Two New *Calagrassor* (Gastropoda: Buccinidae) from Japan and Adjacent Waters

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**Abstract:** Two new species of the genus *Calagrassor* Kantor *et al.*, 2013 are described. *Calagrassor analogous* n. sp. is distributed in Japan, the East China Sea and Taiwan, and has been previously confused with *Aulacofusus hiranoi* (Shikama, 1962). Differences in protoconch morphology serve to distinguish *C. analogous* n. sp. from *A. hiranoi* and differences in sculpture serve to distinguish this new species from *C. aldermenensis* (Powell, 1971) and *C. hayashii* (Shikama, 1971). A second and hitherto unknown species is described from Japanese waters as *Calagrassor hagai* n. sp. Differences in spiral and axial sculpture serve to distinguish it from other known species in the genus.

**Keywords:** Gastropoda, Buccinidae, *Calagrassor*, *Aulacofusus*, Japan, new taxa

**Introduction**

Deep-water Buccinidae from the Indo-Pacific Ocean are the subject of taxonomic and systematic confusion. Comparative study in this group is generally difficult because most species have a rather featureless small white shell and are often represented only by few specimens. However, the multitude of deep-water buccinid samples collected during the Tropical Deep-Sea Benthos programme (previously known as Campagnes MUSORSTOM) in the Indo-Pacific has formed a solid base for taxonomic studies, providing insight into intraspecific variability versus specific characteristics.

Among this material were hundreds of samples from chemosynthetic habitats, mainly sunken wood, that belong or are similar to *Eosipho* and *Manaria*. The genus-level taxonomy was studied and discussed by Kantor *et al.* (2013), resulting in the description of a number of new genera, including *Calagrassor*, based on molecular, anatomical and conchological evidence. The species-level taxonomy was studied and discussed in a revision by Fraussen & Stahlschmidt (2016).

The present study treats an undescribed species from Japanese waters that is often labelled in collections as *Aulacofusus hiranoi* (Shikama, 1962). Conchological characteristics serve to place it, together with a second hitherto undescribed species, in *Calagrassor Kantor* *et al.* 2013 as suggested by Fraussen & Stahlschmidt (2016: 431–432). They are here named as *Calagrassor analogous* n. sp. (Japan, Taiwan and China) and *C. hagai* n. sp. (Japan).

**Abbreviations:** AD – collection Aart Dekker, Netherlands; KF – collection Koen Fraussen, Belgium; KPM – Kanagawa Prefectural Museum of Natural History, Odawara, Japan; MC – collection Mitsuo Chino, Japan; MNHN – Muséum national d’Histoire naturelle, Paris, France; NSMT – National Museum of Nature and Science, Tsukuba, Japan; PS – collection Peter

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Stahlschmidt, Germany; SL – shell length.

**Systematics**

Family Buccinidae Rafinesque, 1815

Genus *Calagrassor* Kantor, Puillandre, Fraussen, Fedosov & Bouchet, 2013

*Type species*: *Cantharus aldermenensis* Powell, 1971 (type locality: east of Aldermen Islands, New Zealand, 366–475 m), by original designation.

*Range*: *Calagrassor* is known from throughout the Indo-West Pacific with a single specimen recorded from Chile, East Pacific (Fraussen et al., 2012).

*Remarks*: *Calagrassor* is characterized by a semi-oval shaped shell with a blunt apex, a short siphonal canal and weakly convex whorls sculptured with fine spiral cords. The type species, *C. aldermenensis*, is characterized by having axial ribs on the upper spire whors only, leaving the lower whors smooth.

For differences with *Manaria* Smith, 1906 (type species by monotypy: *Manaria thurstoni* Smith, 1906 from India) we refer to the extensive comparison given by Kantor et al. (2013: 2181–2184, fig. 4). Species from Japan and adjacent waters that belong to *Manaria* are: *M. kuroharai* Azuma, 1960 and *M. lurata* Kuroda & Habe in Habe, 1961.

Species belonging to *Aulacofusus* Dall, 1918 (type species by original designation: *Fusus spitzbergensis* Reeve, 1855; = *A. brevicaudatus* (Deshayes, 1823) from the North Atlantic and Arctic waters) look similar at first glance because the shells are usually white, often small, more or less fusiform and have dominant spiral sculpture, they but differ in having a larger protoconch and in their larger adult size.

Species from Japan and adjacent waters that are included in *Calagrassor* are *C. aldermenensis* (Powell, 1971), *C. hayashii* (Shikama, 1971), *C. poppei* (Fraussen, 2001) (= *Colus ryukyuensis* (Lan, 2002)), *C. analogus* n. sp. and *C. hagai* n. sp.

*Calagrassor analogus* n. sp.

(Figs 1–4)

*Calagrassor* sp. 3 – Fraussen & Stahlschmidt, 2016: 432, figs 100–102, 130.

*Description*: Shell small, thin, rather fragile, alabaster white. Shape slender fusiform with moderately high spire. Whorls well convex, subsuturally weakly tabulated.

Protoconch of paratype 1 (Fig. 3b) paucispiral, tip round, number of whorls 1 1/4; whorls convex; smooth and glossy. Transition to teleoconch distinct, marked by slightly flared lip.

First teleoconch whorl convex, with five thin spiral cords, subsutural cord finest, sixth cord partly concealed under suture with subsequent whorl, upper interspaces (between subsutural cord and second cord) broad, second interspaces as broad as spiral cords, lower interspaces narrower. Along first whorl, thin secondary spiral cord appears in upper interspace, growing in strength rapidly, forming additional second fine subsutural cord. Suture descending slightly along first whorl, revealing partly concealed spiral cord. Second whorl with seven thin spiral cords, two subsutural ones finer. Spiral cords becoming slightly flattened along third whorl. Fourth whorl with eight or nine spiral cords with flattened tops and steep sides, intersection rather quadrangular in shape. Penultimate whorl with nine such spiral cords, interspaces variable: as broad as or narrower than spiral cords on shoulder, broader along periphery, narrower on base. Body whorl with 19 such spiral cords.
Axial sculpture absent. Juvenile specimens with intact outer shell layer show spiral cords only. Fully adult specimens with eroded apex occasionally show weak axial waves, due to different thickness of material in underlying shell layers or irregular erosion.

Aperture semi-oval, rather lens-shaped; outer lip thin, slightly waving according to outer
sculpture; columella well curved, smooth, slightly impressed; aperture and siphonal canal together slightly less than 1/2 of total shell length.

Periostracum olive green, rather thick in juvenile specimens, forming fine axial lamellae;
smooth or glossy in older specimens, eroded on top of spiral cords, with fine, axial lamellae visible in spiral interspaces.

Operculum thin, corneous, pale brown, oval, with terminal nucleus.

**Comparison:** *Calagrassor analogus* n. sp. is characterized by the alabaster white shell being rather lens-shaped with a moderately high spire; the fine spiral sculpture in combination with absence of any axial sculpture; the semi-oval aperture with a short siphonal canal and the small adult size.

*Calagrassor analogus* n. sp. differs from *C. bacciballus* Fraussen & Stahlschmidt, 2016 (Fig. 5) from the Philippines in its slender shape narrower aperture, the narrower subsutural tabulation resulting in a rather convex shoulder (rather than an angulate shape) and the narrow spiral cords that are slightly higher in number.

*Calagrassor analogus* n. sp. differs from both *C. aldermenensis* (Fig. 12) and *C. hayashii* (Figs 13–15) in the slightly narrower spiral cords and the absence of axial ribs on the upper spire whorls.

*Calagrassor analogus* n. sp. differs from *C. hagai* n. sp. (Fig. 8) in its narrower spiral cords with broader interspaces, the thin shell and the smaller adult size.

*Aulacofusus hiranoi* (Shikama, 1962) (Figs 6–7) from the North Pacific coast of Japan (type locality: off Choshi [Chiba Prefecture, central Honshu]) is almost identical in spiral sculpture and has the same fine incremental lamellae in the spiral interspaces. *C. analogus* n. sp. differs in having slightly narrower spiral cords, a much smaller protoconch with thin whorls, a more convex base with gently curved transition to siphonal canal (rather than being constricted) and much smaller adult size.

**Type locality:** Off Owase, Mie Prefecture, Japan, trawled, 200 m deep.

**Type material** (dimension in SL): Holotype, 16.4 mm, NSMT-Mo 78455. Paratype 1, 12.7 mm, from the type locality, MC; paratypes, 2–4, 11.3–14.3 mm, from the type locality, MC; paratype 5, 17.4 mm, Cape Shio, Wakayama Prefecture, trawled, 300 m, MC; paratype 6, 14.8 mm, Kasasa, NW of Cape Noma, Kagoshima Prefecture, by shrimpers, 350–400 m, on sunken wood, NSMT-Mo 78993; paratypes 7–8, 12.0–13.6 mm, Kumano-nada, Mie Prefecture, NSMT-Mo 78994; paratype 9, 17.0 mm, Japan, KF-0903; paratypes 10–11, 14.5–18.0 mm, NE off Senkaku Islands, Okinawa Prefecture, 200 m, MC; paratype 12, 7.5 mm (juvenile), E. Taiwan, TAIWAN2000 stn CP58, 24°35.1N, 122°05.8E, 221 m, MNHN-IM-2012-19; paratype 13, 12.2 mm, off Suao, Taiwan, TAIWAN2004 stn CP269, 24°30.3N, 122°04.3E, 397–417 m, MNHN-IM-2012-20; paratype 14, 9.2 mm, SW Taiwan, TAIWAN2000 stn CP27, 22°13N, 120°23´E, 326 m, MNHN-IM-2012-21; paratypes 15–16, 14.8–15.0 mm, Taiwan, local fishermen, 500–600 m, AD; paratypes 17–18, 16.0–16.6 mm, East China Sea, trawled by Chinese fishermen, 260–380 m deep, attached to or in holes of sunken wood, KF-5445, 6659; paratypes 19–23, 14.4–16.5 mm, East China Sea, trawled by Chinese fishermen, 100–300 m deep, PS, KF-6661, 6680.

**Other material examined:** 16 additional specimens from Wakayama, Mie and Aichi Prefectures, Japan (MC), excluding the type material.

**Range and habitat:** Known from the Pacific coast of Japan, East China Sea (paratypes 17–23) and from off Taiwan (paratypes 12–16). Bathymetric range: the Pacific shelf slope between 200 and 380 m off Japan, East China Sea and Taiwan, living on muddy bottom attached to or in holes of sunken wood.

**Etymology:** Latin *analogus* (adjective), meaning “corresponding” or “analogous”, referring to the similarity of this species to those of the genera *Colus* and *Aulacofusus*, where it was once placed.
Calagrassor hagai n. sp.
(Fig. 8)

Calagrassor sp. 2 – Fraussen & Stahlschmidt, 2016: 431, figs 99, 131.

**Description:** Shell thick, solid, snow white. Shape slender fusiform with moderately high spire. Whorls well convex, suture distinct.

Protoconch eroded in all specimens examined (Fig. 8), number of protoconch whorls estimated at 1 1/4; whorls convex with weak subsutural tabulation at transition to teleoconch whorl; smooth and glossy. Transition to teleoconch distinct, marked by fine axial line.

First teleoconch whorl convex, with seven or eight thin spiral cords, interspaces rather narrow. Along first whorl, interspaces growing broader but still narrower than spiral cords. Second whorl with nine thin spiral cords, two subsutural ones slightly finer. Penultimate whorl with 10 spiral cords of equal strength, with weakly flattened top. Body whorl with 22 such spiral cords, interspaces slightly narrower.

Axial sculpture absent.

Aperture semi-oval, weakly lens-shaped; outer lip rather thin, edge weakly waving according to outer sculpture; columella gently curved, smooth; aperture and siphonal canal together about 1/2 of total shell length.

Periostracum olive green, thin, well adherent to shell.

Operculum not examined.

**Comparison:** Calagrassor hagai n. sp. is characterized by fine spiral sculpture in combination with the absence of axial ribs, the semi-oval aperture with a short siphonal canal and the moderately thick, heavy shell. No variation in shape or sculpture has been found within this species.

Calagrassor tashiensis (Lee & Lan, 2002) (Fig. 9) from Taiwan looks very similar at first glance but C. hagai n. sp. differs in having broader spiral interspaces on the upper spire whorls and in the absence of axial ribs, the slightly longer siphonal canal and the paler periostracum.

Calagrassor pidginoides Fraussen & Stahlschmidt, 2016 (Figs 10–11) from the Philippines, Papua New Guinea, the Solomons and Vanuatu looks very similar at first glance but C. hagai n. sp. differs in the higher number of spiral cords with broader interspaces on the upper spire whorls and its more convex whorls (instead of a conical spire with laterally flattened whorls).

Calagrassor hagai n. sp. differs from both C. aldermenensis (Fig. 12) and C. hayashii (Figs 13–15) in the slightly narrower spiral cords and the absence of axial ribs on the spire.

Calagrassor hagai n. sp. differs from C. analogus n. sp. (Figs 1–4) in its broader spiral cords with narrower interspaces, the thick and heavy shell and the larger adult size.

**Type locality:** Off Akune, Kagoshima Prefecture, Japan, 300 m depth.

**Type material** (dimension in SL): Holotype, 16.6 mm, NSMT-Mo78980. Paratype 1, 13.6 mm juvenile, from the type locality, NSMT-Mo78981; paratype 2, 18.3 mm, from the type locality, MC; paratype 3, 16.9 mm, from the type locality, KF-7638.

**Other material examined:** The type material comprises the only specimens we know at the present date.

**Range and habitat:** Known from the type material only. No additional information is available about the locality or habitat. The specimens were collected together in the same haul with C. hayashii (Fig. 14).

**Etymology:** Calagrassor hagai n. sp. is dedicated to Dr. Takuma Haga, Toyohashi Museum of Natural History, Japan, for his knowledge of the mollusca and his dedication to the sunken-wood fauna in particular.
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References


日本中南部及び周辺海域より採集されたチビトマキツマバイ属（新称）
（腹足綱：エゾバイ科）の2新種

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要約

Calagrasor Kantor et al., 2013 ヒメイトマキツマバイ属（和名新称）は、沈木を中心とした深海化学合成群集から得られたエゾバイ科サンプルの分子系統学的考察の中で提唱された属グループである。タイプ種は C. aldermenensis (Powell, 1971) ニュージーランドトマキツマバイ（新称）（タイプ産地：ニュージーランド Aldermen 島沖）。本属は貝殻が亜楕円形、殻頂は鈍く、螺線は明瞭、螺肋は螺層上部にのみ残り、水管は短いなどの特徴をもつ。形態的に類似する Manaria Smith, 1906 イトマキツワバイ属とは原殻が高く、螺肋を欠くことで、また Aulacofusus Dall, 1918 ヒモマキツマバイ属とは、螺肋が強く、体かく殻が大きいことなどで区別される。

その後、Fraussen & Stahlschmidt (2013) は熱帯太平洋のイトマキツワバイ属とそれに関連した属の種レベルの詳細な検討を行い、ヒメイトマキツマバイ属には3種の未記載種を含む12種を含めた。そのうち本邦海域からは、C. hayashii (Shikama, 1971) ハヤシトマキツマバイ (遠州灘)、C. poppei (Fraussen, 2001) ポペイトマキツマバイ (沖縄、南シナ海) を記録している。今般、日本中南部とその周辺海域、及び鹿児島県阿久根沖から得られた標本を検討した結果、さらに2新種を認めたので、ここに命名記載する。

Calagrasor analogus n. sp. チビトマキツマバイ

本属の中ではやや小型。薄質で陶器質。紺錐形で膨らむ。螺塔は高い。次体層で9、体層で19の螺線があり、周縁部では太く螺線間隔も広いが体層下部では細まる。螺肋を欠く。殻口は楕円形、水管溝は短い。オリーブ色の殻皮を被る。殻口、水管部で殻長の半分を占める。蓋は薄い角質で、青みがかった褐色、核は下端にある。沈木に付着あるいは沈木上の小穴に棲息する。

比較：本属の他種ではフィリピン産の C. bacciliatus Fraussen & Stahlschmidt, 2016 と最も近似するが、殻口が狭く、細形で脇部が狭くならぬことで区別される。ニュージーランドトマキツマバイ、ハヤシトマキツマバイとは螺塔がやや狭く、螺層上部で螺肋を欠くことで異なる。

本種は従来、北海道東岸、東北沿岸を経て銅子に分布する Aulacofusus hiranoi (Shikama, 1962) ヒラノイトマキツマバイに混同されてきたが、原殻が小さく、成殻は狭かに小型で、殻高が高く、殻頂部が溶失せず、螺肋の幅が細いこと等により異なる。

種小名は近縁属と同様を示唆、和名はタイプ産地による。

タイプ標本：ホロタイプ NSMT-Mo 78455 (殻高16.4 mm)。

タイプ産地：三重県尾鷲沖、水深200 m。

分布：愛知県沖、三重県尾鷲沖、和歌山県潮岬沖、鹿児島県野間岬沖、沖縄県尖閣諸島、東シナ海、台湾。

Calagrasor hagai n. sp サツママキツトマキツマバイ（和名新称）

殻は厚重、原殻は溶失する。純白色、細い梨形。螺塔は高く、総合は明瞭。次体層で10、体層で22の螺線があり、螺線間隔はやや狭い。螺肋を欠く。殻口は亜楕円形、外脛はやや薄く、殻批部に対応し端部は弱く波打つ。軸脣は緩やかに曲がる。殻口、水管部で殻長の半分を占める。緑オリーブ色の殻皮を被る。盖は確認されていない。

比較：本種は、台湾北部に分布する C. tashiensis (Lee & Lan, 2002) ターシトマキツマバイ（新称）に似るが、殻批部、特に螺層上部の殻批が異なること、水管溝がやや長いことなどで区別される。フィリピン
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以南に分布する C. pidginoides Frsaussen & Stahlschmidt, 2016 ミナミイトマキツムバイ（新称）とは殻条が多く、殻条間隔が広く、殻形はより膨らむことで異なる。ニュージーランドツムバイ、ハヤシイトマキツムバイとは殻条がやや狭く、殻塔上部で縦肋を欠くことで区別される。

種小名は本属の知見を提供された芳賀拓真博士に献名。和名はタイプ産地による。

タイプ標本：ホロタイプ NSMT-Mo 784980，殻長 16.6 mm。

タイプ産地：鹿児島県阿久根市沖，水深 300 m。ハヤシイトマキツムバイと同時に得られた。

分布：タイプ産地以外からは知られていない。