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VERSITA

Opecoelids (Platyhelminthes, Digenea) from the fork-tailed threadfin bream *Nemipterus furcosus* (Valenciennes, 1830) (Perciformes, Nemipteridae), with preliminary keys to the problematic genera *Macvicaria* Gibson et Bray, 1982 and *Neolebouria* Gibson, 1976

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Abstract

The opecoelid species *Macvicaria jagannathi* (Gupta et Singh, 1985) Bijukumar, 1997 (new syn. *Plagioporus deeghaensis* Gupta et Gupta, 1988) and *Neolebouria lineatus* Aken'Ova et Cribb, 2001 are redescribed from *Nemipterus furcosus*, from the waters off New Caledonia. Provisional keys to the genera *Macvicaria* Gibson et Bray, 1982 and *Neolebouria* Gibson, 1976 are presented. The following new combinations are made: *Macvicaria yamagutii* (Gupta et Ahmad, 1977), *M. puriensis* (Gupta et Govind, 1984) and *M. chilkai* (Gupta et Govind, 1984).

Keywords

Digenea, Opecoelidae, *Macvicaria*, *Neolebouria*, *Macvicaria jagannathi*, *Neolebouria lineatus*, identification keys

Introduction

The genera *Macvicaria* Gibson et Bray, 1982 and *Neolebouria* Gibson, 1976 were erected in attempts to divide the large opecoelid genus *Plagioporus* Stafford, 1904 into identifiable smaller units (Gibson 1976, Gibson and Bray 1982). The success of this enterprise is certainly debatable, but the genera have been widely recognised as convenient, if not convincing as monophyletic groups. Cribb (2005) in his major review of the Opecoelidae Ozaki, 1925, emphasised the difficulty taxonomy of this family. We have recovered two opecoelid species from the fork-tailed threadfin bream *Nemipterus furcosus* (Valenciennes, 1830) from off New Caledonia and, using the key in Cribb (2005) find that they belong to *Macvicaria* and *Neolebouria*. By our reckoning there are about 46 species recognised in the former genus and about 21 in the latter. The difficulties encountered in identifying opecoelid species is at least as problematical as identifying genera, so we have developed keys to these two genera, which we have annotated with data on hosts, distribution and useful relevant literature. Using these keys we find that our newly connected specimens may well be conspecific with described species. We find it advisable, however, to describe our new material and to draw attention to any slight differences from previous descriptions.

The two species described in this paper represent, in both biomass and number of individuals, a minor part of the digenean fauna of *Nemipterus furcosus*, which in the main consists of specimens of the large and abundant cryptogonimid *Adlardia novaecaledoniae* Miller, Bray, Goiran, Justine et Cribb, 2009 (Miller *et al*. 2009).

Materials and methods

Digeneans were collected live, immediately fixed in hot saline and then transferred to ethanol. Whole-mounts were stained with Mayer's paracarmine, cleared in beechwood creosote and mounted in Canada balsam. Measurements were made through a drawing tube on an Olympus BH-2 microscope, using a Digicad Plus digitising tablet and Carl Zeiss KS100

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software adapted by Imaging Associates, and are quoted in micrometres, with the range and the mean in parentheses. The following abbreviations are used: BMNH, the British Museum (Natural History) Collection at the Natural History Museum, London, UK; MNHN JNC, Muséum National d'Histoire Naturelle, Paris.

Two voucher specimens of *Nemipterus furcosus* were deposited in the Muséum National d'Histoire Naturelle (MNHN), Paris under the accession numbers MNHN 2005-0768 and 2006-1330.

Results

Family Opecoelidae Ozaki, 1925
Subfamily Plagioporinae Manter, 1947
Genus *Macvicaria* Gibson et Bray, 1982

Macvicaria jagannathi **(Gupta et Singh, 1985) Bijukumar, 1997**
(syn. *Plagioporus jagannathi* Gupta et Singh, 1985; *Plagioporus deeghaensis* Gupta et Gupta, 1988)

Description: Based on 8 worms. Body elongate, narrow, anterior part pyriform, widest in region of ventral sucker; 1,240–1,793 × 237–339 (1578 × 293), width 17.0–19.1 (18.4)% of body-length. Tegument unarmed. Pre-oral lobe short; 2–7 (5). Oral sucker oval, subterminal; 85–135 × 90–135 (110 × 119). Ventral sucker transversely oval, in anterior quarter of body; 161–273 × 169–289 (208 × 234). Sucker-length ratio 1:1.70–2.22 (1.89), sucker-width ratio 1:1.81–2.15 (1.96). Forebody short; 245–377 (301) long; 15.7–21.2 (18.9)% of body-length. Prepharynx short, often entirely dorsal to oral sucker; 0–17 (4). Pharynx 68–110 × 67–105 (87 × 92). Pharynx to oral sucker-width ratio 1:1.26–1.40 (1.30). Oesophagus 51–125 (77) long, 3.37–5.28 (4.46)% of body-length. Intestinal bifurcation in dorsal forebody or at level of anterior margin of ventral sucker, distance 0–77 (44), 1.59–4.35 (3.11)% of body-length. Caeca terminate blindly 67–85 (74) from posterior extremity.

Testes two, oval, longitudinal axis longest, usually separated, in mid-hindbody; anterior 120–197 × 90–126 (153 × 110), posterior 105–208 × 80–150 (165 × 117), distance between testes 0–92 (36), 0.41–6.95 (1.81)% of body-length. Post-testicular region 160–490 (381) long, 24.7–28.2 (26.4)% of body-length. Cirrus-sac long, relatively narrow, reaching from just within hindbody to level of anterior oesophagus; 289–483 × 43–68 (392 × 55), length 21.6–26.5 (24.0)% of body-length; reaches 17–72 (34) into hindbody, 9.34–37.9 (19.1)% of ventral sucker to ovary distance. Internal seminal vesicle saccular, narrower distally. Pars prostatica fairly short, in distal third of cirrus-sac, ejaculatory duct short. Genital atrium small. Genital pore sinistral, mid-way between median line and body margin at level of anterior part of oesophagus.

Ovary oval, entire, pretesticular, 80–122 × 81–124 (109 × 106), 8–65 (25) from anterior testis, 0.81–2.21 (1.37)% of body-length; 141–213 (178) from ventral sucker, 9.92–12.5 (10.9) of body-length. Seminal receptacle canalicular, dorsal to anterior part of ovary. Mehlis' gland and Laurer's canal not seen. Uterus pre-ovarian, intercaecal. Metraterm about half length of cirrus-sac, passes along sinistral margin of cirrus-sac, muscular, but not highly developed. Eggs relatively few, tanned, operculate, 65–72 × 30–36 (69 × 32). Vitellarium follicular, fields reach from close to posterior extremity to level

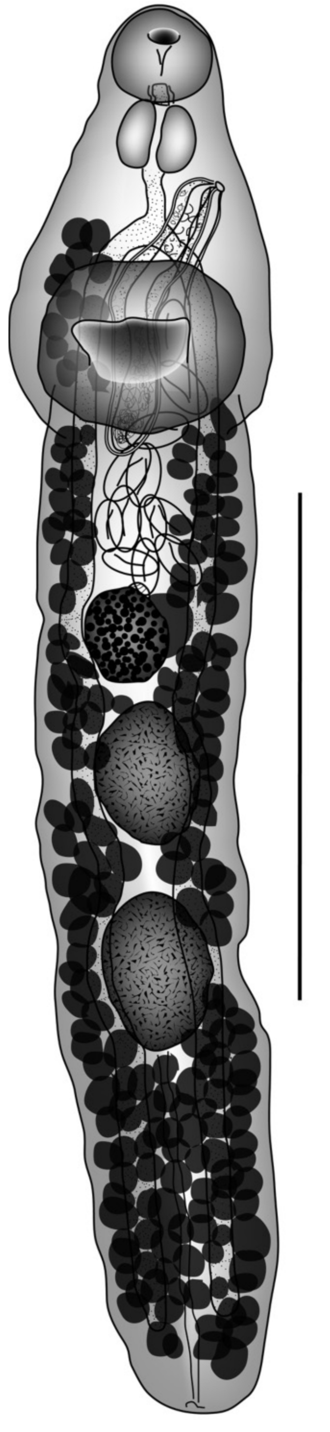

Fig. 1. *Macvicaria jagannathi* (Gupta et Singh, 1985) from *Nemipterus furcosus*. Ventral view, uterus in outline only. Scale bar = 500 µm

of anterior part of ventral sucker or more usually just into forebody, reaching to about bifurcal level, this extent sometimes only on one (usually dextral) side, 0–66 (21) from ventral sucker, 0.00–2.82 (1.23)% of body-length, dorsal, ventral and lateral to caeca, small gaps may occur at level of gonads and ventral sucker.

Excretory pore terminal. Vesicle I-shaped reaches (at least) to ovary.

Host: *Nemipterus furcosus* (Valenciennes, 1830), Perciformes: Nemipteridae, fork-tailed threadfin bream.

Site: Digestive tract.

Localities: Baie Maa, New Caledonia (22°13´S, 166°20´E, 30/08/2007, 30/10/2007), off Baie des Citrons, New Caledonia (22°17´S, 166°25´E, 16/10/2007).

Prevalence: 4 of 6 (67%).

Intensity: 1–4.

Deposition of specimens: Vouchers MNHN JNC2331A-1-3, JNC2366A-1. BMNH 2009.2.12.11-14.

Discussion

The genus was erected by Gibson and Bray (1982) to include those 'species of *Plagioporus* (*sensu lato*) which are marine and possess both a ventro-lateral genital pore and an excretory vesicle which reaches forward at least to the level of the anterior testis'. The vitellarium was defined with the 'lateral fields confluent in post-testicular region and normally dorsally in forebody (fields at least approach one another)'. Since that time the genus has generally been recognised and many additional species have been added to it, mostly by transfer from *Plagioporus*, widening the definition as far as the distribution of the vitelline follicles in the forebody. When Cribb (2005) reviewed the family he included 'vitelline follicles enter forebody …' with no reference to whether the fields were confluent.

Macvicaria jagannathi belongs in a small group of species previously reported from the waters off India, with a relatively narrow outline, probably a protuberant ventral sucker, separated gonads, a straight undivided saccular seminal vesicle and vitelline fields reaching just into the forebody, where they are distinctly separated. Four of these species were originally described in *Plagioporus*, and the fifth, which has never previously been considered a *Macvicaria* species, was described in *Allopodocotyle* Pritchard, 1966 as *A. yamagutii* Gupta et Ahmad, 1977 from the largescaled therapon *Terapon theraps* Cuvier, 1829 [Therapontidae] Bay of Bengal (Gupta and Ahmad 1977). *P. filamentusi* Gupta et Govind, 1984 was described from the whipfin silverbiddy *Gerres filamentosus* Cuvier, 1829 [Gerreidae] and *P. chilkai* Gupta et Govind, 1984 was described from the Savalani hairtail *Lepturacanthus* [= *Trichiurus*] *savala* Cuvier, 1829 [Trichiuridae], both from off Orissa, India (Gupta and Govind 1984). *P. jagannathi* Gupta et Singh, 1985 was described from the chiseltooth wrasse *Pseudodax moluccanus* (Valenciennes, 1840) (Labridae), Bay of Bengal (Gupta and Singh 1985) and *P. deeghaensis* Gupta et Gupta, 1988 was described from the king soldierbream *Argyrops* [= *Pagrus*] *spinifer* (Forsskål, 1775) (Sparidae), Bay of Bengal (Gupta and Gupta 1988). *P. jagannathi* was not actually described as having an undivided seminal vesicle, but no division was described and the seminal vesicle appears saccate in the figures. Bijukumar (1997) placed *P. jagannathi* in *Macvicaria* reporting the species from the flatfishes, the Indo-Pacific oval flounder *Bothus myriaster* (Temminck et Schlegel, 1846) [Bothidae], the largescale flounder *Engyprosopon grandisquama* (Temminck et Schlegel, 1846) [Bothidae], the deep flounder *Pseudorhombus elevatus* Ogilby, 1912 [Paralichthyidae] and the Javan flounder *Pseudorhombus javanicus* (Bleeker, 1853) [Paralichthyidae] from off Kerala in the Arabian Sea. Clearly *A. yamagutii* is closely related to *M. jagannathi*, and is possibly the senior synonym, and should, at least, be included in the same genus as *M. yamagutii* (Gupta et Ahmad, 1977) n. comb., differing in that the cirrus-sac reaches almost to the ovary. In this feature, *M. yamagutii* is similar to the illustration of '*M. jagannathi*' in Bijukumar (1997, fig. 6). We can also see no reason to distinguish *P. deeghaensis* from *M. jagannathi* and, therefore, consider them synonymous. Similarly we cannot distinguish *P. filamentusi* from *M. yamagutii* and consider them synonymous. *P. chilkai* is similar to *M. jagannathi* but is, apparently slightly less slender (width 23–26% of length), with a smaller sucker ratio (1:1.4–1.8) and larger eggs (70–80 µm long).

At this stage we can find no good morphological distinction between our specimens from New Caledonia and the worms described by Gupta and Singh (1985) and Gupta and Gupta (1988). Our specimens are smaller (1,240–1,793 × 237–339 vs 2,510–2,730 × 530–580, 2,340–3,160 × 510–630), with narrower eggs (30–36 vs 43–53, 31–40) and a few ratios may differ slightly, e.g. the ventral sucker to ovary distance is relatively slightly longer according to the illustration in Gupta and Singh (1985, fig. 6) (15 vs 10–12.55 of body-length), but most ratios fall within the same ranges.

Below is the key we have developed to help identify these worms.

Key to the *Macvicaria* spp.

1a. Testes distinctly lobed .... 2.
1b. Testes entire or slightly irregular .... 3.

2a. Width <25% length; seminal vesicle saccular; genital pore at level of oesophagus................ *Macvicaria cynoglossi* (Madhavi, 1975) Bray, 1990 (syn. *Plagioporus cynoglossi* Madhavi, 1975): Pleuronectiformes, Northern Indian Ocean (Madhavi 1975, Bijukumar 1997).
2b. Width >28% length; seminal vesicle coiled; genital pore at level of pharynx .... *Macvicaria japonica* (Yamaguti, 1938) Bray et Cribb, 1989 (syn. *Plagioporus japonicus* Yamaguti, 1938): Pinguipedidae, Plotosidae, Lethrinidae; Japan, Southern Ocean (Yamaguti 1938).

3a. Testes usually distinctly separated .... 4.
3b. Testes adjacent or contiguous .... 7.

4a. Cirrus-sac reaching dorsally to ventral sucker .... *Macvicaria mekistomorphe* Aken'Ova, Cribb et Bray, 2008: *Sillago maculata*; Moreton Bay, Queensland, Australia (Aken'Ova *et al*. 2008)
4b. Cirrus-sac reaching into hindbody .... 5.

5a. Cirrus-sac reaching well into posterior part of ventral sucker to ovary distance .... *Macvicaria yamagutii* (Gupta et Ahmad, 1977) n. comb. (syns. *Allopodocotyle yamagutii* Gupta et Ahmad, 1977; *Plagioporus filamentusi* Gupta et Govind, 1984; possibly *Plagioporus jagannathi* of Bijukumar (1997)): *Therapon theraps*, *Gerres filamentosus*, possibly bothid flatfishes; Bay of Bengal, possibly Arabian Sea (Gupta and Ahmad 1977, Gupta and Govind 1984, possibly Bijukumar 1997).
5b. Cirrus-sac reaching into anterior part of ventral sucker to ovary distance .... 6.

6a. Body slender, width <21% of length; sucker ratio 1:1.7–2.9; eggs 63–71 long .... *Macvicaria jagannathi* (Gupta et Singh, 1985) Bijukumar, 1997 (syn. *Plagioporus jagannathi* Gupta et Singh, 1985; *Plagioporus deeghaensis* Gupta et Gupta, 1988): *Pseudodax moluccanus*, *Argyrops spinifer*, *Nemipterus furcosus*; Bay of Bengal, New Caledonia (Gupta and Singh 1985, Gupta and Gupta 1988, present study).
6b. Body less slender, width >23% length; sucker ratio 1:1.4–1.8; eggs 70–80 long .... *Macvicaria chilkai* (Gupta et Govind, 1984) n. comb. (syn. *Plagioporus chilkai* Gupta et Govind, 1984): *Lepturacanthus savala*; Chilka Lake, Orissa, India (Gupta and Govind 1984).

7a. Ovary separated from anterior testis by loop of uterus in fully developed worms .... 8.
7b. Ovary close to testis, overlapping testis or separated from testis, but with no intervening eggs .... 11.

8a. Seminal vesicle saccular; sucker ratio 1:>2.4; cirrus-sac reaches into hindbody, testes oblique in posterior hindbody, genital pore at level of middle of oesophagus .... *Macvicaria synagris* (Yamaguti, 1952) Aken'Ova, Cribb et Bray, 2008 (syn. *Plagioporus* (*Caudotestis*) *synagris* Yamaguti, 1952): *Synagris* sp.; Makassar, Sulawesi (Yamaguti 1952).
8b. Seminal vesicle coiled; sucker ratio 1:<2.1; cirrus-sac reaches dorsally to ventral sucker; testes tandem in mid-hindbody, genital pore bifurcal .... 9.

9a. Ventral sucker borne on powerful eminence of ventral surface of body; excretory vesicle reaching to level of ventral sucker; ovary normally similar in size to testes .... *Macvicaria mormyri* (Stossich, 1885) Bartoli, Gibson et Bray, 1993 (*Distomum mormyri* Stossich, 1885; *Allocreadium mormyri* (Stossich, 1885) Stossich, 1905; *Plagioporus mormyri* (Stossich, 1885) Yamaguti, 1971: *Lithognathus mormyrus*; Mediterranean Sea (Stossich 1885, Bartoli *et al*. 1993, Jousson *et al*. 1999).
9b. Ventral sucker sessile; excretory vesicle not normally reaching to level of ventral sucker; ovary generally smaller than testes .... 10.

10a. Vitelline fields reach to pharyngeal level, confluent in forebody ….. *Macvicaria chrysophrys* (Nagaty et Abdel Aal, 1969) Bray, 1985 (syns *Plagioporus chrysophrys* Nagaty et Abdel Aal, 1969; *Plagioporus saoudi* Ramadan, 1985): *Acanthopagrus bifasciatus*, Red Sea (Nagaty and Abdel Aal 1969, Ramadan 1985, Hassanine and Gibson 2005).
10b. Vitelline fields reach to bifurcal level; not confluent in forebody …... *Macvicaria obovata* (Molin, 1859) Bartoli, Bray et Gibson, 1989 (syns *Distomum obovatum* Molin, 1859; *Allocreadium obovatum* (Molin, 1859) Dollfus, 1969; *Plagioporus obovatum* (Molin, 1859) Yamaguti, 1971; *Pachycreadium obovatum* (Molin, 1859) Gibson et Bray, 1982; ? *Plagioporus idoneus* from *Oblada melanura* of Fischthal (1980): *Sparus aurata*, possibly *Oblada melanura*, *Blennius* sp.; Mediterranean Sea, southern Iberian waters (Molin 1859, Bartoli *et al*. 1989).

11a. Cirrus-sac confined to forebody .... 12.
11b. Cirrus-sac reaches further posteriorly .... 14.

12a. Width about 23% of body-length; seminal vesicle coiled .... *Macvicaria longicaudus* (Hafeezullah, 1971) Bijukumar, 1997 (syn. *Plagioporus longicaudus* Hafeezullah, 1971): *Cynoglossus* spp., *Synaptera commersoniana*; Gulf of Mannar, Arabian Sea (Hafeezullah 1971, Bijukumar 1997).
12b. Width >30% of body-length; seminal vesicle saccular ... 13.

13a. Testes tandem; genital pore at bifurcal level; ovary pretesticular; vitellarium reaches just into forebody; eggs 57–66 long .... *Macvicaria hunghuaensis* (Qiu et Li in Shen et Qiu, 1995) Aken'Ova, Cribb et Bray, 2008 (syn. *Plagioporus hunghuaensis* Qiu et Li in Shen et Qiu, 1995): *Collichthys lucidus*; off Hebei Province, China (Shen and Qiu 1995).
13b. Testes oblique; genital pore at level of middle of oesophagus; ovary overlaps anterior testis; vitellarium reaches just prebifurcally; eggs 68–74 long .... *Macvicaria oligolecithosus* (Wang, Wang et Zhang, 1992) Aken'Ova, Cribb et Bray, 2008 (syn. *Plagioporus oligolecithosus* Wang, Wang et Zhang, 1992): *Epinephelus awoara*, *Hapolegenys mucronatus*; off Fujian Province, China (Wang *et al*. 1992).

14a. Cirrus-sac reaches into hindbody .... 15.
14b. Cirrus-sac reaches to level of ventral sucker .... 26.

15a. Body squat, width usually >38% length .... 16.
15b. Body relatively elongate; width usually <38% length .... 18.

16a. Cirrus-sac not reaching to ovary .... *Macvicaria skorai* Zdzitowiecki, 1999: *Lepidonotothen macrophthalma*, North Scotia Ridge – sub-Antarctic Atlantic Ocean (Zdzitowiecki 1999).

16b. Cirrus-sac reaching to ovary or anterior testis .... 17.

17a. Width 42–48% length; post-testicular space 11–18 (15)% of body-length; eggs 50–75 × 25–41 .... *Macvicaria flexuomeatus* Aken'Ova, Cribb et Bray, 2008: *Goniistius gibbosus*, *Cheilodactylus rubrolabiatus*; southern Western Australia (Aken'Ova *et al*. 2008).

17b. Width 37–42% length; post-testicular area 15–21 (18)% body-length; eggs 53–83 × 30–52 .... *Macvicaria vitellocopiosa* Aken'Ova, Cribb et Bray, 2008: *Sillaginodes punctatus*; off Kangaroo Island, South Australia (Aken'Ova *et al*. 2008).

18a. Seminal vesicle bipartite .... 19.

18b. Seminal vesicle saccular or coiled .... 21.

19a. Body-width <27% of body-length; testes tandem, genital pore at pharyngeal level; vitellarium reaches to anterior pharyngeal level .... *Macvicaria longibursata* Zdzitowiecki et Cielecka, 1997: *Ophthalmolycus amberensis*, *O. bothriocephalus*; Weddell Sea (Zdzitowiecki and Cielecka 1997).

19b. Body width >29% of body-length; testes oblique, genital pore posterior to pharyngeal level; vitellarium not reaching to anterior pharyngeal level .... 20.

20a. Body width >30% of body-length; testes oblique; genital pore at anterior oesophagus level; ovary overlaps anterior testis; vitellarium reaches to oesophageal level .... *Macvicaria gerridis* (Fischthal et Thomas, 1970) Aken'-Ova, Cribb et Bray, 2008 (syn. *Plagioporus gerridis* Fischthal et Thomas, 1970): *Gerres nigri*; Ghana (Fischthal and Thomas 1970).

20b. Body width 29–31% of body-length; testes oblique; genital pore at bifurcal level; vitellarium reaches to bifurcal level .... *Macvicaria macassarensis* (Yamaguti, 1952) Bray et Cribb, 1989 (syn. *Plagioporus macassarensis* Yamaguti, 1952): *Lethrinus* sp., *Lethrinus miniatus*; Sulawesi (Makassar), Great Barrier Reef (Yamaguti 1952, Bray and Cribb 1989).

21a. Seminal vesicle coiled, cirrus-sac long may reach to ovary .... 22.

21b. Seminal vesicle saccular, cirrus-sac not reaching to ovary .... 23.

22a. Width 25–27% of body-length; sucker width ratio 1:1.18–1.2; genital pore at bifurcal level; post-testicular region 7–8% of body-length; eggs 72–73 long .... *Macvicaria longicirratus* (Manter, 1963) Aken'Ova, Cribb et Bray, 2008 (syn. *Plagioporus longicirratus* Manter, 1963): unknown Balistidae; Fiji (Manter 1963).

22b. Width 33–40% of body-length; sucker width ratio 1:1.6–1.9; genital pore usually pre-bifurcal; post-testicular region 15–22% of body-length; eggs 54–71 (63) long .... *Macvicaria mutovitellina* Aken'Ova, Cribb et Bray, 2008: *Dactylophora nigricans*; southern Western Australia (Aken'Ova *et al*. 2008).

23a. Width 20–27% of body-length; vitellarium reaches to pharynx .... 24.

23b. Width >33% of body-length; vitellarium to oesophageal level .... 25.

24a. Eggs 51–62 × 29–37; vitelline fields dense and confluent in forebody .... *Macvicaria ophthalmolyci* Zdzitowiecki, 1991: *Ophthalmolycus amberensis*, *Nototheniops nudifrons*; South Shetland Islands (Zdzitowiecki 1990a, 1997).

24b. Eggs 65–80 × 25–36; vitelline fields sparse and not confluent in forebody .... *Macvicaria puriensis* (Gupta et Govind, 1984) n. comb. (syn. *Plagioporus puriensis* Gupta et Govind, 1984): *Lutjanus fulvus* [= *vaigiensis*]; Bay of Bengal (Gupta and Govind 1984).

25a. Width 33–34% of body-length; forebody 22–30% of body-length; sucker width ratio 1:2.48–2.75; testes oblique in mid-hindbody; genital pore at oesophageal level; eggs 67–78 .... *Macvicaria dampieri* Bray, 1990: *Pseudorhombus jenynsi*; Shark Bay, Western Australia (Bray 1990).

25b. Width >35% of body-length; forebody ≥35% of body-length; sucker width ratio 1:c 1.6; testes tandem in posterior hindbody; genital pore at pharyngeal level; eggs ≤66 long .... *Macvicaria longisaccus* (Fischthal et Kuntz, 1964) Bray, 1985 (syn. *Plagioporus longisaccus* Fischthal et Kuntz, 1964): *Choerodon anchorago*; Palawan Island, Philippines (Fischthal and Kuntz 1964).

26a. Ovary closer to ventral sucker than to anterior testis .... *Macvicaria aegyptensis* (Shalaby et Hassanine, 1997) Cribb, 2005 (syn. *Cryptacetabulum aegyptensis* Shalaby et Hassanine, 1997): *Acanthopagrus bifasciatus*; Sharm el-Sheikh, Red Sea (Shalaby and Hassanine 1997).

26b. Ovary close to or overlapping anterior testis .... 27.

27a. Vitelline fields distinctly separated in forebody .... 28.

27b. Vitelline fields confluent or close in forebody .... 29.

28a. Vitellarium to bifurcal level; eggs 70–80 long .... *Macvicaria eleuthoronemae* (Wang, Wang et Zhang, 1992) Aken'Ova, Cribb et Bray, 2008: *Lateolabrax japonicus*, *Eleutheronema tetradactylum*; Fujian, China (Wang *et al*. 1992).

28b. Vitellarium to oesophageal level; eggs 65 long .... *Macvicaria isaitschikowi* (Layman, 1930) Bray, 1985 [syn. *Lebouria isaitschikowi* Layman, 1930; *Plagioporus isaitschikowi* (Layman, 1930) Yamaguti, 1938]: *Sebastodes schlegeli*, *Sebastiscus albofasciatus*, *S. marmoratus*; Peter the Great Bay, off Japan. There are many reports of this species, but it remains poorly known. (This key is based on Layman 1930, Yamaguti 1938, Kuramochi 2006; other records are doubtful).

29a. Genital pore at anterior oesophagus to pharyngeal level .... 30.

29b. Genital pore more posterior .... 38.

30a. Seminal vesicle bipartite .... *Macvicaria microtestis* Zdzitowiecki et Cielecka, 1997: Nototheniidae, Artedidraconidae; Weddell Sea (Zdzitowiecki and Cielecka 1997).
30b. Seminal vesicle saccular or coiled .... 31.

31a. Seminal vesicle saccular .... 32.
31b. Seminal vesicle coiled .... 34.

32a. Egg-length 36–50 µm .... *Macvicaria muraenolepidis* Zdzitowiecki, 1990: *Muraenolepis microps*; South Georgia (Zdzitowiecki 1990a, 1997).
32b. Egg-length 50–70 µm .... 33.

33a. Sucker ratio 1:1.6–2.0 .... *Macvicaria georgiana* (Kovaleva et Gaevskaya, 1974) Zdzitowiecki, Pisano et Vacchi, 1992 (syn. *Plagioporus pennelli georgianus* Kovaleva et Gaevskaya, 1974; *Plagioporus pennelli* nec Leiper and Atkinson of authors): *Notothenia rossii*, Nototheniidae, Bathydraconidae, Channichthyidae, Harpagiferidae; Western Antarctic (Kovaleva and Gaevskaya 1974; Gibson 1976; Zdzitowiecki 1990a, 1997; Zdzitowiecki *et al*. 1992).
33b. Sucker ratio 1:2.0–2.8 .... *Macvicaria pennelli* (Leiper et Atkinson, 1914) Zdzitowiecki, 1987 (syns *Podocotyle pennelli* Leiper et Atkinson, 1914, *Plagioporus pennelli* (Leiper et Atkinson, 1914) Byrd, 1963, *Allocreadium fowleri* Leiper et Atkinson, 1914): *Pagothenia bernacchii*, Nototheniidae, Channichthyidae, Zoarcidae; Eastern Antarctica (Leiper and Atkinson 1914; Byrd 1963; Prudhoe and Bray 1973; Zdzitowiecki *et al*. 1992; Zdzitowiecki 1997).

34a. Body width <30% of body-length .... 35.
34b. Body width >35% of body-length .... 36.

35a. Sucker-width ratio of 1:2.0–2.6; genital pore at level of pharynx or anterior oesophagus ...... *Macvicaria heronensis* Bray et Cribb, 1989: *Lethrinus miniatus*, *Gymnocranius audleyi*, *Parma polylepis*, *Trachinotus coppingeri*; southern Great Barrier Reef and off southern Queensland (Bray and Cribb 1989, Aken'Ova *et al*. 2008).
35b. Sucker-width ratio 1:1.4–1.8; genital pore at level of mid-oesophagus .... *Macvicaria kingscotensis* Aken'Ova, Cribb et Bray, 2008: *Neoodax balteatus*, *Haletta semifasciata*; off Kangaroo Island, South Australia (Aken'Ova *et al*. 2008).

36a. Testes oblique; vitelline fields in forebody close but not confluent .... *Macvicaria branchiostegi* (Yamaguti, 1937) Bray, 1990: *Branchiostegus japonica*; Japan (Yamaguti 1937), based on original record only, not on record by Wang *et al*. (1992).
36b. Testes tandem; vitelline fields usually confluent in forebody .... 37.

37a. Forebody about 40% of body-length; testes close, in posterior hindbody; ovary pretesticular, close ..... *Macvicaria dubia* (Stossich, 1905) Bartoli, Bray et Gibson, 1989 (syns *Allocreadium dubium* Stossich, 1905, *Plagioporus varicus* [sic] from *Oblada melanura* of Sey (1970), ? *Plagioporus idoneus* from *Oblada melanura* of Papoutsoglou (1976)): *Oblada melanura*, Mediterranean Sea (Stossich 1905, Bartoli *et al*. 1989).
37b. Forebody 24–28% of body-length; testes contiguous, in mid-hindbody; ovary overlaps anterior testis .... *Macvicaria taksengi* Bray, 1985: *Otolithes ruber*, *Sillago sihama*; Pinang Island, Malaysia (Bray 1985).

38a. Forebody >40% of body-length .... *Macvicaria maillardi* Bartoli, Bray et Gibson, 1989 (syns *Distomum obovatum* of Stossich (1885, 1898)), ? *Plagioporus idoneus* from *Sparus aurata* of Papoutsoglou (1976): *Sparus aurata*, Mediterranean Sea (Stossich 1885, 1898; Bartoli *et al*. 1989).
38b. Forebody <36% of body-length, usually much less .... 39.

39a. Eggs small, up to 56 long .... 40.
39b. Eggs larger, up to 80 long .... 41.

40a. Genital pore sinistral; no dorsal inflexion .... *Macvicaria antarctica* (Kovaleva et Gaevskaya, 1974) Zdzitowiecki, 1990 (syn. *Plagioporus antarcticus* Kovaleva et Gaevskaya, 1974); *Notothenia kempi*, *Notothenia* spp., *Nototheniops* spp.; subantarctic and Antarctic waters (Kovaleva and Gaevskaya 1974; Zdzitowiecki 1990a, 1997).
40b. Genital pore dextral; strong dorsal inflexion .... *Macvicaria dextrocaula* Aken'Ova, Cribb et Bray, 2008: *Notolabrus parilus*, *N. fucicola*; off southern Western Australia; off Kangaroo Island, South Australia (Aken'Ova *et al*. 2008).

41a. Width >35% of body-length .... 42.
41b. Width <35% of body-length .... 43.

42a. Oesophagus short to not seen; testes entire; vitellarium reaches to pharyngeal level; genital pore bifurcal .... *Macvicaria crassigula* (Linton, 1910) Bartoli, Bray et Gibson, 1989 (syns *Lebouria crassigula* Linton, 1910; *Plagioporus crassigulus* (Linton, 1910) Price, 1934; *Pachycreadium crassigulum* (Linton, 1910) Manter, 1954; see also list in Bartoli *et al*. (1989): *Calamus calamus*, mainly Sparidae, other records in Anguillidae, Blenniidae, Centracanthidae, Cheilodactylidae and Labridae; NW Atlantic, NE Atlantic, SE Atlantic Ocean; Mediterranean Sea, Indian Ocean (Linton 1910, Manter 1947, Siddiqi and Cable 1960, Bray 1987, Bartoli *et al*. 1989) – Jousson *et al*. (2000) have demonstrated that this is a complex of two cryptic species.
42b. Oesophagus long; testes irregular, more or less marked concavity of anterior surface; vitellarium reaches to mid-oesophageal level; genital pore at mid-oesophageal level .... *Macvicaria sillagonis* (Yamaguti, 1938) Bray, 1985: *Sillago sihama*, *Ilisha elongata*, *Pholis nebulosa*; Japan, China (Yamaguti 1938, Wang *et al*. 1992).

43a. From northern Atlantic waters .... 44.
43b. From Australian waters .... 45.

44a. Testes relatively large in relation to body-width; pharynx relatively small; vitelline follicles relatively few, large .... *Macvicaria alacris* (Looss, 1901) Gibson et Bray, 1982 (syns *Distomum alacre* Looss, 1901; *Allocreadium alacre* (Looss, 1901) Stossich, 1905; *Lebouria alacris* (Looss, 1901) Nicoll, 1909; *Plagioporus alacer* (Looss, 1901) Price, 1934): *Labrus bergylta*, other Labridae; NE Atlantic and Mediterranean Sea (Looss 1901, Nicoll 1910, Dawes 1947, Gibson and Bray 1982).
44b. Testes relatively small in relation to body-width; pharynx relatively large; vitelline follicles relatively numerous, small .... *Macvicaria soleae* (Dujardin, 1845) Gibson et Bray, 1982 (syn. *Distoma* (*Brachylaimus*) *soleae* Dujardin, 1845; *Lebouria varia* Nicoll, 1909; *Plagioporus varius* (Nicoll, 1910) Price, 1934): *Solea solea*, other Pleuronectiformes, *Callionymus lyra*; North Atlantic (Dujardin 1845; Nicoll 1909, 1910; Dawes 1947; Gibson and Bray 1982).

45a. Body usually widest in hindbody; vitellarium continuous laterally .... *Macvicaria shotteri* Aken'Ova, Cribb et Bray, 2008: *Apogon fasciatus*, *Sillaginodes punctatus*, *Sillago bassensis*; Moreton Bay (eastern Australia), off Kangaroo Island (South Australia), off southern Western Australia (Aken'Ova *et al*. 2008).
45b. Body spindle-shaped, widest at ventral sucker level; vitellarium interrupted at level of ventral sucker .... *Macvicaria adomeae* Aken'Ova, Cribb et Bray, 2008 (*Sillaginodes punctatus*; off Kangaroo Island (South Australia) (Aken'Ova *et al*. 2008).

Genus *Neolebouria* Gibson, 1976

(syn. *Paramanteriella* Li Qiu et Zhang, 1988)

Neolebouria lineatus Aken'Ova et Cribb, 2001

Description: Based on 3 worms. Body small, fusiform, widest in region of ventral sucker; 682–829 × 240–274 (748 × 252), width 33.0–35.2 (33.8)% of body-length. Tegument unarmed. Pre-oral lobe short; 3–6 (4). Oral sucker subglobular, subterminal; 100–110 × 97–102 (104 × 100). Ventral sucker transversely oval, just pre-equatorial; 153–168 × 157–167 (162 × 161). Sucker-length ratio 1:1.48–1.65 (1.55), sucker-width ratio 1:1.57–1.64 (1.62). Forebody 257–334 (286) long; 36.4–40.2 (38.1)% of body-length. Prepharynx short, entirely dorsal to oral sucker. Pharynx 55–63 × 65–77 (59 × 70). Pharynx to oral sucker width ratio 1:1.32–1.49 (1.42). Oesophagus 39–87 (65) long, 3.37–5.28 (4.46)% of body-length. Intestinal bifurcation in mid to posterior forebody, distance 18–98 (65), 2.68–11.8 (8.45)% of body-length. Caeca terminate blindly 63–154 (101) from posterior extremity, reach to about middle of posterior testis.

Testes 2, irregular, contiguous, oblique in mid-hindbody; anterior 76–97 × 81–183 (90 × 100), posterior 112–122 × 82–107 (116 × 98). Post-testicular region 62–105 (79) long, 9.13–12.6 (10.4)% of body-length. Cirrus-sac claviform, just overlaps ventral sucker; 177–199 × 51–61 (188 × 54), length 23.3–28.4 (25.2)% of body-length. Internal seminal vesicle saccular. Pars prostatica not clearly delineated from ejaculatory duct short. Genital atrium small. Genital pore sinistrally submedian, at level of mid-oesophagus.

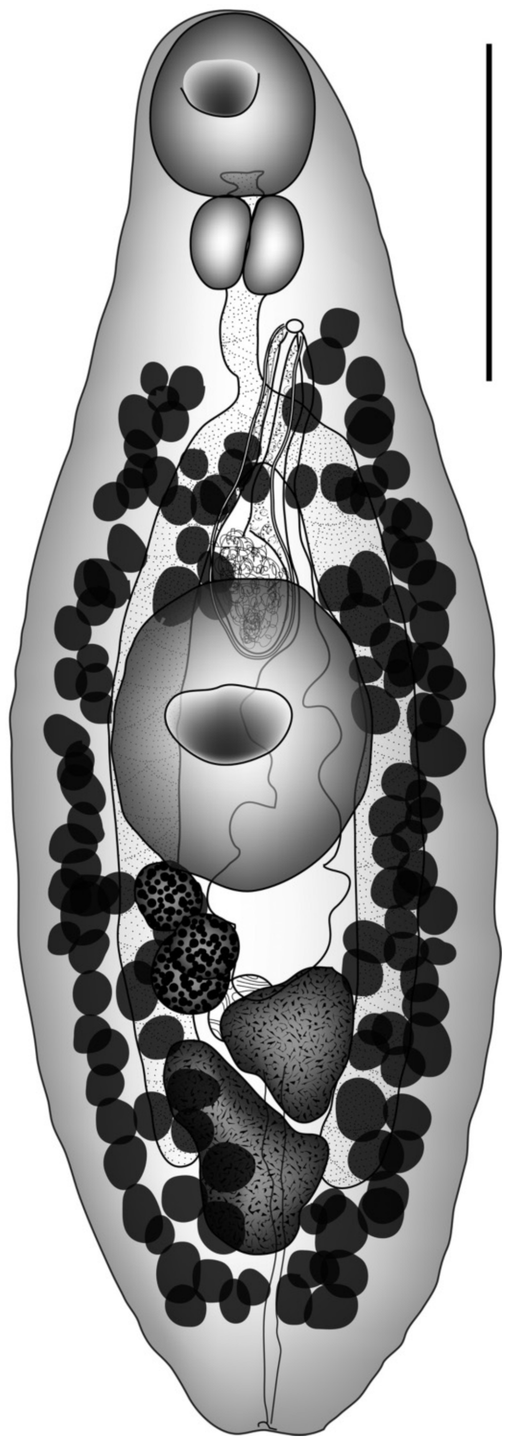

Fig. 2. *Neolebouria lineatus* Aken'Ova et Cribb, 2001 from *Nemipterus furcosus*. Ventral view, uterus in outline only. Scale bar = 200 µm

Ovary deeply trilobed, pre-testicular, dextral, 70–102 × 58–75 (90 × 69), 8–65 (25) from anterior testis, 0.81–2.21 (1.37)% of body-length; 0–7 (4) from ventral sucker, 0–0.63 (0.21) of body-length. Seminal receptacle canalicular, medio-dorsal to ovary, overlapping anterior testis, difficult to see. Mehlis' gland and Laurer's canal not seen. Uterus pre-testicular, partly dextral to ovary, intercaecal. Metraterm not clearly differentiated. Eggs relatively few, tanned, operculate, 50–59 × 24–31 (54 × 29). Vitellarium follicular, fields reach from fairly close to posterior extremity to level of mid-oesophagus, 107–150 (124) from ventral sucker 15.7–18.1 (16.5)% of body-length, ventral, lateral and sometimes dorsal to caeca.

Excretory pore terminal. Vesicle I-shaped, traced to anterior testis.

Host: *Nemipterus furcosus* (Valenciennes, 1830); Perciformes: Nemipteridae, fork-tailed threadfin bream.

Site: Digestive tract.

Locality: Baie Maa, New Caledonia (22°12´S, 166°20´E, 13/11/2007).

Prevalence: 1 of 6 (16%).

Intensity: 3

Deposition of specimens: Vouchers MNHN JNC2398-1-2; BMNH 2009.2.12.15.

Discussion

The genus *Neolebouria* was erected by Gibson (1976) for those species in the *Plagioporus*/*Podocotyle* complex with irregularly lobed ovaries and vitelline fields confluent dorsally in the forebody. The acceptance of this genus has not been universal (see Shimazu and Nagasawa 1985), but in his review of the family Cribb (2005) retained the genus as useful, but probably artificial. Several species in which the vitelline fields are not confluent in the forebody have now been included in this genus (see Aken'Ova and Cribb 2001), so it is apparent that the genus is now based on the lobed ovary and the vitellarium reaching into the forebody, where the fields may or may not be confluent.

Aken'Ova and Cribb (2001) described two similar species of *Neolebouria* from Australian waters. Both are similar to the specimens described here, but *N. lineatus* appears indistinguishable from them. The other species *N. moretonensis* differs in the characters listed in the key below.

Key to the species of *Neolebouria* Gibson, 1976

1a. Testes deeply lobate .... 2.
1b. Testes entire or irregular .... 8.

2a. Cirrus-sac reaches distinctly into hindbody .... 3.
2b. Cirrus-sac usually not reaching into hindbody, occasionally slightly .... 4.

3a. Body relatively elongate, width 26–35% of body-length; genital pore at level of mid-oesophagus to pharynx; ovary relatively shallowly lobed .... *Neolebouria antarctica* (Szidat et Graefe, 1967) Zdzitowiecki, 1990 (syns *Crassicutis antarcticus* Szidat et Graefe, 1967; *Neolebouria georgianus* Gibson, 1976; *Plagioporus lobatus georgianus* Gaevskaya et Kovaleva, 1976; *Opegaster synodi* of Szidat (1965)): *Parachaenichthys charcoti*, fish of many other Antarctic families; western Antarctica (Szidat 1965; Szidat and Graefe 1967; Gaevskaya and Kovaleva 1976; Gibson 1976; Zdzitowiecki 1990b, 1997).
3b. Body broad, width 55–61% of body-length; genital pore at bifurcal level; ovary relatively deeply lobed .... *Neolebouria merretti* Gibson et Bray, 1982: *Bathytyphlops sewelli*; off Canary Islands, northern Atlantic (Gibson and Bray 1982).

4a. Cirrus-sac mainly restricted to forebody .... 5.
4b. Cirrus-sac reaches dorsally to ventral sucker or beyond ... 6.

5a. Body oval; testes tandem; genital pore at level of oesophagus .... *Neolebouria lobata* (Yamaguti, 1934) Gibson, 1976 (*Lebouria lobata* Yamaguti, 1934; *Plagioporus lobata* (Yamaguti, 1934) Yamaguti, 1938): *Chelidonichthys spinosus*, *Conger nystromi*, *Zeus faber*, off Japan (Yamaguti 1934, 1951; Kuramochi 2006); (doubtful record: Reimer (1987), wide variety of deep-sea fishes; Mozambique).
5b. Body elongate pyriform; testes oblique; genital pore postbifurcal ……. *Neolebouria maorum* (Allison, 1966) Gibson, 1976 (*Plagioporus maorum* Allison, 1966): *Octopus maorum*; Kaikoura, New Zealand (Allison 1966).*

6a. Vitellarium only just reaches into forebody, where it is not contiguous; eggs <60 µm long ……..... *Neolebouria lanceolata* (Price, 1934) Reimer, 1987 (*Podocotyle lanceolata* Price, 1934): *Polymixia* sp., *P. nobilis*; deep-water off Puerto Rico and Mozambique (Price 1934, Reimer 1987); (doubtful record: Wang *et al*. 1992, *Choerodon azurio*; off China).
6b. Vitellarium reaches well into forebody, where it is contiguous; eggs >60 µm long .... 7.

7a. Testes in posterior half of hindbody; eggs 63–78 µm long .... *Neolebouria acanthogobii* (Yamaguti, 1951) Gibson, 1976: *Acanthogobius hasta*, *Ostracion tuberculatum* (encysted in gill chamber), *Chaunax pictus*, *Xenocypris argentea*; off Japan, Mozambique, China (Yamaguti 1951, Reimer 1987).
7b. Testes in mid-hindbody; eggs 76–111 µm long .... *Neolebouria terranovaensis* Zdzitowiecki, Pisano et Vacchi, 1993 (Opecoelidae sp. indet. of Prudhoe and Bray (1973)): *Chionodraco hamatus*, numerous other Antarctic fishes; East Antarctica (Prudhoe and Bray 1973, Zdzitowiecki *et al*. 1993, Zdzitowiecki 1997).

8a. Ventral sucker equatorial or close to equatorial; forebody usually >40% of body length .... 9.
8b. Ventral sucker further anteriorly, forebody usually <40% of body-length .... 12.

9a. Genital pore distinctly post-bifurcal .... 10.

9b. Genital pore more anterior .... 11.

10a. Sucker ratio 1:0.80–0.82; cirrus-sac reaches into hindbody; eggs 50–58 × 34–37 .... *Neolebouria cantherhini* (Li, Qiu et Zhang, 1988) Cribb, 2005 (*Paramanteriella cantherini* Li, Qiu et Zhang, 1988): *Thamnaconus septentrionalis*; Bo Hai Sea, off China (Li *et al*. 1988, Shen and Qiu 1995).

10b. Sucker ratio 1:1.4–1.7; cirrus-sac confined to forebody; eggs 73–85 × 43–49 .... *Neolebouria confusum* (Overstreet, 1969) Cribb, 2005 (*Hamacreadium confusum* Overstreet, 1969): *Ocyurus chrysurus*, *Epinephelus adscensionis*; Biscayne Bay, Florida, Jamaica (Overstreet 1969).

11a. Body broad, pyriform; testes diagonal, nearly symmetrical; genital pore bifurcal; ovary 4-lobed .... *Neolebouria diacopae* (Nagaty et Abdel-Aal, 1962) Gibson, 1976 (*Hamacreadium diacopae* Nagaty et Abdel-Aal, 1962): *Lutjanus fulviflamma*, *Lethrinus* sp.; Red Sea, off New Caledonia (Nagaty and Abdel Aal 1962); could this be a species of *Pinguitrema* Siddiqi et Cable, 1960?

11b. Body lanceolate; testes tandem to slightly oblique; genital pore at pharyngeal level; ovary 3-lobed .... *Neolebouria palauensis* Machida, 2004: unidentified Labridae; Palau (Machida 2004).

12a. Eggs small, 27–33 × 15–20; ovary 2-lobed .... *Neolebouria pentacerotis* Machida et Araki, 2002: *Pentaceros japonicus*; Okinawa, Japan (Machida and Araki 2002).

12b. Eggs larger, >45 long; ovary 3-lobed to multilobate ..... 13.

13a. Cirrus-sac confined to forebody .... 14.

13b. Cirrus-sac reaching to ventral sucker or beyond .... 15.

14a. Body fusiform, width about 27% of length; testes oblique in mid-hindbody; genital pore at pharyngeal level, ovary paratesticular, coarsely indented; vitellarium reaches to oesophageal/pharyngeal level, confluent in forebody; eggs 75–82 × 42–47 .... *Neolebouria ira* (Yamaguti, 1940) Gibson, 1976 (*Plagioporus ira* Yamaguti, 1940): *Choerodon azurio*; off Japan (Yamaguti 1940); (doubtful record: Wang (1992), *Paraplagusia japonica*, off China; ovary appears entire in illustration).

14b. Body oval, width about 37–43% of body-length; testes tandem in posterior hindbody; genital pore at oesophageal level; ovary pre-testicular, 3-lobed; vitellarium reaches to bifurcal level, fields separated in forebody; eggs 46–63 × 35–42 .... *Neolebouria tohei* (Yamaguti, 1970) Gibson, 1976 (*Plagioporus tohei* Yamaguti, 1970): *Conger* sp.; off Hawaii (Yamaguti 1970).

15a. Cirrus-sac reaches to ovary; seminal vesicle bipartite to quadripartite; ovary multilobate .... *Neolebouria georgenascimentoi* Bray, 2002: *Pinguipes chilensis*, *Prolatilus jugularis*, *Pseudopercis numida*; off Chile and Brazil (Bray 2002, Luque *et al*. 2008, González and Oliva 2009).

15b. Cirrus-sac reaches to ventral sucker or just beyond; seminal vesicle saccular to coiled; ovary 3–5 lobed .... 16.

16a. Body broadly pyriform, width >40% of body-length .... *Neolebouria krusadaiensis* (Gupta, 1956) Gibson, 1976*: original host as 'marine catfish', *Lethrinus frenatus*; Gulf of Mannar (Gupta 1956, Hafeezullah 1971).

16b. Body more elongate, width <40 of body-length .... 17.

17a. Vitellarium reaches to pharynx or just posterior .... 18.

17b. Vitellarium reaches to intestinal bifurcation or just anteriorly .... 19.

18a. One caecum (at least) terminates anterior to posterior margin of posterior testis; vitelline fields continuous or only irregularly interrupted at ventral sucker level; genital pore at about level of middle of oesophagus .... *Neolebouria lineatus* Aken'Ova et Cribb, 2001: *Centroberyx lineatus*, *Nemipterus furcosus*; off Rottnest Island, Western Australia, New Caledonia (Aken'Ova and Cribb 2001).

18b. Both caeca terminate well posterior to testes; vitelline follicles interrupted at level of ventral sucker; genital pore at or just posterior to posterior margin of pharynx .... *Neolebouria moretonensis* Aken'Ova et Cribb, 2001: *Gerres subfasciatus*; Moreton Bay, Queensland, Australia (Aken'Ova and Cribb 2001).

19a. Body relatively broad, width 34–37% of body length; forebody short, about 24% of body-length; testes oblique; genital pore bifurcal; ovary 4–5 lobed .... *Neolebouria ulaula* (Yamaguti, 1970) Gibson, 1976 (*Plagioporus ula-ula* Yamaguti, 1970): *Etelis carbunculus* [= *marshi*]; off Hawaii (Yamaguti 1970).

19b. Body relatively narrow, width <27% of body-length; forebody relatively long, >29% of body-length; testes tandem; genital pore at oesophageal level; ovary usually 3-lobed ……..… 20.

20a. Vitelline fields not interrupted at level of ventral sucker; not confluent in forebody .... *Neolebouria leiognathi* (Wang, Wang et Zhang, 1992) Bray, 2002 (*Plagioporus leiognathi* Wang, Wang et Zhang, 1992): *Leiognathus ruconius*; off China (Wang *et al*. 1992)).

20b. Vitelline fields interrupted at level of ventral sucker; confluent in forebody ...... *Neolebouria tinkerbellae* Thompson et Margolis, 1987: *Platichthys stellatus*, *Leptocottus armatis*, *Gasterosteus aculeatus* (all experimentally), *Pandalus jordani* (Decapoda: Penaeidae – natural); off Vancouver Island, western Canada (Thompson and Margolis 1987).

**Neolebouria truncata* (Linton, 1940) Gibson, 1976: *Cynoscion regalis*, *Menticirrhus saxatilis*, *Morone americana*, *Synodus foetens*, north western Atlantic off Massachusetts, USA (Linton 1940). This species is not well enough known to include in the key, but may fit at the semi-couplets indicated by asterisks.

Two other species at various times allocated to *Neolebouria* are probably members of other genera. Kuramochi (2006) moved *Lebouria choerodonis* (Yamaguti, 1934) to *Neolebouria* as a new combination, presumably unaware that

Cribb (2005) had erected the genus *Choerodonicola* Cribb, 2005 for this (and other) species with much smaller eggs than usually encountered in opecoelids. *Neolebouria multilobatus* (Travassos, Teixeira de Freitas et Bürnheim, 1966) Gibson, 1976 was considered a member of the genus *Pinguitrema* Siddiqi et Cable, 1960 by Cribb (2005).

Conclusions

Both species described here presented problems in their identification, mainly due to the proliferation of species in these, probably polyphyletic, genera. We have, therefore, resorted to the production of dichotomous keys to the genera to aid us. We present them here, but caution all workers that these keys are based mostly on the original descriptions of the species, often from few specimens where, inevitably, variation is poorly documented. If possible it is advisable that a series of specimens be compared with the keys rather than an isolated individual which may be atypical.

The host involved in these new records is a nemipterid perciform. *M. jagannathi* has been reported in labrids, sparids (considered with the nemipterids within the superfamily Sparoidea by some workers) and possibly pleuronectiforms. *N. lineatus* was originally reported from *Centroberyx lineatus* (Berycidae, Beryciformes).

The identifications of the forms reported here must be considered provisional and are based on morphological similarity, or rather on the difficulty in finding convincing morphological distinctions. The spread of hosts as discussed above and the apparent discontinuous geographical distribution strongly indicate that these named forms are unlikely to represent robust specific groupings. Is it likely, for example, that one species should infect one berycid beryciform host and one nemipterid perciform and show no other signs of being a highly generalist parasite? A perusal of the list of hosts and localities of other species in the keys shows that this type of discontinuity in recorded hosts and localities occurs in several other species, whereas the relatively well-known species tend to have a restricted geographical and host range. The worker seeking to document digenean, and particularly opecoelid, faunas has to decide how to tackle the problem of implausible species boundaries. The worker has three options; firstly a new species can be erect based solely on geographical isolation or host specificity, secondly the forms can be left unnamed, or thirdly he can place the specimens in identifiable morphological groupings, aware that further evidence, probably molecular, may well be able to distinguish distinct monophyletic groupings within these 'species'. This later course is adopted here, being we believe the best of these courses of action if descriptions and illustrations are provided for the use of later workers attempting to elucidate their relationships.

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