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Loxocorone, a New Genus of the Family Loxosomatidae (Entoprocta: Solitaria), with Descriptions of Two New *Loxomitra* (*sensu stricto*) and a New *Loxocorone* from Okinawa, the Ryukyu Archipelago, Japan

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ABSTRACT—The type species of *Loxomitra* Nielsen, 1964, *L. kefersteinii* (Claparède, 1867), has following characters: A) the buds have a pair of terminal wings at the base of the stalk, and B) the liberated buds crawl on the substratum by attaching the two terminal wings to the substratum and twisting the whole body. By contrast, some other members of the genus have following characters: A') the buds lack the terminal wings but have a foot with foot groove, and B') the liberated buds glide over the substratum using the foot with foot groove. I thus propose to divide *Loxomitra* (*sensu lato*) into two genera– *Loxomitra* (*sensu stricto*) characterized by A) and B), and *Loxocorone* gen. nov. by A') and B'). I also describe two new *Loxomitra* (*sensu stricto*), *L. mizugamaensis* sp. nov., and *L. tetraorganon* sp. nov., and one new *Loxocorone*, *L. allax* sp. nov. from the Ryukyu Archipelago, Japan. All of the currently recognized species of the *Loxomitra* (*sensu lato*) are reviewed to specify their generic allocations in response to the above change.

Key words: Entoprocta, Kamptozoa, *Loxocorone*, *Loxomitra*, Okinawa

INTRODUCTION

Entoprocts are small (0.2–5 mm long), sessile animals, and are classified into a total of approximately 160 species (Cf. Brusca and Brusca, 1990). Of these species approximately 110 are solitary (the order Solitaria), whereas the others are colonial (the order Coloniales). The solitary entoproct was first described by Keferstein (1862) as *Loxosoma*, which had been the only genus of the solitary entoprocts until Mortensen (1911), who established two additional genera (*Loxocalyx* and *Loxosomella*) on the basis of differences in structure of a foot, an attaching apparatus located at the base of the stalk. Members of the genus *Loxosoma* have a disk-shaped foot called "sucking disc", in which some gland cells are distributed dispersedly, whereas members of *Loxocalyx* have an antero-posteriorly expanded foot with a foot gland (an aggregate of some gland cells opening to the front of the foot) and a foot groove (longitudinal rows of gland cells). These foot structures are known to enable the animal to glide over the substratum slowly like slugs. *Loxosomella*, on the other hand, lacks such foot and cements itself on the substratum throughout the adulthood. Even so, the buds have foot similar to that of adults and buds of *Loxocalyx*.

Nielsen (1964), however, met difficulties in assigning several species to *Loxosomella* or *Loxocalyx*: in these species, some adult individuals retained the foot, but other conspecific individuals lost this structure and were cemented on the substratum permanently. Accordingly, he united the two genera under the name of *Loxosomella* and recognized therein two subgenera, *Loxosomella* and *Loxomitra*, on the basis of the budding mode. Whereas the buds of the former subgenus attach to the mother's calyx by the posterior tip of the foot, the buds of the latter subgenus attach by the back of their calyx or stalk. Soule *et al.* (1987) elevated the subgenus *Loxomitra* to the rank of the full genus.

Bobin and Prenant (1953) reported a unique species that has no stalk and attaches to the substratum by a small gland on the underside of the calyx. The genus *Loxomespilon* was established for this species. As such, four genera are currently recognized for the solitary entoprocts, composing the family Loxosomatidae Hincks, 1880, the only family of the Order Solitaria.

The type species of the genus *Loxomitra* is *Loxomitra kefersteinii* (Claparède, 1867). The bud of this species is known to have a pair of small expansions each composed of several gland cells at the base of the stalk (Nielsen, 1966;

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1989). Nielsen (1989) referred to this unique foot structure as “terminal wings”. To date, this structure is reported only for the buds of *L. kefersteinii*, and a unique crawling behavior of the liberated buds using this portion was also described for this species (Ryland and Austin, 1960). Some other members of the genus *Loxomitra* have an antero-posteriorly expanded foot that bears a foot groove and lacks terminal wings. This condition, different from that in *L. kefersteinii* (see above), is common to the genus *Loxosomella*. It is thus reasonable to establish a new genus for those *Loxomitra* species having such a foot.

There is only one report on entoprocts from the Ryukyu Archipelago, Japan, in which three new species were described for *Loxosomella* (Iseto, 2001). Recently, I collected specimens representing three additional undescribed solitary species from a shallow reef flat of Okinawa Island and Tokashiki Island of the central Ryukyus. According to the budding mode, all of them could be assigned to the genus *Loxomitra* (see above). In the bud stage, two of them have terminal wings, whereas the other one has a foot with a foot groove. This suggests that the former two are closely related to *L. kefersteinii*, whereas the latter one to the species lacking the terminal wings and thus representing an undescribed genus.

MATERIALS AND METHODS

Sampling was carried out in Mizugama (estuary of Hija River) (26°21'N, 127°45'E) and Ginowan Fishery Port (26°17'N, 127°45'E), Okinawa Island, the Ryukyu Archipelago, Japan. Slide glasses were immersed in reef flats, and were collected after two or four months. Stones were also collected from these localities, as well as from Aharen Beach (26°10'N, 127°20'E) of Tokashiki Island, a small islet close to Okinawa Island (Fig. 1). Epifaunas on these objects were examined under a binocular stereomicroscope. Some of these stones and glasses were examined immediately after collection, whereas others were kept in a bucket of seawater with glass plates for 1–3 months in order to obtain asexually proliferated individuals attached on the glass plates. Contaminated detritus were seemingly enough for their diet, although microalgae (Marine Chlorella 100, Marine-bio Co., Japan) were supplied in some cases.

I added 0.37M of $MgCl_2$, up to equal volume to seawater to the sample for narcotization, and then, fixed and stored the specimens in 2% formalin in seawater. All the drawings were prepared on the basis of fixed specimens under a light microscope equipped with a camera lucida. Type specimens are deposited in the National Science Museum, Tokyo (NSMT).

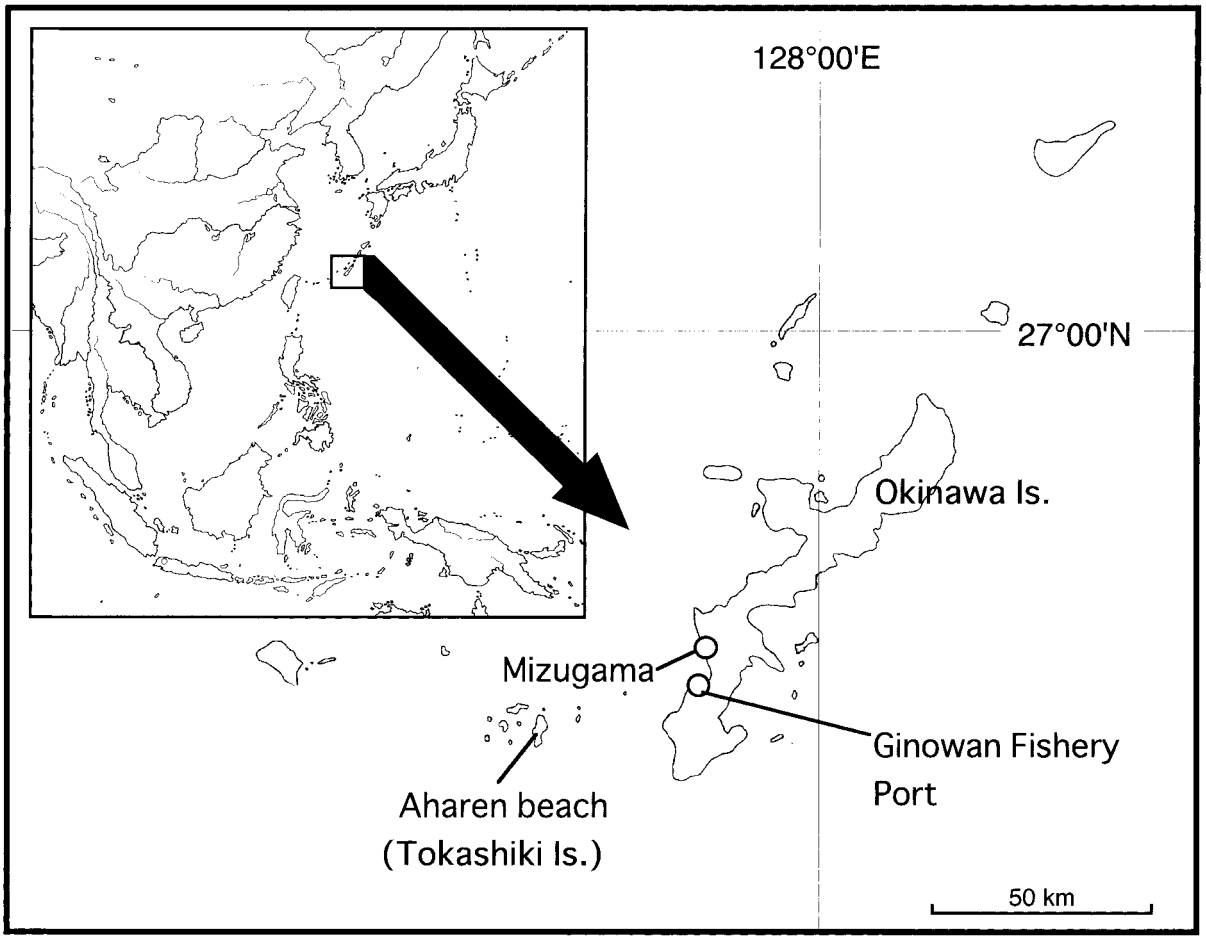

Fig. 1. Map of Okinawa Island and its vicinity, showing geographic locations of Mizugama, Ginowan Fishery Port, and Aharen Beach, the type localities of the three species described here.

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DESCRIPTIONS OF NEW TAXA

Order **Solitaria** Emschermann, 1972
Family **Loxosomatidae** Hincks, 1880
Genus ***Loxomitra*** Nielsen, 1964

Diagnosis: Bud attaching to mother's calyx by back of calyx or stalk. Stalk of bud long, with a pair of small terminal wings bearing some gland cells at its tip. No foot groove. Liberated bud crawls on the substratum with terminal wings. No foot in adult.

Type species: *Loxomitra kefersteinii* (Claparède, 1867)

Other species: *Loxomitra annulata* (Harmer, 1915) comb. nov., Two new species described here.

Loxomitra mizugamaensis sp. nov.

(Figs. 2 and 3)

Material examined. Holotype: An adult (NSMT-Ka 34) found on 29 December 2000 on a slide glass that had been settled on the reef flat at a depth of ca. 1 m in Mizugama (26°21'N, 127°45'E), Okinawa Island for two months. **Paratypes:** NSMT-Ka 35: Five adults collected with the holotype. NSMT-Ka 36: Six adults raised from budding from individuals collected with the holotype. NSMT-Ka 37: A liberated bud from an individual collected with the holotype. NSMT-Ka 38: A liberated bud from an individual found on 12 October 2000 on a slide glass that had been settled at a depth of ca. 4 m at the Ginowan Fishery Port (26°17'N, 127°45'E), Okinawa Island for two months.

Etymology: The specific name "*mizugamaensis*" refers to the type locality, where this species is the most abundant entoproct.

Diagnosis. Adult: Total length (from basal tip of stalk to uppermost part of tentacle membrane) up to 1114 μm. Cemented on substratum. The number of tentacles invariably nine. Stalk about three times as long as calyx. No foot groove and foot gland. Lateral sense organs absent. **Liberated bud:** Total length (from basal tip of stalk to apical margin of tentacle membrane) 354 μm in NSMT-Ka 37, 379 μm in NSMT-Ka 38. The number of tentacles invariably nine. Stalk about one and half times longer than calyx. A pair of terminal wings with gland cells at base of stalk. Foot groove absent. Lateral sense organs absent.

Reproduction: Buds emerge from the frontal area of calyx at the level of middle part of the stomach, attaching themselves to their mother's calyx by the back of posterior part of the stalk. A maximum of two buds were observed simultaneously on a single mother. Only one bud grew large at a time. No larvae were found.

Remarks: *Loxomitra annulata* (Harmer, 1915), reported to

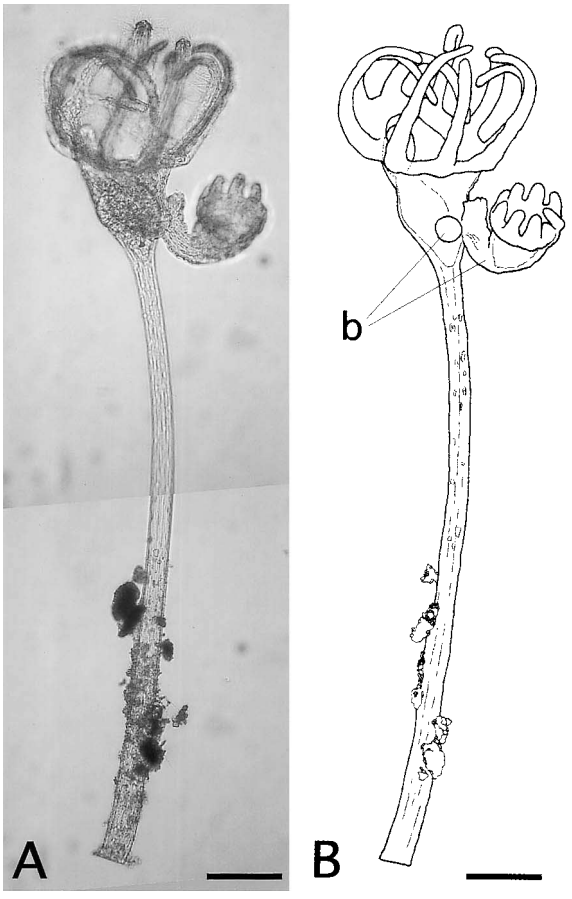

Fig. 2. An adult of *Loxomitra mizugamaensis* (NSMT-Ka 34, holotype) with a large and a small buds. A, B: Photograph and drawing of laterofrontal view, respectively. b, bud. Bars: 100 μm

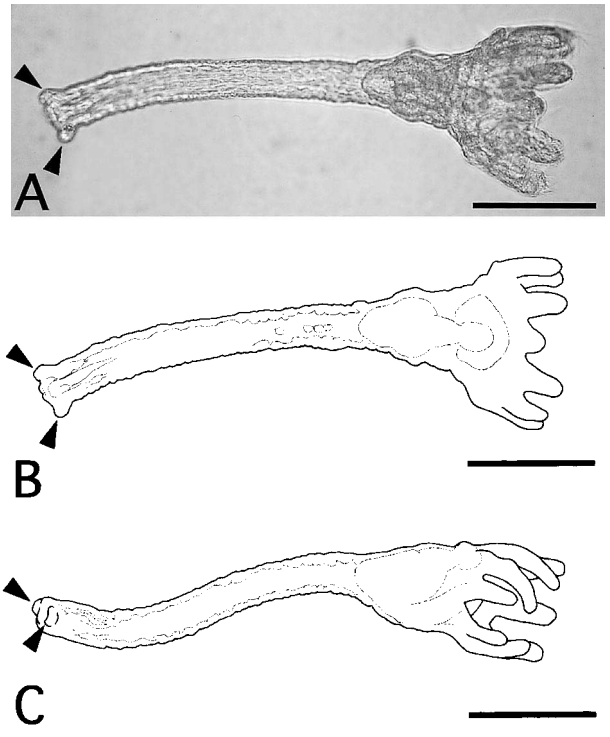

Fig. 3. A liberated bud of *Loxomitra mizugamaensis* (NSMT-Ka 38, paratype). A: Photograph. B, C: Drawings. A, B: Abfrontal view. C: Lateral view. Arrowheads, terminal wings. Bars: 100 μm

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have usually nine tentacles, resembles the present species in general shape. *Loxomitra mizugamaensis*, however, does not have an annulated stalk unlike *L. annulata* (see Harmer, 1915).

The liberated bud of the present species crawls trailing the calyx by twisting the whole body and by attaching the two terminal wings alternately to the substratum. Although all type specimens were collected from slide glasses, this species was also found on stones.

Loxomitra tetraorganon sp. nov.
(Figs. 4 and 5)

Material examined. Holotype: An adult (NSMT-Ka 39) raised from budding from one of the individuals found on 11 October 2000 on a slide glass that had been settled at a depth of ca. 4 m at the Ginowan Fishery Port (26°17'N, 127°45'E), Okinawa Island for two months. **Paratypes:** NSMT-Ka 40: Five adults raised from budding from individuals including the one from which the holotype was originated. NSMT-Ka 41: Five adults found on 9 October 2000 on glass plates that had been incubated in the laboratory with stones collected on 13 July 2000 from the reef flat at a depth of ca. 1 m in front of Aharen Beach (26°10'N, 127°20'E), Tokashiki Island. Two liberated buds: NSMT-Ka 42, liberated from an individual found on a slide glass on 17 January 2001 that had been settled at the type locality for two months; NSMT-Ka 43, liberated from an individual collected with NSMT-Ka 41.

Etymology: The specific name "*tetraorganon*" is composed of two Greek words meaning "four" and "organ". This refers to the presence of four lateral sense organs in this species.

Diagnosis. Adult: Total length (from basal tip of stalk to uppermost part of tentacle membrane) up to 1200 μm. Cemented on substratum. The number of tentacles invari-

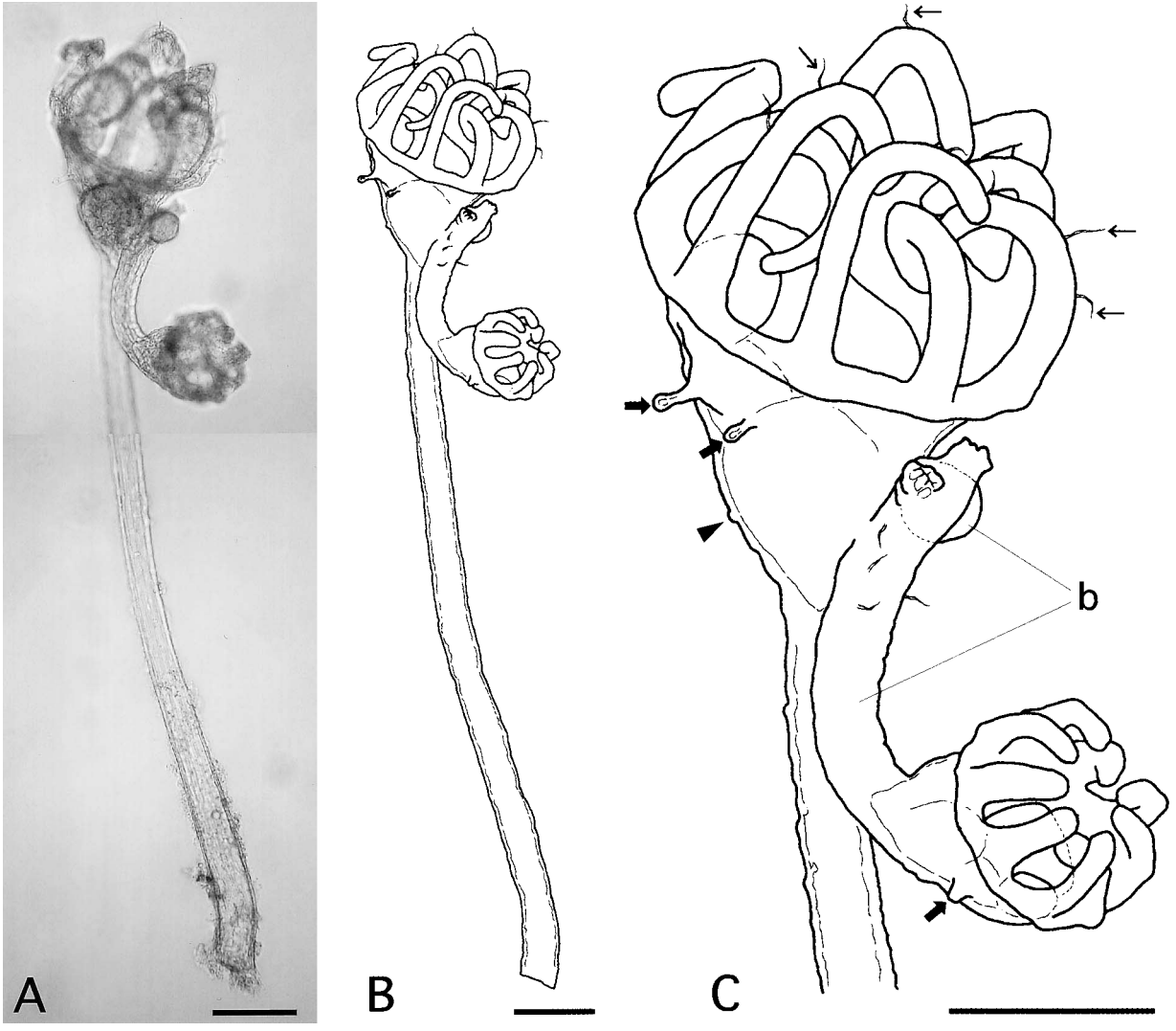

Fig. 4. An adult of *Loxomitra tetraorganon* (NSMT-Ka 39, holotype) with a large and a small bud. A, B: Photograph and drawing of laterofrontal view, respectively. C: Enlargement of the upper half (drawing). b, bud; thin arrows, hair-like appendages on outer edges of tentacles; thick arrows, lateral sense organs; arrowhead, a small knob on lateral side of the calyx. Bars: 100 μm

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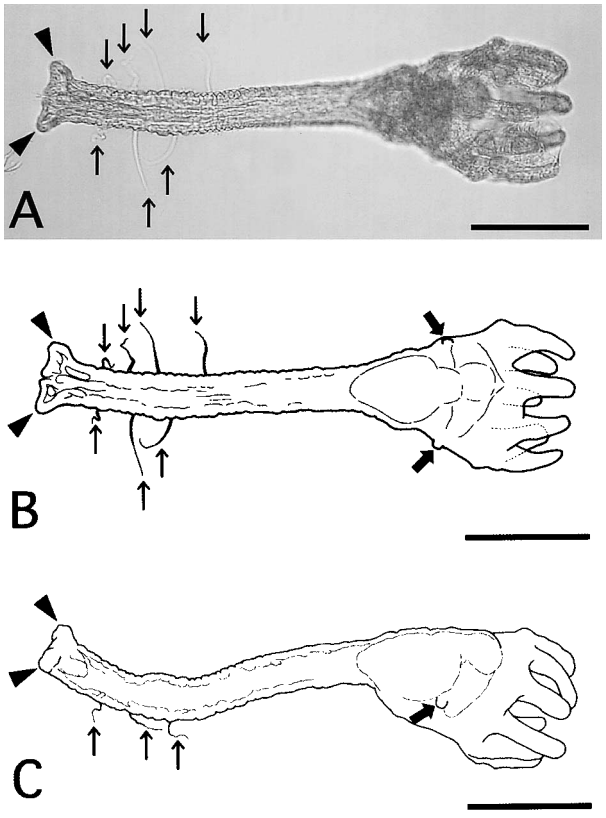

Fig. 5. A liberated bud of *Loxomitra tetraorganon* (NSMT-Ka 42, paratype). A, B: Photograph and drawing of abfrontal view, respectively. C: Drawing of lateral view. Thin arrows, hair-like appendages on lateral sides of the stalk; thick arrows, lateral sense organs; arrowheads, terminal wings. Bars: 100 μm

ably nine. Hair-like appendages at outer edge of some tentacles; straight in living specimens, twisted in fixed specimens. Stalk three to four times as long as calyx. No foot groove and foot gland. Two pairs of lateral sense organs present. A pair of small knobs also present at lateral sides of calyx. **Liberated bud:** Total length (from basal tip of stalk to apical margin of tentacle membrane) 399 μm in NSMT-Ka 42, 309 μm in NSMT-Ka 43. The number of tentacles invariably nine. Stalk about one and a half times longer than calyx. A pair of terminal wings with gland cells at the base of stalk. Foot groove absent. A pair of lateral sense organs developed. Another pair of the organs present but less prominent. Several hair-like appendages present at lateral sides of stalk. The appendages straight in living specimens, curved or twisted in fixed specimens.

Reproduction: Buds emerge from the frontal area of calyx at the level of middle part of the stomach, attaching themselves to their mother's calyx by the back of posterior part of the stalk. A maximum of two buds were observed simultaneously on a single mother. Only one bud grew large at a time. No larvae were found.

Remarks: Like the former species, this species resembles *Loxomitra annulata* (Harmer, 1915) in tentacle number and in general shape. *Loxomitra tetraorganon*, however, does not have an annulated stalk unlike *L. annulata* (see Harmer, 1915). Under a binocular microscope, *L. mizugamaensis* and *L. tetraorganon* are difficult to distinguish from each other due to their resemblance in body size, and general shape. In adults, *Loxomitra tetraorganon*, however, differs from the former in having two pairs of lateral sense organs at the calyx and hair-like appendages at the outer edge of some tentacles. In liberated bud, the latter differs from the former in having hair-like appendages at the stalk. All these characteristics are absent in *L. mizugamaensis*.

The lateral sense organ is known for various solitary entoprocts. However, in all but one case (*Loxosoma annelidicola*: see Van Benden and Hesse, 1864), it occurs only as a single pair, and *Loxomitra tetraorganon* is the second species that has two pairs of lateral sense organs. The liberated bud of the present species crawls in the same manner as that of *Loxomitra mizugamaensis*.

Genus ***Loxocorone*** gen. nov.

Diagnosis: Bud attaching to mother's calyx by back of calyx or stalk, lacking terminal wings. Foot of bud with foot gland and foot groove. No foot gland and foot groove at adult stage in some species, but in others adults retain foot gland.

Type species: *Loxocorone allax* sp. nov. (see below).

Other species: *Loxocorone brochobola* (Emschermann, 1993) comb. nov.; *Loxocorone pseudocompressa* (Konno, 1977) comb. nov.

Etymology: The generic name "*Loxocorone*" is composed of two Greek words, "*loxos*", meaning "oblique", and "*korone*" meaning "crown". Gender is feminine.

Loxocorone allax sp. nov.

(Figs. 6–8)

Material examined. Holotype: An adult (NSMT-Ka 44) found on 13 December 2000 on a slide glass that had been settled at a depth of ca. 4 m at the Ginowan Fishery Port (26°17'N, 127°45'E), Okinawa Island for two months. **Paratypes:** NSMT-Ka 45: an adult found on 5 July 2000 on a slide glass that had been settled at a depth of ca. 1 m at Mizugama (26°21'N, 127°45'E), Okinawa Island for four months. NSMT-Ka 46: an adult found on 12 September 1999 on a stone collected at a depth of ca. 1 m at Mizugama, fixed on 22 November 1999. NSMT-Ka 47: one young individual collected with holotype. NSMT-Ka 48: four adults found on 29 December 2000 on slide glasses that had been settled at a depth of ca. 1 m at Mizugama for two months. Three liberated buds: NSMT-Ka 49, liberated from an individual found on 19 September 1999 on a slide glass that had been settled at Mizugama for two months; NSMT-Ka 50 and 51, liberated from individuals found on 4 November 2000 on slide glasses that had been settled at Mizugama for two months.

Etymology: The specific name "*allax*" is a Greek word meaning "alternate". This refers to the unique arrangement

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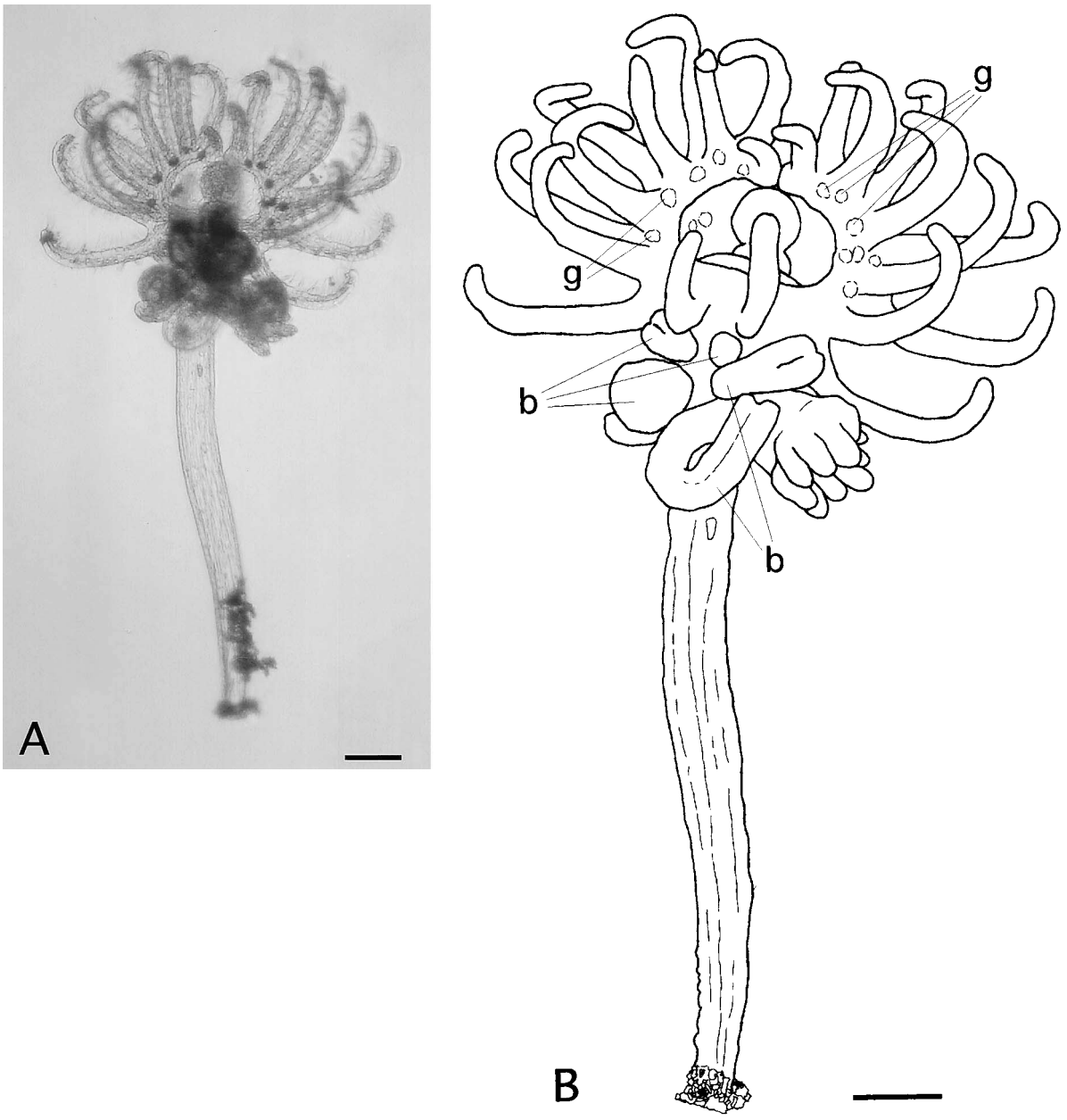

Fig. 6. An adult of *Loxocorone allax* (NSMT-Ka 44, holotype) with five buds in various stages. A, B: Photograph and drawing of frontal view, respectively. b, bud; g, granules in the calyx. Bars: 100 μm

of the tentacles of this species.

Diagnosis. Adult: Total length (from basal tip of stalk to uppermost level of tentacle membrane) up to 1317 μm. Cemented on substratum. The number of tentacles 14 to 24. Stalk one and a half to two times as long as calyx. No foot groove and foot gland. Lateral sense organs absent. Granules, ca. 20 μm in diameter, in calyx; transparent in living specimen, brownish in fixed specimen. **Liberated buds:** Total length (from posterior tip of foot to apical margin of tentacular membrane) 370 to 554 μm. The number of tentacles 12 to 14. Stalk absent. Foot about one and half times as long as calyx. Foot groove and foot gland present. Ciliary bundle at opening of foot gland. Lateral sense organs absent.

Reproduction: Buds emerge from the frontal areas of the calyx at the level of middle part of the stomach, attaching themselves to their mother's calyx by their back of the lowermost part of the calyx. A maximum of five buds were observed simultaneously on a single mother. No larvae were found.

Remarks: The present species can be distinguished from all hitherto described loxosomatids by the unique arrangement of the tentacles that are alternatively directed laterally and frontally. Its adults show some variations not only in the tentacle number but also in calyx width and stalk diameter, making some different appearances among the specimens.

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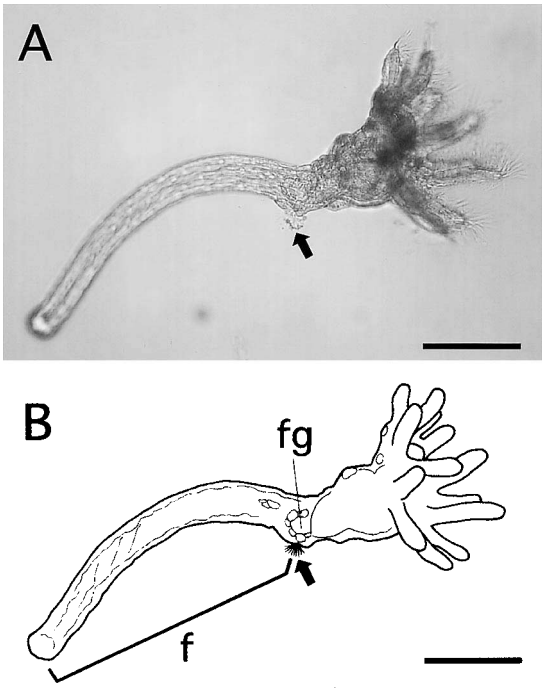

Fig. 7. A liberated bud of *Loxocorone allax* (NSMT-Ka 50, paratype). A, B: Photograph and drawing of lateral view, respectively. Arrows, ciliary bundle under the foot gland; f, foot; fg, foot gland. Bars: 100 μm

The liberated bud of the present species sometimes glides over the substratum using the foot with foot groove, and also often swims using the tentacular cilia.

DISCUSSION

The genus *Loxomitra* (*sensu lato*) Nielsen, 1964 was separated from the genus *Loxosomella* Mortensen, 1911 on the basis of the difference in budding mode. In *Loxosomella*, the bud attaches to the mother's calyx by the tip of the foot, whereas in *Loxomitra* (*sensu lato*) by the back of the stalk or calyx (Nielsen, 1964). It is clear that the present three new species belong to *Loxomitra* (*sensu lato*), because their buds are confirmed to attach to the mother's calyx by the back of the stalk or calyx.

In *Loxomitra kefersteinii* (Claparède, 1867), the type species of the genus *Loxomitra*, and the two new species, *L. mizugamaensis* sp. nov. and *L. tetraorganon* sp. nov., the bud has a pair of terminal wings at the tip of the stalk. The liberated bud of *L. kefersteinii* was reported to "attach (to the substratum) by its foot and use the rest of the body to perform the waving and searching movement (Ryland and Austin, 1960)". This unique behavior corresponds to the crawling behavior of liberated buds of *L. mizugamaensis* and *L. tetraorganon*. Similarities in the foot structure and the crawl-

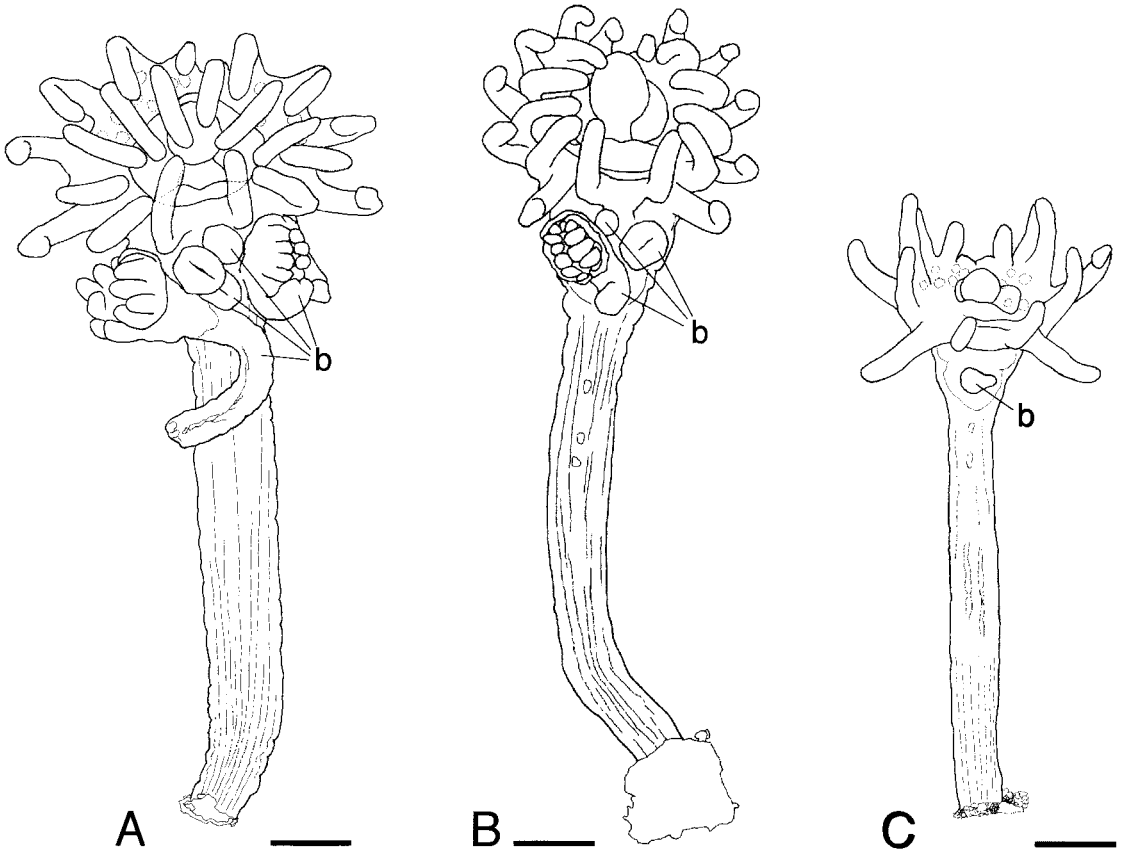

Fig. 8. Paratypes of *Loxocorone allax* showing the morphological variations of this species. A: NSMT-Ka 45, an adult with four buds. B: NSMT-Ka 46, an adult with three buds. C: NSMT-Ka 47, a young individual with one bud. b, bud. Bars: 100 μm

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ing behavior strongly suggest close relationships of the three species. On the other hand, some other species of the genus *Loxomitra* (*sensu lato*) share another type of foot. They have an antero-posteriorly elongated foot with longitudinal foot groove that seems to be identical with the foot of the genus *Loxosomella*. Therefore, it is reasonable to separate the genus *Loxomitra* (*sensu lato*) into two genera on the basis of the difference in foot structure. *Loxomitra* (*sensu stricto*) includes the species having the terminal wings, and *Loxocorone* gen. nov. is established to encompass species having foot with foot groove, but lacking the terminal wings. Members of the two genera hitherto described are as follows:

Genus *Loxomitra* Nielsen, 1964

Loxomitra annulata (Harmer, 1915) comb. nov.

Loxosoma annulatum Harmer,1915: 11, pl. 1, fig. 2–6.

Loxosomella annulata: Nielsen, 1964: 63; 1996: 69, tab. 2.

Loxosomella (*Loxomitra*) *annulata*: Nielsen, 1964: 61.

The original description includes drawings of five specimens showing serial budding stages. The five specimens, however, seemed to include more than two species of both *Loxomitra* or *Loxocorone* and *Loxosomella*. The bud of one specimen attaches to the mother's body by its foot tip, showing *Loxosomella*-type of budding, whereas buds of other two specimens by back of its stalk, showing *Loxomitra*- or *Loxocorone*-type. Moreover, the foot structure of the buds are not clearly described. In July, 2001, I examined the syntypes of this species (ZMA V. Br. 1527) in the Zoological Museum, University of Amsterdam and confirmed that the buds of the all syntype specimens attach to their mothers by the back of their stalk and they have terminal wings at the tip of the stalk. Therefore, this species proved to be assigned to the genus *Loxomitra* (*sensu stricto*). I also examined the paratype specimens showing *Loxosomella*-type of budding (BM(NH) 16.8.23.20) in the Natural History Museum, London. These paratypes proved to be not *L. annulata* because they have lateral sense organ, that is not observed in the syntypes, as well as show *Loxosomella*-type of budding.

Habitat: On *Retepora* sp. (Bryozoa).

Distribution: Arafura Sea, Savu Sea, Seram Sea (Indonesia)

Loxomitra kefersteinii (Claparède, 1867)

Loxosoma kefersteinii Claparède, 1867: 28, pl. 6, fig. 1-3; 1871: 170, pl. 10, fig. 4; Nitche, 1875: 451; 1876: 361, pl. 25, fig. 4-20; Barrois, 1877: 7; Schmidt, 1878: 73; Leunis-Ludwig, 1886: 32; Seeliger, 1890: 563; Brumpt, 1897: 495; Waters, 1910: 252; Mortensen, 1911: 400; Cori, 1936: 107; ?Hincks, 1887: 312.

Loxosomella kefersteinii: Bobin and Prenant, 1954: 11; Prenant and Bobin, 1956: 68, fig. 30; Ryland and Austin, 1960: 423, fig. 1; Nielsen, 1964: 61; 1966: 269, fig. 11–12; 1989: 48, fig. 22; Emschermann, 1982: 326.

Habitat: On various substrata including the body surface of other animals and settled panels.

Distribution: Bristol Channel (South Wales), Gulf of Naples, Adriatic Sea, Red Sea, Southeast coast of USA (Florida).

Loxomitra mizugamaensis sp. nov.

Habitat: On stones and settled panels.

Distribution: The Ryukyu Archipelago (South Japan).

Loxomitra tetraorganon sp. nov.

Habitat: On stones and settled panels.

Distribution: The Ryukyu Archipelago (South Japan).

Genus *Loxocorone* gen. nov.

Loxocorone brochobola (Emschermann, 1993) comb. nov.

Loxosomella brochobola Emschermann, 1993a: 157, fig. 3–4; 1993b: 97, fig. 1–11.

Habitat: On the inner, abfrontal surface of *Porella malouinensis* (Bryozoa).

Distribution: Weddell Sea.

Loxocorone pseudocompressa (Konno, 1977) comb. nov.

Loxosomella pseudocompressa Konno, 1977: 82, fig. 5–7; 1985: 6.

Habitat: On the body of *Lepidasthenia interrupta* (Polychaeta).

Distribution: Fukaura Bay (North Japan).

Loxocorone allax sp. nov.

Habitat: On stones and settled panels.

Distribution: The Ryukyu Archipelago (South Japan).

Species with unconfirmed generic allocations

Loxomitra mepse (du B-R-Marcus, 1957) comb. nov.

Loxosomella mepse du B-R-Marcus, 1957: 71, fig. 4–5.

Loxosomella (*Loxomitra*) *mepse*: Nielsen, 1964: 61.

When Nielsen (1964) established the subgenus *Loxomitra*, he placed *Loxosomella mepse* in the list of its component species. Although Soule *et al.* (1987), when elevating this subgenus to the full genus, did not refer to the species included, it is obvious that this species is to be assigned to the genus *Loxomitra* (*sensu lato*) because its bud attaches to the mother's body by the back of its stalk. Nevertheless, morphological features of the stalk tip of the liberated buds are not clearly described, and thus, it is not clear whether this species belongs to *Loxomitra* (*sensu stricto*) or *Loxocorone*. It seems to be most appropriate at present to retain this species in the former genus until future studies clarify its generic allocation unambiguously.

Habitat: On *Anguinella palmata* (Bryozoa).

Distribution: Southeast coast of Brazil (Santos).

It may be meaningful to extend discussion on an enigmatic species, *Loxosomella bifida* Konno, 1972. This species has a unique characteristic in foot structure. Whereas the other *Loxosomella* species have a foot with a foot groove, both the buds and adults of this species have a pair

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of expanded "legs" at the base of the stalk. Using of the two legs, they can "walk" on the substratum as a human does. Attaching position of the bud to its mother's calyx is the base of these legs. This attaching position is similar to that of *Loxomitra mizugamaensis* and *L. tetraorganon* (i.e., posterior part of the stalk). It is likely that the two legs are homologous to the terminal wings of the *Loxomitra* (*sensu stricto*), and that this species is a close relative of *Loxomitra* (*sensu stricto*). Detailed comparative studies of the foot structure is needed to ascertain their relationships.

Loxomitra (*sensu lato*) has been one of the least investigated genera of the phylum Entoprocta. In this study, three new species were described from coral reef shores of the Ryukyu Archipelago and they provided us clue to the improvement of taxonomy of this poorly known group. Surveys of entoprocts at less known localities, including the Ryukyu Archipelago, are expected to yield more new species and further contribute to the better understandings of the phylum.

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