

**DESCRIPTION OF *THELANDROS AEGYPTI* (NEMATODA:  
PHARYNGODONIDAE) FROM THE EGYPTIAN SPINY-TAILED LIZARD,  
*UROMASTYX AEGYPTIA* (SQUAMATA: AGAMIDAE) IN EGYPT**

By

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**Abstract**

*Thelandros aegypti* (Nematoda: Pharyngodonidae) isolated from the large intestine of the Egyptian spiny-tailed lizard, *Uromastyx aegyptia*, in North Sinai deserts, Egypt were described by means of light microscopy as a first description from this host in Egypt. 18 out of 25 (72%) of the examined specimens were naturally infected. The recovered nematodes characterized by the followings; the mouth bounded by three bilobed lips, the presence of three pairs of caudal papillae in male, the absence of gubernaculum, the post-equatorial vulva and the tail of female was suddenly constricted behind anus to form a terminal spike. Male was cylindrical with distinct posterior truncation, 3.0 (2.71-3.7) mm long; 0.24 (0.20-0.33) mm wide. Three pairs of anal Papillae were recorded; the first and the second were pre and perianal and the last pair immediately behind the rounded posterior region of the worm. The tail was narrow, sharply pointed and measured 0.052-0.072 mm in length with slender spicule measured 0.045-0.077mm long. Female was 4.34 (3.32-4.73) mm long, 0.29 (0.24-0.39) mm wide, vulva was post-equatorial, ovary was amphidelphic, the anterior part extended to the level of excretory pore and the posterior ovary extended posteriorly to the anal opening. Uteri were divergent. Egg was oval, slightly flattened and measured 65.4-79.2 µm long and 44.3-74 µm wide.

The described parasite was compared with different species of the same genus from different hosts. It was found that morphometrically, the present species was more or less different from the comparable species and the only morphologically similar species was *Thelandros aegypti*.

**Key words:** *Thelandros aegypti*, Nematoda, *Uromastyx aegyptia*, Agamidae, North Sinai, Egypt

**Introduction**

Genus *Thelandros* was erected by Wedl (1861) for *T. alatus*, a nematode from the intestine of an Egyptian mastigure, *Uromastyx aegyptia*. Chatterji (1933) described *Parapharyngodon maplestoni* from the intestine of an oriental garden lizard, *Calotes versicolor*, collected in Burma. The differentiation between *Parapharyngodon* (Chatterji, 1933) and *Thelandros* (Wedl, 1861) was controversial by reason of the morphological similarities. Some authors considered them as synonym (Baylis, 1936; Karve, 1938; García-Calvente, 1948; Skryabin *et al*, 1951). However, Freitas (1957) considered them as different genera as did (Sharpilo, 1976; Adamson, 1981; Baker, 1987; Castaño-Fernandez *et al*, 1987; Hering-Hagenbeck *et al*, 2002). Adamson (1981) redefined *Paraph-*

*aryngodon* and *Thelandros* and distinguished both based on the host dietary habits, the male and female caudal morphology and egg structure. Males of *Thelandros* have a genital cone with pendulant papillae located outside this cone with an accessory piece present in some species and terminal posteriorly directed tail. But, *Parapharyngodon* spp. males lack the genital cone and the accessory piece. Also, they have mammilliform papillae surrounding the more-or-less terminal anus, lateral alae and subterminal dorsally directed tail (Ramallo *et al*, 2002; Bursey and Goldberg, 2005; Dung *et al*, 2009). *Thelandros* females have various tail morphologies; eggs have a terminal operculum and are larvated when released. *Parapharyngodon* spp. females with a conical tail ending in a short stout spike, eggs with sub

terminal operculum and are in the early stages of cleavage when released (Ramallo *et al*, 2002; Bursey and Goldberg, 2005). Genus *Thelandros* (Wedl, 1861) is characterized by their haplodiploidy, direct life-cycle and essentially parasites of omnivorous and herbivorous reptiles (Adamson, 1989; 1990; Roca, 1999; Dung *et al*, 2009). More than 30 species are assigned to the genus *Thelandross* (Bursey and Goldberg, 2005); however the taxonomic status of some species is still under discussion.

The Egyptian spiny-tailed lizard *Uromastix aegyptia* (Forskål, 1775) was reported in Egypt, Libya, Palestine, Israel and other countries throughout the Middle East (Baha El Din and Sherif, 2006; Nemtzo, 2008). It is by far the largest species of the genus *Uromastix* with a maximum body length of more than 700mm and a weight of up to 2,500g (Wilms *et al*, 2010). This lizard is active during the day time, they basking at the burrow entrance to warm up before heading out to forage for leaves, buds, fruits, seeds and flowers (Nemtzo, 2008). They are even known to be predacious, especially as juveniles, on arthropods (Cunningham, 2000).

The present study described the nematode isolated from the large intestine of the Egyptian spiny-tailed lizard, *Uromastix aegyptia* on the basis of light microscopy.

### Materials and Methods

During the period from May to October 2017, twenty-five specimens of the Egyptian spiny-tailed lizard, *Uromastix aegyptia* were collected by noosing or hand from the plains of North Sinai, Egypt. Hosts were killed by using 20% benzocaine gel (Anbesol, Pfizer, Inc., New York, New York). Upon necropsy, the body cavity was opened by a longitudinal incision from vent to throat and the gastrointestinal tract was removed and examined searching for helminths with the use of stereomicroscope. All animal procedures were carried out according to the regulatory laws regarding experimental Animal Ethics Committee, Faculty of Science,

Beni-Suef University, Egypt (Ethical Approval Number: 2015/10). Nematodes found were heat fixed in 10% neutral buffered formalin for 15 min and then preserved in 70% ethanol in 5% glycerol solution to avoid sudden drying. Finally, samples were transferred to lactophenol for clearance. The prepared samples were examined using differential interference contrast (DIC) light microscopy with digital image analysis system (analysis auto 5.0). Measurements were in mm unless otherwise stated.

### Results

A total of 18/25 (72.0%) specimens of the Egyptian spiny-tailed lizard *U. aegyptia* were infected with nematode parasites.

*Thelandros aegypti* Amer (2004) based on 12 specimens (Figs. 1-7): Robust cylindrical nematodes with prominent cuticle annulations from beginning of oesophagus and continuing to anal opening. Body tapered at both ends. The oral opening was surrounded by three bilobed lips. Male posterior extremity truncated; caudal alae absent; spicule short, sharp, pointed and gubernaculum absent. The tail of female is suddenly constricted behind anus and vulva positioned little behind the middle of body.

Male: Cylindrical body with distinct posterior truncation, measured 3.0 (2.71-3.7 mm) in length; 0.24 (0.20-0.33mm) in width. Length of oesophagus (including bulb) was 0.58 (0.41-0.72mm). Nerve ring and excretory pore were 55-100µm (80±7) and 44-84 (56±5) from anterior end respectively. Testes situated at the mid-body. Three pairs of anal papillae; the first and the second were pre and perianal and the last pair immediately behind the worm rounded posterior region. The tail was narrow, sharply pointed and measured 0.052-0.072mm in length. The slender spicule measured 0.045-0.077mm in length.

Female: Body length 4.34 (3.32-4.73 mm); width 0.29 (0.24-0.39 mm). Total esophagus length 0.87 (0.76-0.98 mm). Bulb length was 89-170µm (153±18); bulb width 85-120

$\mu\text{m}$  ( $96\pm 10$ ). Nerve ring and excretory pore were  $66\text{--}116\ \mu\text{m}$  ( $84\pm 7$ ) and  $40\text{--}83$  ( $52\pm 6$ ) respectively from anterior end. Vulva was post-equatorial. Ovary was amphidelphic, the anterior part extended to the level of excretory pore and the posterior ovary extended posteriorly to anal opening. Uteri were divergent. Egg was oval, slightly flattened and measured  $65.4\text{--}79.2\ \mu\text{m}$  x  $44.3\text{--}74\ \mu\text{m}$ .

*Taxonomic summary:*

Type species: *Thelandros aegypti* Amer (2004)

Type-host: *Uromastix aegyptia* (Agamidae)

Site of infection: Large intestine

Type locality: North Sinai Governorate, Egypt

Prevalence: Eighteen out of 25 (72.0%) specimens were infected

Deposition: Permanent slides of paratype female and holotype male were deposited in Department of Zoology Museum, Faculty of Science, Beni-Suef University, Egypt.

### Discussion

Egypt has a relatively long history of reptile nematology, mostly of the genera *Agama* and *Scincus* (Seurat, 1917; Baylis, 1923; Moravec *et al.*, 1987). The morphological studies of the recorded species showed that it belonged to genus *Thelandros* (Wedl, 1861). Species of *Thelandros* are distinguished based on pattern of the caudal papillae, spicule length and morphology of the anterior cloacal lip in males, location of the vulva and morphology of the posterior end of the female and geographical distribution (Burse and Goldberg, 2005). The recorded species can be differentiated from *Parapharyngodon* sp. based on the mouth bounded by three bilobed lips, the presence of three pairs of caudal papillae in male, the absence of gubernaculum and the tail of female is suddenly constricted behind anus to form a terminal spike.

*Thelandros aegypti* Amer (2004) is most morphologically and morphometrically similar to the present nematode isolated. Both species resemble each other in; oral opening is surrounded by three bilobed lips; three

pairs of male anal papillae, post-equatorial vulva in addition to the similar morphometric data. A comparison between the present species and some species of the same genus recorded was given (Tab.1).

*Thelandros petterae* Adamson and Nasher (1984a) differed from the present species in the flask shaped anal peduncles in males and the prevular swelling in females. *T. agama* Adamson and Nasher (1984a) differed from the species recorded in the present study in the absence of lips; caudal appendages and host locality. *T. masaae* Adamson and Nasher (1984a) differs from the present species in the presence of a long tubular extension supporting the vulva, the shape of female tail and the shape of the anterior anal lip in male.

The present species differed from *T. popovi* Adamson and Nasher (1984b) in the presence of lips, metric characters and host locality.

*Thelandros* sp. Rabie *et al.* (2012) differed from the present species in that; oral opening without lips, presence of two pit-like amphids at the lateral side of cephalic collarets, the number and position of caudal papillae and absence of male spicule. The recorded species should be classified as *Thelandros aegypti* with a new host records in Egypt.

### Conclusion

*Thelandros aegypti* Amer (2004) was recorded from *Uromastix aegyptia* (new host), North Sinai Governorate (new locality) during a general survey on parasites infecting lizards in Egypt.

The parasite was described morphologically and morphometrically by light microscopy. More phylogenetic studies are on-going to elucidate the taxonomy of such nematode.

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Table 1: Comparison between present *Thelandros aegypti* and some of same genus species previously recorded.

Aspect	Male				Female			
	BL	BW	OL	TL	BL	BW	OL	EL (µm)
<i>T. agama</i> Adamson and Nasher (1984)	2.29 0.27-2.51	0.16	0.66	0.065	5.64 4.74-6.25	0.5 0.44-0.58	1.21	95-120 x 62-68
<i>T. masaae</i> Adamson & Nasher (1984)	2.8 2.2-3.56	0.23 0.18-0.25	0.92	0.09 0.07±0.09	5.64 4.74-6.25	0.5 0.44-0.58	1.21	116-118 x 57-63
<i>T. petterae</i> Adamson & Nasher (1984)	2.5 2.31-2.54	0.16 0.15-0.18	0.87	0.077	3.04 2.95-3.3	0.28 0.31-0.32	1.18	122-143 x 97-112
<i>Thelandros</i> sp. Rabie <i>et al.</i> (2012)	1.85- 3.02	0.17- 0.25	0.48 -0.65	0.03- 0.05	2.65 -3.85	0.36 -0.46	0.66 -0.76	78-84 x 51-68
<i>T. aegypti</i> Amer (2004)	3.55-4.31	0.28-0.32	0.64-0.75	0.06-0.07	6.16-6.98	0.45-0.59	0.98-1.03	126-144 x 75-90
<i>T. aegypti</i> Rabie <i>et al.</i> (2012)	2.85-3.6	0.24-0.32	0.48-0.65	0.03-0.05	3.65-4.8	0.25-0.36	0.76-0.98	78.7-84.3 x 51.34-68
<i>T. aegypti</i> (Present study)	3.0 2.71-3.7	0.24 0.20-0.33	0.58 0.41-0.72	0.052-0.072	4.34 3.32-4.73	0.29 0.24-0.39	0.87 0.76-0.98	65.4-79.2 x 44.3-74

BL: Body length, BW: Body width, OL: oesophagus length, TL: Tail length Measurements in mm, otherwise

### Explanation of figures

Figs. 1-7: Light micrographs of *Thelandros aegypti* infecting *Uromastix aegyptia*.

Fig. 1: Female, left lateral view terminated at a blind end, O oesophagus; VU vulva; BU bulb.

Fig. 2: Male, left lateral view terminated at a caudal spike and spicule (SP).

Fig. 3: Transverse cuticular annulations (TS).

Fig. 4: Anterior part of the worm body. (5) Posterior end of female.

Fig. 5: Female anal opening (A).

Fig. 6: Posterior end of male with a spicule (SP). Scale bars: 1 = 0.3mm; 2 = 0.2mm; 3-7 = 0.06mm

