

Parasites of the relict fauna of Ceylon

IV. *Zeylanurotrema lyriocephali* gen. et sp. nov.

and other trematodes from mountain lizards and a rodent

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Summary

An initial survey of the helminth parasites of several endemic vertebrate hosts, particularly relict agamid lizards, collected in the montane zone of Ceylon, has shown a general paucity of trematode species.

Paradistomoides ceratophorae (Dollfus, 1923) is reported from the gall bladder and liver of *Ceratophora stoddarti* and of two new hosts, *Cophotis ceylanica* and *Calotes nigrilabris*.

A new urotrematid genus and species, *Zeylanurotrema lyriocephali*, is described from the urinary bladder of the relict hump-nosed lizard, *Lyriocephalus scutatus*. The new genus is characterised by the absence of œsophagus and cirrus sac, the location of the ovary near the testes, in the posterior quarter of the body, far caudad of the acetabulum, and the enlargement of the distal portion of the uterus into a thin-walled, non-muscular sac.

The near-cosmopolitan species, *Brachylaemus (Brachylaemus) advena* Dujardin, 1843, is reported from the small intestine of an endemic rodent, the Highland Spiny Rat, *Mus mayori*.

Résumé

Parasites de la faune relique de Ceylan. IV. Zeylanurotrema lyriocephali gen. et sp. nov. et autres Trématodes de lézards et rongeur de la zone montagneuse.

Une vue préliminaire des parasites helminthiques de plusieurs hôtes vertébrés endémiques, en particulier des lézards agames reliques récoltés dans la zone montagneuse de Ceylan, a montré la rareté des espèces trématodes.

Paradistomoides ceratophorae (Dollfus, 1923) a été trouvé dans la vésicule du fiel et dans le foie de *Ceratophora stoddarti* et de deux hôtes nouveaux, *Cophotis ceylanica* et *Calotes nigrilabris*.

Nous décrivons une espèce uotrématide et un genre nouveau, *Zeylanurotrema lyriocephali*, trouvés dans la vessie urinaire du lézard « hump-nosed » relique, *Lyriocephalus scutatus*.

Ce nouveau genre est caractérisé par l'absence de l'œsophage et du cirrus sac ; par la position de l'ovaire près des testes dans la partie postérieure du corps, bien caudad de l'acétabulum ; par l'agrandissement de la partie distale de l'utérus en un sac non musculéux à paroi mince.

L'espèce près-cosmopolite *Brachylaemus (B) advena* Dujardin, 1843, a été trouvée dans l'intestin grêle d'un rongeur endémique, le Rat épineux des Montagnes (Highland Spiny Rat), *Mus mayori*.

Introduction

« Small populations, living in marked isolation, tend to lose their trematode parasites, but they may acquire new and different species from sympatric congeners that frequent the site. »

H. W. STUNKARD, 1970.

The trematodes of Ceylon's relict and other endemic animals so far examined for parasites seem to be scanty (Table I, A-E). Among reptiles, 13 specimens of *Cophotis ceylanica*, 25 specimens of *Ceratophora stoddarti*, 1 specimen of *Ceratophora tennenti*, 4 specimens of *Lyriocephalus scutatus* and 20 specimens of *Calotes nigrilabris*, a total of 63 specimens in all, harboured only 2 trematode species in 9 of the specimens. One of these, *Paradistomoides ceratophorae* (Dollfus, 1923), a species confined to Ceylon, was recovered from relict agamid lizards. The other, a new genus and species, *Zeylanurotrema lyriocephali*, is described from the relict agamid *Lyriocephalus scutatus*.

While only a single specimen of the near-cosmopolitan species *Brachylaemus (Brachylaemus) advena* was collected from an endemic rodent *Mus mayori* (3 specimens) no trematodes were recovered from other endemic hosts examined, namely: Amphibia: *Nannophrys guentheri* (1 specimen), *Rhacophorus microtympanum* (2), *Philautus schmardanus* (4); Reptilia: *Otocryptis wiegmanni* (1), *Aspidura trachyprocta* (4); Mammalia: *Solisorex pearsoni* (1), *Suncus murinus montanus* (3), *Rattus rattus kelaarti* (2).

The trematodes were freshly collected, placed in 0.9 % saline and preserved in aqueous Bouin's fluid, with or without pressing.

Table I (a)

Host	Sex and No. of hosts Male	Female	Locality of Host	Habitat of Parasite	Parasite	No. of parasites collected
1. <i>Cophotis ceylanica</i> Peters, 1861	1	—	Horton Plains 2 195 m (7 200 ft.)	Gall bladder	<i>Paradistomoides ce- ratophorae</i> (Dollfus, 1923)	2
2. »	—	1	Nuwara Eliya Park 1 885 m (6 185 ft.)	—	—	—
3. »	1	—	»	—	—	—
4. »	—	1	»	—	—	—
5. »	1	—	»	—	—	—
6. »	—	1	»	—	—	—
7. »	1	—	»	—	—	—
8. »	1	—	»	—	—	—
9. »	1	—	Nuwara Eliya	—	—	—
10. »	1	—	»	—	—	—
11. »	—	1	»	—	—	—
12. »	—	1	Hakgala Gardens 1 707 m (5 600 ft.)	—	—	—
13. »	—	1 young	»	—	—	—

Table I (b)

Host	Sex and No. of hosts Male Female	Locality of Host	Habitat of Parasite	Parasite	No. of parasites collected
1. <i>Ceratophora stoddarti</i> Gray, 1835 (Horn-nosed lizard)	1	Nuwara Eliya	—	—	—
2. »	1	»	—	—	—
3. »	1	»	—	—	—
4. »	1	»	—	—	—
5. »	1	»	—	—	—
6. »	1	»	—	—	—
7. »	1	»	—	—	—
8. »	1	»	—	—	—
9. »	1	»	—	—	—
10. »	1	»	—	—	—
11. »	1	»	—	—	—
12. »	1	»	—	—	—
13. »	1	»	—	—	—
14. »	1	»	—	—	—
15. »	1	Horton Plains	Gall bladder	<i>P. ceratophorae</i>	2
16. »	1	»	—	—	—
17. »	1	»	Gall bladder	<i>P. ceratophorae</i>	4
18. »	1	»	Gall bladder	<i>P. ceratophorae</i>	2
19. »	1	»	Gall bladder	<i>P. ceratophorae</i>	1
20. »	1 young	Hakgala Gardens	—	—	—
21. »	1	»	—	—	—
22. »	1	»	—	—	—
23. »	1	»	—	—	—
24. »	1	»	—	—	—
25. »	1	»	—	—	—
26. <i>Ceratophora tenmentii</i> Günther, 1861	1	Nuwara Eliya Park Knuckles region 1 863 m (6 112 ft.)	—	—	—

Table I (c)

Host	Sex and No. of hosts Male Female	Locality of Host	Habitat of Parasite	Parasite	No. of parasites collected
1. <i>Lyriocephalus scutatus</i> (L.) (Hump-nosed lizard)	— 1	Udawatekele (Kandy) 510 m (1 674 ft.)	—	—	—
2. »	— 1	»	—	—	—
3. »	— 1	»	—	—	—
4. »	1 —	»	Urinary bladder	<i>Zeylanurotrema lyriocephali</i> gen. et sp. nov.	19

Table I (d)

Host	Sex and No. of hosts Male Female	Locality of Host	Habitat of Parasite	Parasite	No. of parasites collected
1. <i>Calotes nigrilabris</i> Peters, 1860 (Black-lipped agama)	1 —	Horton Plains	—	—	—
2. »	1 young —	»	—	—	—
3. »	1 young —	»	—	—	—
4. »	— 1	»	—	—	—
5. »	— 1	»	—	—	—
6. »	1 —	»	—	—	—
7. »	1 —	»	—	—	—

Host	Sex and No. of hosts Male Female	Locality of Host	Habitat of Parasite	Parasite	No. of parasites collected
8. »	— 1	»	Liver	<i>P. ceratophorae</i>	3
9. »	— 1	»	Gall bladder	<i>P. ceratophorae</i>	1
10. »	1 —	»	—	—	—
11. »	1 —	»	—	—	—
12. »	— 1	»	Gall bladder	<i>P. ceratophorae</i>	2
13. »	1 —	»	—	—	—
14. »	— 1	»	—	—	—
15. »	1 —	»	—	—	—
16. »	1 —	Nuwara Eliya Park	—	—	—
17. »	— 1	»	—	—	—
18. »	1 young —	»	—	—	—
19. »	1 —	Hakgala Gardens	—	—	—
20. »	1 —	»	—	—	—

Table I (e)

1. <i>Mus mayori</i> (Thomas, 1915) (Highland spiny rat)	1	Horton Plains	Small intestine	<i>Brachylaemus (Brachylaemus) advena</i> Dujardin, 1843	1
2. »	1	»	—	—	—
3. »	1	»	—	—	—

Type specimens are deposited in the Department of Zoology, University of Ceylon, Peradeniya.

Paradistomoides ceratophorae (Dollfus, 1923) Travassos, 1944
(Plagiorchioidea : Dicrocoeliidae)

Seventeen specimens of this parasite were collected from the liver and gall bladder of agamid lizards caught at Horton Plains. Two worms were taken from *Cophotis ceylanica*, 9 from the horn-nosed lizard, *Ceratophora stoddarti*, and 6 from the black-lipped agama, *Calotes nigrilabris*. The worms are all alike in shape and detailed anatomy, but differ greatly in size. This may be due to the availability of space within the host, because the fewer the worms collected, the larger was their size. This trematode was reported previously (Dollfus, 1923 ; Fernando, 1932) from *Ceratophora stoddarti* in Nuwara Eliya and Hakgala, and from *Ceratophora tennenti* in Gammaduwa (Prudhoe, 1944). Hence *Cophotis ceylanica* and *Calotes nigrilabris* are new host records and Horton Plains is a new host locality in the same mountain region in Ceylon. Detailed measurements of the worms from the different hosts are given in Table II.

Zeylanurotrema lyriocephali gen. et sp. nov.
(Brachylaemoidea : Urotrematidae)
(fig. 1)

Nineteen specimens of this interesting fluke were obtained from the urinary bladder of a male hump-nosed lizard, *Lyriocephalus scutatus*, on 12th July, 1971. The host was caught at Udawattekele, Kandy, and sent to us through the kind offices of Dr P. Nelson of the Department of Parasitology, Faculty of Medicine. The parasites were seen moving actively inside the bladder. They were first released in 0.9 % saline and then pressed and preserved in Bouin's fluid for mounting whole and for sectioning. Three worms were stained in acetic-alum carmine and 7 in Mayer's carmalum. Sagittal, horizontal, and transverse sections were also cut and stained with celestine blue B and eosin.

Description :

The worms are elongate and spindle-shaped, with bluntly rounded anterior and posterior ends. The cuticle is spinose. The suckers are well developed. The oral sucker is subterminal and larger than the acetabulum. It is followed by a small, muscular pharynx which leads directly to the intestine without the intervention of an oesophagus. The caeca, which are either simple or sinuous, start immediately behind the pharynx and end just short of the posterior end of the body.

Table II. — Comparative table of measurements in mm. of *Paradistomoides ceratophorae* collected from different hosts

Measurements taken	<i>Cophotis ceylanica</i> (2)	<i>Ceratophora stoddarti</i> (9)	<i>Calotes nigrilabris</i> (6)
Length	3.04-3.22	1.52-5.22	1.7-4.5
Maximum width	1.57-1.74	1.09-2.61	1.09-3.08
Oral sucker	0.43 (diameter)	$0.22 \times 0.30-0.43 \times 0.61$	0.22-0.43 long and 0.30-0.61 broad
Ventral sucker	0.43 (diameter)	0.43 (diameter)	—
Pharynx	0.17 (diameter)	0.13-0.22 (diameter)	0.13-0.22 (diameter)
Oesophagus	0.09-0.17 long	0.04-0.22 long	— (negligible)
Left Testis	0.30-0.39 broad and 0.22-0.26 long	0.22-0.43 long and 0.26-0.43 broad	0.22-0.49 long and 0.30-0.65 broad
Right Testis	0.26 long and 0.35-0.43 broad	0.22-0.43 long and 0.26-0.52 broad	0.26-0.49 long and 0.26-0.43 broad
Cirrus sac	—	0.43 long	—
Receptaculum seminis	0.22-0.26 (diameter)	0.13-0.26 (diameter)	0.13 (diameter)
Extent of Vitellaria	1.04-1.26 (left) 0.87-1.04 (right)	0.7-2.17 (left) 0.87-1.7 (right)	0.36-1.5 (left) 0.52-1.7 (right)
Ovary	0.26 (diameter)	0.22-0.43 long and 0.22-0.43 broad	0.35-0.43 long and 0.35-0.49 broad
Eggs	0.024×0.012	0.017×0.012 - 0.024×0.012	0.024×0.012

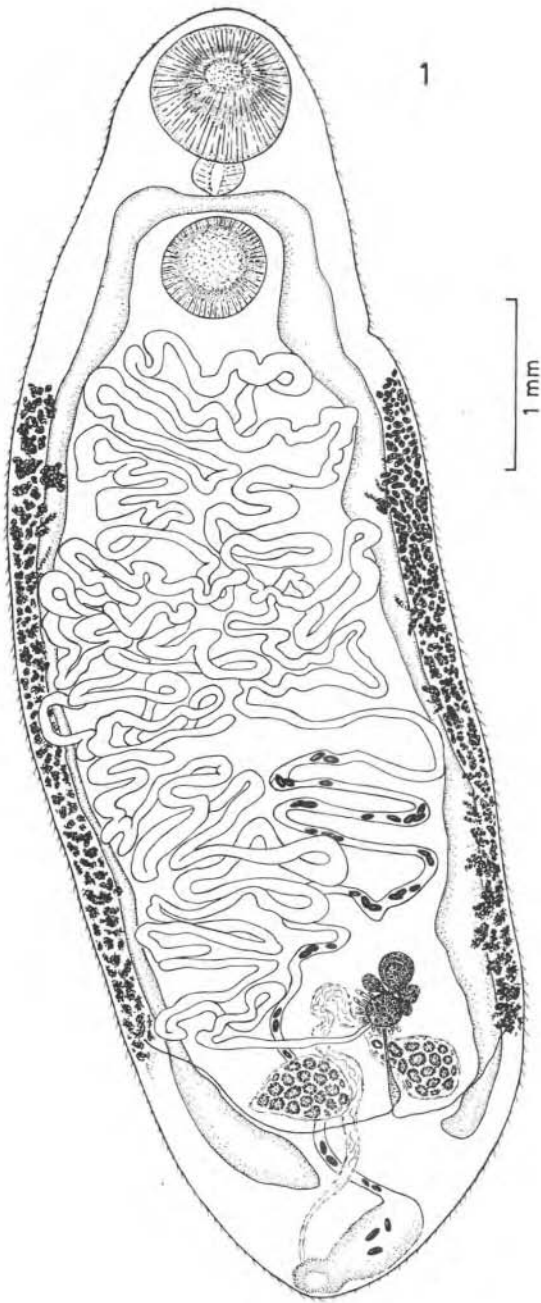


FIG. 1. — *Zeylanurotrema lyriocephali* gen. et sp. nov. Dorsal view.

The gonads are situated in the last quarter of the body. The testes are oval in shape with entire margins and are either intercaecal, postero-caecal, extra-caecal or overlapping the caeca. The vasa efferentia arising from each testis unite behind the ovary at the level of the caecal termination to form the vas deferens. This leads to a seminal vesicle which continues as a narrow ejaculatory duct ending in a minute, weakly muscular papilla opening at the posterior end of the body close to the female genital pore.

The ovary is multi-lobed and pre-testicular. It is slightly disposed to the left of the median line. The small ducts arising from the various lobes of the ovary unite to form the oviduct which joins the ascending limb of the uterus. The uterus ascends to the level of the acetabulum and then descends to the posterior extremity of the body, where it enlarges to form a thin-walled vesicle containing a few gravid eggs before opening to the exterior. The vitellaria extend from the post-acetabular zone to the anterior level of the testes on each side. The right and the left vitelline ducts unite behind the ovary, and the common vitelline duct runs a short distance anteriorly where it enlarges to form a reservoir. Mehlis's gland is also seen around the ovary.

The eggs are numerous, small, ovoid and thin-shelled, and have a distinct opercular ridge.

MEASUREMENTS IN MM. :

Body length	7.85-8.17
Body width	2.74-2.85
Oral sucker	0.71-0.84 long by 0.74-0.79 broad
Ventral sucker	0.56-0.60 long by 0.60-0.63 broad
Pharynx	0.19 long by 0.27-0.33 broad
Right testis	0.38-0.44 by 0.59-0.84
Left testis	0.35-0.47 by 0.55-0.76
Ovary	0.12-0.19 in diameter (Largest lobe)
Egg dimensions	0.029-0.041 by 0.012-0.020
Extent of vitellaria	3.09-4.20 (posterior to acetabulum and anterior to testes)
Uterine vesicle	0.71-1.11 long by 0.31-0.35 broad

Discussion :

Poche (1926) erected the family Urotrematidae to include small, elongate distomes with genital pore at or near the posterior extremity and with a pre-testicular ovary. The family consists of two genera (Travassos and Kohn, 1966), namely *Urotrema* Braun, 1900, with 3 species (two from mammals and one from a reptile) and *Urotrematulum* Macy, 1933, with a solitary species from a bat. The validity of the genus *Urotrematulum* has however been questioned (Caballero, 1942 ; Baer, 1957).

Whether or not *Urotrematum* is a synonym of *Urotrema*, a question which would have to be settled only after a closer study of much more material, the worm described here shows the following well-marked differences from other urotrematids :

1. Habitat : This is the only urotrematid collected from the urinary bladder of its host. All the other species were collected from the small intestine.
2. Absence of oesophagus.
3. Absence of cirrus sac.
4. Location of ovary near the testes, in the posterior quarter of the body, far caudad of acetabulum.
5. The distal portion of the uterus is enlarged into a thin-walled, non-muscular sac.

These differences clearly point to the worms belonging to a new genus, for which we propose the name *Zeylanurotrema*. The diagnostic characters of the family Urotrematidae would consequently require revision as follows. It may be that ultimately two subfamilies, Urotrematinae and Zeylanurotrematinae, would have to be instituted.

Urotrematidae Poche, 1926

Diagnosis : Small elongate brachylaemoids with spinulate body. Pharynx present. Oesophagus present or absent. Caeca long. Acetabulum in anterior half of body. Testes tandem or diagonal, in posterior half of body. Cirrus pouch present or absent. Genital pore at or very near posterior end. Ovary post-acetabular. Uterus consisting of descending limb only, or ascending and descending limbs. Eggs numerous, small. Vitellaria lateral, usually post-acetabular. Excretory vesicle V-shaped. Parasites of mammals and reptiles.

Zeylanurotrema gen. nov.

Diagnosis : Elongate to fusiform urotrematids. Oral sucker sub-terminal. Acetabulum smaller than oral sucker and in anterior third of body. Pharynx well developed. Oesophagus absent. Caeca simple, extending almost to posterior end of body. Gonads in last quarter of body. Testes symmetrical. Cirrus sac absent. Ovary lobed and just anterior to testes. Vitellaria extending from level of acetabulum to that of testes. Uterus with ascending and descending limbs and a saccular distal end. Eggs small, ovoid, with distinct opercular ridge. Genital pore terminal or sub-terminal.

GENOTYPE : *Zeylanurotrema lyriocephali* gen. et sp. nov.

HOST : *Lyriocephalus scutatus* (L.), the hump-nosed lizard.

HABITAT : Urinary bladder.

LOCALITY : Udawattekele (Kandy), 1674 ft. (510 m.) above mean sea level.

Brachylaemus (Brachylaemus) advena

Dujardin, 1843

(Brachylaemoidea : Brachylaemidae)

(fig. 2)

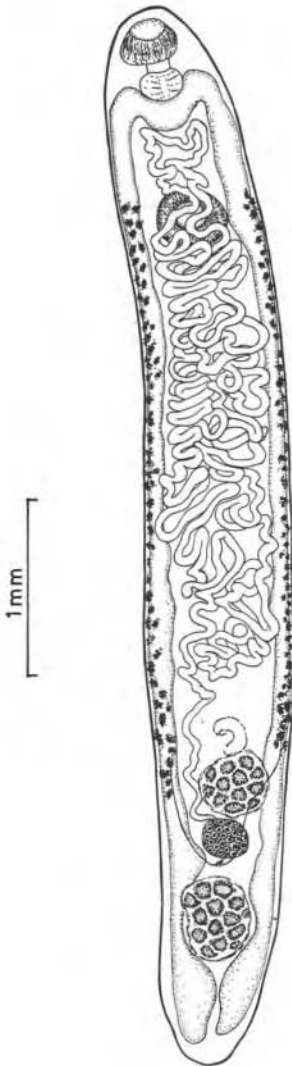


FIG. 2. — *Brachylaemus (Brachylaemus) advena*. Dorsal view.

Out of the three male specimens of Highland Spiny Rat, *Mus mayori*, that were brought from Horton Plains, and dissected, only one had a trematode infection and yielded a solitary specimen of *Brachylaemus* from the small intestine. The worm was alive and actively moving. It was pressed and preserved in Bouin's fluid and stained with borax carmine.

The fluke is elongated and flattened, with rounded anterior and posterior ends. The cuticle is thin and unarmed. The suckers are subequal in size and restricted to the anterior third of the body. The mouth leads into a muscular pharynx which opens into the intestine. The oesophagus is lacking. The caeca are simple and extend to the posterior end of the body.

The gonads are situated in the last third of the body. The testes are rounded and tandem in position, with the ovary lying between them and closer to the anterior testis. The cirrus sac is short and curved and opens to the exterior immediately anterior to the anterior testis. The vitellaria extend from the level of the acetabulum to the level of the anterior end of the anterior testis. The common vitelline duct with its reservoir is situated between the ovary and the posterior testis. The uterine coils are confined to the zone between the intestinal bifurcation and the anterior testis. They are packed with small ovoid eggs.

MEASUREMENTS IN MM. :

Body length	6.5
Body width	0.82
Oral sucker	0.35 × 0.27

Acetabulum	0.4 in diameter
Anterior testis	0.4 in diameter
Posterior testis	0.53 × 0.40
Ovary	0.28 × 0.27
Eggs	0.023 × 0.010

Discussion :

This worm closely resembles *Brachylaemus (Brachylaemus) advena* Dujardin, 1843, which species has hitherto been recorded from various small mammals, including shrews and rodents, in Africa, Europe and the Americas (Freitas, Kohn and Ibanez, 1967).

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