Amplexidiscus fenestrafer n. gen., n. sp. (Coelenterata: Anthozoa), a Tropical Indo-Pacific Corallimorpharian

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Abstract.—The sixth genus of corallimorpharian family Actinodiscidae, *Amplexidiscus* n. gen., is described. It is distinguished by its numerous short, simple, conical tentacles, and few marginal tentacles. The type species, and currently the only one known for the genus, *A. fenestrafer*, may attain the largest size of any known corallimorpharian (up to 450 mm oral disc diameter). It has been found in relatively shallow waters on the lagoon side of coral reefs on the Great Barrier Reef, in eastern Indonesia, Palau and Guam.

Introduction

An unusually large corallimorpharian has been found on coral reefs in Australia, Indonesia, Palau and Guam. It is generically and specificially distinct from any previously described member of order Corallimorpharia, but falls within Carlgren's (1949) definition of family Actinodiscidae except for its size. The definition of neither of the other two families of corallimorpharians refers to size, which we believe is not of taxonomic significance at the familial level. We therefore propose deletion of the first sentence of Carlgren's (1949, page 14) definition of Actinodiscidae ("Corallimorpharia of small or ordinary size"). *Amplexidiscus fenestrafer* n. gen., n. sp. would then unquestionably fall within that family.

The following description is based on morphological and histological study of six individuals from the Great Barrier Reef, and five from Palau. Additional observations were made on several live animals in situ and in aquaria.

Amplexidiscus n. gen.

Solitary or gregarious Actinodiscidae lacking a sphincter but possessing strong endodermal circular musculature in the upper column. Tentacles simple. Discal tentacles short, conical, arrayed in radial rows over endocoels, single or lacking over exocoels. Marginal tentacles few, appearing as short lobular projections of oral disc

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Micronesica 16(1): 29–36. 1980 (June).

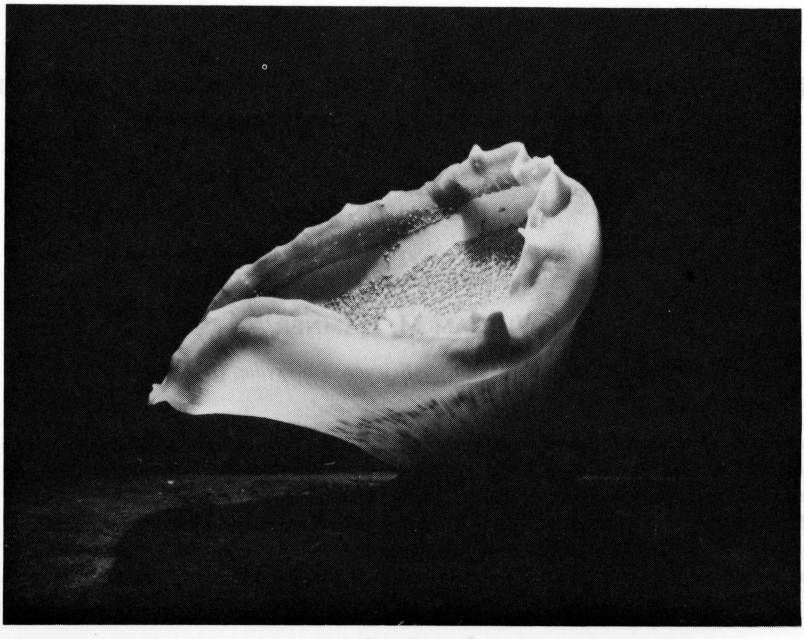

Fig. 1. *Amplexidiscus fenestrafer* n. gen., n. sp. Note mesenterial insertions visible through column, marginal tentacles, and "window" separating discal tentacle field into two portions. Oral disc diameter about 400 mm.

when animal is expanded, lengthening into distinct digitiform tentacles when animal contracts. No naked zone between oral and discal tentacles, but there may be a circular tentacle-free zone within the discal tentacle field. No siphonoglyphs. One mouth per animal. Cnidom: holotrichs, atrichs, microbasic p-mastigophores, spirocysts (rare).

Type species *Amplexidiscus fenestrafer* n. sp. (Fig. 1).

The generic name is masculine in gender, being a compound of the Latin words *amplexus,* meaning an embracing, encircling or enfolding, and *discus,* signifying a plate. It refers to the action of the oral disc in feeding (Fig. 1, Hamner and Dunn 1980) by the type species.

Of the five other genera of Actinodiscidae, *Amplexidiscus* most nearly resembles *Actinodiscus,* differing mainly in the distinctiveness of its marginal tentacles and the discreteness of its discal tentacles. Carlgren's (1949, page 14) key to the genera of Actinodiscidae may be amended as follows to include this genus:

A. Tentacles not dendritic

a) A distinct naked zone between the discal and marginal tentacles. Marginal tentacles delicate; discal tentacles large, plump, not dendritic ..... *Orinia*

aa) No naked zone between the marginal and discal tentacles.

b) All tentacles small. Marginal tentacles hardly different externally

from discal tentacles ..... *Actinodiscus*

bb) Discal tentacles small, simple, numerous; marginal tentacles few, large, barely discernible when animal is expanded, becoming pronounced only in contraction ..... *Amplexidiscus*

Amplexidiscus fenestrafer n. sp.
Figs. 1–4

Description

PEDAL DISC: Immovably attached to firm substratum. Irregular but roughly circular in outline, about half the diameter of expanded oral disc. Colorless to pale yellow, thin, mesenterial insertions visible through it.

COLUMN: Short (up to about 50 mm tall), smooth, thin, mesenterial insertions visible through it. Fossa absent. Color similar to that of oral disc distally, fading basally to color of pedal disc, reflecting decreased density of endodermal zooxanthellae toward base. Longitudinal musculature lacking. Endodermal circular muscles of increasing strength toward margin, forming a series of sphincter-like thickenings (Fig. 2). No ectodermal nematocysts, but some present in endoderm. Ectoderm containing vacuolated cells which, in fixed material, appear to have discharged rather fluid contents (Fig. 3A).

ORAL DISC AND TENTACLES: Expanded oral disc circular to ovoid in outline, up to 450 mm diameter, although usually only 200–250 mm. Single central, elongate mouth usually situated atop pronounced oral cone (see Fig. 1A, Hamner and Dunn, 1980). Color dull grey-greenish brown, lightening toward margin, probably due entirely to presence of endodermal zooxanthellae. Endodermal musculature circular,

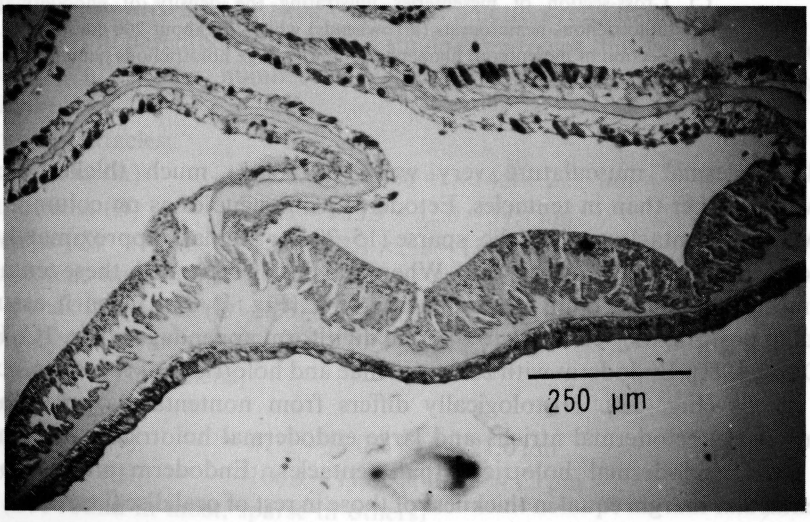

Fig. 2. Sphincter-like thickenings of endodermal musculature in upper column.

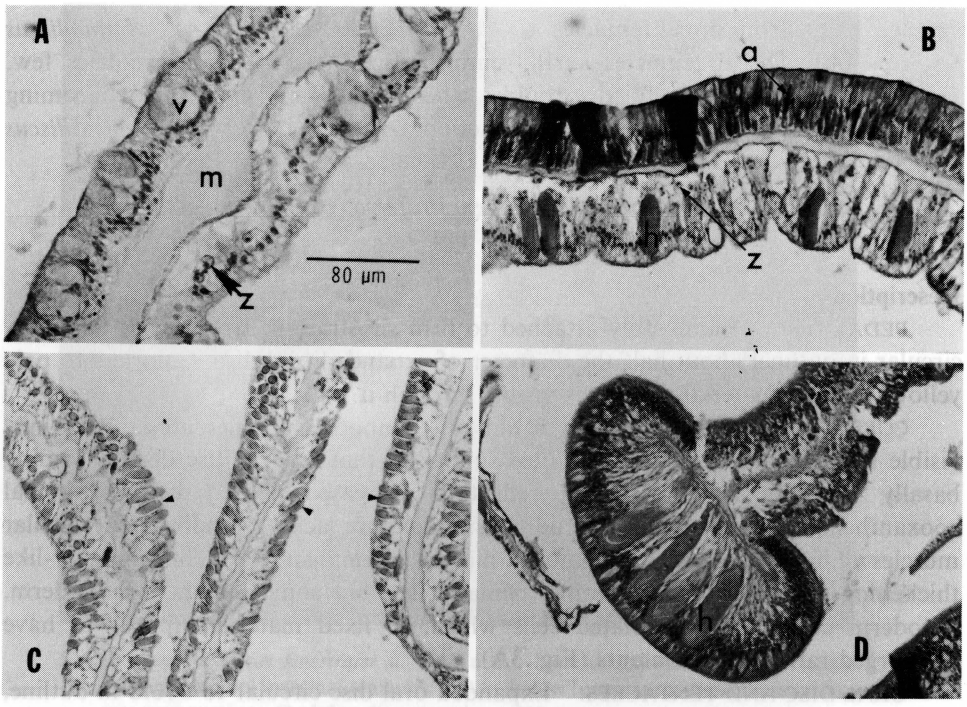

Fig. 3. A) Cross-section through upper column of *Amplexidiscus fenestrafer* n. gen., n. sp. showing endodermal zooxanthellae (z), acellular mesoglea (m) and vacuolated ectodermal cells (v).
B) Section through marginal tentacle containing endodermal zooxanthellae (z) and holotrichous nematocysts (h), and ectodermal atrichs (a). Holotrichs are about 120 µm long.
C) Cross-section of mesenteries illustrating the density of endodermal holotrichous nematocysts (arrowheads) which are about 200 µm long.
D) Section of mesenterial filament containing large holotrichous nematocysts (h) which are about 200 µm long.

radial ectodermal musculature very weak. Mesoglea much thicker, ectoderm somewhat thicker than in tentacles. Ectoderm with vacuoles as on column.

Marginal tentacles endocoelic, sparse (15–20 per animal), approximately evenly spaced around periphery of oral disc. When oral disc is expanded, these tentacles are little more than short, blunt prolongations of it (Fig. 1), but when it assumes its enfolding posture, they elongate to discrete digitiform appendages (Fig. 1C, Hamner and Dunn, 1980). Endoderm with zooxanthellae and holotrichs of two sizes, ectoderm with atrichs (Fig. 3B). Histologically differs from nontentacular margin which virtually lacks ectodermal atrichs and large endodermal holotrichs, but which has more small endodermal holotrichs than tentacles. Endoderm and mesoglea of nontentacular margin equal in thickness of those in rest of oral disc (i.e., much thinner than in marginal tentacles).

Discal tentacles all alike, with smaller ones frequently scattered among the larger. Conical, blunt digitiform or nipplelike (rarely bifurcate), tapering from base as much as 4 mm across to a height of up to 4 mm, but usually taller than broad. Thick endoderm with dense zooxanthellae and some small holotrichs. Ectoderm lacking nematocysts but provided with vacuolated cells like those of column and oral disc.

Most exocoels lack discal tentacles, but some have one. Exceptional endocoels also lack tentacles but most have many tentacles arrayed in a single radial row. Discal tentacles separated into marginal field about 10 mm wide (in an animal of average size) and central field, separated by tentacle-free "window" approximately 10 mm wide. Tentacles in marginal field sparse, a maximum of 8–10 per endocoelic row, some of which run out onto a marginal tentacle. (Successive endocoels of one animal contained 8, 0, 6, 4, 1, 6 and 2 tentacles.) Tentacles in central field densest near "window", diminishing in number toward mouth, with up to about 20 tentacles per endocoelic row. Area immediately around mouth may lack tentacles. Occasional "islands" of several tentacles may occur in normally tentacle-free "window".

INTERNAL ANATOMY: Throat often orange in color, deeply sulcated but lacking siphonoglyphs. Nematocysts entirely endodermal. Endodermal zooxanthellae sparse or absent.

Mesenteries very narrow, delicate. Most or all complete; directives apparently lacking. About 500 pairs in an average-sized animal. Retractor muscles very weak, lacking pennons. Mesenterial endoderm thickly studded with large holotrichous nematocysts (Fig. 3C), zooxanthellae sparse or absent; vacuolated cells similar to those of ectoderm present, mesenterial filaments with single lobed ends (Fig. 3D) containing large holotrichous nematocysts. One specimen contained sperm, all others sterile.

CNIDOM: atrichs, holotrichs, microbasic p-mastigophores, spirocysts.

DISTRIBUTION AND SIZE OF NEMATOCYSTS: Letters refer to illustrations in Fig. 4; measurements in parentheses are from a single nematocyst that fell well outside the usual range; "n" is the number of nematocysts measured (all from squash preparations).

Marginal tentacles:		
holotrichs (A)	$43.3-60.0\ (66.4) \times 14.4-22.3\ \mu m$	n = 94
holotrichs (B)	$92.7-133.9 \times 32.0-59.7\ \mu m$	n = 86
atrichs (C)	$35.0-72.1 \times 5.8-11.3\ \mu m$	n = 130
hoplotelic microbasic p-mastigophores (D)	$16.5-28.8 \times 3.7-8.2\ \mu m$	n = 56
spirocysts (E)	$20.6-23.7 \times 3.1-4.1\ \mu m$	n = 3
(seen in 2 specimens)		
Discal tentacles:		
holotrichs (A)	$41.2-56.0 \times 14.0-21.0\ \mu m$	n = 95
holotrichs (B)	$106.1-119.5 \times 40.2-45.3\ \mu m$	n = 5
(not found in most, sparse in others)		
hoplotelic microbasic		

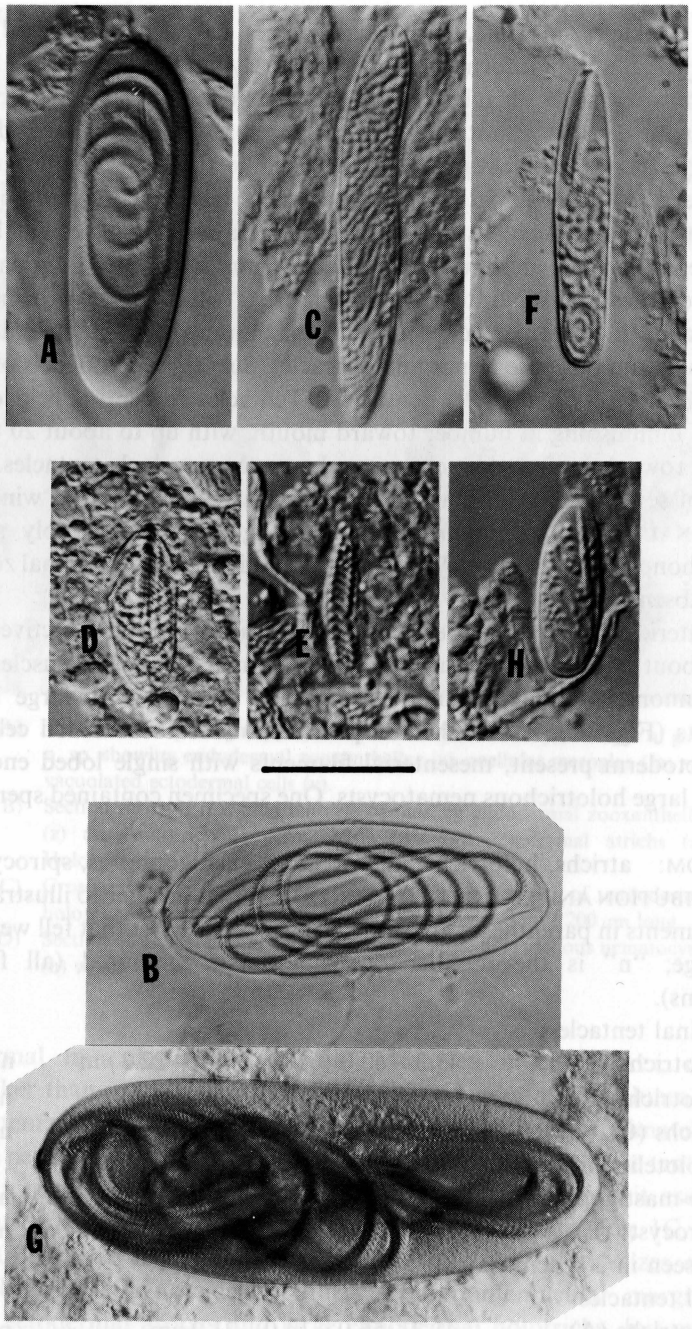

Fig. 4. Nematocysts and spirocyst of *Amplexidiscus fenestrafer* n. gen., n. sp. See text for explanation. Scale bar 50 μm for B and G, 25 μm for all others. Nomarski optics.

p-mastigophores (D) $17.5-22.7 \times 4.0-7.4\,\mu m$ n=14
(present in most but sparse)
spirocysts (E) $20.6-26.4 \times 4.5-6.2\,\mu m$ n=12
(seen in 3 specimens)
Actinopharynx:
holotrichs (A) $37.6-68.0 \times 8.6-21.6\,\mu m$ n=58
hoplotelic microbasic
p-mastigophores (F) $26.4-45.3 \times 6.2-10.4\,\mu m$ n=60
Mesenteries:
holotrichs (G) $142.4-220.0 \times 49.4-78.4\,\mu m$ n=85
holotrichs (A) $46.4-59.2 \times 14.4-19.2\ (21.6)\,\mu m$ n=28
(seen mainly in smaller specimens)
hoplotelic microbasic
p-mastigophores (F) $25.6-49.4 \times 6.2-9.6\,\mu m$ n=86
Column:
holotrichs (A) $49.6-61.6 \times 13.6-22.1\,\mu m$ n=12
(sparse)
hoplotelic microbasic
p-mastigophores (D) $16.0-23.2 \times 6.4-9.2\,\mu m$ n=46
microbasic
b-mastigophores (H) $17.6-28.0 \times 5.6-8.8\,\mu m$ n=41

Habitat

Amplexidiscus fenestrafer occurs subtidally, usually in relatively shallow, quiet, often turbid waters on the lagoon side of coral reefs. It is frequently attached to vertical faces of rock or coral. Clusters of several individuals are not uncommon; presumably each constitutes a clone, having been derived asexually from a single founder.

Type locality

Lizard Island, Great Barrier Reef, Australia (14°40′S 145°30′E)

Type specimens

The holotype (which was collected by WMH on 8 January 1977 at a depth of 10 m), including histological slides of some of its tissues, is deposited in the Department of Invertebrate Zoology, California Academy of Sciences (CASIZ Type Series #00708 and CASIZ Type Slide Series ##118–127), as is a paratype (CASIZ Type Series #00709 and CASIZ Type Slide Series ##128–131). Additional paratypes have been deposited in the Department of Invertebrate Zoology, U. S. National Museum of Natural History (USNM catalog #57988), the Department of Invertebrate Zoology, B. P. Bishop Museum, Honolulu (#D524) and the Australian Museum, Sydney (#G15056). Other specimens examined in this study constitute voucher material, and have been deposited in the Department of Invertebrate Zoology, California Academy of Sciences.

Differential diagnosis

Many specimens of *Amplexidiscus fenestrafer* are much larger than any solitary or gregarious corallimorpharian thus far described. The mode of feeding of this species, engulfment (Hamner and Dunn, 1980), is characteristic, although not unique among tropical members of family Actinodiscidae. Projections from the oral disc of other members of this family [e.g., *Paradiscosoma neglecta* (Duchassaing and Michelotti, 1860) (see Fig. 12 in Pax, 1910)] are lobes, apparently histologically identical to the rest of the margin. It is likely that they form at any point along the margin, a geometrical necessity during contraction of the disc, and in the specimen examined by one of us (DFD), each encompasses several pairs of mesenteries. In contrast, the marginal tentacles of *Amplexidiscus fenestrafer* are endocoelic in position, and are histologically differentiated from the nontentacular margin.

Etymology

The specific epithet "fenestrafer," meaning "window-bearer" in Latin (*fenestra* and *fer*) refers to the circular, tentacle-free zone near the margin of this animal.

ACKNOWLEDGMENTS

DFD was supported in this research by grants DEB76–82277 from the National Science Foundation and 1741 from the National Geographic Society. We thank Drs. Arthur Furst and Thomas S. Acker, University of San Francisco, for use of equipment and facilities, and Mr. Maurice Giles, California Academy of Sciences, for photographic assistance.

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