD	Garner et al., 1976
		Socorro County, New Mexico, USA	ChD	Decker et al., 2001
	Dipodomys panamintinus (Merriam, 1894)	Palmdale, California, USA	SD	Read & Millemann, 1953
	D. spectabilis	Socorro County, New Mexico, USA	ChD	Decker et al., 2001
	Perognathus flavus	Socorro County, New Mexico, USA	ChD	Decker et al., 2001
H. longejector	*Chaetodipus* sp.	Loreto, Zacatecas, Mexico	MP	Martínez-Salazar et al., 2016
		Pánuco, Zacatecas, Mexico	MP	Martínez-Salazar et al., 2016
		Villa de Cos, Zacatecas, Mexico	MP	Martínez-Salazar et al., 2016
	Ch. eremicus	Mazapil, Zacatecas, Mexico.	MP	Iturbe-Morgado et al., 2017
	Ch. hispidus	Hidalgo, Durango, Mexico	MP	Iturbe-Morgado et al., 2017
		San Luis de La Paz, Guanajuato, Mexico	MP	Iturbe-Morgado et al., 2017
		Villa de Reyes, San Luis Potosí, Mexico	MP	García-Prieto et al., 2008
	D. merriami	Arizona, USA	UNK	Hannum, 1941
		Washington County, Utah, USA	CP	Bienek & Klikoff, 1974
		Pánuco, Zacatecas, Mexico		Martínez-Salazar et al., 2016
		Villa de Cos, Zacatecas, Mexico	MP	Martínez-Salazar et al., 2016
		Mazapil, Zacatecas, Mexico	MP	Iturbe-Morgado et al., 2017
	Perognathus sp.	Clark County, Nevada, USA	MD	Quentin, 1973
	P. amplus	Mazatán, Sonora, Mexico	SD	García-Prieto et al., 2008
	Perognathus californicus Merriam, 1889	Monterrey, California, USA	ODA	Quentin, 1973

Table 1. Continued

Species	Host	Locality and Country	DALNA*	Reference
	Peromyscus sp.	Ojo Caliente, Zacatecas, Mexico	MP	Martínez-Salazar et al., 2016
	Sylvilagus floridanus	Payne County, Oklahoma, USA	ODA	Boggs et al., 1990
H. otomii	*P. flavus*	San Luis de La Paz, Guanajuato, Mexico	MP	Iturbe-Morgado et al., 2017
		Ajacuba, Hidalgo, Mexico	MP	García-Prieto et al., 2008
H. garciaprietoi n. sp.	*D. merriami*	San Luis de La Paz, Guanajuato, Mexico	MP	Iturbe-Morgado et al., 2017
	D. merriami	San Pedro de las Colonias, Coahuila, Mexico	MP	this study
	D. ordii	San Pedro las Colonias, Coahuila, Mexico	MP	this study

*Mexican Plateau (MP); Great Basin Desert (GBD); Mohave Desert (MD); Sonora Desert (SD); Outside desert areas (ODA); Chihuahua Desert (ChD); Unknown (UNK); Colorado Plateau (CP).

Universidad Nacional Autónoma de México (IB-UNAM), Mexico City, Mexico, were examined. The nematodes were obtained from the caecum of the host and stored in 70% ethanol. The specimens were cleared on temporary slides by an immersion in a solution of glycerol and 70% ethanol (2:1). Transverse sections were made at different levels of the body in both sexes using a razor blade and placed in semi-permanent preparations. Photographs and measurements were taken using a Zeiss microscope, which was equipped with an Axiocam ERc5s and a calibrated ocular millimeter. For scanning electron microscopy (SEM) observations, 4 males and 4 females (2 of each sex per locality; these specimens were previously measured in the morphological study and correspond with the paratype series) were dehydrated in a series of graded ethanol solutions, followed by critical point drying with carbon dioxide. Six specimens (3 from Coahuila and 3 from Guanajuato) were coated with a gold-palladium mixture and examined in a Hitachi S-2460 N SEM (Hitachi, Tokyo, Japan) at 15 kV.

The species description is based on specimens parasitizing 2 species of *Dipodomys* (*D. ordii* and *D. merriami*) from the states of Coahuila and Guanajuato; measurements of *D. merriami* specimens collected in Coahuila and Guanajuato are provided in Table 2. All measurements are given in micrometers (µm), unless otherwise indicated. The measurements are reported as a range, with the mean and standard deviation in parentheses. Also, the measurements of the holotype and allotype are included in brackets. The specimens were deposited in the CNHE, IB-UNAM.

Description

Family Oxyuridae Cobbold, 1864
Genus *Heteromyoxyuris* Quentin, 1973
Heteromyoxyuris garciaprietoi n. sp. Falcón-Ordaz and Martínez-Salazar
(Figs. 1-3)
http://zoobank.org/urn:lsid:zoobank.org:act:716F4F32-F0BE-473C-95AB-7297A8635510

General description (based on 57 individuals, 17 males and 40 females). Nematodes small and robust. Mouth with 3 strong teeth (Fig. 1A); females with 3 interlabial processes, 2 latero-dorsal and 1 ventral (Fig. 1B). Cephalic end with 2 circles of 4 papillae each; external circle simple papillae (Fig. 1C), clearly differentiated; amphids located at external circle of papillae. Cephalic region separated from body by deep groove (Fig. 1D). Males with a pair of caudal cuticular inflations and tail acute (Fig. 1E). Females with conical tail. Excretory pore situated in first third of body. In cross sections at different levels of the body, lateral alae are not observed in either sex (Fig. 2A-F).

The measurements of the *Dipodomys ordii* specimens from Coahuila are given below, while those of *Dipodomys merriami* from Guanajuato and Coahuila are presented in Table 2.

Male (based on holotype and 4 paratypes): body 2.9-3.7 (3.2±0.3) mm long and 202.5-222.5 (211±10.5) width at mid-body. Esophagus length 105-437.5 (351±139); esophageal bulb 95-110 (100.5±6.7) long and 92.5-120 (102.5±12) wide. Nerve ring and excretory pore located

Table 2

Measurements of paratype specimens (min.-max., mean ± standard deviation) of *Heteromyoxyuris garciaprietoi* n. sp., parasite of *Dipodomys merriami* from Guanajuato and Coahuila.

Locality	San Luis de La Paz		San Pedro de las Colonias	
State	Guanajuato		Coahuila	
Sex	Male, n = 8	Female, n = 16	Male, n = 4	Female, n = 8
Length (mm)	2.52-3.55 (3±0.34)	7.30-12.45 (10.48±1.66)	1.78-2.8 (2.5±0.5)	9.1-11 (10.1±8)
Maximum diameter	182.5-232.5 (218.12±17.81)	265-472.5 (373.9±69.52)	125-180 (159.3±26.3)	360-455 (411.5±35.5)
Esophagus with bulb				
Length	325-425 (381.25±32)	550-725 (629.68±48.49)	345-392.5 (372.5±20.1)	570-630 606.2±21.3)
Esophageal bulb				
Length	70-100 (89.37±10.66)	100-162.5 (134.68±18.43)	77.5-92.5 (82.5±7)	110-132.5 (126.2±9)
Width	72.5-120 (92.81±14.72)	107.5-170 (141.25±19.4)	72.5-90 (81.8±8.2)	140-157.5 (150±6)
Nerve ring	95-132.5 (113.43±11.72)	130-370 (196.1±55.55)	82.5-145 (105±28.3)	165-195 (176.2±15.2)
Excretory pore	177.5-870 (671±235.14)	1.18-1.80 mm (1.48±0.22)	215-350 (273.7±61.1)	1.2-1.6 mm 1.4±0.12
Spicule length	77.5-80 (78.33±1.44)		75-80 (77.5±3)	
Gubernaculum length	22.5-27.5 (24.5±2.09)		25-27.5 (26.6±1.44)	
Vulva		3.0-4.8 mm (3.84±0.59)		3.8-4.4 mm (4.1±0.22)
Ovejector		300.0-620 (434.54±96.47)		250-362.5 (318.4±38.2)
Anus*	100-157.5 (129.64±20.12)	0.85-1.47 mm (1.23±0.17)	105-145 (126±20)	0.96-1 mm (1±0.04)
Tail length	70-127.5 (95.93±19.95)		85-87.5 (86.2±1.4)	
Caudal cuticular inflation	70-127.5 (96±20)		192.5-255 (221.8±28.3)	
Eggs				
Length		100-112.5 (107.63±4.23)		97.5-112.5 (105.3±3.8)
Width		30-40 (35.76±2.80)		30-40 (34.2±2.4)

*In male is cloaca and in females is anus.

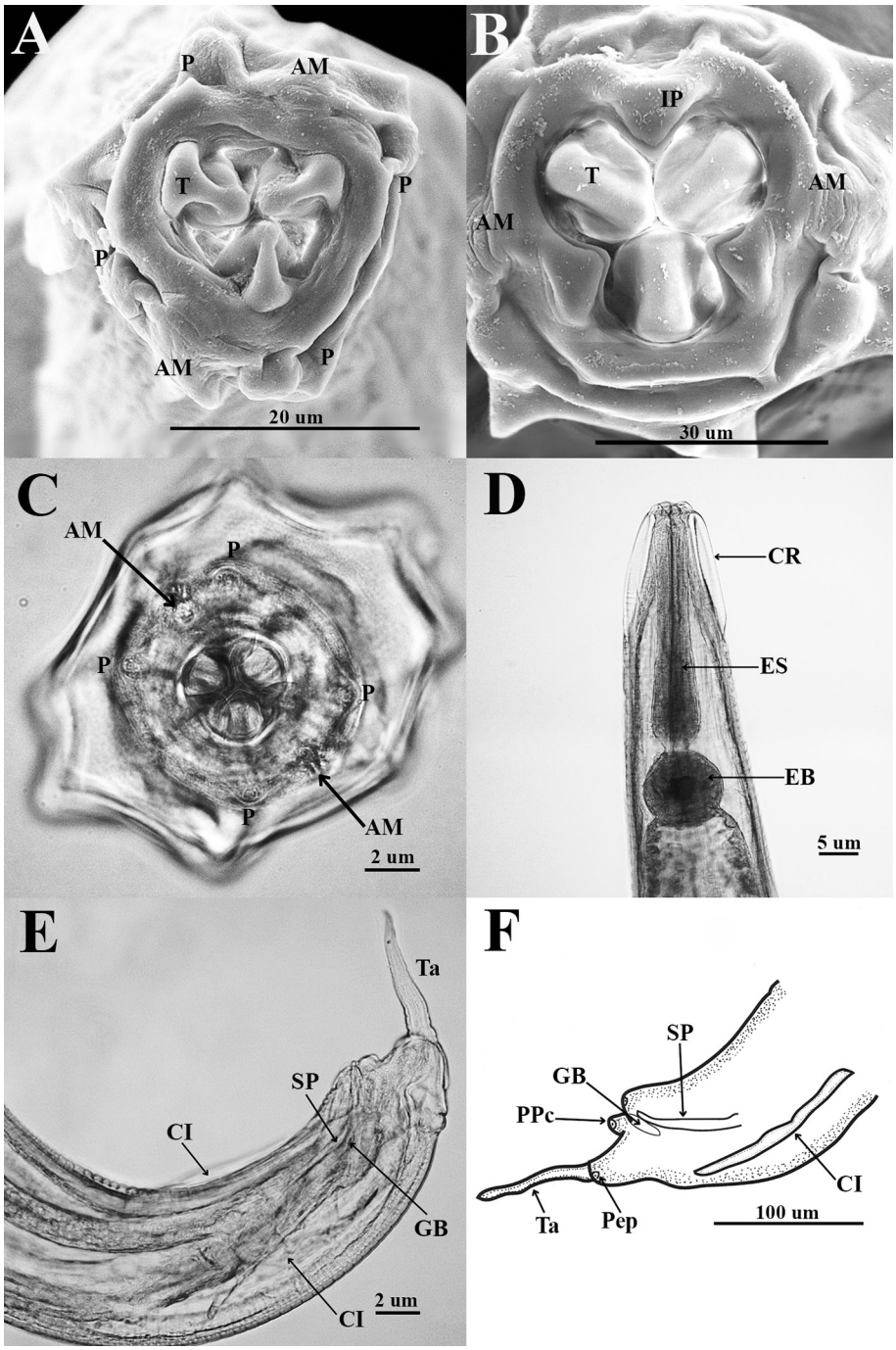

Figure 1. *Heteromyoxyuris garciaprietoi* n. sp., scanning electron micrographs. A, Male, apical view, amphids (AM), papillae (P), and tooth (T); B, female, apical view, interlabial processes (IP). Micrographs; C, male, apical view; D, lateral view of the cephalic region (CR), showing the esophagus (ES) and the esophageal bulb (EB); E, lateral view of the caudal region, showing cuticular inflation (CI), spicule simple (SP), gubernaculum (GB), and tail (Ta); F, line drawing of the caudal region, showing the same structures as in Figure (E), plus a pair of preanal papillae (PPc) and pedunculated papillae (Pep).

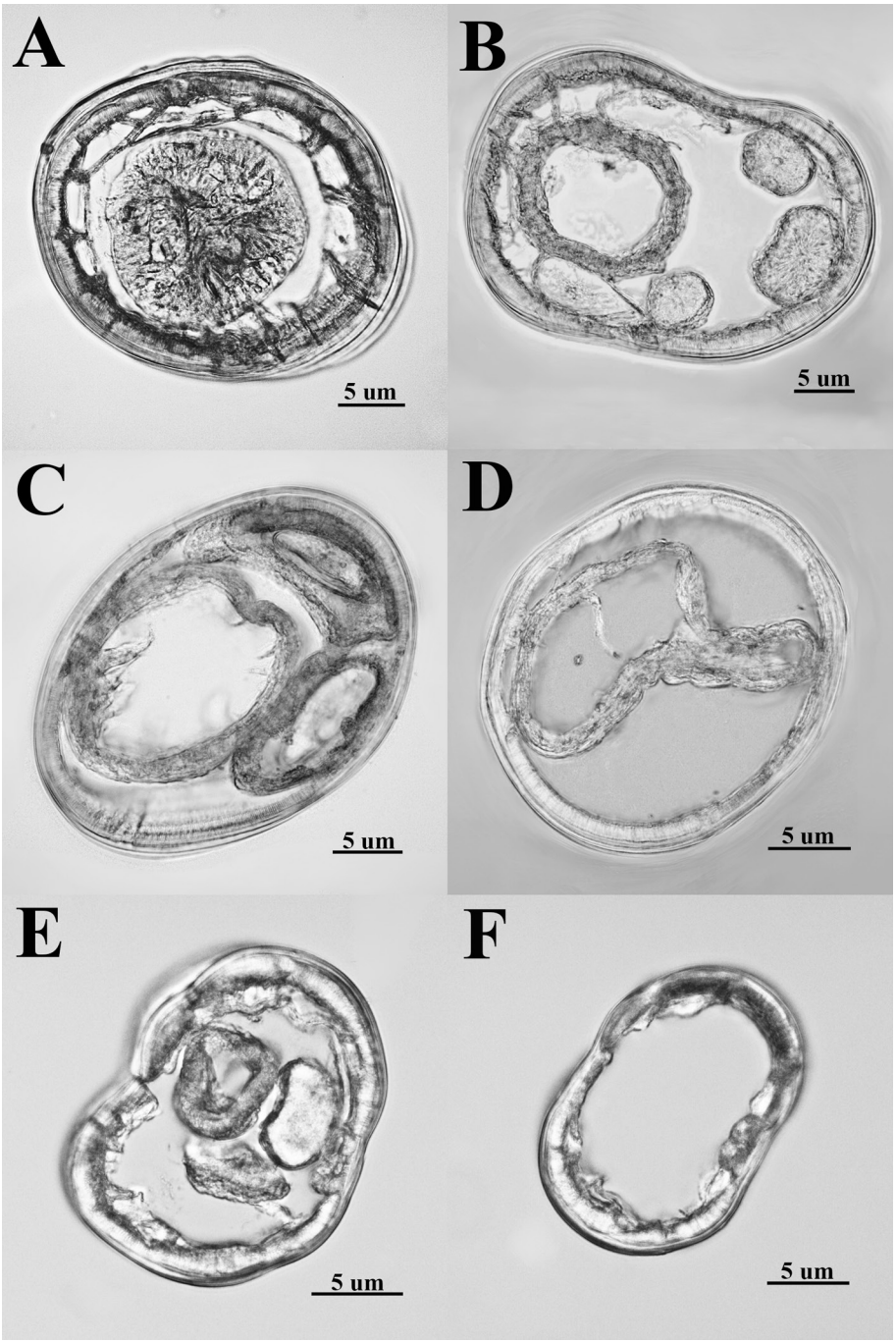

Figure 2. *Heteromyoxyuris garciaprietoi* n. sp. parasite of *Dipodomys ordii* from Coahuila, Mexico, cross section at different levels of the body. Micrographs. Female: A, at the level of the esophageal bulb; B, at mid-body; C, posterior to the middle region; D, in the caudal region. Male: E, at mid-body; F, in the caudal region.

at 85-130 (108.5±17.2), and 490-567.5 (540.5±27), from anterior end, respectively. Spicule simple 75-82.5 (79.3±3.14) in length; gubernaculum 20-27.5 (24±3) long (Fig. 1E, F). Tail 127.5-137.5 (132±4.1) long; tail reduced to slender appendage 90-117.5 (100±16) in length. In the caudal region, the specimens exhibit a cuticular inflation 182.5-255 (207.5±17.5) long. Caudal sessile papillae arranged as follows: 1 preanal pair and 2 postanal pairs; posterior pair fused. One additional pair of pedunculated papillae located laterally at beginning of caudal filament containing phasmidia (Fig. 3A-C).

Female (based allotype and 15 paratypes): length 8.0-12.1 (11±1.4) mm, width 270-457.5 (386.2±0.7) at mid-body level. Esophagus length 590-680 (645±35.8); esophageal bulb 130-147.5 (139±7.7) long by 130-187.5 (158.1±20.6) wide. Nerve ring and excretory pore located at 125-207.5 (166.2±23), and 1.21-1.69 (1.4±0.1) mm from anterior end, respectively. Vulva opening at 3.1-5.3 (4.2±0.7) mm from anterior end. Ovejector 257.5-390 (338.7±44.7) long (Fig. 3D). Tail conical, 1.0-1.4 (1.1±0.1) mm long (Fig. 3E). Eggs without operculum, 97.5-112.5 (105.2±4.6) long by 30-40 36.3±3.2) wide (Fig. 3F).

Taxonomic summary

Type host: *Dipodomys ordii* (UACH-M152)

Type locality: 4.6 km S Ejido Mayran (25º37'48" N 102º50'5.1" W; 1,091 m asl), municipality of San Pedro de las Colonias, Coahuila, Mexico.

Site of infection: intestinal caecum.

Type specimens: holotype male (CNHE 12143); allotype female (CNHE 12144); paratypes: 8 males and 4 females (CNHE 12145).

Etymology: the new species was named in honor of MSc. Luis García-Prieto (IB-UNAM, Mexico) for his important and invaluable contribution to Mexican parasitology.

Other hosts and localities: *Dipodomys merriami,* 4.6 km S Ejido Mayran, municipality of San Pedro de las Colonias, Coahuila, Mexico (CNHE 12146); 3 km N San Luis de La Paz, Guanajuato, Mexico (CNHE: 9832).

Remarks. Hereromyoxyuris was established by Quentin in 1973 and currently comprises 4 species: *H. longejector*, *H. deserti*, *H. otomii* (Quentin, 1973; García-Prieto et al., 2008), and *H. garciaprietoi* n. sp. The new species is characterized by the presence of 2 circles of 4 cephalic papillae (which are double in external circle), a mouth opening surrounded by 3 interlabia (1 ventral and 2 laterodorsals), containing 3 thick teeth, a strongly muscular vagina and nonembryonated eggs, lacking opercula. The new species is unique in that it is the only one with a smooth cuticle, not featuring lateral alae in worms of either sex. In contrast, *H. deserti* exhibits simple lateral alae located on both sides of the body. The males of both *H. deserti* and the new species feature caudal alae (caudal cuticular inflation) on the caudal region. These alae are more prominent in *H. deserti* (Fig. 4, in Quentin, 1973) than in the new species. In comparison to the new species, both *H. longejecto*r and *H. otomii* possess double alae on both sides of the body. The new species is found in 2 localities of the Mexican Plateau, where it parasitizes 2 species of the genus *Dipodomys*.

Also, the morphometry of specimens from Guanajuato and Coahuila is consistent with the same morphological characteristics (Table 2). Notably, the males present a caudal cuticular inflation (Fig. 4A); the arrangement of the papillae in the caudal region is the same as that described above (Fig. 4B). Both sexes lack lateral alae (Fig. 4 C-E).

The distribution of the genus *Heteromyoxyuris* coincides with the geographic distribution of the heteromyid rodent subfamilies Dipodomyinae (6 species) and Perognathinae (7 species) (Morrone, 2005; Omernik, 1987). Despite a record of *H. longejector* in *Sylvilagus floridanus* (J. A. Allen, 1890) (Lagomorpha: Leporidae] from Oklahoma, USA, this finding remains unverified due to the absence of a voucher specimen [therefore, we have excluded this data from our work; Boggs et al., 1990]).

Biogeographic studies of North American and Mexican deserts and drylands frequently reveal an east-west division of closely related species, with sister species often limited to the eastern (Chihuahuan) and western (Mojave and Sonoran) deserts (Ayoub & Riechert, 2004; Devitt, 2006; Douglas et al., 2006; Jaeger et al., 2005; Wilson & Pitts, 2010). The distribution pattern observed is presumably present in the *Heteromyoxyuri*s host-parasite system. To confirm our hypothesis of a mirrored distribution pattern, initially we need to undertake phylogenetic analyses and exploratory studies in regions that match the host distribution.

In Mexico, *Heteromyoxyuris* has been found in Coahuila, Durango, Guanajuato, San Luis Potosí, and Zacatecas (Table 1). Most records of this nematode genus are associated with Heteromyidae, including hosts such as *Chaetodipus eremicus* (Mearns, 1898), *Chaetodipus hispidus* (Baird 1858), *Chaetodipus* sp., *Dipodomys merriami*, *Dipodomys ordii*, *Perognathus amplus* Osgood, 1900, and *Perognathus flavus* Baird, 1855. Only 1 record exists in Cricetidae, specifically in *Peromyscus* sp. *Heteromyoxyuris deserti* and *H. longejector* are of particular interest for biogeographic studies due to their wide distribution across the deserts and drylands of North America. The evidence suggests that both *H. longejector* and *H. deserti* are generalist parasites, infecting a wide range of hosts: 9 and 7 species, respectively (Table 1). It is noteworthy that *H. deserti* has been documented

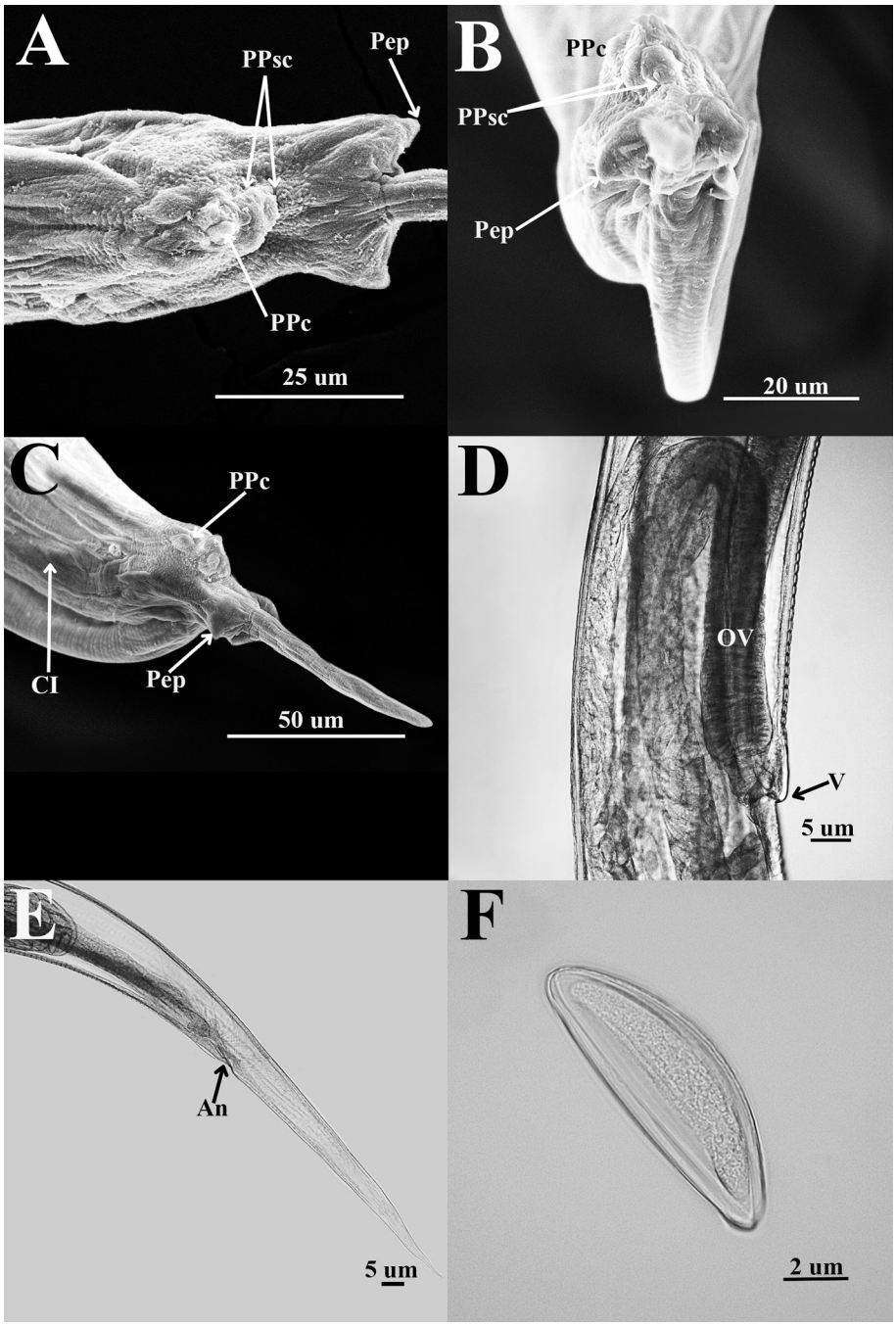

Figure 3. *Heteromyoxyuris garciaprietoi* n. sp. scanning electron micrographs. Male caudal extremity: A, ventral view showing sessile papillae, 1 preanal pair (PPc), 2 postanal pairs (PPsc), and pair of pedunculated papillae (Pep); B, caudal view showing sessile papillae, 1 preanal pair (PPc), 2 postanal pairs (PPsc), and pair of pedunculated papillae (Pep); C, lateral view showing sessile papillae, 1 preanal (PPc), pedunculated papillae (Pep), and cuticular inflation (CI). Micrographs. Female: D, ovejector region showing ovejector (OV) and vulva (V), lateral view; E, caudal end anus (An), lateral view; F, egg.

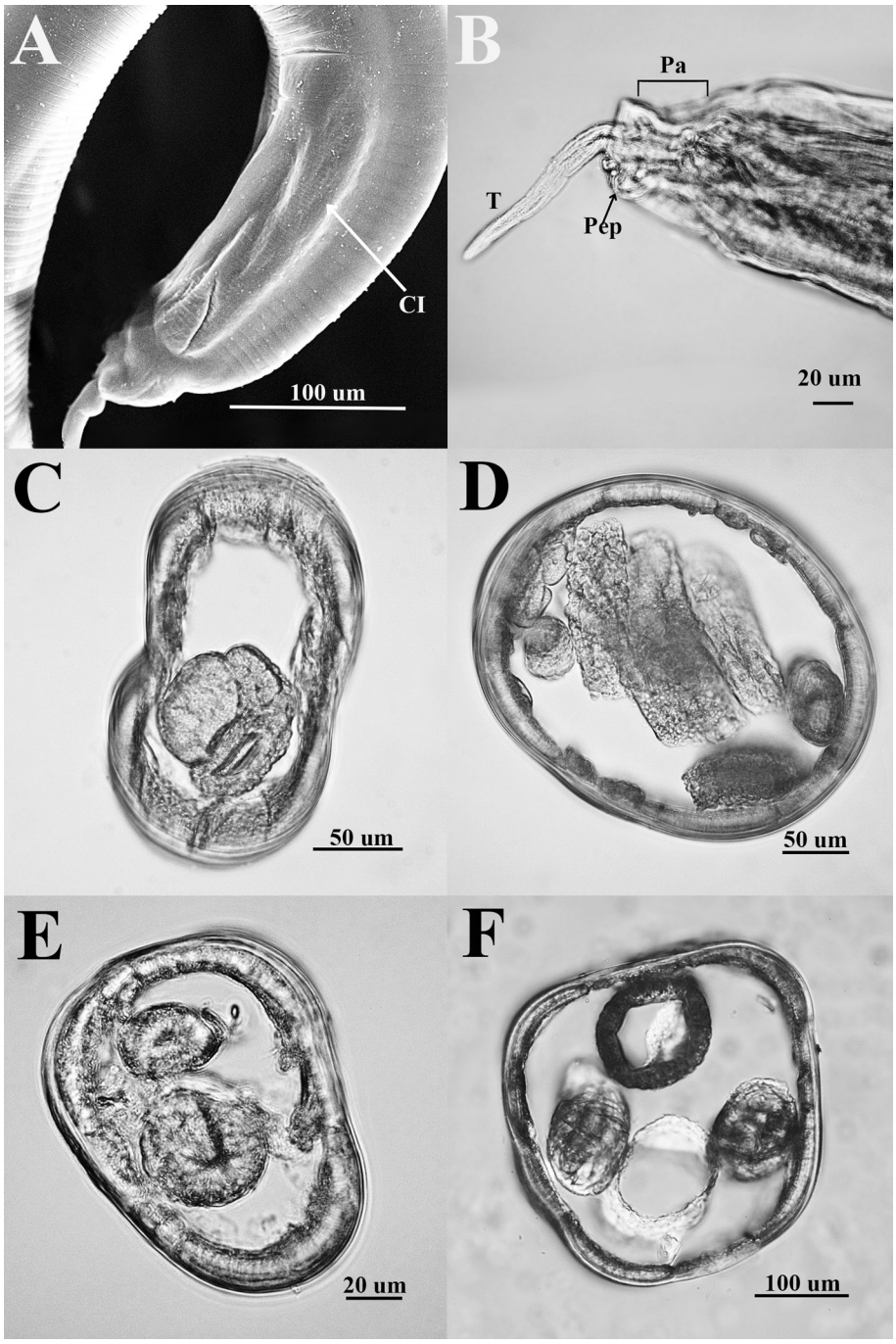

Figure 4. *Heteromyoxyuris garciaprietoi* n. sp., scanning electron micrograph. Male: A, caudal extremity lateral view showing cuticular inflation (CI). Micrographs, male: B, caudal extremity ventral view showing caudal sessile papillae (Pa) and pair of pedunculated papillae (Pep).

in Nevada, California, New Mexico, and Texas, USA, as well as in host species that are also distributed in Mexico. These include *Dipodomys deserti* Stephens, 1887, *D. merriami*, *D. spectabilis* Merriam, 1890, *D. ordii*, and *P. flavus* (Table 1). Therefore, it cannot be excluded that this species is also present in arid and semi-arid regions of Mexico.

Heteromyoxyuris otomii and *H. garciaprietoi* n. sp. are currently endemic to Mexico, but their distribution could be as wide as that of their hosts, which are not endemic to Mexico. *Heteromyoxyuris otomii* has only been recorded on *P. flavus* in Guanajuato and Hidalgo, Mexico (García-Prieto et al., 2008; Iturbe-Morgado et al., 2017). However, since its host is widespread across central Mexico and the southern USA, this species of nematode likely occurs in other regions in Mexico. Likewise, the broad distribution of *D. merriami* and *D. ordii* suggests that *H. garciaprietoi* n. sp. probably exists in other Mexican locations, similar to *H. longejector* (Table 1).

So far, there is only 1 study of the parasites of rodents in Coahuila. According to Falcón-Ordaz et al. (2024), only *D. merriami* has been examined for parasites in Coahuila, reporting *Syphacia* sp., *Pterygodermatites dipodomis* Tiner, 1948, and *Protospirura dipodomis* (Read & Millemann, 1953), and *H. garciaprietoi* n. sp. The diversity of parasitic helminths in rodents remains incomplete (García-Prieto et al., 2012; Falcón-Ordaz et al., 2024; Iturbe-Morgado et al., 2017; Martínez-Salazar et al., 2016), and the helminth fauna is still unknown in Campeche, Quintana Roo, Sinaloa, and Tamaulipas (González-Moreno & Falcón-Ordaz, 2025) or is under investigation, as in the Baja California Peninsula (Martínez-Salazar, Pers. Comm.).

Conservation efforts often overlook parasites, despite their ecological significance and potential as environmental indicators (Lymbery & Smit, 2023). Bridging this knowledge gap demands comprehensive updates to taxonomic inventories; this means examining not just living wildlife, but also the extensive collections of parasite and host material housed in biological repositories, since there are still species to be discovered (e.g., Museomics, see Fernández, 2019; Greiman et al., 2018). In addition, some areas are inaccessible for various reasons or due to the lack of support directed to this type of work (Martínez-Salazar et al., 2016). Undoubtedly, our understanding of host-parasite systems is incomplete, largely due to significant gaps in knowledge of species diversity (the Linnaean shortfall), their distribution (the Wallace shortfall), and their phylogenetic and evolutionary relationships (the Darwin shortfall) (Hortal et al., 2015; Rubio-Godoy & Pérez-Ponce de León, 2023). To reduce these limitations, we examined the material deposited at the CNHE (CNHE 9832), and subsequently, taxonomic analysis revealed that this material corresponds to *H. garciaprietoi* n. sp. The examination of museum specimens, as evidenced by the discovery of *H. garciaprietoi* n. sp. in CNHE material, highlights the vital role of biological collections in this effort.

In this study, it was not possible to extract DNA from the *H. garciaprietoi* n. sp. material due to the fixation condition of the organs examined (in formalin). Therefore, if this species is found in other regions of the country, it may offer a favorable panorama for exploring the phylogenetic relationships of the genus. Regarding this last point, it would be essential to confirm the close morphological relationship that the new species has with *H. deserti*. *Heteromyoxyuris garciaprietoi* n. sp. is the only species of the genus that does not have lateral alae in either sex. This is the fourth species described for the genus and the second described for Mexico.

Key to species of the genus *Heteromyoxyuris* Quentin, 1973

1a. Male and female with lateral alae on the body 2a
1b. Male and female without lateral alae on the body ..... *H. garciaprietoi* n. sp.
2a. Male and female with simple lateral alae on the body ..... *H. deserti* (Read and Millemann, 1953)
2b. Male and female with double lateral alae on the body 3a
3a. The lateral alae extend from esophageal bulb to anus in both sexes ..... *H. otomii* García-Prieto, Falcón-Ordaz, Lira-Guerrero and Mendoza-Garfías, 2008
3b. The lateral alae in male begin at the posterior half of the body and in female start posterior to esophageal bulb ending in the anus in both sexes ..... *H. longejector* (Hannum, 1943)

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