

## Helminths from seven species of *Microlophus* (Squamata: Tropicuridae) from Peru

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**Abstract.** Seven species of *Microlophus* lizards from Peru were examined for helminth parasites: *M. koepckeorum*, *M. occipitalis*, *M. peruvianus*, *M. stolzmanni*, *M. theresiae*, *M. thoracicus* and *M. tigris*. We found five species of Nematoda, mature individuals of *Parapharyngodon sceleratus*, *Physalopera retusa*, *Spauligodon oxkutzcabensis*, *Thubunaea parkeri*, and larvae of Ascarididae gen. sp. On average, there were  $2.0 \pm 1.2$  SD (range = 1-4) helminth species per *Microlophus* species. Nine new host records are reported.

Key words. Reptilia, Tropicuridae, *Microlophus*, Nematoda, helminth, parasites, Peru.

The purpose of this paper is to report helminths from seven species of *Microlophus* from Peru. The genus *Microlophus* consists of some 20 species restricted in distribution to South America and the Galapagos Islands (PETERS & DONOSOS BARROS 1986). *Microlophus koepckeorum*, *M. peruvianus*, *M. theresiae*, *M. thoracicus*, *M. tigris* are endemic to Peru (LEHR 2002). *Microlophus occipitalis* is known from southwestern Ecuador and northern and central Peru; *M. stolzmanni* is known from northwestern Peru and possibly southwestern Ecuador (PETERS & DONOSOS BARROS 1986). The only report, to our knowledge, of helminths from *Microlophus* is the description of *Thubunaea parkeri* from *Microlophus occipitalis* by BAYLIS (1926).

Seventy-five *Microlophus* specimens from Peru that had been deposited in the herpetological collection of the Natural History Museum of Los Angeles County (LACM), Los Angeles, California, USA were examined for gastrointestinal helminths: *M. koepckeorum* (n = 10), mean snout-vent length (SVL) = 70.9 mm  $\pm$  6.1 SD, range 59-77 mm, Lambayeque Department: Motupe (LACM 122584, 122588-122590), Olmes (LACM 122591, 122599, 122600), Zapote (LACM 122612-122614); *M. occipitalis* (n = 13), SVL = 65.2 mm  $\pm$  8.4 SD, range = 50-78 mm, Lambayeque Department: Motupe (LACM

122616-122622, 122625-122627, 122630, 122633, 122634); *M. peruvianus* (n = 11), SVL = 81.2 mm  $\pm$  19.5 SD, range = 58-109 mm, Ancash Department: Pativilca (LACM 49021, 49037), Ica Department: Paracas (LACM 49018, 49019, 49040, 49042, 49044, 49046, Lima Department: Pavilca (LACM 49024, 49032), Cerro Azul (LACM 49057); *M. stolzmanni* (n = 11), SVL = 68.1 mm  $\pm$  12.0 SD, range = 49-89 mm, Cajamarca Department: Ocheniuno (LACM 122652), Bellavista (LACM 122655, 122659, 122660, 122667-122669, 122671, 122677, 122679, 122681); *M. theresiae* (n = 10), SVL = 66.1 mm  $\pm$  5.3 SD, range = 58-73 mm, Lima Department: El Paraiso Peninsula (LACM 122692-122694, 122699, 122701-122704, 122710, 122711); *M. thoracicus* (n = 10), SVL = 67.9 mm  $\pm$  6.1 SD, range = 56-78 mm, Ica Department: Pisco Junction (LACM 122731-122736), Ancash Department: Cullebras (LACM 122739-122741, 122743); *M. tigris* (n = 10), SVL = 64.7 mm  $\pm$  14.1 SD, range = 42-80 mm, Lima Department: Asia Vieja (LACM 122712, 122715-122723).

The abdominal cavity of each lizard was opened and the digestive tract was removed. The digestive tract was opened and examined for helminths under a dissecting microscope. Nematodes were placed on a glass slide, cleared in a drop of lactophenol solution, covered with a cover slip and identified.

Tab. 1. Number (N), percent prevalence (P) and mean intensity  $\pm$  SD (X) of Nematoda species for seven species of *Microlophus* from Peru.

	<i>Parapharyngodon scleratus</i>			<i>Physaloptera retusa</i>			<i>Spauligodon oxkutzcabensis</i>			<i>Thubunaea parkeri</i>			Ascarididae gen. sp.		
	N	P	X	N	P	X	N	P	X	N	P	X	N	P	X
<i>M. koepckeorum</i>	8	10	8	1	10	1	-	-	-	-	-	-	-	-	-
<i>M. occipitalis</i>	9	23	3.0 $\pm$ 2.7	-	-	-	3	8	3	-	-	-	2	8	2
<i>M. peruvianus</i>	4	18	2.0 $\pm$ 1.4	1	9	1	-	-	-	-	-	-	-	-	-
<i>M. stolzmanni</i>	6	27	2.0 $\pm$ 1.7	2	18	1.0 $\pm$ 0.0	-	-	-	2	9	2	-	-	-
<i>M. theresiae</i>	-	-	-	-	-	-	-	-	-	4	20	2.0 $\pm$ 1.4	-	-	-
<i>M. thoracicus</i>	18	30	6.0 $\pm$ 5.6	-	-	-	-	-	-	-	-	-	-	-	-
<i>M. tigris</i>	-	-	-	2	20	1.0 $\pm$ 0.0	-	-	-	-	-	-	-	-	-

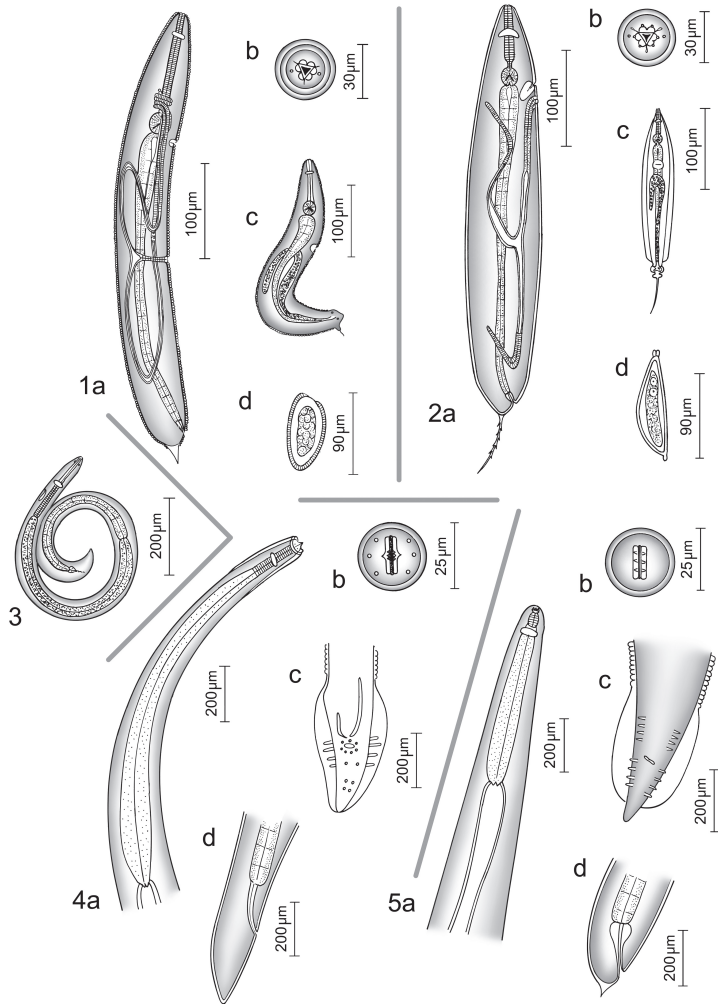
Selected nematodes were deposited in the United States National Parasite Collection (USNPC), Beltsville, Maryland: *Microlophus koepckeorum*: *Parapharyngodon scleratus* (USNPC 100775), *Physaloptera* sp. (USNPC 100776); *Microlophus occipitalis*: *Parapharyngodon scleratus* (USNPC 100777), *Spauligodon oxkutzcabensis* (USNPC 100778), Ascarid larvae (USNPC 100779); *Microlophus peruvianus*: *Parapharyngodon scleratus* (USNPC 100780), *Physaloptera retusa* (USNPC 100781); *Microlophus stolzmanni*: *Parapharyngodon scleratus* (USNPC 100782), *Physaloptera retusa* (USNPC 100783), *Thubunaea parkeri* (USNPC 100784); *Microlophus theresiae*: *Thubunaea parkeri* (USNPC 100785); *Microlophus thoracicus*: *Thubunaea parkeri* (USNPC 100786); *Microlophus tigris*: *Physaloptera retusa* (USNPC 100787). Identification was based on comparisons with the original descriptions (see below) as well as comparisons to reference specimens maintained in our laboratory. Parasite terminology is in accordance with Bush et al. (1997).

Five species of Nematoda were found: gravid individuals of *Parapharyngodon scleratus* (TRAVASSOS, 1923), *Physaloptera retusa* RUDOLPHI, 1819, *Spauligodon oxkutzcabensis* (CHITWOOD, 1938), *Thubunaea parkeri* BAYLIS 1926 and second stage larvae of Ascaridae gen. sp. (Fig. 1, Table 1). On average there were 2.0  $\pm$  1.2 SD (range = 1-4) helminth species per *Microlophus* species. These nematodes are frequently found in South American lizards.

*Parapharyngodon scleratus* was originally described as *Thelandros scleratus* by TRAVASSOS (1923) from the iguanid *Tropidurus torquatus* from Maguinhos, State of Rio de Janeiro, Brazil. It was reassigned to *Parapharyngodon* by FREITAS (1957). *Parapharyngodon scleratus* is widely distributed in Brazil and has been reported from *Ameiva ameiva*, *Kentropyx altamazonicus*, *Mabuya bistrata*, *Tropidurus scutipunctatus*, *T. spinulosus*, *T. torquatus* and the gekkonid *Hemidactylus mabouia* (see BURSEY et al. 2005). It also is known from *Microlophus albemarlensis* from the Galapagos Islands (BARUS 1973) and *Tropidurus melanopleurus* from Bolivia (ROCA 1997). *Microlophus koepckeorum*, *M. occipitalis*, *M. peruvianus* and *M. stolzmanni* represent new host records for *Parapharyngodon scleratus*.

*Spauligodon oxkutzcabensis* was described from the gecko *Thecadactylus rapicauda* from the Yucatan peninsula (CHITWOOD 1938). It was recorded from sceloporine lizards (*Sceloporus malachiticus*) from Costa Rica by GOLDBERG & BURSEY (1992a), *S. formosus*, *S. grammicus*, *S. megalepidurus*, *S. mucronatus* from Mexico (GOLDBERG et al. 2003), and from the gecko *Phyllodactylus reissii* from Peru (GOLDBERG & BURSEY 2004). *Spauligodon*, a member of the Oxyuridae, has a monoxenous (= direct life cycle) not involving an intermediate host (ANDERSON 2000). Infection occurs by contact with contaminated substrate or possibly by ingesting eggs from licking the substrate (see GOLDBERG &

Fig. 1-5: Fig. 1a-d. *Parapharyngodon scleratus* from *Microlophus* from Peru: (a) female; (b) female en face view; (c) male; (d) egg. Fig. 2a-d. *Spauligodon oxkutzcabiensis* from *Microlophus* from Peru: (a) female; (b) female en face view; (c) male; (d) egg. Fig. 3. Ascarididae gen. sp. (larva) from *Microlophus* from Peru. Fig. 4a-d. *Physaloptera retusa* from *Microlophus* from Peru: (a) female (anterior view); (b) female en face view; (c) male (posterior view); (d) female (posterior view). Fig. 5a-d. *Thubunaea parkeri* from *Microlophus* from Peru: (a) female (anterior view); (b) female en face view; (c) male (posterior view); (d) female (posterior view).



BURSEY 1992b). *Microlophus occipitalis* represents a new host record for *Spauligodon oxkutzcabiensis*.

There are few reports of ascarid larvae in South American lizards (VRCIBRADIC et al. 2002, BURSEY et al. 2005) and ascarid transmission commonly involves terrestrial invertebrates (ANDERSON 2000). Thus, the presence of ascarid larvae in *M. occipitalis* may represent an accidental occurrence, a byproduct of diet. *Physaloptera retusa* was originally described from the teiid *Tupinambis teguixin* from Brazil by RUDOLPHI (1819). *Physaloptera retusa* is widespread in the western hemisphere and is known from North, Central

and South America (see GOLDBERG et al. 2007). Insects serve as intermediate hosts (ANDERSON 2000). *Microlophus stolzmanni* represents a new host record for *Physaloptera retusa*. *Thubunaea parkeri* was described from *M. occipitalis* and *Dicrodon heterolepis* from Peru (BAYLIS 1926). The life cycle of *T. parkeri* has not been studied, but VELIKANOV (1992) reported beetles to serve as intermediate hosts for the congener *Thubunaea baylisi*. *Microlophus stolzmanni* and *M. theresioides* represent new host records for *Thubunaea parkeri*.

With at least 178 lizard species known from Peru (LEHR 2002) and reports of helminths

from only 15 (8%) much work needs to be done before the helminth diversity of Peruvian lizards can be ascertained.

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