

A new species of *Mathevotaenia* (Cestoda, Anoplocephalidae, Linstowiinae) from the lizard *Sceloporus malachiticus* (Squamata, Phrynosomatidae) from Panama

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Abstract

Mathevotaenia panamaensis sp. nov. (Cestoda, Anoplocephalidae, Linstowiinae) from a green spiny lizard, *Sceloporus malachiticus*, collected in Panama is described. This is the first species of *Mathevotaenia* reported from a lizard host. The new species is most similar to *Mathevotaenia bivittata* in that mature eggs are concentrated along the lateral margins of the proglottids. Major differences between the two species include oval cirrus sac in *M. bivittata*, a spherical cirrus sac in *M. panamaensis*; ovary compact consisting of 10–15 short lobules in *M. bivittata*, ovary bilobed with each lobe consisting of 3–4 lobules in *M. panamaensis*.

Keywords

Cestoda, *Mathevotaenia panamaensis*, Squamata, *Sceloporus malachiticus*, Panama

Introduction

In a helminthological survey of lizards from Panama, 1 individual of the green spiny lizard, *Sceloporus malachiticus* Cope, 1864, was found to harbor 12 individuals of a species of a linstowiine cestode. *Sceloporus malachiticus* is known from parts of Costa Rica, Panama, El Salvador, Honduras and Nicaragua (Savage 2002). There is one report (Goldberg and Bursey 1992) of nematodes from *S. malachiticus*, but to our knowledge no cestodes have been reported. The purpose of this paper is to describe a new cestode species, which we have assigned to *Mathevotaenia* Akhmyan, 1946.

Materials and methods

One of 11 individuals of *Sceloporus malachiticus*, collected by hand 3 May 1968 in Chiriqui Province, Panama, was found at necropsy to harbor 12 cestodes. The cestodes were relaxed in tap water, fixed in alcohol-formalin-acetic acid, stained in hematoxylin and mounted singly on glass slides in neutral balsam. The slides were examined under a light microscope. Illustrations were made with the aid of a microprojector. Measurements are given in micrometers unless otherwise stated. The host carcass was fixed in 10% formalin, preserved in 40% iso-

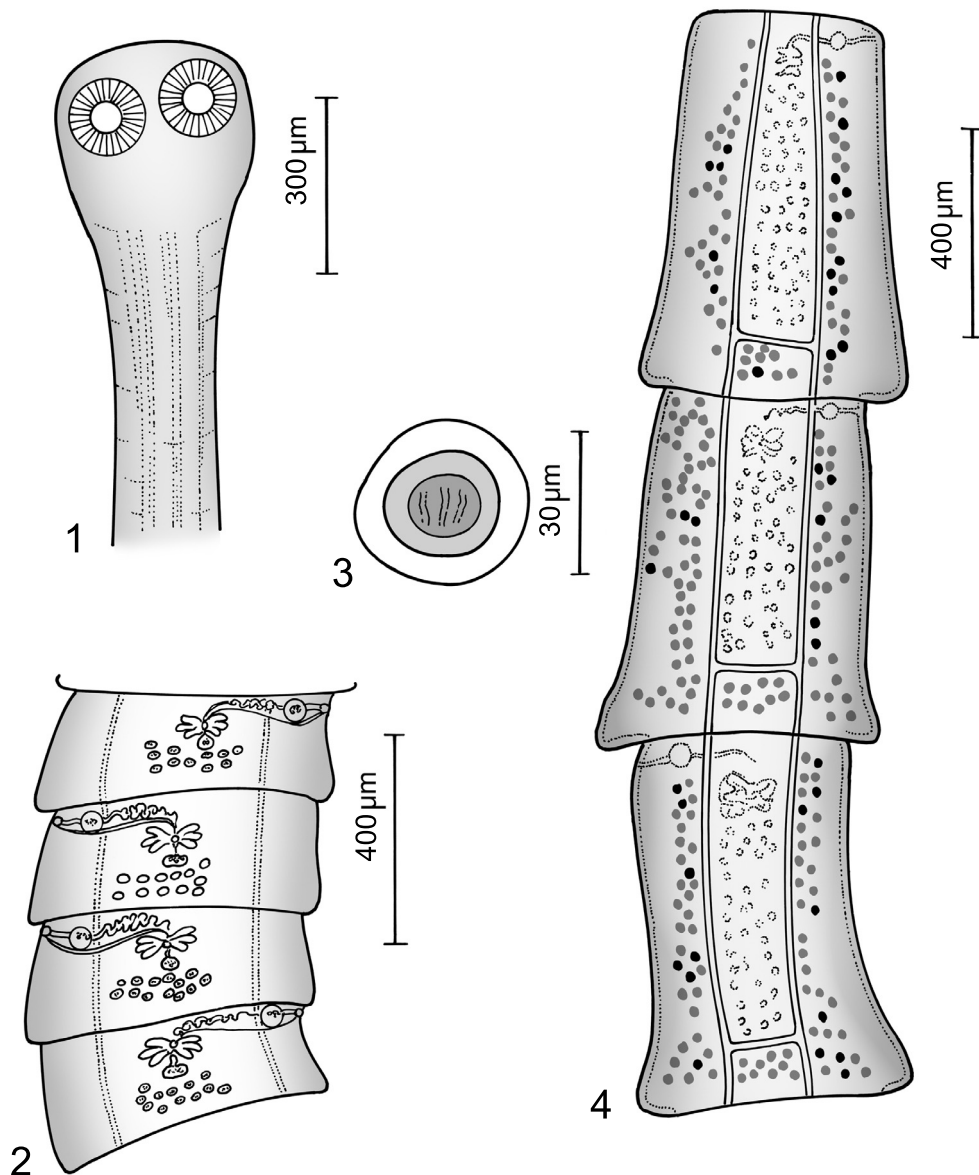
propanol and deposited in the herpetology collection of the Florida Museum of Natural History (FMNH).

Description

Mathevotaenia panamaensis sp. nov. (Figs 1–8)

Small cestodes, 22–29 mm in length by 640–970 in maximum width ($n = 5$). Maximum width occurs in posterior quarter of strobila. Scolex unarmed, 357–434 wide by 357–383 long. Suckers circular, 137–168 in diameter. Neck 230–306 wide, 765–1,275 in length. Proglottids craspedote, numbering 45–58, trapezoidal with laterally expanded posterior edges. Immature proglottids, 7–12 in number, wider than long; mature proglottids, 11–16 in number, equal length and width to longer than wide; gravid progottids 24–30 in number, longer than wide. Osmoregulatory system consisting of paired lateral canals; dorsal canal narrower than ventral canal; single anastomosis connects ventral canals near posterior end of proglottid. Genital ducts pass between osmoregulatory canals. Genital atrium cylindrical, 8–12 wide by 25–30 deep. Genital pores irregularly alternating, opening along anterior quarter of lateral margin of proglottid. Cirrus sac spherical, 40–49 in diameter; lateral to osmoregulatory canal. Extended cirrus not obviously armed.

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Figs 1–4. *Mathevotaenia panamaensis* sp. nov.: 1. Scolex and neck, dorsal view. 2. Mature proglottids. 3. Egg. 4. Gravid proglottids

Vas deferens anterior and poral to ovary forming numerous loops and convolutions medial to cirrus sac. Internal and external seminal vesicles absent. Vagina opening into genital atrium posterior to cirrus sac. Ovary, 120–154 wide by 51–78 long, medial in position, bilobed; each lobe of similar size and subdivided into 3–4 lobules. Vitelline gland compact, oval, 65–78 wide by 26–34 long, posterior to ovary on midline. Mehlis' gland between ovarian isthmus and vitellarium. Uterus not seen. Testes in single field, 10–16 in number, posterior to vitelline gland, sub-spherical, measuring 30–33 × 9–12. Testes involute in gravid proglottids. Mature eggs, visible as darkly staining oncospheres concentrated along the lateral margins of the proglottids and embedded in the parenchyma. In more posterior proglottids, posterior sixth of proglottid filled with mature eggs. Female genitalia and cirrus sac persistent throughout

strobila, visible in relatively clear area at anterior end and central region of gravid proglottid, although in all gravid proglottids, region surrounding female genitalia and lying between osmoregulatory ducts filled with immature eggs. Egg capsule 27–30, darkly staining egg shell 18–22, oncosphere 15–18, hooks 10–12 in length.

Taxonomic summary

Type host: *Sceloporus malachiticus* Cope, 1864, green spiny lizard; symbiotype, Florida Museum of Natural History No. FMNH 125048; collected 3 May 1968.

Type locality: Nueva Suisse, El Volcan, Chiriqui Province, (8.43333°N, 82.43333°W, elev. 914 m), Panama.

Site of infection: Small intestine.

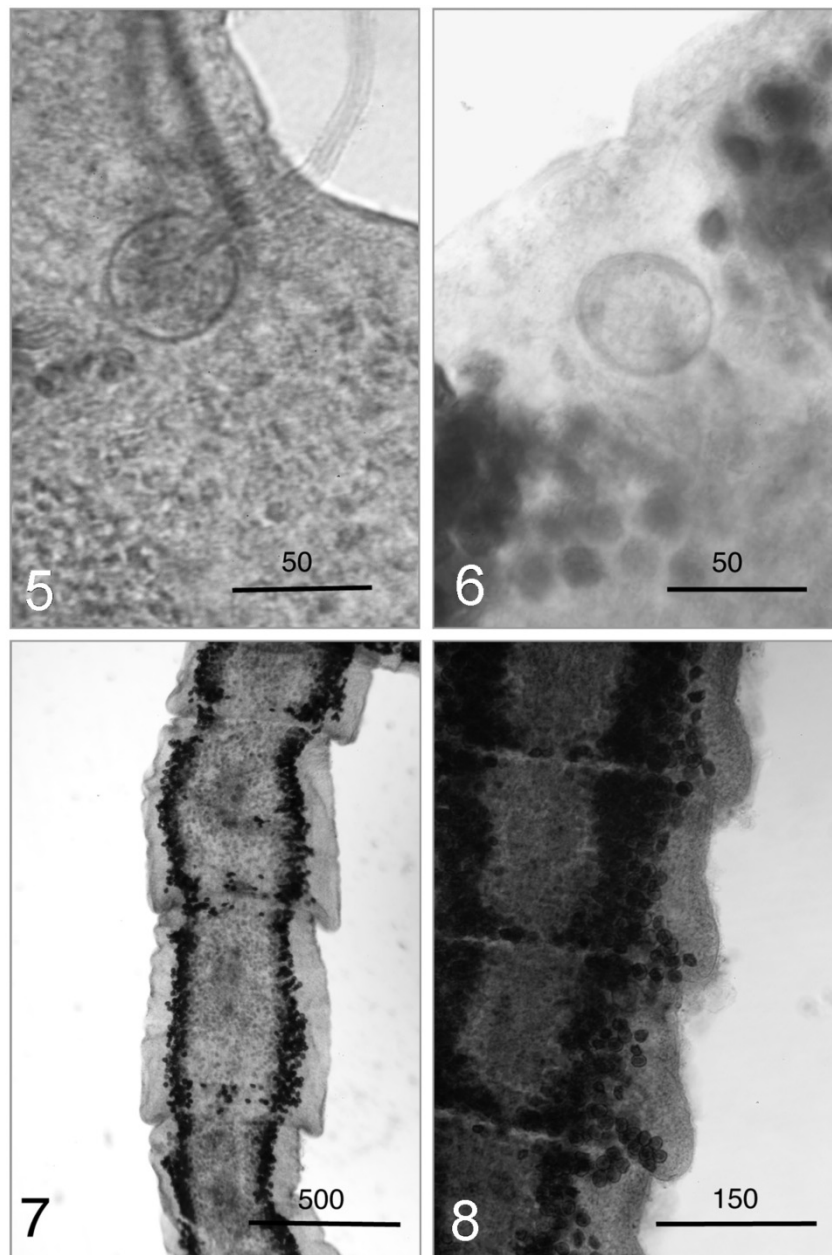
Type specimens: Holotype, U.S. National Parasite Collection (Beltsville MD) No. 102137, paratypes 102138.

Etymology: The specific epithet indicates the country of collection.

Remarks: Assignment of these specimens to *Mathevotaenia* is based upon the keys of Jones *et al.* (1994a, b) and Beveridge (1994). The presence of compact vitellarium posterior to ovary in concert with four acetabulate suckers (Figs 1 and 2) allows assignment to the Cyclophyllidae van Beneden in Braun, 1900. The presence of a dorsoventrally flattened strobila with marginal genital pores and a scolex with 4 acetabulate unarmed suckers and lacking a rostellum (Figs 1, 2 and 4)

allows assignment to the Anoplocephalidae Cholodkovsky, 1902. The presence of an ephemeral uterus (Fig. 4) allows assignment to the Linstowiinae Fuhrmann, 1907. The presence of testes in a single field posterior to ovary, simple suckers, simple genital atrium and craspedote proglottids (Figs 7 and 8) allows assignment to *Mathevotaenia*.

Mathevotaenia currently consists of 47 species found in mammals and 1 species in birds (Beveridge 2008, Jiménez *et al.* 2008). However, the number of species is uncertain due to complex synonymies and because descriptions of some species are too poor to determine correct generic assignment (Beveridge 2008). *Mathevotaenia* has had a confusing history, with



Figs 5–8. *Mathevotaenia panamaensis* sp. nov.: 5. Cirrus sac and extended cirrus. 6. Cirrus sac and retracted cirrus. 7. Gravid proglottids. 8. Gravid craspedote proglottids

Table I. Comparative measurements of various structures of *Mathevotaenia panamaensis* and *M. bivittata*

Reference	<i>M. panamaensis</i>	<i>M. bivittata</i>						
	this paper	Janicki 1904	Baer 1927	Spasskii 1951	Della Santa 1956	dos Santos 1968	Gomes 1979	Campbell <i>et al.</i> 2003
No. of proglottids	45–58	—	—	—	—	92	28–44	37–49
Length (mm)	22–29	55	55	55	55	75	4.38–6.30	13–15
Width (max.)	640–970	900	900	900	900	1,870	860	960–1,350
Scolex W	357–434	400	400	400	400	1,100	520–650	460–600
L	357–383	—	—	—	—	1,360	—	360–390
Sucker shape	circular	—	—	circular	—	circular	circular	oval
Sucker size W	137–168	—	—	150	—	400	190–200	201–228
L	—	—	—	—	—	—	290–220	225–291
Neck L (mm)	3–5	0.51	—	0.51	—	—	—	0.2–0.4
No. of testes	10–16	5	5–8	5–8	5	21–23	8–10	10–13
Testis L	9–12	—	—	—	—	—	36–40	23–31
W	30–33	—	—	—	—	—	36–40	30–41
Genital atrium deep	25–30	—	—	—	—	—	—	24–43
wide	8–12	—	—	—	—	—	—	5–6
Cirrus sac shape	spherical	oval	—	—	—	oval	oval	oval
Cirrus sac size W	40–49	—	—	—	—	49	47–54	34–49
L	—	90	90	90	90	105	58–79	71–108
Ovary W	120–154	—	—	—	—	223	40–100	98–209
L	51–78	—	—	—	—	—	140–290	48–123
Ovary structure	bilobed	bilobed	bilobed	bilobed	—	bilobed	single mass	single mass
Ovary substructure	3–4 lobules/ lobe	compact	compact	compact	—	5–8 lobules	multilobular	10–15 lobules
Vitellarium W	65–78	—	—	—	—	90	70–90	42–105
L	26–34	—	—	—	—	—	40–60	31–74
shape	oval	oval	—	—	—	oval	compact	pyriform
Egg capsule	27–30	—	—	—	—	24 × 18	23–35 × 20–32	31–41 × 15–17
Egg	18–22	21	21	21	—	18 × 15	17–26 × 9–17	26 × 23
Oncosphere	15–18	—	—	—	—	—	—	19–23 × 15–17
Hook L	10–12	—	—	—	—	—	—	11.8

many species originally assigned to *Oochoristica* Lühe, 1898 (considered a genus of reptilian cestodes) being transferred to *Mathevotaenia* (considered a genus of mammalian cestodes) based upon craspedote segments, occurrence in mammals rather than reptiles, or possession of a seminal receptacle (Spasskii 1951). The separation of *Oochoristica* and *Mathevotaenia* was rejected by Della Santa (1956) but maintained by Dollfus (1954). Schmidt (1986) retained separation of *Mathevotaenia* and *Oochoristica* on the basis of hosts and craspedote/acraspedote proglottids, respectively. Beveridge (1994) distinguished *Mathevotaenia* and *Oochoristica* solely on craspedote/acraspedote proglottids, based on the type species of the two genera. Thus, many of the genera erected by various authors are treated as synonyms of *Mathevotaenia* or *Oochoristica* by Beveridge (1994).

The maintenance of separation based upon craspedote/acraspedote proglottids has led to the assignment of one mammalian cestode to *Oochoristica*, namely, *O. eremophilia* Beveridge, 1977 from *Antechinus rosamondae* Ride, 1964 (Marsupialia, Dasyuridae: Australia) (Beveridge 1977) and the current reptile cestode to *Mathevotaenia*. Of the Western Hemisphere species of *Mathevotaenia*, *M. panamaensis* sp. nov. is most similar to *M. bivittata* in that mature eggs are concentrated

along the lateral margins of the proglottids. Major differences (per Campbell *et al.* 2003) between the two species include oval cirrus sac in *M. bivittata*, a spherical cirrus sac in *M. panamaensis*; ovary compact consisting of 10–15 short lobules in *M. bivittata*, ovary bilobed with each lobe consisting of 3–4 lobules in *M. panamaensis*. A comparison of the two species is given in Table I. It should be noted (Table I) that measurements of various structures given by dos Santos (1968) are much larger than measurements given in the original description (Janicki 1904) or in the two later redescrptions (Gomes 1979, Campbell *et al.* 2003) of *M. bivittata*. It would appear to us that dos Santos (1968) has described a marsupial cestode other than *M. bivittata*.

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