

First record of *Brevimulticaecum* larvae (Nematoda, Heterocheilidae) in amphibians from northern Argentina

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(With 4 figures)

Brevimulticaecum Mozgovoy, in Skrjabin, Shikhobalova, and Mozgovoy, 1951 was redefined and presented as a valid genus by Sprent (1979). Previously, this genus was proposed as a subgenus of the genus *Multicaecum* Baylis, 1923. The new denomination proposed by Sprent (1979) is based on the following morphological characteristics: flat lips with alate margins and notches, without dentigerous ridges. The excretory pore in *Brevimulticaecum* is located in front of or at the nerve ring, and the ventriculus presents short appendices. Conversely, the genus *Multicaecum* is characterised by smooth rounded lips, each with a dentigerous ridge comprising small sharp denticles. The excretory pore is levelled with the nerve ring or behind it, and the ventricular appendices are long and slender. Larval stages of this genus have been reported parasitising fish, reptiles and amphibians in some geographical region (see Vieira et al., 2010).

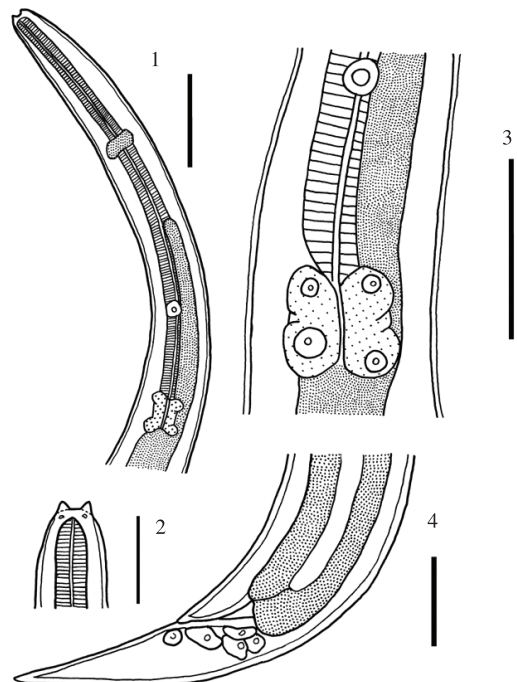
One *Lepidobatrachus laevis* Budgett, 1899 (Ceratophryidae) was collected in Ingeniero Juárez, Formosa, Argentina (23° 57' S and 61° 44' W) and 34 *Physalaemus albonotatus* (Steindachner, 1864) (Leiuperidae) and 19 *Pseudis paradoxa* (Linnaeus, 1758) (Hylidae) were collected near the city of Corrientes, Corrientes, Argentina (27° 28' S and 58° 50' W) between March 2010 and February 2011. Hosts were transported live to the laboratory and euthanised in a chloroform (CHCl₃) solution. At necropsy, all the organs were examined for parasites by dissection. Capsules were counted and isolated from host tissues. Larvae were removed from capsules using preparation needles and studied first *in vivo*, enumerated, and then killed in hot distilled water, preserved in 70% ethyl alcohol and examined as temporary mounts. Infection prevalence (P) and intensity (I) were calculated according to Bush et al. (1997). Nematodes were deposited in the Colección Helminológica of the Centro de Ecología Aplicada del Litoral, Corrientes, Argentina (CECOAL). Accession numbers: *L. laevis* CECOAL 11020901 (30 larvae); *P. albonotatus* CECOAL 10032304 (2 larvae); *P. paradoxa* 11020202 (1 larvae), 11020204 (1 larvae), 11020205 (3 larvae).

One hundred and ten larvae in the third-stage of genus *Brevimulticaecum* were found in the mesentery, abdominal cavity, serous of stomach, and/or wall of small intestine, from *L. laevis* (P: 100.0%, I: 75), *P. albonotatus* (P: 5.9%, I: 2) and *P. paradoxa* (P: 47.3%, I: 33). Each larva was

spirally coiled inside a brownish, thin-walled, almost spherical capsule.

Small whitish nematodes; cuticle is smooth. The anterior end of body bears 2 subdorsal and 2 subventral papillae; it also bears 2 toothlike prominences, 1 dorsal and 1 ventral. Amphids between the lateral subdorsal and subventral papillae. Esophagus slender; ventriculus with 4 rounded lobes. Anterior intestinal cecum present, dorsal to ventriculus. Prominent excretory nucleus is located about halfway along cecum. Unicellular rectal glands are well developed. Tail is conical and pointed (Figures 1-4). Capsules almost spherical. Measurements of specimens collected from each species of amphibian hosts are given in Table 1.

Morphological characteristics of the ventriculus and the position of the excretory pore and excretory nucleus,



Figures 1-4. *Brevimulticaecum* sp. larva collected in amphibians from Northern Argentina. 1) Anterior end of body. 2) Detail of cephalic end. 3) Detail of ventriculus. 4) Posterior end, lateral view. (Scale bar: 1, 3: 100 µm; 2, 4: 50 µm).

Table 1. Comparative measurements (in μm unless otherwise stated) of larvae of *Brevimulticaecum* in amphibians from different localities in Argentina.

Hosts	<i>P. albonotatus</i> (n = 2)	<i>L. laevis</i> (n = 12)	<i>P. paradoxa</i> (n = 9)
Length	3.0 \pm 0.75 mm (2.47-3.54)	3.71 \pm 0.52 mm (2.60-4.60)	2.67 \pm 0.48 mm (2.10-3.49)
Width	80 \pm 7.0 (75-85)	92.9 \pm 15.5 (68-118)	75 \pm 18.3 (50-105)
Esophagus length	462.5 \pm 24.7 (445-480)	517.5 \pm 58.2 (410-575)	425.2 \pm 103.8 (320-660)
Esophagus width	17.5 \pm 3.5 (15-20)	30.4 \pm 9.0 (20-40)	23.3 \pm 5.4 (18-35)
Ventriculus length	40.0 \pm 7.0 (35-40)	57.4 \pm 8.5 (42-72)	50.1 \pm 12.1 (38-68)
Ventriculus width	32.5 \pm 3.53 (30-35)	51.3 \pm 7.9 (40-60)	41.5 \pm 7.9 (30-57)
Cecum length	234 \pm 19.8 (220-248)	326.4 \pm 52.9 (265-425)	246.0 \pm 79.9 (110-332)
Nerve ring/anterior end	167.5 \pm 38.9 (140-195)	186.5 \pm 21.1 (150-225)	142.4 \pm 27.7 (95-180)
Excretory pore/ anterior end	Not observed	147.0 \pm 26.8 (100-165)	138
Excretory nucleus/ anterior end	380	420.0 \pm 70.0 (350-490)	320.7 \pm 65.2 (245-380)
Anus/posterior end	90 \pm 7.0 (85-95)	89.2 \pm 5.6 (83-100)	89.2 \pm 14.0 (66-105)
Capsules	0.98 \pm 0.04 mm (0.95-1.02) \times 0.855 \pm 0.07 mm (0.85-0.86)	1.15 \pm 0.12 mm (0.85-1.32) \times 1.04 \pm 0.13 mm (0.85-1.25)	0.73 \pm 0.20mm (0.48-1.12) \times 0.67 \pm 0.16 mm (0.45-0.99)

made possible the identification of these larvae. Compared with larvae found in *Dendropsophus minutus* by Moravec and Kaiser (1994) the principal differences were the shorter length of the esophagus and the cecum (477-510 and 285-300, respectively) and, the smaller measurements of ventriculus (length: 45-57; width: 39-50). Besides, ventriculus of specimens analysed in this study showed 4 rounded lobes while Moravec and Kaiser (1994) found specimens with ventriculus with 4 and 5 rounded lobes.

Little is known about the biology of nematode parasites of the genus *Brevimulticaecum*. Walton (1937) infected a young alligator with larvae of this genus and 3 weeks later, found several immature males and females of this nematode. Moravec and Kaiser (1994) established that the occurrence of this larva in amphibian hosts indicates that toads and frogs may play a role in the transmission of this nematode, serving as either intermediate or paratenic hosts.

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