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# A NEW SPECIES, *PRETESTIS LATICAECUM*, (TREMATODA: CLADORCHIIDAE), FROM *EMYDURA KREFFTII* GRAY, 1871 (PLEURODIRA: CHELIDAE) FROM CENTRAL QUEENSLAND, AUSTRALIA

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**Summary**

Ferguson, M. A., Smales, L. R. & Cribb, T. H. (2001) A new species, *Pretestis laticaecum* (Trematoda: Cladorchiidae) from *Emydura krefftii* Gray, 1871 (Pleurodira: Chelidae) from Central Queensland, Australia. *Trans. R. Soc. S. Aust.* **125** (2), 123–127, 30 November, 2001.

*Pretestis laticaecum* is described from the small intestine of the freshwater turtle *Emydura krefftii*. The new species can be distinguished from its congener *P. australianus* by the following characters: significantly smaller ovary, main lymph vessels reach anterior to posterior testis, genital atrium in mid-oesophageal region, small vitelline follicles clumped around the ovary and significantly larger caeca overlapping. The position of this species and related genera in fish, the life cycle of *P. australianus* and the presence of *P. laticaecum* in turtles suggest that it is a relatively recent host capture.

Key Words: *Emydura krefftii*, freshwater turtle, trematode, amphistome.

## Introduction

Only 11 species of amphistome trematodes have been reported from Australia; eight of these are endemic (Sey 1991). Of the endemic species *Macropotrema perlinae* Blair, Beveridge & Speare, 1979 (Zygocotylidae Sey, 1988), and *Gemellicotyle wallabicola* Prudhoe, 1975 (Paramphistomidae Fischoeder, 1901) occur in macropodid marsupials, *Australodiscus megalorchus* (Johnston, 1912) (Diplodiscidae Skrjabin, 1949) occurs in amphibians, *Pretestis australianus* Angel & Manter, 1970, *Australotrema brisbanense* Khalil, 1981, *Bancroftrema neocirrotodi* Angel, 1966 (all Cladorchiidae Southwell et Kirshner, 1932) occur in fish and *Lobatodiscus australiensis* Rhode, 1984 and *Elsevatrema microacetabularis* Rohde, 1984 (both Cladorchiidae) occur in turtles (Sey 1991). These latter two species occur in the freshwater turtle *Elseya dentata* Gray, 1836.

With the exception of *Carettochelys insculpta* from New Guinea and the Northern Territory, all Australian freshwater turtles belong to the Order Pleurodira, characterised by horizontal flexion of the neck vertebrae during head retraction. Family Chelidae, a group that has no fossil record outside its present distribution, Australia and South America (Ernst & Barbour 1989). *Emydura krefftii* is distributed across most of eastern Queensland (Cann 1998) and is common in larger rivers, waterholes, billabongs and associated floodplains (Cogger 1992). Juvenile *Emydura* species are mainly carnivorous but increase the proportions of other food types as they mature (Georges 1982) and become omnivorous, opportunistic feeders which adapt to local availability of food (Cann 1998).

During a survey of freshwater turtles from the Fitzroy River catchment in Central Queensland, three of 51 *Em. krefftii* were found to harbour a previously undescribed amphistome species. Examination showed this to be a new species of *Pretestis*, which is described below.

## Materials and Methods

Turtles were captured using drum nets and hand lines baited with ox heart. Turtles were euthanased with a cervical injection of Nembutal (sodium pentobarbitone) and all organs examined under a dissecting microscope for helminths. Trematodes were fixed unflattened in near-boiling formalin, stained with Gower's carmine and mounted in Canada balsam. Drawings were made with the aid of a drawing tube. All measurements are in micrometres given as the range followed by the mean in parentheses.

All work for this project was carried out under Central Queensland University Animal Ethics Approval No. 95/7-105 and all collections were made under Queensland Environmental Protection Agency permits N0/001662/97/SAA and C6/000077/98/SAA. Specimens have been deposited in the South Australian Museum, Adelaide (SAMA) and the Queensland Museum, Brisbane (QMB).

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***Pretestis laticaecum*** sp. nov.
(FIGS 1-5)

*Holotype*: from the lower small intestine of *Emydura krefftii* Gray, Fitzroy River, Queensland (23° 22' S, 150° 32' E), coll M. Ferguson, 17/ix/1996 QMB218302.

*Paratypes*: 21 specimens SAMA AHC28364.

*Description of adult*

(Measurements of 20 specimens, types). Body cylindrical, 833-1105 (941) long, round in cross section, 187-374 (251) at widest point. Pharynx 102-132 (111) long x 66-82 (75) wide, cup-shaped and strongly muscularised, with anterior sphincter. Large extramural pharyngeal sacs, 59-99 (81) long x 56-82 (67) wide. Oesophagus 148-270 (213) long with oesophageal bulb 33-42 (36) long x 46-66 (51) wide. Caeca short, 231-448 (302) x 69-127 (92) wide, occupying middle third of body, with thin muscular walls and a thick layer of glandular tissue. Ventral sucker ventroterminal, 154-247 (197) long x 201-268 (130) wide, well muscularised. Lymph glands large, opening through y-shaped pore in cup of ventral sucker, main paired lymph vessels extending to just past posterior testis. Excretory bladder y-shaped, excretory pore dorsal, posterior, exiting just anterior to margin of acetabulum. Testes two, oblique, round to slightly oval. Anterior testis 69-105 (89) diameter, precaecal, submidline. Posterior testis 75-145 (106) diameter, intracaecal, midline. Ovary midline, oval, 36-39 (38) long, intracaecal, directly posterior to posterior testis. Laurer's canal opening on dorsal surface posterior to ovary. Vitelline follicles intracaecal, extending from just behind posterior testis to just past termination of caeca. Uterus intracaecal. No eggs present. Cirrus-sac with vesicula seminalis interna. Cirrus spined. Gonopore midline, 171-264 (221) from anterior, at margin of anterior testis, just posterior to diverticula. Distinct eyespots in mid-oesophageal zone.

*Description of redia*

Body cylindrical, 850-952 (895) long x 170-306 (221) wide. Large oral opening with muscular pharynx 142-165 (149) long x 112-132 (124) wide, without extramural sacs. Sac-like intestine 288-409 (346) long x 134-268 (230) wide. Up to six developing cercariae in body of redia.

*Description of cercaria*

Body oval to elongate 630-710 (662) x 208-302 (259), heavily pigmented. Tail simple, shorter than body 677-710 (693) x 94-127 (103), attached dorsal to ventral sucker. Pharynx 58-94 (72) x 60-101 (78) with extramural pharyngeal sacs 47-101 (60) x 67-94 (74). Oesophagus long, 107-147 (129) with oesophageal bulb. Caeca short 134-201 (171) x 13-40 (27), ending mid-body. Testes two, 34-94 (66) x 34-80 (56), anterior testis precaecal, submidline, posterior testis intracaecal, midline. Ovary small, 13-40 (25), posterior to testis. Caudal excretory tube. Large lymph vessel opening through y-shaped pore in papilla of ventral sucker. Ventral sucker ventroterminal. Genital pore at anterior margin of anterior testis. Two eyespots present, 34-87 (57) long.

*Etymology*

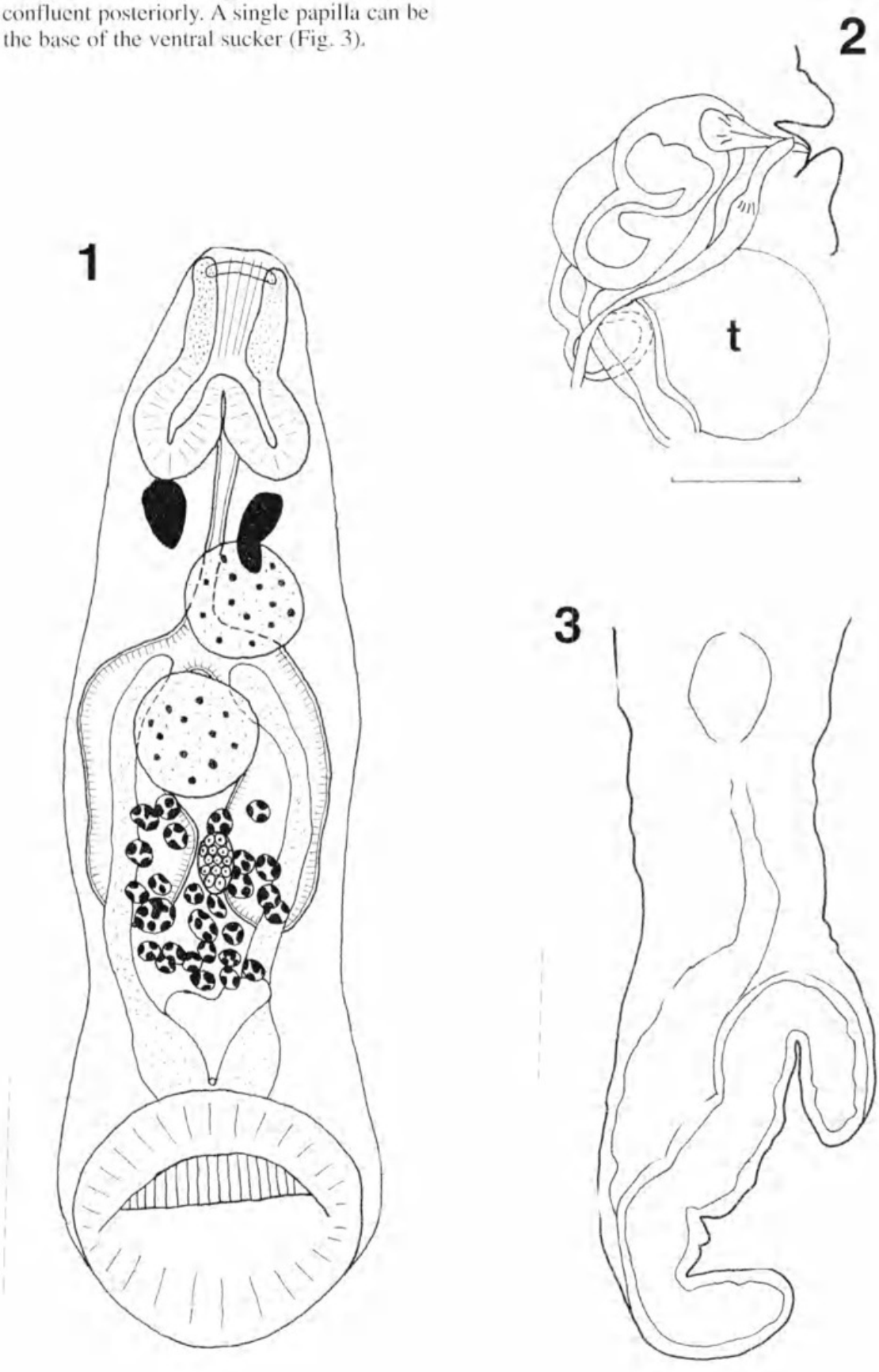
The species name refers to the characteristic wide caeca.

## Remarks

*Pretestis laticaecum* sp. nov., with two testes, the anterior extracaecal, a post-testicula ovary, cirrus sac and primary pharyngeal sacs, is clearly a member of the family Cladorchiidae, Subfamily Sandoniinae Ukoli, 1972. Of the four genera comprising the Sandoniinae, *P. laticaecum* falls within the monospecific genus *Pretestis* Angel & Manter 1970, as it has a cylindrical body shape, ventral sucker smaller than the body width with an oval aperture and caeca that terminate midbody. Of the other three genera of the Sandoniinae, the new species can be excluded from *Basidiodiscus* Fischthal & Kuntz, 1959, because the acetabulum is smaller than the body width and without papilloform projections. It can be excluded from *Sandonia* McClelland, 1957 because the caecal termination and ovary are midbody, and do not reach to the level of the acetabulum. *Australotrema* Khalil, 1981, has tandem testis and an acetabulum with a transverse opening and strong sphincter, characters absent from *P. laticaecum*.

The new species can be distinguished from *P. australianus* in having a smaller ovary, 36-39 µm compared to 530-840 µm long. The main lymph vessels in *P. australianus* reach only to the level of the ovary, whereas the main lymph vessels in *P. laticaecum* reach a point in front of the posterior testis (Fig. 1). The genital atrium in *P. australianus* is mid-oesophageal (Angel & Manter 1970), whereas in the new species it sits on the anterior margin of the anterior testis (Fig. 2). The caeca of all specimens of *P. laticaecum* are very wide and, in many specimens, overlap centrally, whereas in *P. australianus* they are slender and distinctly separate. Finally, the vitelline follicles of the new species are not "considerably large" (Sey 1991) and the follicles are clumped around the ovary, whereas in *P. australianus* they are

in two distinct fields which align with the caeca and are not confluent posteriorly. A single papilla can be seen in the base of the ventral sucker (Fig. 3).



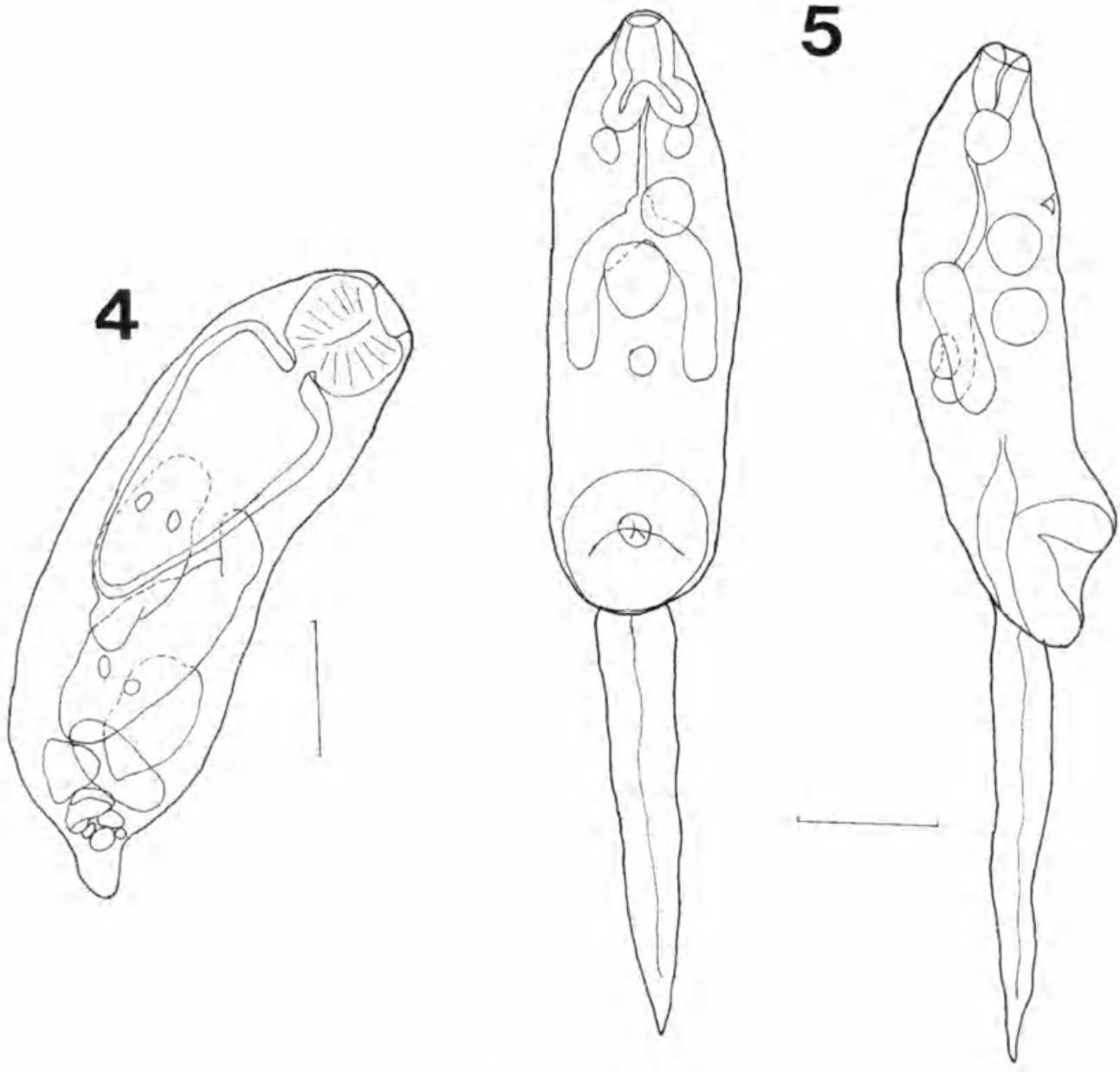

Figs 1-3. *Pretestis laticaecum* sp. nov. 1. Adult, ventral view. 2. Cirrus sac, lateral view. 3. Ventral sucker papilla, lateral view.

Angel & Manter (1970) mention "cercarial eyespots" in their specimens, and anterior pigmentation in this area, presumably as a result of disrupted eyespots. The specimens we examined had large amounts of sperm stored in the vesicula seminalis interna and a single egg has been recorded. All of the specimens we examined had eyespots and we therefore consider them to be a feature of adults.

## Discussion

The subfamily Sandoniinae comprises three monotypic genera plus *Pretestis*, all species with the exception of *P. laticaecum*, occurring in fish (Sey 1991). *Sandonia sudanensis* McClelland, 1957 and *Basidiodiscus ectorchis* Fischthal & Kuntz, 1959 are from North Africa (Egypt, Ghana, Niger and Sudan), *P. australianus* and *A. brisbanense* are from Australia. This modern disjunct distribution suggests Gondwanan origins for the group (Sey 1991). As all other representatives of the Sandoniinae occur in fish, *Pretestis laticaecum* may be an example of recent host capture.

The fish hosts for *P. australianus* commonly occur in coastal rivers and estuaries in Queensland (Grant 1982). Angel & Manter (1970) observed the metacercariae of *P. australianus* encysting on filamentous algae. Probably the fish become infected when they eat such algae and presumably turtles become infected the same way.




Figs 4-5. *Pretestis laticaecum* sp. nov. 4. Redia, ventral view. 5. Cercaria, ventral and lateral view. t: anterior testis. Scale bars = 1, 3-5 200 mm; 2, 50 mm.

The rediae (Fig. 4) and cercariae (Fig. 5) were recovered from the snail host *Thiara balonensis*, Conrad. The cercariae especially have many of the features of the adult, including the distinctive pharyngeal sacs, eyespots, alignment of the testes, small ovary, short caeca and papilla in the ventral sucker.

*Emydura krefftii* has a sympatric distribution with *Em. macquarii* Gray, 1830 in southern Queensland, the northern part of *Em. macquarii*'s range (Cann 1998), and the two species have similar dietary habits. No amphistomes however have been found in *Em. macquarii*[1].

All other amphistomes known from turtles, also cladorchids, are included in the subfamilies Nematophilinae, Schizamphistominae and Caballerodiscinae. The previously known Australian representatives, *L. australiensis* and *E. microacetabularis*, are placed within the latter two subfamilies, and are thought to represent both a Gondwanan distribution (*Elseyatrema*) and parallel evolution (*Lobatodiscus*) (Sey 1991).

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