

AUSTRALIAN ACANTHOCEPHALA No. 15: FOUR SPECIES

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Summary

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Four species of Acanthocephala are reported from Australian hosts. The parasites are *Nipporhynchus carangis* (Yamaguti), *Prosthorhynchus cylindraceus* (Goeze), *Neoechinorhynchus tylosuri* Yamaguti and *N. agilis* (Rudolphi).

KEY WORDS: Acanthocephala, Australia, taxonomy.

Introduction

Four acanthocephalans are reported from Australia. The parasites, their hosts and the localities where they were collected are stated in Table 1. The following abbreviations are used in this paper; S.A. (South Australia), N.S.W. (New South Wales), Vic. (Victoria) and Ql. (Queensland).

Account of species

Nipporhynchus carangis (Yamaguti, 1939)

FIGS 1-3

Rhadinorhynchus carangis Yamaguti, 1939: 341; Golvan, 1969: 65-66.

Nipporhynchus carangis: Ward, 1951: 293.

Protorhadinorhynchus carangis: Petroschenko, 1956, figs 795-796; Yamaguti, 1963: 110.

Host and locality of specimens examined: *Trachinotus russelli* Cuvier; Heron I., Qld; coll. H. M. Manter.

Type host: *Caranx mertensi* Cuvier & Valenciennes, from Inland Sea, Japan; type specimen: Yamaguti Helminthological Museum.

Material: One female and three males examined.

Description

Trunk: Long, slender, cylindrical. Male 11-14

× 0.4-0.8 mm, female 13 × 0.4-0.6 mm. Anterior region of both sexes with strong body spines, extending more posteriorly on ventral side (for about ¼ of trunk length). Spines arise from a cuticular sheath. No posterior or genital spines.

Introvert: Very long, cylindrical, often curved and fully extended in two specimens; length 2.1-2.4 mm, width slightly variable about 0.2 mm and usually narrower in posterior ⅓. Introvert hooks in 10 longitudinal rows of 34-38 hooks per row; hooks placed ventrally usually slightly longer and always more slender than dorsal hooks which are stouter and more curved. Largest ventral hooks 0.070-0.078 mm, largest dorsal hooks 0.065-0.070 mm. Posterior hooks smaller, especially towards base, about 0.04 mm long. Most posterior row, however, most prominent, consisting of longer (about 0.055-0.070 mm) and sharper hooks placed almost at right angles to introvert surface. Short unarmed neck, 0.1-0.2 mm long.

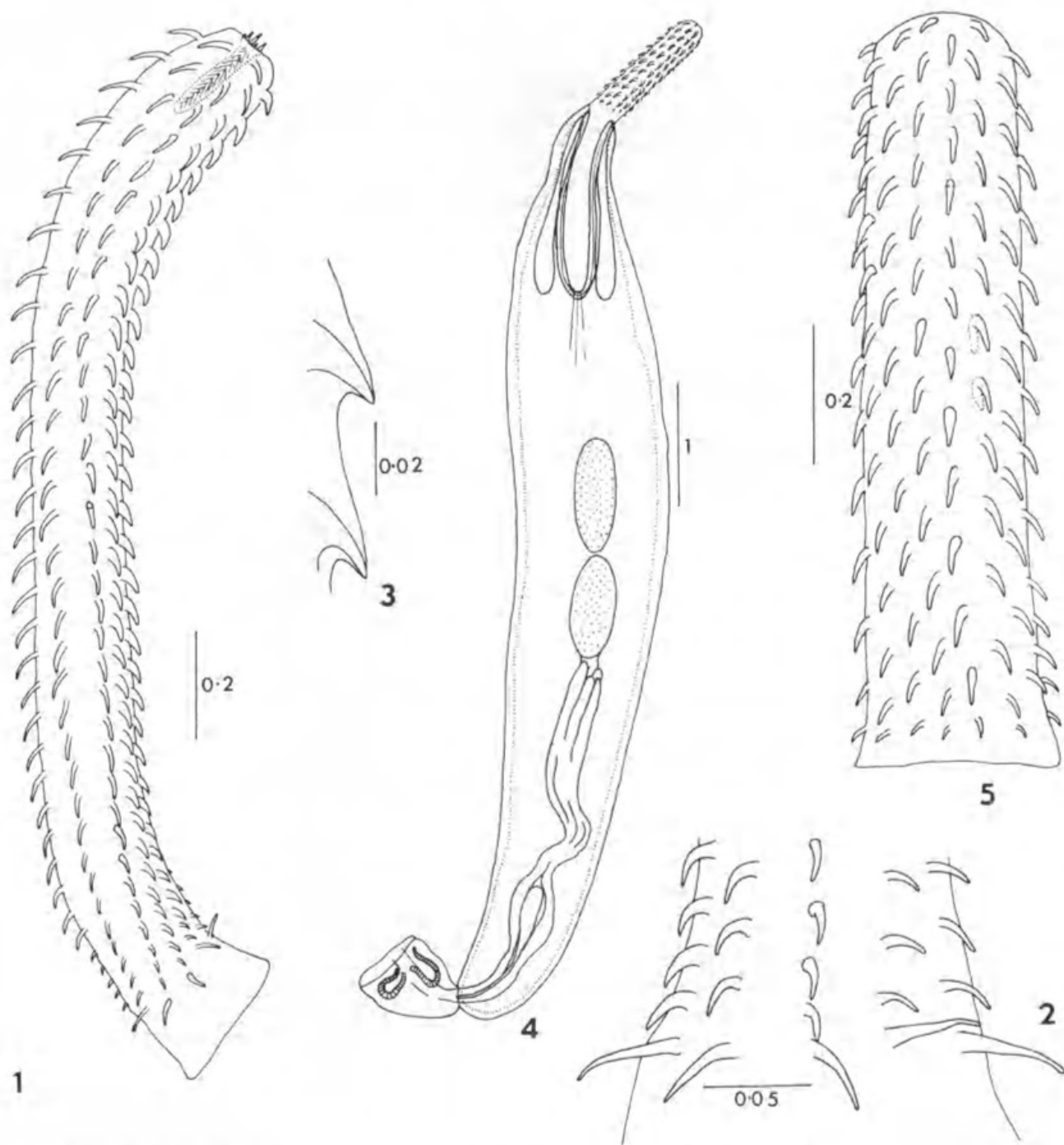
Introvert sheath: Very long, 3.1-4.3 mm, double walled? (single-walled according to Yamaguti). Position of ganglion not clear.

Lemnisci: One-half to ¾ length of sheath, tending to broaden posteriorly.

TABLE 1. *Parasites, hosts and localities*

Parasite	Host	Locality
<i>Nipporhynchus carangis</i> (Yamaguti, 1939)	<i>Trachinotus russelli</i> Cuvier (syn. <i>T. botla</i> Cuvier & Valenciennes)	Heron Is., Ql.
<i>Prosthorhynchus cylindraceus</i> (Goeze, 1782)	<i>Turdus merula</i> Linnaeus <i>Acridotheres tristis</i> Linnaeus	Werribee, Vic. Heidelberg, Vic.
<i>Neoechinorhynchus tylosuri</i> (Yamaguti, 1939)	<i>Tylosurus</i> sp.	Heron Is., Ql.
<i>Neoechinorhynchus agilis</i> (Rudolphi, 1819)	<i>Crenimugil crenilabris</i> (Forsk.) <i>Mugil cephalus</i> Linnaeus	Heron Is., Ql. Heron Is., Ql.

* South Australian Museum, North Terrace, Adelaide, S. Aust. 5000.



Figs 1-3. *Nipporhynchus carangis*. 1. introvert. 2. posterior region of introvert. 3. trunk spines (scale in mm).
Figs 4-5. *Prosthorrhynchus cylindraceus*. 4. male. 5. introvert.

Testes: Ellipsoidal, $0.9-1.3 \times 0.35-0.45$ mm, tandem or slightly overlapping.

Cement glands: Long, tubular to pyriform, pressed closely together; number not known.
Female complex: Uterus very long, about 4.5 mm, slender; embryonated eggs slender and fusiform $0.053-0.058 \times 0.008-0.012$ mm,

with pronounced polar prolongations. Genital pore sub-terminal.

Systematic position

These specimens resemble most closely *Rhadinorhynchus carangis* Yamaguti, especially in the length and armature of the introvert.

The introvert sheath of his specimens, however, is said to be single-walled.

The generic position of the species seems, however, to be uncertain. Ward (1951: 293) considered it as a *Nipporhynchus* "chiefly because of the presence of four cement glands and the prominent arcuate hooks at the base of the proboscis". Petroschenko (1956) and Yamaguti (1963) transferred it to *Protorhadinorhynchus* in which (1) the sheath is single-walled and (2) the egg is elliptical. Golvan (1964) admitted *Nipporhynchus cadenati* Golvan & Houin but decided against the validity of the genus in 1969. There seems little doubt to me that the Australian specimens are the same as Yamaguti's species and, like Ward (1951), I consider them as *Nipporhynchus carangis*.

The specimens resemble in some respects *Rhadinorhynchus cadenati* (Golvan & Houin 1964) but differ significantly because the latter possesses 16 rows of 25-26 hooks and not 10 rows of 34-36 hooks per row. Golvan (1969) gives *Trachinotus goreensis* as one of the hosts of *R. cadenati*.

I have also compared the parasites from *Trachinotus russelli* with those of *Illiosentis edmondsi* Golvan 1960 (= *Illiosentis furcatus* of Johnston & Edmonds, 1957) in my possession. In *I. edmondsi* the number of rows of introvert hooks is greater, the field of trunk spines extends to the posterior of the worm, the eggs are elliptical and larger and the uterus is short and not very long.

Prosthorhynchus cylindraceus (Goeze)

FIGS 4-5

Prosthorhynchus cylindraceus (Goeze, 1782); Yamaguti, 1963: 152.

Prosthorhynchus transversus (Rudolphi, 1819); Meyer, 1932: 123; Golvan, 1960: 578.

Hosts: (1) *Turdus merula* Linnæus, coll. P. Whitely, Heidelberg, Vic., 23.xii.74. (2) *Acridotheres tristis* Linnæus, coll. I. Beveridge, Werribee, Vic., 3.xii.74.

Both are introduced birds.

Description

Trunk: Smooth, without body spines. Male, length 5-8 mm, maximum width (in anterior half) 1.0-1.3 mm; subcylindrical, tending to taper slightly at extremities. Female, larger and stouter, length 6-13 mm, maximum width 1.4-1.9 mm.

Introvert: Cylindrical. Male, length of armed region 0.93-1.0 mm, maximum width 0.22-0.27 mm. Female, length 0.98-1.1 mm, width 0.25-0.30 mm. Armed with 14-16 rows of 12-14 hooks per row. Size of hooks almost uniform (0.080-0.086 mm, measured from tip to anterior-most point), except last two of each row which are smaller (0.055-0.070 mm) and more spiniform. Short, aspinose neck 0.14-0.20 mm long. Introvert arises slightly on ventral side of longitudinal mid-line.

Introvert sheath: Length 1.7-2.1 mm, width 0.30-0.45 mm. Double-walled. Cerebral ganglion in posterior third.

Lemnisci: Two, tubular, up to twice length of sheath.

Male system: Two ovoid testes, contiguous or tandem, 0.5-0.9 mm long. Cement glands long and pressed closely together, extending anteriorly usually to base of second testis. Male aperture terminal.

Female system: Eggs, none with fully developed embryos; length 0.045-0.052 mm, width 0.016-0.020 mm, without polar prolongations. Female complex with total length 1.2-1.9 mm. Female aperture subterminal on ventral side.

Systematic position

I have been unable to distinguish these parasites from *P. cylindraceus* (Goeze, 1782) described from a number of European birds including *Turdus merula*. According to Golvan (1960) *P. cylindraceus* and *P. transversus* (Rudolphi, 1819) are synonymous. The Australian specimens resemble in a number of respects both *Prosthorhynchus pittorum* Tubangu, 1935 (from *Pitta atricapilla*) and *P. limnobaeni* Tubangu, 1933 (from *Porzana fusca*). They differ from the former largely in the size of the egg (0.105-0.130 mm) × (0.045-0.050 mm), and from the latter in the number of introvert hooks. *Prosthorhynchus charadrii* Yamaguti, 1939, reported from *Charadrius eucallatus* in S.A. by Johnston & Edmonds, 1947, possesses 17 rows of 17-18 hooks per row.

Both *Turdus* and *Acridotheres* are introduced genera and it is possible that the birds brought the parasites with them. How the life cycle of the parasite then managed to become established in Australia is puzzling in many ways. Yamaguti (1963) lists *Merula* (from New Caledonia) and *Megalurys* (from north Australia) as hosts of *P. cylindraceus*. If *P.*

cylindraceus was already established in a native bird it is possible that the parasite found its way into blackbirds when they were introduced. Schmidt (1981: 597) reports two juvenile specimens of *P. cylindraceus* from an Australian "pigeon". There seems little doubt, then, that the species is present in a number of birds in Australia.

Neoechinorhynchus tylosuri Yamaguti

FIG. 6

Neoechinorhynchus tylosuri Yamaguti, 1939: 347, figs 25, 35, 49-50.

Host: Single male specimen collected from gut of *Tylosurus* sp. at Heron Is., Ql., by H. Manter in Aug. 1963; SAM V2932. The Great Barrier Reef Handbook, Series No. 1, lists *Tylosurus crocodilus*, *T. giganteum*, *T. incisus* and *T. macleayanus* among the fishes of the island.

Type host: *Tylosurus schismatorhynchus*; type locality, Lake Hamana, Kōti, Japan.

Description

Trunk: Long, very slender and cylindrical; length 24 mm, width 0.5-0.8 mm; without spines and hooks.

Introvert: Small in comparison with size of trunk, subspherical, 0.11 mm long, maximum width 0.13 mm. Although some hooks damaged, clearly it is armed with six spiral rows each of three hooks per row. Anterior-most hook is about 0.06 mm long, second about 0.03 mm and last 0.023-0.028 mm.

Introvert sheath: Length 0.22 mm, width 0.13 mm and single-walled.

Lemnisci: Long and of unequal length, 2.0 and 3.4 mm.

Testis: Two, arranged in tandem in posterior half of trunk, 1.6-2.2 mm long.

Cement gland: Long (4.5 mm), syncytial, containing about 20 nuclei. Male aperture terminal.

Systematics

The details of this specimen correspond very closely with those of *Neoechinorhynchus tylosuri* Yamaguti, the type host of which is *Tylosurus schismatorhynchus* from Japan.

Southwell & Macfie (1925) described *Neoechinorhynchus magnus* from an unknown Queensland fish. Their rather brief description is based on a single immature (?), female specimen 90 mm long. The introvert of *N. magnus*, however, is reported to be small, sub-

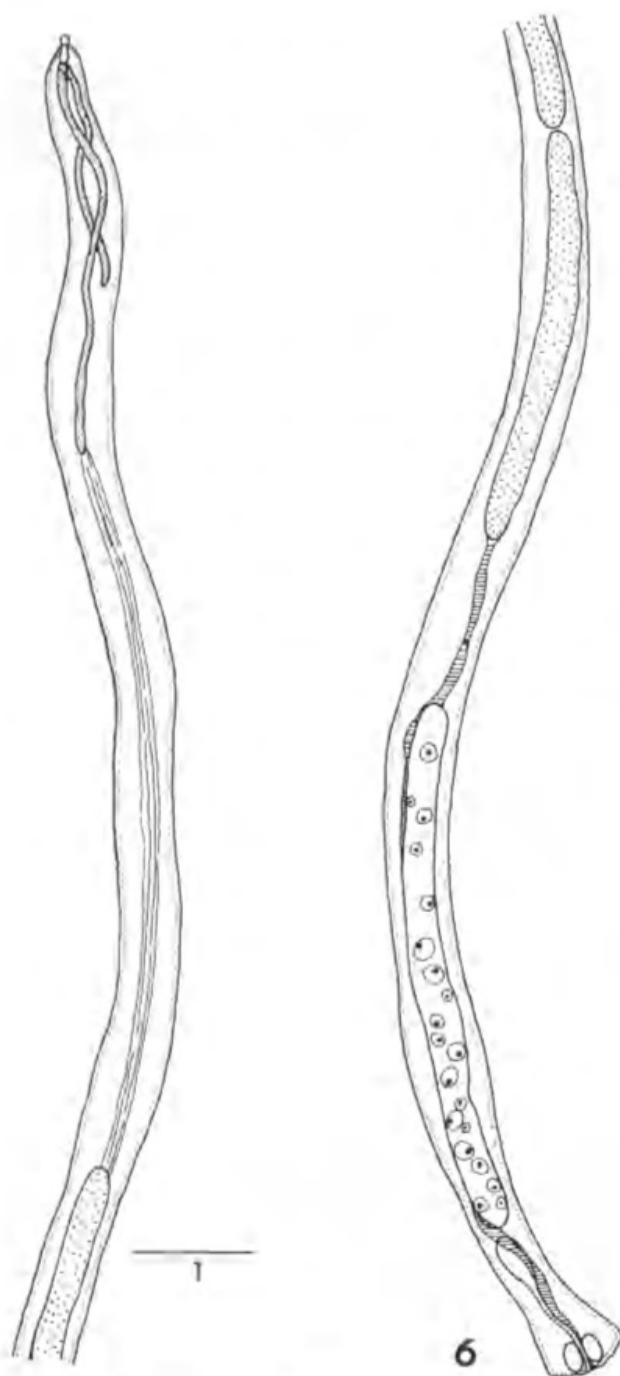


Fig. 6. *Neoechinorhynchus tylosuri*. Male (scale in mm).

globular and armed with 18 hooks placed in three rows. The largest (terminal) hook was 0.060-0.071 mm long, the middle one 0.030-0.037 mm and the smallest about 0.018 mm. Since the length of the female trunk of *N. tylosuri* is given by Yamaguti as 21-70 mm it seems just possible that *N. magnus* and *N. tylosuri* are conspecific. I have recently examined the type of *N. magnus* (lodged at the Liverpool School of Tropical Medicine and

Hygiene). It is much less than 90 mm long, almost opaque and seems to lack an introvert. No other specimen of *N. magnus* is known. Consequently the question about the synonymy of the two species has not yet been answered.

Neoechinorhynchus agilis (Rudolphi)

FIGS 7-8

Neoechinorhynchus agilis (Rudolphi, 1819); Yamaguti, 1935: 275-6; 1939: 345.

Hosts: About 20 specimens from the small intestine of *Crenimugil crenilabis* and *Mugil cephalus* from Heron Is., Ql. Coll. H. Manter in Aug. 1963.

Type host: *Mugil cephalus*; type locality, Mediterranean Sea.

Description

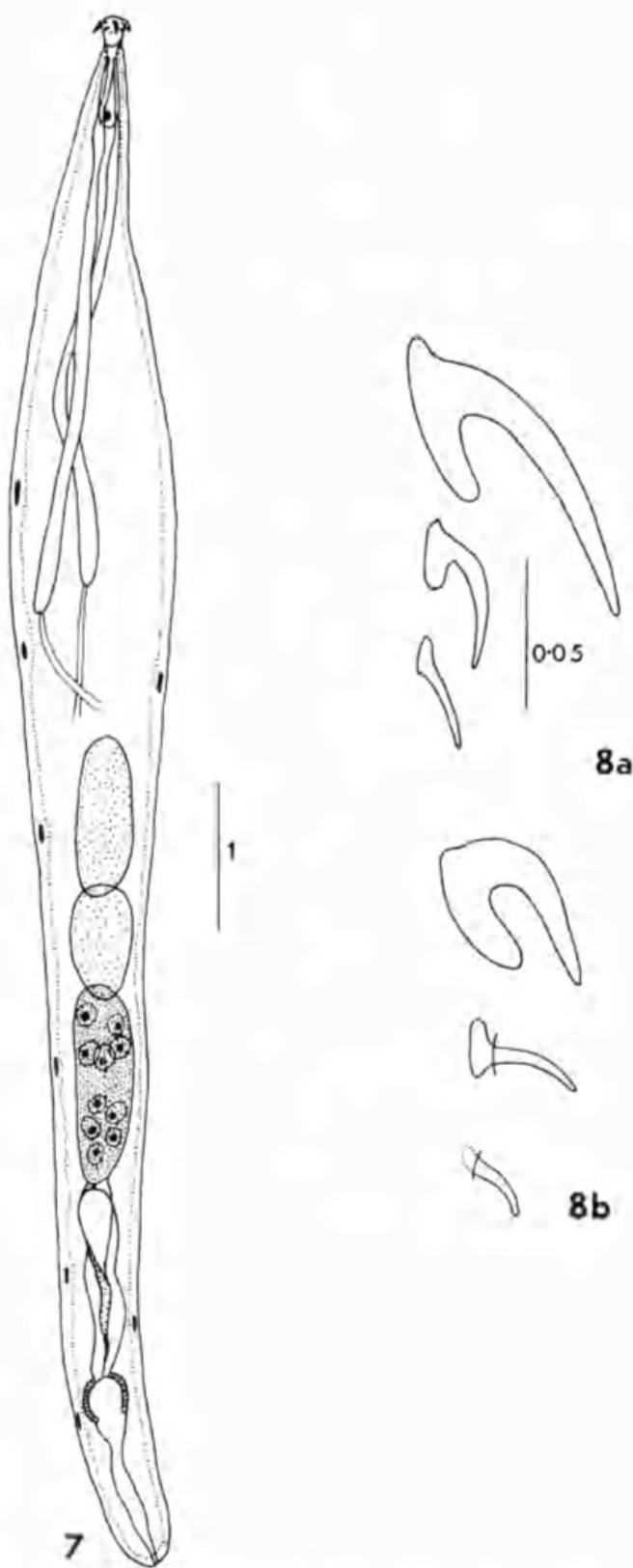
Trunk: Tends to be slender and taper posteriorly. Body wall thick, without spines and containing numerous circular lacunae in hypodermis; with eight subcuticular giant nuclei. Male, length 8.2-11.8 mm, maximum width 0.7-1.2 mm. Female, length 8.1-13.2 mm, width 0.7-1.3 mm.

Introvert: Globular, arising from a short, unarmed neck. In male, length 0.11-0.14 mm, width 0.12-0.15 mm; in female corresponding measurements are 0.13-0.15 mm and 0.12-0.15 mm. Armed with six spiral rows of three hooks per row. Length of first hook (measured from tip to highest point on anterior curve) 0.089-0.12 mm, of second 0.040-0.051 mm and third 0.030-0.040 mm. Well developed posteriorly directed rooting processes present in hooks 1 and 2. Unarmed neck, 0.12-0.18 mm long, 0.09-0.14 mm wide (where it joins trunk).

Introvert sheath: Subcylindrical and long for such a short introvert; length 0.51-0.60 mm, maximum width 0.13-0.17 mm. Single-walled. Cerebral ganglion towards posterior extremity in most specimens.

Lemnisci: Two, long, approximately equal in size, tubular, sometimes reaching to mid-region of trunk.

Male system: Two ovoid testes, tandem or contiguous, in middle third of trunk; 0.45-1.1 mm long, 0.22-0.50 mm wide. Cement gland (as long as 1.1 mm), a syncytial mass containing 8-14 nuclei. Male aperture terminal. Female system: Rather small, total length 0.55-0.87 mm. Eggs small, most containing not fully developed embryos, 0.023-0.029 mm



Figs 7-8. *Neoechinorhynchus agilis*. 7, male. 8a. hooks from introvert. 8b. hooks from introvert of *N. aldrichettae* (figs 8a and 8b to same scale).

long, 0.008–0.010 mm wide. Female aperture terminal to slightly ventro-terminal.

Systematics

Yamaguti (1963) lists 39 species of *Neoechinorhynchus* from fishes and more have been described since 1963. It is very difficult, however, to find significant differences between some of them and it seems likely that a number will eventually be shown to be synonymous.

N. agilis was described from *Mugil cephalus* caught at Spezia, Italy. Van Cleave (1919) thought that *N. agilis* was probably restricted to species of *Mugil* of the Mediterranean.

Yamaguti (1935, 1939), however, reported and redescribed the species from *Mugil cephalus* caught in Japan. The parasites from the mullets caught at Heron Is. resemble closely those from Japan and Italy and are considered to be *N. agilis*.

The specimens from Heron Is. also closely resemble *N. aldrichettae* Edmonds, 1971 from S.A. The main difference is in the size and shape of the introvert hooks, particularly the first of each row. Fig. 8 shows hooks from both *N. aldrichettae* and *N. agilis* (the latter from Heron Is.). They are drawn to the same scale. The differences are marked and consistent.

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