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Nota Breve | Short Note

First record of *Thelandros* sp. Wedl, 1862 pinworms (Nematoda: Oxyurida: Pharyngodonidae) on São Vicente Island, Cabo Verde

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Parasites represent one of the most abundant lifestyles, and yet, only a small portion is described (Dobson *et al.* 2008). Cabo Verde parasitofauna is mostly unknown and the only study on parasites infecting reptiles, in which a new species of nematodes is referred, highlights the presence of unrecognized taxa (Jorge *et al.* 2012).

The genus *Thelandros* Wedl, 1862 has currently more than 30 species, although its taxonomic status is still is under discussion. This genus, as other belonging to the Oxyurida order, is characterized by their haplodiploidy and direct life–cycle, being found in omnivorous and herbivorous lizards (Adamson 1989, Adamson 1990, Roca 1999, Dung *et al.* 2009). In this study, we report the first finding of *Thelandros* sp. helminths infecting reptiles in Cabo Verde.

Fieldwork was performed in the Cabo Verde Islands of Santo Antão, São Vicente, Santa Luzia and Raso in June 2016. A total of 118

endemic lizards belonging to the species *Tarentola gigas, Tarentola raziana, Tarentola substituta, Tarentola caboverdiana, Chioninia stangeri*, and *Chionina fogoensis* were collected, and 86 faecal pellets were recovered. Parasites were screened in faecal pellets and found in 39 of them. With the resource of light microscopy individuals were identified and measured and sequences of 18S and 28S rRNA nuclear markers (Whiting 2002, Floyd *et al.* 2005) were obtained using previously validated methods for parasitic nematodes (Jorge *et al*. 2014). New sequences are deposited in GenBank (KY541834 and KY541835).

Most of the collected pinworms were identified as *Parapharyngodon* sp., *Spauligodon* sp. and *Spauligodon nicolauensis*. Remarkably, one parasitic nematode from a *C. stangeri* skink from São Vicente was identified as a *Thelandros* sp. male (Fig 1).

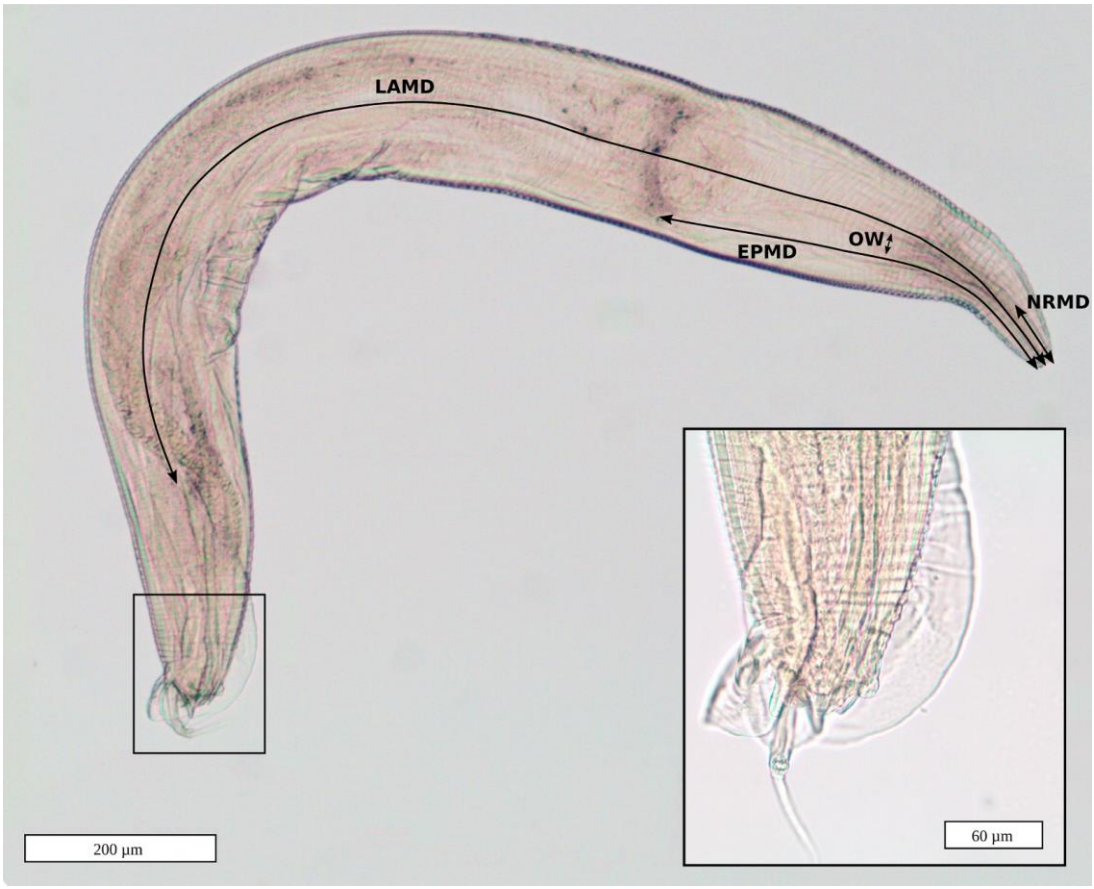

Fig 1. Light microscopy photographs of the general and detailed view of the posterior extremity of a *Thelandros* male found infecting a *Chioninia stangeri* skink from São Vicente Island. Abbreviations correspond to some measurements obtained for the morphological characterization. NRMD: Distance from nervous ring to mouth structure, LAMD: Distance from lateral alae to mouth structure, OW: Oesophagus width measured at the second third of the organ, EPMD: Distance from excretory pore to mouth structure.

Specimen morphology was assessed (Table 1) based on the specimen posterior end (Adamson 1981, Roca 1985). Specimen identity was molecularly confirmed by blasting sequences in GenBank and computing uncorrected p-distances. We retrieved 99/95% identity with *Thelandros tinerfensis* from the Canary Islands, and 0.4/3.5% p–distance, for 18S (KJ778073) and 28S markers (KJ778089), respectively.

Table 1. Measurements of the variables analysed on the *Thelandros* pinworm specimen infecting a *Chioninia stangeri* skink from São Vicente Island (mean ± standard error). Measurements of *Thelandros tinerfensis* (Solera–Puertas *et al.*, 1988) were included for comparison (mean ± standard deviation). * indicates measurements detailed in Fig 1. Linear measurements were taken three times independently (in µm).

	Thelandros tinerfensis	***Thelandros* sp. (present study)**
Linear measurements	**Mean ± SD**	**Mean ± SE**
Body length	1628 ± 69	1562.77 ± 3.26
Body width	209 ± 6	167.35 ± 1.15
Nervous ring (NRMD)*	–	40.02 ± 1.16
Distance to alae (LAMD)*	1321 ± 125	1293.74 ± 5.94
Alae size	–	430.17 ± 1.00
Alae width	–	69.10 ± 3.18
Oesophageal bulb length	–	81.90 ± 0.27
Oesophageal bulb width	34 ± 6	95.90 ± 1.50
Oesophagus length	493 ± 0	401.11 ± 1.69
Oesophagus width (OW)*	124 ± 3	17.70 ± 0.01
Excretory pore (EPMD)*	646 ± 34	466.66 ± 1.99
Spicule length	79 ± 8	85.42 ± 1.32
Tail length	101 ± 12	94.39 ± 1.37
Tail width	–	6.07 ± 0.37
Other variables		
Number of cloacal papillae	4	4
Number of caudal papillae	1	1
Spicule shape	blunt	blunt
Genital cone	present	present
Genital cone shape	v–shape	v–shape
Caudal alae	reaching the caudal papillae	reaching the caudal papillae

This represents the first record of *Thelandros* infecting Cabo Verde lizards. Based on the presence of a well sclerotized V–shaped genital cone, caudal alae reaching the caudal papilla, short lateral alae and five posterior papillae, this specimen resembles *T. tinerfensis*, previously described infecting reptiles from Canary Islands (Solera–Puertas *et al.* 1988). However, 28S sequences showed high divergence with *T. tinerfensis* sequences. Therefore, additional molecular markers and more samples are required to correctly determine the relationship to other *Thelandros* spp. This will allow us to assess if this parasite represents a distinctive lineage specific to Cabo Verde and to infer the prime host with whom this parasite colonized the archipelago.

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