

## **Miscellaneous marine invertebrates and protists from the Mariana Islands**

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**Abstract**—Of the 32 or so animal phyla, eight (Porifera, Cnidaria, Platyhelminthes, Annelida, Mollusca, Arthropoda, Echinodermata, Chordata) are documented in other papers in this volume, together with one protist phylum and several algal divisions. This paper brings together the few records from the Marianas of groups not covered elsewhere. Forty-two species are documented among the Ciliophora, Placozoa, Ctenophora, Nemertea, Sipuncula, Echiura, Mollusca (smaller classes), Brachiopoda, Bryozoa, and Hemichordata.

### **Introduction**

This volume brings together what is known about Guam's marine biota, and is clearly an uneven effort. Although most papers note or imply that our knowledge of the group under consideration remains incomplete, much progress has been made and we have a fairly good inventory of several phyla. These are the Foraminifera, Porifera, Cnidaria, Mollusca, Arthropoda, Echinodermata, and Chordata, as well as several algal divisions. Large and conspicuous members of the Platyhelminthes and Annelida have also received focused attention, however the remaining animal phyla, and the vast world of protists and prokaryotes, have not. The purpose of this paper is to review what we know about these other groups. Some, like the "minor phyla" Sipuncula and Echiura are moderately well known on Guam, but they are included in this paper because of the small number of species involved. Others, like the Bryozoa, are very diverse on Guam, but remain virtually unstudied. Of the 32 or so animal phyla, this paper presents information about nine: the Placozoa, Ctenophora, Nemertea, Sipuncula, Echiura, Mollusca, Brachiopoda, Bryozoa, and Hemichordata, as well as the protistan phylum Ciliophora. Half (16) of the animal phyla are recorded from Guam in this volume. Members of several other phyla have been seen, but not studied.

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## Methods

Records of phyla and classes not covered by other papers in this volume were searched for in the literature, with additional records added from newly collected material. These efforts were limited and uneven among taxa. Additional records doubtless exist in the literature, these will be added to the online version (<http://www.flmnh.ufl.edu/reefs>) of the Guam checklist as they are encountered. Limited collecting of conspicuous species from several phyla added a few additional records, these are vouchered with specimens and/or photographs. The former are housed at the Florida Museum of Natural History, University of Florida (UF), curated under phylum-specific catalogue numbers (hence the same low-series numbers appear for several species from different phyla in the Appendix). Photographs are available online at: <http://www.flmnh.ufl.edu/reefs> or on the Marine Biodiversity of Guam CD-ROM co-publication.

## Results and Discussion

This paper presents records of one protist and nine animal phyla (Appendix). Aside from the much-studied Foraminifera, protists are virtually undocumented on Guam. *Maristentor*, a striking, recently-discovered, photo-symbiotic genus of ciliates provides a notable exception (Lobban et al. 2002), together with a parasitic ciliate.

The enigmatic metazoan *Trichoplax*, the sole genus of the phylum Placozoa, has been collected from reef flats on Guam (Pearse 1989, A.G. Collins pers. comm.). Ctenophores remain little studied in the Marianas, although several planktonic species are occasionally seen in Apra Harbor. Species of the benthic ctenophore genus *Coeloplana* are relatively diverse: they have been observed on *Sargassum*, *Halimeda*, soft corals (see photo voucher), and various echinoderms on Guam. John Starmer (pers. comm.) has documented considerable diversity in this sessile group in neighboring Palau.

Nemerteans are diverse on Guam, but remain little studied. Seven, mostly unidentified but striking species are listed in the hope that they will attract attention of specialists. Compared with other groups featured in this paper, sipunculans are relatively well known in the Marianas, with 15 species recorded. Cloud (1959) documented several species from Saipan, and Edmonds (1971) identified several from Guam. *Phascolosoma*, *Cloeosiphon*, and *Aspidosiphon* are abundant in reef limestones and *Sipunculus* is occasional in sand. Echiurans are represented on Guam by at least two species of bonellids and three echiurids. Reef-dwelling bonellids are often abundant, but difficult to study, as they live in the reef matrix and only extend their proboscis at night. Collecting these worms requires that they are located and chiseled out of the reef during night dives. Echiurids in contrast are occasionally encountered under rubble.

Three of the molluscan classes, the Gastropoda, Bivalvia and Cephalopoda, are covered by separate papers in this volume. Of the remaining classes, the

Monoplacophora have not been seen in the Marianas, and the Scaphopoda are represented by a couple of as yet unidentified species collected by dredging from around 100 m depth. The Polyplacophora are moderately diverse and material from Guam is currently under study by Enrico Schwabe. The five chiton species documented here represent a fraction of the fauna. A single aplousobranchian is known, collected from the hydroventral vent communities of the Mariana Trough.

Brachiopods on Guam are small and inconspicuous, restricted to caves, caverns, and deep water. Of the species encountered *Thecidellina* is by far the most common, and it can form dense aggregations on the roofs and walls of caverns. Bryozoans are very diverse on Guam, but remain unstudied except for an endolithic species described from gastropod shells. The widespread and common enteropneust *Ptychodera flava* is the only hemichordate currently known from the island.

### Acknowledgements

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Appendix 1. Miscellaneous marine invertebrates and protists of the Mariana Islands

Voucher: at LI: Oberösterreichische Landesmuseum in Linz, Austria, NSMT: National Science Museum, Tokyo, UF: Florida Museum of Natural History, University of Florida, Gainesville.

Ref: Literature records by numbers, identifier of species not previously documented from the Marianas listed by letters as follows. P) G. Paulay, S) E. Schwabe, 1) Lobban & Scheffer 1996, 2) Lobban et al. 2002, 3) Grim 1998, 4) Pearce 1989, 5) Edmonds 1971, 6) Edmonds 1981, 7) Cutler 1994, 8) Cloud 1959, 9) Hessler & Lonsdale 1991, 10) Scheltema & Kuzirian 1991, 11) Vermeij et al. 1983, 12) Saito 1996, 13) Smyth 1988, 14) Smyth 1989

Notes: are below appendix.

Photo: Photo vouchers are by Allen Collins (AC), William Hamner (WH), Chris Lobban (CL), and Gustav Paulay (GP numbers, housed at UF) and are available online at: <http://www.flmnh.ufl.edu/reefs>, and also in the Marine Biodiversity of Guam CD-ROM co-publication.

Depth: 1) 0-60m, 2) 60-200m, 3) >200m

Is: islands: G: Guam, S: Saipan, An: Anatahan, P: Pagan, Tr: Mariana Trough

Taxon	Voucher	Ref	Photo	Notes	Depth	Is
CILIOPHORA: STENTORIDAE						
<i>Maristentor dinoferus</i> Lobban et al., 2002	LI 2000/48 (holotype)	1, 2	CL	1	1	G
CILIOPHORA: NICTOTHERIDAE						
<i>Paracichlidotherus leeuwenhoekii</i> Grim, 1992		3			1	G
PLACOZOA: TRICHOPLACIDAE						
<i>Trichoplax</i> sp. 1		4	AGC		1	G
CTENOPHORA: COELOPLANIDAE						
<i>Coeloplana</i> spp.		P	GP820-21		1	G
CTENOPHORA: CESTIDAE						
<i>Cestum veneris</i> Lesueur, 1813		P	WH		1	G
NEMERTEA: BASEODISCIDAE						
<i>Baseodiscus hemprichii</i> (Ehrenberg, 1831)	UF 1	P	GP413-5		1	G
NEMERTEA: LINEIDAE						
<i>Notospermus tricuspidatus</i> (Quoy & Gaimard, 1833)	UF 6	P	GP403-21		1	G
NEMERTEA: INCERTAE SEDIS						
Nemertea sp. 1 (red tip, white neck)		P	GP408-13		1	G
Nemertea sp. 2 (two head stripes)	UF 16	P	GP466-35		1	G
Nemertea sp. 3 (burgundy, striped)		P	GP862-14		1	G
Nemertea sp. 4 (flesh-colored)	UF 5	P	GP461-22		1	G
Nemertea sp. 5 (green)	UF 13	P	GP539-6		1	G

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Taxon	Voucher	Ref	Photo	Notes	Depth	Is
Nemertea sp. 6 (mottled)	UF 8	P	GP318-36	1	1	G
SIPUNCULA: ASPIDOSIPHONIDAE						
<i>Aspidosiphon tenuis</i> Sluiter, 1886		5, 6, 7		2	1	G
<i>Aspidosiphon laevis</i> Quatrefages, 1865		8 (S)		3	1	S
<i>Aspidosiphon steenstrupii</i> Diesing, 1859		8 (S)		1	1	S
<i>Aspidosiphon coyi</i> Quatrefages, 1865		8 (S)		4	1	S
<i>Cloosiphon aspergillus</i> (Quatrefages, 1865)	UF 4	5, 8 (S)		1	1	G, S
<i>Lithacrosiphon cristatus</i> (Sluiter, 1902)		8 (S)		1	1	S
<i>Lithacrosiphon maldivensis</i> Shiple, 1902		7 (S)		1	1	S
SIPUNCULA: PHASCOLOSOMATIDAE						
<i>Phascolosoma albolineatum</i> (Baird, 1868)		8 (S)		1	1	S
<i>Phascolosoma glabrum</i> (Sluiter, 1902)		8 (S)		5	1	S
<i>Phascolosoma nigrescens</i> Keferstein, 1865		5, 6, 8 (S)		1	1	G, S
<i>Phascolosoma pacificum</i> Keferstein, 1866		5, 6, 8 (S)		1	1	G, S
SIPUNCULA: SIPUNCULIDAE						
<i>Siphonosoma cumanense</i> (Keferstein, 1867)		5, 6		6	1	G
<i>Siphonosoma rotumanum</i> (Shiple, 1898)		5, 6		1	1	G
<i>Siphonosoma vastum vastum</i> (Selenka & Bülow, 1883)		5, 6		1	1	G
<i>Sipunculus indicus</i> Peters, 1850		5, 6, 7		1	1	G
ECHIURA: BONELLIDAE						
<i>Bonellia?</i> sp. 1		P		7	1	G
<i>Achaetobonellia</i> sp. 1 (aff. <i>maculata</i> Fisher, 1953)		P	GP262-3	1	1	G
ECHIURA: ECHIURIDAE						
<i>Anelassorhynchus porcellus</i> Fisher, 1948	UF 3	P		1	1	G
<i>Ochetosoma erythrogrammon</i> Leuckart & Ruppell, 1828		5, 6, 8 (S)		1	1	G, S
<i>Thalassema</i> sp.		5, 6		1	1	G
MOLLUSCA: APLOCOPHORA: HELICORADOMENIA						
<i>Helicoradomenia</i> sp. 1		9 (Tr), 10 (Tr)		3	1	Tr
MOLLUSCA: POLYPLACOPHORA: ACANTHOCHITONIDAE						
<i>Choneplax/Cryptoplax</i> sp.	UF 286828	S	GP692-8	1	1	G
<i>Craspedochiton laqueatus</i> (Sowerby, 1842)		S	GP455-17	1	1	G

Appendix 1. Miscellaneous marine invertebrates and protists of the Mariana Islands / (continued)

Taxon	Voucher	Ref	Photo	Notes	Depth	Is
MOLLUSCA: POLYPLACOPHORA: CHITONIDAE						
<i>Acanthopleura gemmata</i> (de Blainville, 1825)	UF 284811	11 (A,M,P)	GP420-31		1	An, G, M, P
<i>Chiton luhulensis</i> (E.A. Smith in Gardiner, 1903)		S	GP521-18		1	G
MOLLUSCA: POLYPLACOPHORA: LEPIDOPLEURIDAE						
<i>Parachiton guamensis</i> Saito, 1996	NSMT-Mo 70508 (holotype)	12			1	G
BRACHIOPODA: THECIDELLINIDAE						
<i>Thecidellina blochmanni</i> Dall, 1920	UF 9	8?	GP572-34	8	1,2	G, S
BRYOZOA: PENETRANTIIDAE						
<i>Penetrantia clinoidales</i> Smyth, 1988		13, 14			1	G
HEMICHORDATA: PTYCHODERIDAE						
<i>Ptychodera flava</i> (Eschscholtz, 1825)	UF 4	P			1	G

Notes:

- 1) as *Stentor* in Lobban & Scheffer (1996)
- 2) as *Aspidosiphon formosanum* in Edmonds (1971, 1981); synonymy after Cutler (1994)
- 3) as *Aspidosiphon pachydermatum* in Cloud (1959); synonymy after Cutler (1994)
- 4) as *Aspidosiphon truncatum* in Cloud (1959); synonymy after Cutler (1994)
- 5) as *Phascolosoma funafutiense* in Cloud (1959); synonymy after Cutler (1994)
- 6) as *Siphonosoma novaepommeraniae* in Edmonds (1971, 1981); synonymy after Cutler (1994)
- 7) sight record by author
- 8) as *Thecidellina* aff. *T. maxilla* Hedley in Cloud 1959