

Description of a New Species of the Genus *Epidendrium* from Japan, with Taxonomical Comments on the Taxa Previously Assigned to the Genus *Alora* in the Northwestern Pacific (Gastropoda: Epitoniidae)

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Abstract: The northwestern Pacific species of the genus *Epidendrium* Gittenberger & Gittenberger, 2005, and those previously assigned to the genus *Alora* are reviewed based mainly on the conchological characters. The species previously identified as *Alora billeeana* (DuShane & Bratcher, 1965) in this area is correctly identified herein as *E. aureum* Gittenberger & Gittenberger, 2005, and another species in the genus, *E. sordidum* Gittenberger & Gittenberger, 2005, is recorded for the first time in the Japanese waters. *Alora reticulata* (Habe, 1962) is transferred to the genus *Epidendrium*, and an additional new species is described as *E. parvitrochoides* n. sp. from Japan. *Alora annulata* (Kuroda & Ito, 1961) is retained in the genus *Alora* following most recent works, and *Alora kiiensis* Nakayama, 2000 is transferred to the genus *Tuba* Lea, 1833 in the basal heterobranch family Mathildidae based on the characteristic heterostrophic protoconch and overall teleoconch features.

Keywords: Epitoniidae, *Epidendrium parvitrochoides*, new species, *Tuba kiiensis*, new combination

Introduction

Nakayama (2003) reviewed the northwestern Pacific species of the family Epitoniidae including four representatives of the genus *Alora* H. Adams, 1861. Gittenberger & Gittenberger (2005) subsequently proposed the new genus *Epidendrium* to accommodate some of the species previously assigned to *Alora*, and described the new species *E. sordidum* and *E. aureum* with a distribution record of the latter in Japan. However, they did not show clear morphological evidence to distinguish these two superficially similar genera. Instead they made a more detailed comparison between *Epidendrium* and *Alora* based on jaw morphology and molecular phylogenetic analysis using a part of COI gene, and showed the validity of *Epidendrium* (Gittenberger & Gittenberger, 2012). These studies made it necessary to reevaluate the taxonomic status of several other species that had previously been assigned to *Alora*. During the course of that study one apparently undescribed species in the genus *Epidendrium* was found in the Japanese waters and is described in the following lines, with brief taxonomic review of the other species previously assigned to *Alora* in the northwestern Pacific.

Abbreviations: NSMT – National Museum of Nature and Science, Tsukuba.

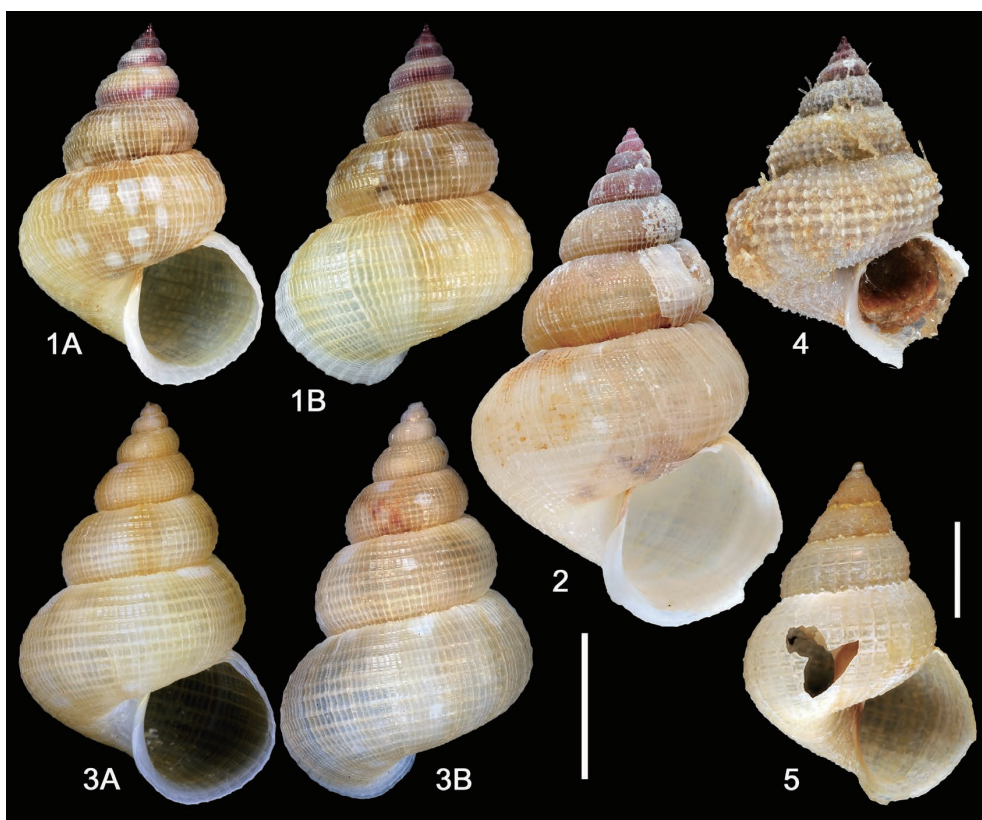
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Taxonomy

Family Epitoniidae Berry, 1910

Genus *Epidendrium* A. & E. Gittenberger, 2005

Remarks: This genus was originally proposed based partly on the ecological peculiarity of its parasitism of dendrophylliid hard corals (Scleractinia, Dendrophylliidae). Besides the designated type species, *E. sordidum* A. & E. Gittenberger, 2005 (Fig. 4), three other species were originally assigned to the genus, i.e., *Scalina billeana* DuShane & Bratcher, 1965 (Fig. 3), *Epitonium dendrophylliae* Bouchet & Warén, 1986 and *E. aureum* A. & E. Gittenberger, 2005 (Figs 1, 2). Although Gittenberger & Gittenberger (2012) later provided the anatomical and molecular bases to distinguish *Epidendrium* from the superficially similar genus *Alora*, it is still difficult to determine the generic position of certain species that lack biological information. Nevertheless, species of the genus *Epidendrium* can be conchologically recognized by the relatively large but fragile shell with a distinct teleoconch sculpture of regularly spaced, low, axial ribs and fine spiral threads, although the general shape of shell considerably varies from broad to slender conical, and an umbilicus may



Figs 1–5. *Epidendrium* spp. 1–2. *Epidendrium aureum* A. & E. Gittenberger, 2005; 1, Iejima, Okinawa, Japan, intertidal reef, Nakayama collection; 2, off Chichijima Island, Ogasawara Islands, NSMT-Mo 78922. 3. *Epidendrium billeanum* (DuShane & Bratcher, 1965), Baja California, Mexico, Nakayama collection. 4. *Epidendrium sordidum* A. & E. Gittenberger, 2005, off Sesoko, northwestern Okinawa Island, 3–5 m, NSMT-Mo 77872. 5. *Epidendrium reticulatum* (Habe, 1962), holotype, NSMT-Mo 39818. Scale = 5 mm (all images at the same magnification, except for Fig. 5).

be present or absent. On the other hand, the type species of *Alora*, *A. gouldii* (A. Adams, 1857) has a thicker and more solid shell, with a relatively larger body whorl and aperture and a completely closed umbilicus. Based on these characters, northwestern Pacific (mainly Japanese) species that have previously been assigned to the genus *Alora* are reevaluated below.

Taxonomical Comments on the Species Previously Assigned to the Genus Alora: Nakayama (2003) placed four species from in this area in the genus *Alora*, i.e., *Scalina billeeanae* [sic; = *billeeana*] DuShane & Bratcher, 1965, *Akibumia reticulata* Habe, 1962, *Teramachiacirsa annulata* Kuroda & Ito, 1961 and *Alora kiiensis* Nakayama, 2000.

1) *Scalina billeeana* (Fig. 3) was originally described from the Gulf of California on the west coast of North America, and is known to be distributed from the Gulf of California to the Galapagos archipelago (Gittenberger & Gittenberger, 2005). Specimens recorded under this name from the northwestern Pacific (Tsuchida, 2000: pl. 169, fig. 116; Nakayama, 2003: pl. 7, figs 24–25; Figs 1–2) actually belong to a different species, which was later described as *E. aureum* by Gittenberger & Gittenberger (2012). Besides this, another closely related species, *Epidendrium sordidum*, is recorded herein for the first time in Japanese waters; it was found attached to *Tubastrea* sp. at a depth of 3–5 m off northwestern Okinawa Island (NSMT-Mo 77872: Fig. 4).

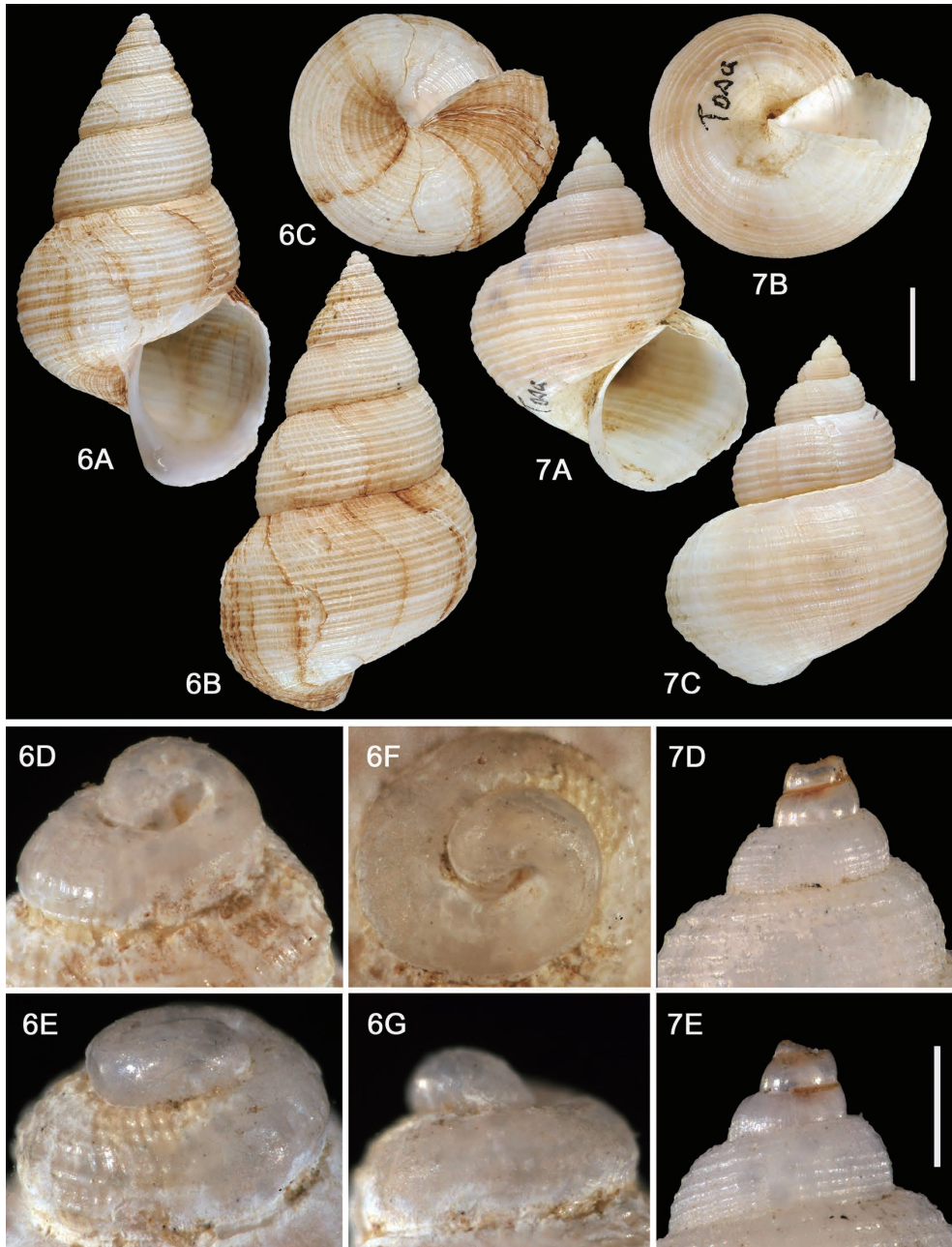
2) *Akibumia reticulata* (Fig. 5) was originally assigned to the family Trichotropidae Gray, 1850 [= Capulidae Fleming, 1822] (Habe, 1962), but was subsequently transferred to the family Epitoniidae by Warén & Bouchet (1990: 75), who illustrated the holotype and suggested that “it may provisionally be classified in *Epitonium*”. Subsequently it was transferred to the genus *Alora* by Tsuchida (2000) and retained there by Nakayama (2003). It reasonably agrees with other species in the genus *Epidendrium* in overall conchological characters, and is transferred herein to that genus. However, this species was reported to attach to the plumulariid hydrozoan *Dentitheca habereri* (Stechow, 1909) [= *Plumularia haberei* Stechow, 1909] growing on the anthozoan *Parazoanthus gracilis* (Lwowsky, 1913) (Habe, 1962), making it different from other species in the genus, which are exclusively parasitic on dendrophylliid hard corals (Gittenberger & Gittenberger, 2005). More careful study based on live material will thus be necessary to decide its precise generic position.

3) *Teramachiacirsa annulata* (Fig. 7) is the type species of the genus *Teramachiacirsa* Kuroda & Ito, 1961 by monotypy. The genus was placed in the synonymy of *Alora* by Kilburn (1985: 245) and Bouchet & Warén (1986: 540). Bouchet & Warén (1986: fig. 1253) also illustrated the holotype of *T. annulata*, and used the combination *Alora annulata*. This generic assignment has been accepted by subsequent authors, such as Weil *et al.* (1999: 114) and Brown & Neville (2015: 30, 38), and it is also accepted in the present study.

4) *Alora kiiensis* (Fig. 6) is superficially very similar to *A. annulata* and was considered to be allied to it based on the general morphology of the teleoconch shell (Nakayama, 2000). However, in contrast to the fact that *A. annulata* possesses a multispiral, glossy and conical protoconch (Fig. 7D–E), which is typical for the family, *A. kiiensis* has a relatively large and apparently heterostrophic protoconch, as previously shown by Nakayama (2003: pl. 7, fig. 19). The protoconch is illustrated in more detail in Fig. 6D–G here, indicating its correct systematic position in the lower Heterobranchia. Taking other conchological features into consideration, *A. kiiensis* might be most closely allied to *Gegania valkyrie* Powell, 1971, described from off New Zealand at a depth of 329 m. *Gegania* was regarded by Bieler (1995) as a junior synonym of *Tuba* Lea, 1833 (Type species: *Tuba alternata* Lea, 1833, by subsequent designation by Cossmann, 1912) in the family Mathildidae, and *A. kiiensis* can thus be transferred to the latter genus (new combination). It is apparently a rare species, and has been recorded only from off the Kii Peninsula at depths of 350–500 m (Koyama, 2010).

In summary, one northwestern Pacific species, *A. annulata*, is tentatively retained in the genus *Alora*, and three others, *E. sordidum*, *E. aureum*, and possibly *E. reticulatum*, are assigned to

Epidendrium. There is one more that can be assigned to the latter genus, and it is described below as a new species.

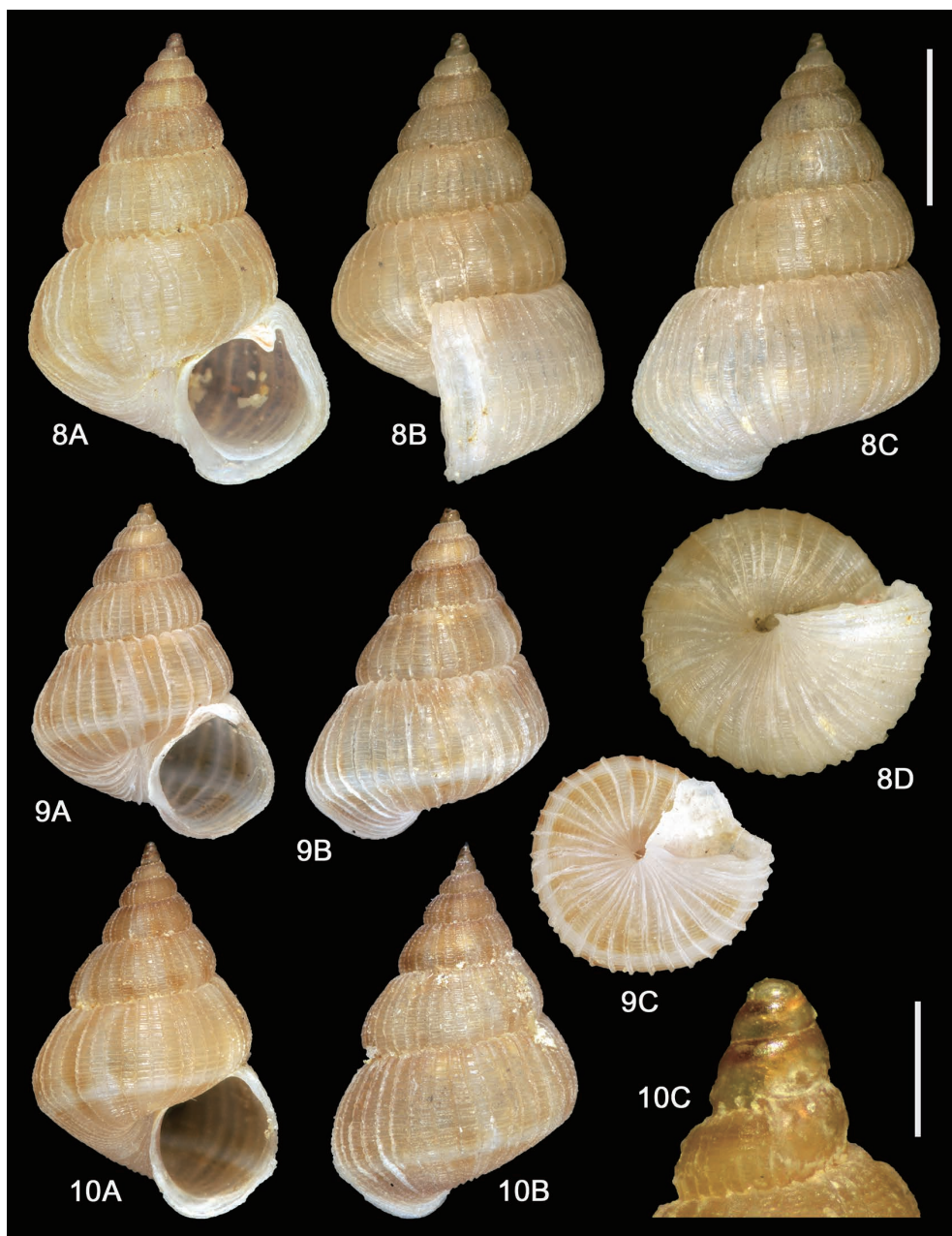


Figs 6–7. *Tuba kiiensis* (Nakayama, 2000) and *Alora annulata* (Kuroda & Ito, 1961). **6.** *Tuba kiiensis*, holotype, NSMT-Mo 71424, off Seragaki beach, Onna, Okinawa, Japan; 6D–G, protoconch. **7.** *Alora annulata*, NSMT-Mo 78942, Tosa Bay; 7D–E, protoconch. Scales: 6A–C and 7A–C, 5 mm; 6D–G and 7D–E, 500 μ m.

Epidendrium parvitrochoides Nakayama n. sp.

(Figs 8–10)

Description: Shell widely conical, moderately thin, yellowish brown in color, occasionally with white spiral and/or axial bands. Protoconch sub-cylindrical in shape, consisting of three glossy



Figs 8–10. *Epidendrium parvitrochoides* n. sp., off Seragaki beach, Onna, Okinawa, Japan; 8, holotype, NSMT-Mo 77925; 9, paratype #1, NSMT-Mo 77924; 10, paratype #3, NSMT-Mo 77923. All images at the same scale (2 mm), except for 3C (scale = 500 μ m).

whorls. Teleoconch of about six convex whorls, with impressed suture. Body whorl angulate above base, without basal keel. Surface sculpture of low but sharp and rather distinct axial ribs and weaker thread-like spiral cords forming reticulate pattern. Axial ribs about 30 in number and spiral ribs about 18 in number on second teleoconch whorl. Aperture quadrate in shape, with thin lip reflected outwardly at columellar margin. Umbilicus widely open and deep.

Type locality: Off Seragaki beach, Onna village, Okinawa, Japan (26°51'N, 127°87'E) at a depth of about 20–25 m.

Distribution: Only known from the type locality.

Type materials: Holotype, NSMT-Mo77925, length 5.8 mm, width 4.0 mm (Fig. 8). Paratypes #1, NSMT-Mo77924, length 4.8 mm, width 3.1 mm (Fig. 9); # 2, NSMT-Mo77923, length 4.3 mm, width 2.8 mm (Fig. 10).

Ethymology: The species name *parvitrochoides* represents a combination of *parvus* [Latin, small] and *trochoides* [Greek, trochus-like], derived from the small size and trochid-like appearance of the shell.

Remarks: Although the present new species is so far represented only by empty shells, it generally agrees with other species in the genus *Epidendrium* in overall shell characters as discussed above, and can be assigned to the genus. It differs from *E. billeanum* (Fig. 3) and *E. aureum* (Figs 1–2) in the strong angulation of the periphery above the base and in having considerably weaker spiral cords and a quadrate aperture. It is also distinguishable from *E. sordidum* (Fig. 4) by the shallower suture and significantly weaker sculpture. *Epidendrium reticulatum* (Fig. 5) most resembles the present new species in general shell shape and sculpture, but has a more rounded periphery and stronger and fewer spiral cords that are similar in strength to the axial ribs, forming a more clearly reticulate appearance.

Although no biological information is available for this species, the shells were collected from the sublittoral zone on a coral reef, in a similar habitat to those of *E. sordidum* and *E. aureum*, which both often occur sympatrically (Gittenberger & Gittenberger, 2005).

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日本産イボヤギヤドリイトカケ属（イトカケガイ科：新称）の1新種，及び 従来 *Alora* 属に含められていた北西太平洋産の種の属位について

中山大成・長谷川和範

要 約

沖縄県恩納村瀬良垣から金城浩之氏によって採集された日本産イトカケガイ科の1種をイボヤギヤドリイトカケ属（新称）*Epidendrium* A. & E. Gittenberger, 2005 の新種として記載する。また、本種の属位を決定するにあたり、従来北西太平洋で *Alora* 属に含められていた近似種と比較するとともに、それらの属位についても見直しを行った。

Epidendrium parvitrochoides Nakayama n. sp. エンスイイトカケ（新種・新称）

(Figs 8–10)

殻長は3–5 mmの小型で薄く、円錐形。茶褐色。各層に胎殻は平滑で円筒形，体層，次体層とも下方に角張るが底盤を形成しない。次体層は6層内外で，殻表は縦肋と螺肋が交差し格子状の彫刻をなす。殻口は四角く外唇薄く著しい張り出しにはならない。臍孔は大きく開く。

タイプ標本：ホロタイプ，殻長 5.8 mm；殻径 4.0 mm，NSMT-Mo 77925；パラタイプ 1，殻長 4.8 mm；殻径 3.1 mm，NSMT-Mo 77924；パラタイプ 2，殻長 4.3 mm；殻径 2.8 mm，NSMT-Mo 77923。

タイプ産地：沖縄県恩納村瀬良垣，水深 20–25 m。

分布：タイプ産地のみからしか知られていない。

付記：*Epidendrium* イボヤギヤドリイトカケ属（新称）は *E. sordidum* A. & E. Gittenberger, 2005 ヒロベソイボヤギヤドリイトカケ（新称）をタイプ種として Gittenberger & Gittenberger (2005) によって創設され，従来 *Alora* 属とされていた種の幾つかがここに移された。後に Gittenberger & Gittenberger (2012) は *Alora* 属と *Epidondrium* 属の違いについて改めて議論し，遺伝子配列の比較から系統的に隔たったものであることを示した。殻の形態では両者の区別はやや困難であるが，貝殻の全般的な形状や殻質などの違いによって区別が可能であると考えられる。これらの形質に基づいて，日本産の従来 *Alora* 属に含められていた種を再検討した結果，まず土田 (2000) や Nakayama (2003) によって *Alora billeeana* (DuShane & Bratcher, 1965) イボヤギヤドリイトカケとして図示された種は *E. aureum* A. & E. Gittenberger, 2005 (Figs 1–2) に訂正される。この種と同時に記載されたヒロベソイボヤギヤドリイトカケも今回初めて沖縄から産出が確認された。*E. reticulatum* (Habe, 1962) センナリスナギンチャクイトカケは，貝殻の形態から本属に含めたが，本属の知られているすべての種がイボヤギ類に着生する (Gittenberger & Gittenberger, 2005) のに対して，本種はヒドロ虫類のセンナリスナギンチャクに付着する (Habe, 1962) ことから，今後の詳

しい検討が必要である。*Alora annulata* (Kuroda & Ito, 1961) テラマチイトカケは寄主などの情報が不明であるが、原殻の形態的特徴と近年の他の文献等に倣い暫定的に *Alora* 属に残す。*Alora kiiensis* Nakayama, 2000 キイテラマチイトカケは明らかに異旋する大型の原殻をもつことなどから、タクミナ科の *Tuba* 属に移される。

本新種は *E. billeanum* やイボヤギヤドリイトカケよりも小型で、螺層が角張りを持ち、殻口が方形であることで明瞭に異なる。ヒロベソイボヤギヤドリイトカケとは縫合が浅く、彫刻が弱いことで区別される。センナリスナギンチャクイトカケは殻形が最も近似するが、周縁が丸く、螺肋がより強くて数が少なく、格子状の彫刻を示すことで区別される。