

Two Species of Microcotylid Monogeneans Collected from Black
Sea Bream, *Acanthopagrus schlegeli* (Bleeker)
(Teleostei: Sparidae)

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Parasitological surveys were carried out of the black sea bream, *Acanthopagrus schlegeli* (Teleostei: Sparidae) in order to know its monogenean fauna, and two species of higher monogeneans belonging to the family Microcotylidae were found on the gill filaments. They are *Aspinatrium spari* (Yamaguti, 1937) and *Polylabris japonicus* n. sp.

In the present paper, descriptions are given of the two species, and the systematic positions of the two as well as of their related species are discussed.

Materials and Methods

Host fish specimens (20-35 cm in total length) had been cultured in net pens or in aquaria in Shizuoka, Yamaguchi and Nagasaki Prefectures, Japan. Whole mounts of the parasites were prepared under the methods of Yamaguti (1965). Figures were drawn with the aid of a camera lucida.

Descriptions of the species

Aspinatrium spari (Yamaguti, 1937)
Yamaguti, 1963

(Fig. 1)

Localities and dates: Shizuoka Pref.,

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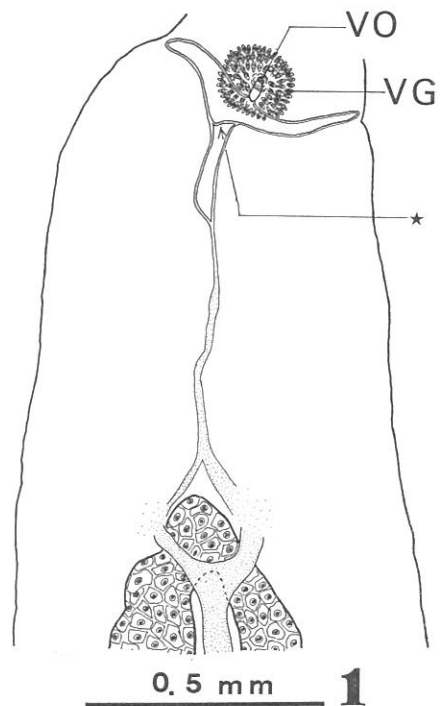


Fig. 1 Vagina and vaginal ducts of *Aspinatrium spari*, ventral view. (Intestine, vas deferens, vitellaria, etc. are not shown in this figure.) VG: vaginal gland, VO: vaginal opening, *: connection of vaginal ducts.

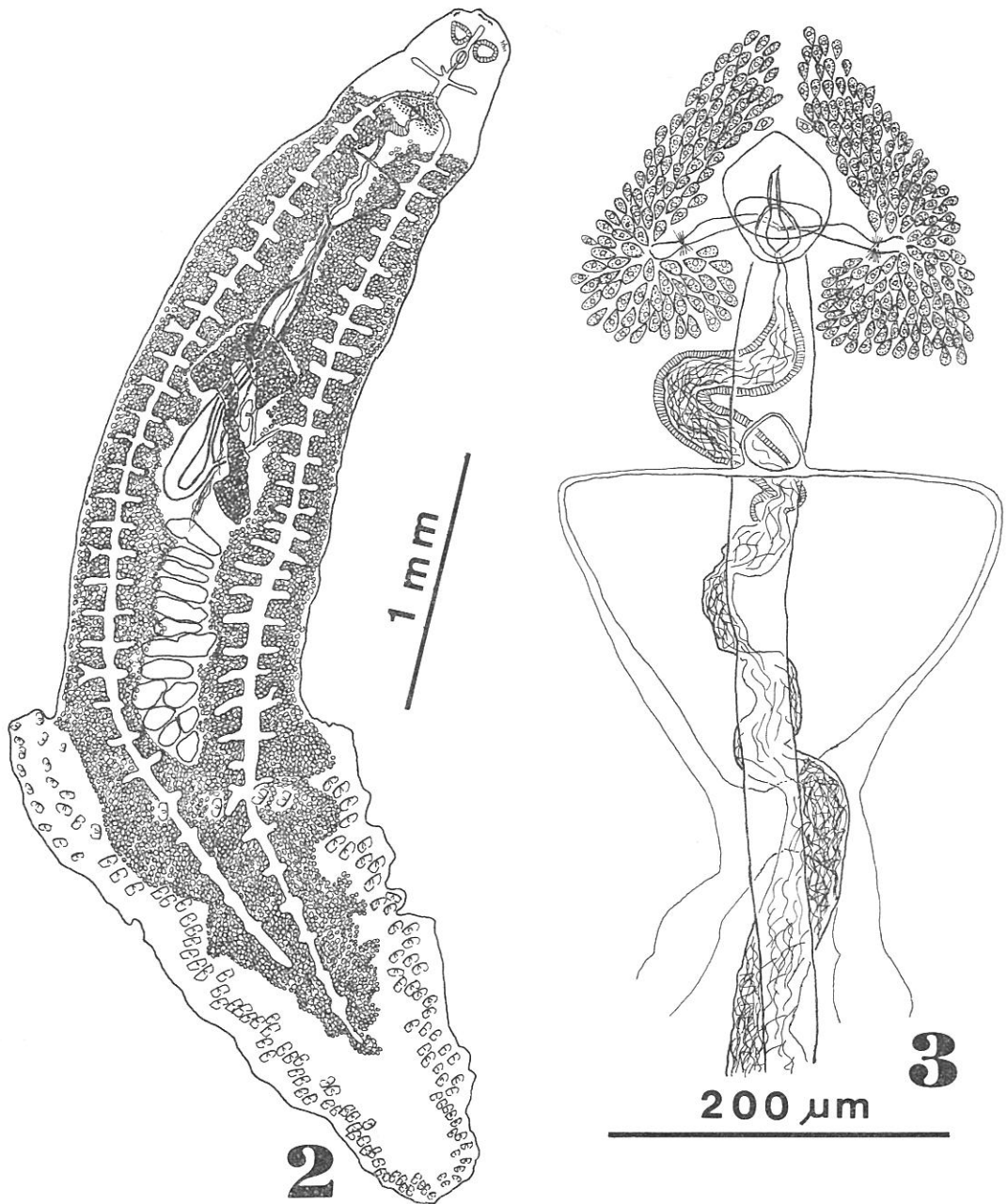
March 15 and June 2, 1978; Yamaguchi Pref., March 9, 1979; Nagasaki Pref., March 4, 1980.

Nos. of specimens: 19.

Specimens: Deposited in the Meguro Parasitological Museum, M.P.M. Coll. No. 19316 and in the authors' collection.

Redescription: A new observation on the vaginal ducts should be referred to in the present redescription.

The vaginal ducts are narrow, drawing



Figs. 2, 3 *Polylabris japonicus* n. sp. 2: whole worm of holotype, dorsal view, 3: terminal genitalia and vagina of paratype, ventral view.

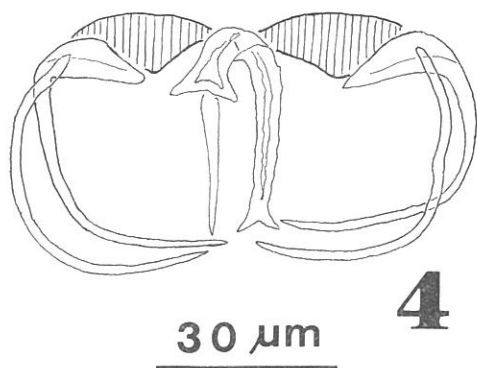


Fig. 4. Clamp of *P. japonicus* n. sp.

a heart-shaped arc. They have a connection (* in Fig. 1) with each other before meeting in the median line. The confluent vaginal duct bifurcates and finally opens into the arms of the vitelline duct in front of the ovary.

Measurements of body parts are as follows. Body, 2.2–7.5×0.51–1.00 mm; anterior suckers, 35–88×48–90 μm; pharynx, 33–56×25–42 μm; total number of clamps (approximately equal rows), 100–119; diameter of the posteriormost clamp, 31–46 μm; diameter of the largest clamp, 74–111 μm; number of testes, 5–11; receptaculum seminis, 53–125×52–126 μm; muscular cirrus (cirrus bulb), 37–66×44–79 μm.

Remark: This microcotylid is characterized by the male copulatory organ and the vaginal complex. The former was precisely redescribed by Yamaguti (1942). The latter is unique in the presence of the vaginal gland surrounding the vaginal opening and a connection of the vaginal ducts (* in Fig. 1).

Polylabris japonicus n. sp.

(Figs. 2–4)

Locality and dates: Shizuoka Pref., November 9, 1978 and May 7, 1979.

Nos. of specimens: 3.

Specimens: The holotype is deposited in the Meguro Parasitological Museum,

M.P.M. Coll. No. 19317 and the paratypes are in the authors' collection.

Description: The body is fusiform, 3.8–5.0×0.83–0.93 mm in size. The opisthohaptor with 106–126 clamps in two almost equal rows is symmetrical, commencing at posterior testes. The clamps are the same in shape as the former species. The smallest or the posteriormost clamp is 35–42 μm, while the largest is 77–91 μm in diameter. The septate anterior suckers are 71–98×93–110 μm and the pharynx is 54–64×42–49 μm in size. The esophagus has several side-branches on both sides. The intestine bifurcates at the site of the copulatory organ, and the intestinal limbs run on both sides of the body with inner and outer side-branches, terminating in the opisthohaptor. The testes (8–14 in number) are transversely elongate and situated in a little posterior region of the body proper. They are considerably larger in size than those of the former species, the maximal testis of each specimen measuring 86–142×225–238 μm. The vas deferens, emerging at the anterior extremity of the testes, ascends with numerous convolutions in the median line, and becomes the ejaculatory duct at its termination, opening into the cirrus. The cirrus (47–54×30–35 μm in size) is chitinous, consisting of the pear-shaped base and the tubular apex protruded from the base. The genital atrium (82–111×52–71 μm in size) is elliptical and unarmed. The genital pore opens at a little posterior part of the genital atrium. A pair of conspicuous prostatic complexes is located symmetrically around the genital atrium. Each half consists of the prostatic reservoir surrounded by a mass of prostatic cells and the following prostatic duct (8.5–12 μm in width) opening into the cirrus base. There is a sphincter between the prostatic reservoir and the prostatic duct. The ovary is originated in front of the testes, shaped like an interrogation mark. The oviduct, after receiving the duct from the receptaculum seminis (69–88×

105–125 μm in size) and branching off the genito-intestinal canal, is confluent with the vitelline duct, ascending to the shell gland to form the ootype. The following uterus ascends in the median line to the genital atrium. The vagina is unarmed and opens midventrally, 135–208 μm posterior to the genital pore. The vaginal ducts direct transversely, changing their courses postero-centrally at approximately the sites of the intestinal limbs. After meeting each other in the median line, they cross and open into the arms of the Y-shaped vitelline duct. The vitellaria extend from the level of the copulatory organ to that of the termination of the intestine.

Remark: This species is most similar to *Polylabris gerres* (Machida, 1973), non (Sandars, 1944) (= *Prostatomicrocotyla gerres* Machida, 1973) in general morphology, but different in the absence of concentric muscle fiber around the genital atrium.

Discussion

Yamaguti (1937) described a new species *Microcotyle spari* from the black sea bream, *Sparus longispinis* (syn. of *Acanthopagrus schlegeli*), in which he misunderstood the position of the vagina as middorsal and overlooked the structure of the prostatic complexes. He, however, in his redescription of the species, corrected the position of the vagina as midventral and pointed out that the prostatic complexes of *M. spari* present a marked feature in morphology (Yamaguti, 1942). Unfortunately, his redescription was overlooked in his proposal of a new genus *Aspinatrium* for *M. spari*, which may result in the today's misunderstanding that the vagina of *Aspinatrium spari* (Yamaguti, 1937), as in *Microcotyle* and *Bivagina*, opens middorsally. Therefore, the diagnosis of the genus *Aspinatrium* proposed by Yamaguti (1963) requires correction in two points; the position of the vagina and the presence of a pair of sym-

metrical prostatic complexes. Further, Yamaguti (1968) mistakenly included *M. spari* into a new genus *Prostatomicrocotyla* in spite of the fact that it had already been the type species of *Aspinatrium*. *Aspinatrium euzeti* Ktari, 1971, *A. gallieni* Euzet et Ktari, 1971 and *A. kahara* Yamaguti, 1968* are excluded from *Aspinatrium* on the grounds of a dorsal vaginal opening and lack of a pair of symmetrical prostatic complexes. Yamaguti (1963) transferred *Microcotyle trachini* Parona et Perugia, 1889 and *M. pogoniae* MacCallum, 1913 to the genus *Aspinatrium*. It is very probable that they are also excluded from *Aspinatrium*, because they have a dorsal vaginal opening. Consequently, *Aspinatrium* contains a single species, *A. spari* (Yamaguti, 1937). Further taxonomical examination should be required of a group of microcotylids which have an unarmed genital atrium as well as an unarmed, dorsally opening vagina without a pair of symmetrical prostatic complexes.

It should be noted that the marked prostatic complexes were first recognized in *Microcotyle spari* (= *Aspinatrium spari*) by Yamaguti (1942). New genera bearing similar prostatic complexes have since been proposed; they are *Polylabris* Euzet et Cauwet, 1967 (syn.: *Prostatomicrocotyla* Yamaguti, 1968 and *Paradiurix* Unnithan, 1971), *Polylabroides* Mamaev et Paruchin, 1976 and *Grandicotyle* Lebedev, 1976. Lebedev (1976) proposed a new subfamily Polylabrinae for *Polylabris* (type genus), *Polylabroides* and a new genus *Grandicotyle*. Since Prostatomicrocotylinae had already been established for the genus *Prostatomicrocotyla* by Yamaguti (1968), the subfamily Polylabrinae is invalidated according to the article 40 of the International Code

* In the present paper, *A. kahara* Yamaguti, 1968 is assigned to the genus *Zeuxapta* Unnithan, 1957 due to the characteristic of the male terminalia, and *Z. kahara* (Yamaguti, 1968) n. comb. is proposed.

of Zoological Nomenclature, although *Prostatomicrocotyla* was synonymized with *Polylabris* by Mamaev et Paruchin (1976). Thus, forms having the conspicuous prostatic complexes in the family Microcotylidae are included in the subfamily Prostatomicrocotylinae, which consists of *Polylabris* (type genus), *Polylabroides*, *Grandicotyle* and *Aspinatrium*. The emended diagnosis of the subfamily and the key to the four genera are given below.

Subfamily Prostatomicrocotylinae, emended

Diagnosis: Microcotylidae. Opisthohaptor symmetrical with numerous pairs of clamps of *Microcotyle* type, not divided into two separate frills. Cirrus either in form of chitinous tube or in form of muscular bulb with or without spines. Paired, symmetrical prostatic complexes connected with cirrus. Genital atrium unarmed. Vagina single, unarmed, opening mid-ventrally. Vaginal ducts paired, united with each other before opening into arms of vitelline ducts. Parasites of marine teleosts.

Key to genera of Prostatomicrocotylinae

1. Cirrus in form of muscular bulb . . . 3
2. Cirrus in form of chitinous tube with or without muscular bulb basally; paired prostatic ducts entering cirrus independently *Polylabris*
3. Cirrus entirely unarmed; paired prostatic ducts united with each other before entering cirrus *Aspinatrium*
 - Cirrus armed with many spines; paired prostatic reservoirs distinct, each connected with cirrus directly *Grandicotyle*
 - Cirrus armed with two long and many minute spines; prostatic ducts as in *Aspinatrium* *Polylabroides*

Type genus: *Polylabris* Euzet et Cauwet, 1967

Polylabris Euzet et Cauwet, 1967

Syn: *Prostatomicrocotyla* Yamaguti, 1968; *Paradiurix* Unnithan, 1971.

Type species: *P. diplodi* Euzet et Cauwet, 1967

Included species:

P. acanthogobii (Yamaguti, 1940) Mamaev et Paruchin, 1976

syn: *Microcotyle a.* Yamaguti, 1940; *Aspinatrium a.* (Yamaguti, 1940) Yamaguti, 1963; *Prostatomicrocotyla a.* (Yamaguti, 1940) Yamaguti, 1968; *Paradiurix a.* (Yamaguti, 1940) Unnithan, 1971

P. acanthopagri Mamaev et Paruchin, 1976

P. gerres (Sandars, 1944) Mamaev et Paruchin, 1976

syn.: *Microcotyle g.* Sandars, 1944; *Nudimusculus (N.) g.* (Sandars, 1944) Unnithan, 1971

**P. gerres* (Machida, 1973), non (Sandars, 1944) Mamaev et Paruchin, 1976

syn.: *Prostatomicrocotyla g.* Machida, 1973

P. japonicus n. sp.

P. kuhliae (Yamaguti, 1968) Mamaev et Paruchin, 1976

syn.: *Prostatomicrocotyla k.* Yamaguti, 1968

†*P. mamaevi* n. nom. pro. *P. gerres*

*Further examination is required on synonymy of this species with *P. gerres* (Sandars, 1944)

†*P. gerres* (Sandars, 1944) sensu Mamaev et Paruchin, 1976 collected from *Siganus stellatus* is different from *P. gerres* (Sandars, 1944) Mamaev et Paruchin, 1976 sensu stricto in having larger size and number of the testes (In the original description of the testes of *M. gerres* Sandars, 1944 on page 68, "average diameter 0.375 mm" should read "average diameter 0.0375 mm"). The present authors consider *P. gerres* sensu Mamaev et Paruchin, 1976 as new and give the name *P. mamaevi* n. nom. in this paper. It is not certain whether or not *P. gerres* sensu Mamaev et Paruchin, 1976 from *Siganus oramin*, *S. sp.* and *Therapon jarbua* is identical with *P. mamaevi* n. nom. from *Siganus stellatus*.

(Sandars, 1944) sensu Mamaev et Paruchin, 1976

P. maomao (Yamaguti, 1968) Mamaev et Paruchin, 1976

syn.: *Prostatomicrocotyla m.* Yamaguti, 1968

P. tubicirrus (Paperna et Kohn, 1964) Mamaev et Paruchin, 1976

syn.: *Microcotyloides t.* Paperna et Kohn, 1964

Probably included species:

Microcotyle sillaginae Woolcock, 1936

"*Bivagina sillaginae* (Woolcock, 1936) Yamaguti, 1963" sensu Gupta et Khullar, 1968

Microcotyle virgatarum Tubangui, 1931

***Polylabroides* Mamaev et Paruchin,
1976**

Type species: *P. biungulatus* Mamaev et Paruchin, 1976

Probably included species:

Microcotyle australis Murray, 1931

***Grandicotyle* Lebedev, 1976**

Type species: *G. bychowskyi* Lebedev, 1976

***Aspinatrium* Yamaguti,
1963, emended**

Diagnosis: Microcotylidae, Prostatomicrocotylinae. Body elongate. Opisthaptor symmetrical with numerous pairs of clamps of *Microcotyle* type, commencing at level of posterior testes, not well marked off from body proper. Anterior suckers septate. Esophagus with side-branches. Intestinal limbs with side-branches, not united posteriorly. Testes postovarian. Ejaculatory duct sigmoid, muscular. Symmetrical prostatic complexes connected with cirrus. Paired prostatic ducts confluent before entering cirrus. Cirrus muscular, entirely unarmed. Genital atrium unarmed. Ovary tubular, looped. Vagina opening midventrally. Vaginal gland present. Vaginal ducts

paired, with a mutual connection before united with each other. Confluent vaginal duct bifurcate, opening into arms of vitelline duct. Eggs filamented with both poles. Gill parasites of marine teleosts.

Type species: *A. spari* (Yamaguti, 1937) Yamaguti, 1963

syn.: *Microcotyle s.* Yamaguti, 1937; *Prostatomicrocotyla s.* (Yamaguti, 1937) Yamaguti, 1968; *Nudimusculus (N.) s.* (Yamaguti, 1937) Unnithan, 1971

Summary

Descriptions are given of *Aspinatrium spari* (Yamaguti, 1937) Yamaguti, 1963 and *Polylabris japonicus* n. sp., monogeneans belonging to the family Microcotylidae, collected from the black sea bream, *Acanthopagrus schlegeli* cultured in Shizuoka, Yamaguchi and Nagasaki Prefectures, Japan.

P. japonicus n. sp. is different from the most similar species, *P. gerres* (Machida, 1973), non (Sanders, 1944) Mamaev et Paruchin, 1976 in the absence of concentric muscle fiber surrounding the genital atrium. The whole structure of the vaginal ducts in *A. spari* is first described, in which a connection between two vaginal ducts before forming the confluent vaginal duct is found. The generic diagnosis of *Aspinatrium* is emended in two points; the vagina opens midventrally and a pair of symmetrical prostatic complexes is present.

The subfamily Polylabrinae proposed by Lebedev (1976) is invalidated, since Prostatomicrocotylinae had already been created for *Prostatomicrocotyla*, a synonym of *Polylabris*. The subfamily Prostatomicrocotylinae is emended; forms having symmetrical prostatic complexes in the family Microcotylidae are included into the subfamily Prostatomicrocotylinae, which consists of *Polylabris* (type genus), *Polylabroides*, *Grandicotyle* and *Aspinatrium*. The key to the genera of the subfamily is given. *Poly-*

labris mamaevi n. nom. for *P. gerres* (Sandars, 1944) sensu Mamaev et Paruchin, 1976 and *Zeuxapta kahara* n. comb. for *Aspinatrium kahara* Yamaguti, 1968 are proposed. *Prostatomicrocotyla gerres* Machida, 1973 should be assigned to *Polylabris*, but further examination is required to decide whether it is a synonym of *P. gerres* (Sandars, 1944).

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クロダイに寄生していた *Microcotylidae* 科に属する 2 種の単生類について

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静岡県, 山口県及び長崎県で養殖されていたクロダイの寄生虫調査を行なった結果, 鰓弁から *Microcotylidae* 科に属する 2 種の単生類を得, 形態を記載し, 分類を検討した。

1 種は *Aspinatrium spari* (Yamaguti, 1937) Yamaguti, 1963 である。本種は *Aspinatrium* 属の模式種であるが, その原記載 (Yamaguti, 1937) にもとづいてつくられた *Aspinatrium* 属の定義は, 腔口が背面にあると誤認している点及び本属にきわめて特徴的である摂護腺の存在を見落している点で問題があり, これらの点を本論文で訂正した。また, 本種の腔管の全体的構造を初めて記載した。

他の 1 種は *Polylabris japonicus* n. sp. であり, 近縁の *P. gerres* (Machida, 1973), non (Sandars, 1944) Mamaev et Paruchin, 1976 とは生殖窩を同心円状に圍繞する筋肉が存在しない点で異なる。

Lebedev (1976) は *Polylabris* (模式属), *Polylabroides* 及び *Grandicotyle* によって *Polylabrinae* 亜科を提案した。しかし, Yamaguti (1968) は, それに先立って, *Prostatomicrocotyla* (*Polylabris* のシノニムとして消滅) を模式属として *Prostatomicrocotylinae* 亜科

を創設しているので, *Polylabrinae* 亜科は無効である。*Microcotylidae* 科の中で, 腔が腹面に開口し, 腔及び生殖窩が無棘であり, 発達した 1 対の摂護腺が陰茎に開口するものは全て *Prostatomicrocotylinae* 亜科に分類される。従って, *Aspinatrium* 属も *Prostatomicrocotylinae* 亜科に含まれることから, 同亜科は模式属の *Polylabris* の他に *Polylabroides*, *Grandicotyle* 及び *Aspinatrium* の 4 属によって構成される。本論文で, *Prostatomicrocotylinae* 亜科を定義し, 4 属の鑑別点を整理した。また, *Polylabris gerres* (Sandars, 1944) Mamaev et Paruchin, 1976 とは, 主として精巢の数と大きさで異なることから, アラビア海の *Siganus stellatus* から得た *P. gerres* (Sandars, 1944) sensu Mamaev et Paruchin, 1976 に対し, *P. mamaevi* n. nom. を提案した。*Prostatomicrocotyla gerres* Machida 1973 は Mamaev and Parukhin (1976) の主張通り, *Polylabris* 属に含まれるが, *P. gerres* (Sandars, 1944) との異同は再検討を要する。*Aspinatrium kahara* Yamaguti, 1968 は生殖器末端の形態で, *Zeuxapta* Unnithan, 1957 に分類されるべきであることから, 本論文において, *Z. kahara* n. comb. を提案した。