Two new species of *Pseudodactylogyroides* Ogawa, 1986 (Monogenea) from two species of eleotridid fishes of Peninsular Malaysia

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Abstract

Two new species of monogeneans were collected: *Pseudodactylogyroides marmoratae* n. sp. from the gills of a freshwater eleotridid, *Oxyeleotris marmorata*; and *P. butisensis* n. sp. from a marine eleotridid, *Butis butis*. They are attributed to the genus *Pseudodactylogyroides* Ogawa, 1986 based on the presence of two pairs of anchors (a large pair and a very small pair) and patches on the large pair. The two small anchors are not needle-like, as in *Pseudodactylogyroides apogonis*, the only previously known species of the genus, but have definite anchor-like features. Descriptions of these two new species are presented. Examinations of the oncomiracidia and post-larvae of the specimens from *O. marmorata* revealed that the small anchors develop before the large anchors. On the basis of the present observation the diagnostic characteristics of the genus *Pseudodactylogyroides* are amended.

Introduction

There are six genera and nine species in the teleost family Eleotrididae of the suborder Gobioidei and order Perciformes in Peninsular Malaysia (Kottelat, 1989). The majority of the Malayan eleotridids are euryhaline with the exception of *Oxyeleotris* which is freshwater. There are two species of *Oxyeleotris* (*O. marmorata* and *O. urophthalmus*) in Peninsular Malaysia.

Two species of eleotridid, i.e. *Butis butis* (Hamilton-Buchanan) and *Oxyeleotris marmorata* (Bleeker) were examined for gill monogeneans. This paper reports the description of two new species of *Pseudodactylogyroides* Ogawa, 1986 from *B. butis* and *O. marmorata* in Peninsular Malaysia. A preliminary study of the development of the hooks and anchors of the species from *O. marmorata* is also given to assist in discussing the relative positions of the anchors, although a detailed description of the ontogeny is not presented because the complete development has not been fully documented.

Materials and methods

*Butis butis* was collected in the estuary of Sungai Sementa Kecil (Selangor) by trawl-nets. Most fishes were frozen immediately and kept in an ice chest; others were brought alive to the laboratory. *Oxyeleotris marmorata* was obtained from streams around Selangor as well as from local aquarium traders. When freshly killed fishes were necropsied, and the gills were usually gently scraped with a bent needle to dislodge the monogeneans. When frozen specimens were used, the gills were shaken in a specimen tube to dislodge the monogeneans, because scraping tends to damage dead monogeneans. To ensure that all the monogeneans were collected, the gills were examined under a dissecting microscope. Some live monogeneans were studied under phase contrast to determine the anatomy of the soft structures. The monogeneans collected were fixed in ammonium-picare glycerine to enable the description of the hard parts.

Some individuals of *O. marmorata* were kept alive in a glass aquarium in order to increase the level of infestation of monogeneans. These fishes were then sacrificed for the collection of post-larval stages. Eggs were collected from adult monogeneans and kept in sterilised water in a cavity-block. These were checked daily for the emergence of oncomiracidia, which were collected under a dissecting microscope using a small pipette.

Drawings were made with the aid of a camera lucida under phase contrast microscopy. Measurements are
given in micrometres. The terminology used follows
that of Gussev (1976, 1978), but differs from that used
by Ogawa (1986): hamuli = anchors; supplementary
pieces = patches; cirrus = copulatory tube. Other terms
used herein are as follows (see also Malmberg, 1990):
anlages = rudiments of developing sclerotised parts;
peduncle = the posterior end of the body immediately
anterior to the haptor; haptor = the larval haptor as well
as the adult haptor.

**Pseudodactylogyroides Ogawa 1986**

*Amended diagnosis*

Ancyrocephalidae. Body elongate with three pairs of
head organs. Adult haptor armed with two pairs of
anchors, one connecting bar and 14 marginal hooks.
One pair of anchors large, with bar and one pair of
patches. One pair of anchors very small or vestigial,
without any bar. All 14 marginal hooks either periph-
eral or six pairs peripheral and one pair central. Copu-
latory organ consisting of simple tube with accessory
piece. Vagina armed or unarmed. Intestinal caeca unit-
ed posteriorly.

*Type-species:* Pseudodactylogyroides apogonis (Yam-

*Type-host:* Apogon semilineatus Temminck &
Schlegel

*Type-locality:* Aburatsubo, Kanagawa Prefecture, Japan.

**Pseudodactylogyroides marmoratae n. sp. (Figs
1, 3)**

*Description*

Body 651 (546–714) × 140 (100–185). Three pairs of
head organs. Accessory glands present along sides of
anterior region. Four granulated eye-spots; posterior
pair larger. Mouth anterior to pharynx. Intestinal caeca
united posterior to testis. Haptor length 161 (126–210),
width 100 (50–168). Two pairs of anchors orientated. Large anchors: inner length 102 (94–110);
outer length 88 (80–94); inner root 30 (28–30); out-
er root 10 (8–12); point 44 (40–50). Smaller anchors,
almost similar in size to hooks: inner length 22 (20–
25); outer length 22 (20–26); inner root 5 (4–6); outer
root 4 (3–4); straight non-recurving point. Patches on
top of inner roots of large anchors, triangular, 39 (34–
42) × 16 (14–16). Only one bar present, ventral to large
anchors, almost straight, 12 (10–14) × 45 (40–50).
Fourteen marginal hooks of larval type, 16 (14–18) in
length, arranged around edge of haptor except for one
central pair. Testis ovoid, post-ovarian. Vas deferens
arising from anterior part of testis on dorsal side, loop-
ing round left intestinal limb onto ventral side, extend-
ing anteriorly before turning posteriorly and dilating
slightly forming seminal vesicle, entering initial part
of copulatory tube as ductus ejaculatorius. Inter-caecal
area around copulatory organ glandular. Copulatory
organ consisting of simple tapering tube, length 95
(80–100), and rod-shaped accessory piece at distal end
of copulatory tube, length 36 (34–40). Prostatic reser-
voir, single opening into base of copulatory tube. Vagi-
nal opening dextral, cup-shaped; sclerotised vaginal
duct, length 56 (48–74), leading into seminal receptac-
ulum which opens into oviduct. Ovary ovoid, in mid-
body. Òotype leads anteriorly from oviduct (presence
of uterus uncertain); opens exteriorly near copulatory
organ. Vitellarium well developed, co-extensive with
intestine. Egg ovoid with short stalk at one end, 80
(66–82) × 58 (56–60).

*Type-host:* Oxyeleotris marmorata (Bleeker, 1852).

*Site:* Gills.

*Localities:* Freshwater streams, Selangor, Malaysia
(type-locality) and Reservoir at Kanchanburi, Thai-
land.

*No. of specimens studied (measured):* 28 (10).

*No. of host examined (prevalence):* 12 (67%)

*Type-specimens:* Holotype (BM(NM) No. 1993.12.2.1
and paratypes (BM(NH) No. 1993.12.2.2-3 in The
Natural History Museum, London. Other paratypes
in author’s collection.

*Remarks*

The present species fits the diagnosis of Pseudodactyl-
ogyroides Ogawa, 1986 in having patches on the large
anchors and a pair of very small anchors. According
to Ogawa (1986), the small anchors of *P. apogonis*
are vestigial and needle-like, whereas in the present
species the small anchors have distinct features of
anchors with roots and points, albeit very small. In
certain positions, however, they do appear needle-like.
This observation justifies the inclusion of the present
species in the genus Pseudodactylogyroides.

The haptors and the four anchors of the present
species are orientated ventrally. The larger anchors are
observed slightly dorsal to the small anchors in lateral
view. Observations of the development of this species