Nat. Hist. Res., Special Issue, No. 1: 293–297. March 1994.

Echinoderms Collected from the Northern Mariana Islands, Micronesia

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Abstract Fifteen species belonging to 12 families in 4 classes of echinoderms (excluding holothurians) were recorded from the northern Mariana Islands. In these, 8 species represent new records for the northern Marianas.

Key words: Echinodermata, rocky intertidal, subtidal, Mariana Islands.

To date, the only known information on echinoderm fauna of the northern Mariana Islands, Micronesia, was that collected by the staff of the University of Guam Marine Laboratory during the expedition to Maug (Eldredge, *et al.*, 1977) and by a review for an environmental and fishing information on Mariana Islands by Eldredge (1983). These included Asteroidea; *Acanthaster planci* (Linnaeus), *Asterina burtoni* Gray, *Linckia multifora* (Lamarck); Crinoidea; *Comanthina schlegeli* (Carpenter), *Comaster* sp.; Echinoidea; *Colobocentrotus mertensi* Brandt, *Diadema savignyi* Michelin, *Echinometra mathaei* (deBlainville), *Echinothrix* sp; Ophiuroidea; *Ophiolepis superba* H.L. Clark (?) and ? *Placophiothrix westwardi* (Devaney); Holothuroidea; *Actinopyga muritina* (Quoy and Gaimard), *Bohadschia argus* Jaeger, *B. marmorata* Jaeger, *Holothuria atra* Jaeger, *H. edulis* Lesson, *H. difficilis* Semper, *H. hilla* Lesson, *Stichopus chloronotus* Brandt and *Thelenota ananas* (Jaeger). In May and June 1992, the Natural History Museum and Institute, Chiba, (NHMIC) organized on expedition to the northern Mariana Islands in cooperation with the Division of Fish and Wildlife, Department of Natural Resources (Commonwealth of the Northern Mariana Islands), and the University of Guam Marine Laboratory. This paper reports echinoderms of classes Crinoidea, Ophiuroidea, Echinoidea and Asteroidea collected during the expedition. Data for Holothuroidea will be published elsewhere, because examination for it has not completed.

Methods

Collections were made on Anatahan, Sarigan, Guguan, Alamagan, Pagan, Agrihan, Asuncion, Maug East, Maug North, Maug West, and Uracas Islands of the northern Mariana Islands (see Asakura *et al.*, 1994, for detailed map and location of the sampling stations). Most of the specimens were collected in rocky intertidal areas, and in the following list, such collection sites are abbreviated as RI. Collections were also made by SCUBA and skin divings in the subtidal areas, and depth of the collection site is indicated in the list. Collectors (their initials in the list) are Akira Asakura (AA) and Taiji Kurozumi (TK) of the NHMIC, and Todd Pitlick (TP) and Peter Schupp (PS) of the University of Guam Marine Laboratory. All of the specimens were deposited in the NHMIC,

and the registration number of each specimen is indicated with the code CBM-ZE. Identifications were made by I. Kogo for class Crinoidea, S. Irimura for class Ophiuroidea, Shigei for class Echinoidea, and M. Saba for class Asteroidea.

List of Collected Species

Phylum ECHINODERMATA
Class Crinoidea
Order Comatulida
Family Mariametridae

1. *Lamprometra palmata palmata* (Müller)

Specimen examined. 1 ex., SARIGAN, 10 m deep, 15 May, PS, CBM-ZE-19.

Distribution. This species is widely distributed in tropical Pacific waters within 50 m depth, including southern Japan (south of the Boso Peninsula), Hawaii, and Palau (Utinomi and Kogo, 1968, Meyer and Macurda, 1980; Saba *et al.*, 1982; Kogo, 1991). The present data represent a new record for the northern Marianas.

Family Antedonidae

2. *Annametra minuta* (A.H. Clark)

Specimens examined. 2 exs., AGRIHAN, 40 m deep, 28 May, PS, CBM-ZE-20.

Distribution. This species is, hitherto, reported only from Sagami Bay (Clark, 1941; Clark and Clark, 1967) and recently found in the shallow water of Kerama Island, Okinawa. No locality is known except those two and the northern Marianas.

Class Asteroidea
Order Valvatida
Family Acanthasteridae

3. *Acanthaster planci* (Linnaeus)

Specimen examined. 1 ex., PAGAN-st.D, 3 m deep, 27 May, TK, CBM-ZE-21.

Remarks. Since the early 1960's, there have been reports of large populations of this species occurring on and giving damage on many coral reefs in tropical Pacific including Guam, Saipan (Tsuda, 1971; Quinn and Kojis, 1987), Maug (Eldredge *et al.*, 1977) and Alamagan (Eldredge, 1983).

Family Ophidiasteridae

4. *Linckia mutifora* (Lamarck)

Specimens examined. 1 ex., SARIGAN-st.A, RI, May 15, AA, CBM-ZE-22; 1 ex., GUGUAN-st. A, 2 m deep, May 18, TK, CBM-ZE-23; 1 ex., PAGAN, 10 m deep, May 27, PS, CBM-ZE-24; 1 ex., PAGAN-st.D, 3 m deep, May 27, TK, CBM-ZE-25; 1 ex., PAGAN-st.D, boulders, 3 m deep, May 27, TK, CBM-ZE-26.

Distribution. This species is widely distributed in tropical Indo-Pacific waters (Marsh, 1974). In the Izu–Mariana Arc, there are records from the Ogasawaras (Bonin) (Ooish, 1970), Maug (Eldredge *et al.*, 1977), Agrihan (Eldredge, 1983), Saipan (Randall, 1987; Randall *et al.*, 1988), and Guam (Chernin *et al.*, 1977; Eldredge, 1979).

5. *Linckia laevigata* (Linnaeus)

Specimen examined. 1 ex., PAGAN-st.D, 3 m deep, 27 May, TK, CBM-ZE-27

Distribution. This species is widely distributed in tropical Indo-Pacific waters (Marsh, 1974). In the Izu–Mariana Arc, there are records from the Ogasawaras (Ooish, 1970), Saipan (Randall, 1987) and Guam (Dickinson and Tsuda, 1975, Strong, 1975).

Class Ophiuroidea
Order Myophiuroida
Family Amphiuridae

6. *Amphipholis squamata* (Della Chiaje)

Specimens examined. 15 exs., GUGUAN-st.B, RI, tide pool, on algae, 17 May, AA, CBM-ZE-2; 1 ex., GUGUAN-st.B, RI, tide pool, on algae, 17 May, AA, CBM-ZE-3; 1 ex., juv., PAGAN-st.D, RI, limestone beach, 27 May, TK, CBM-ZE-4; 1 ex., juv., MAUG NORTH-st.F, RI, under boulders, 3 June, AA, CBM-ZE-5; 2 exs., juv., MAUG NORTH-st. F, 3 June, AA, CBM-ZE- 6; 3 exs., URACAS-st.A, RI, tide pool, on algae, 6 June, AA, CBM-ZE-7.

Distribution. Although this species is tropical cosmopolitic distributed in the world (Devany, 1974; Irimura, 1982), the present data represent a new record for the northern Marianas.

Family Ophiactidae

7. *Ophiactis savignyi* (Müller and Troschel).

Specimens examined. 8 exs., GUGUAN-st.B, RI tide pool, on algae, 17 May, AA, CBM-ZE-8; 7 exs., GUGUAN-st.B, RI, tide pool, on algae, 17 May, AA, CBM-ZE- 9; 1 ex., juv., AGRIHAN, southwest side, 15 m deep, 30 May, TP, CBM-ZE-10.

Distribution. This species is widely distributed in tropical and subtropical waters in the world, often being gregarious and associated with algae or sponges (Devany, 1974). In the Izu–Mariana Arc, although there is a record from the Ogasawaras (Ooish, 1970), the present data represent a new record for the northern Marianas.

Family Ophiocomidae

8. *Ophiocoma dentata* Müller and Troschel

Specimens examined. 1 ex., ANATAHAN-st. C, RI, under boulders, 13 May, AA, CBM-ZE-11; 1 ex., GUGUAN-st.B, RI, under boulders, 17 May, AA, CBM-ZE-12; 1 ex., MAUG EAST-st.A, RI, under boulders, 2 June, AA, CBM-ZE-13; 3 exs., MAUG NORTH-st.F, RI, under boulders, 3 June, AA, CBM-ZE-14; 48 exs., MAUG WEST-st. E, RI, under boulders, 4 June, AA, CBM-ZE-15; 2 exs., young type, URACAS-st.A, RI, tide pool, on algae, 6 June, AA, CBM-ZE-16; 1 ex., juv., URACAS-st.A, RI, tide pool, 6 June, TK, CBM-ZE-17; 1 ex., juv., ALAMAGAN-st.B, RI, under boulders, 9 June, AA, CBM-ZE-18.

Distribution. This species is widely distributed in tropical Indo-Pacific waters (Devany, 1974). The present data represent a new record for the northern Marianas.

Family Ophiuridae

9. *Ophiostriatus* sp.

Specimens examined. 2 exs., AGRIHAN, 40 m deep, on corals, 29 May, TP, CBM-ZE-1.

Remarks. This species is an undescribed one, and a description will be made and published in Irimura (in press).

Class Echinoidea
Order Cidaroida
Family Cidaridae

10. *Eucidaris metularia* (Lamarck)

Specimen examined. 1 juv., ANATAHAN-st. C, RI, 13 May, AA, CBM-ZE-28.

Distribution. Although this species is widely distributed in Indo-West Pacific waters (Shigei, 1986) including the Ogasawaras (Ooishi, 1970) and Guam (Eldredge, 1979), the present data represent a new record for the northern Marianas.

Order Diadematoida
Family Diadematidae

11. *Echinothrix diadma* (Linnaeus)

Specimen examined. 1 juv., PAGAN-st.C, 3 m deep, 26 May, TK, CBM-ZE-29.

Distribution. This species is widely distributed in Indo-West Pacific (Ooishi, 1970; Shigei, 1970) including Saipan (Doty and Marsh, 1977; Randall, 1987; Randall *et al.*, 1988), Guam (Dickinson and Tsuda, 1975; Neudecker *et al.*, 1978) and Tinian (Jones *et al.*, 1974) in the southern Marianas. The present data represent a new record for the northern Marianas.

12. *Diadema* sp.

Specimen examined. 1 juv., MAUG WEST-st. E, RI, 4 June, AA, CBM-ZE-30.

Distribution. This is a damaged specimen of, probably, *Diadema setosus* (Leske) or *D. savignyi* (Audouin). *D. setosus* has been recorded from Agrihan (Eldredge, 1983).

Order Echinoida
Family Toxopneustidae

13. *Nudechinus* sp.

Specimen examined. 1 juv., AGRIHAN-st.C, 3 m deep, 30 May, TK, CBM-ZE-31.

Family Echinometridae

14. *Echinometra mathaei* (Blainville)

Specimens examined. 1 ex. Form A (by Uehara *et al.*, 1990), juv., ANATAHAN-st.C, RI, 13 May, AA, CBM-ZE-32; 2 exs., Form A, PAGAN-st. D, boulders, 3 m deep, 27 May, TK, CBM-ZE-33; 1 ex., Form B (by Uehara *et al.*, 1990), PAGAN-st. D, boulders, 3 m deep, 27

May, TK, CBM-ZE-34; 1 ex., Form B, AGRIHAN-st.C, RI, 30 May, AA, CBM-ZE-35; 2 tests, AGRIHAN-st.C, RI, 30 May, AA, CBM-ZE-36; 2 exs. Form B, AGRIHAN-st. A, 28 May, AA, CBM-ZE-37.

Distribution. This species is widely distributed in tropical Indo-Pacific waters (Shigei, 1986). In the Izu–Mariana Arc, there are records from the Ogasawara (Bonin) Islands (Ooish, 1970; Shigei, 1970; Asakura *et al.*, 1990, 1991, 1993), Maug (Eldredge *et al.*, 1977), Saipan (Doty and Marsh, 1977; Randall, 1987; Randall *et al.*, 1988) Guam (Marsh *et al.*, 1977; Dickinson and Tsuda, 1975; Neudecker *et al.*, 1978) and Tinian (Jones *et al.*, 1974).

Remarks. This species shows highly intraspecific variations in morphology and color patterns. Recently, Uehara *et al.* (1990), Arakaki and Uehara (1991) and Uehara *et al.* (1991) concluded from the observation on experimental crossing and differences in physiological tolerance, breeding season and chromosome number that this species should be divided into 4 different species. In this list, the forms A and B refers Uehara's category of the species.

15. *Colobocentrotus mertensii* Brandt

Specimens examined. 1 ex., ANATAHAN-st. A, RI, 11 May, TK, CBM-ZE-38; 1 ex., ANATAHAN-st.B, RI, 12 May, TK, CBM-ZE-39; 3 exs., ANATAHAN-st.B, RI, 12 May, AA, CBM-ZE-40; 18 exs., GUGUAN-st.B, RI, 17 May, AA, CBM-ZE-41; 7 exs., ALAMAGAN-st.A, RI, 19 May, AA, CBM-ZE-42; 8 exs., PAGAN-st.A, RI, 25 May, AA, CBM-ZE-43; 1 ex., PAGAN-st.B, RI, 26 May, AA, CBM-ZE-44; 8 exs., AGRIHAN-st.A, RI, 28 May, AA, CBM-ZE-45; 5 tests, AGRIHAN-st.C, RI, 30 May, AA, CBM-ZE-46; 8 exs., ASUNCION-st.A, RI, 1 June, AA, CBM-ZE-47; 1 ex., MAUG EAST-st.A, RI, 2 June, AA, CBM-ZE-48; 19 exs., MAUG NORTH-st.F, RI, 3 June, AA, CBM-ZE-49; 14 exs., URACAS-st.A, RI, 6 June, AA, CBM-ZE-50; 1 juv., URACAS-st. A, tide pool, RI, 6 June, TK, CBM-ZE-51.

Distribution. This species is widely distributed in tropical Indo-west Pacific waters (Shigei, 1986). In the Izu–Mariana Arc, there are records from the Ogasawaras (Ooish, 1970; Shigei, 1970; Asakura *et al.*, 1990, 1991, 1993), Maug (Eldredge *et al.*, 1977), Asuncion, and Uracas (Eldredge, 1983).

Acknowledgments

We gratefully thank Messrs. T. Pitlick and P. Schupp of the University of Guam Marine Laboratory and Mr. T. Kurozumi of NHMIC for providing specimens. We also thank Dr. S. Nojima of Aitsu Marine Biological Laboratory, Kumamoto University and Dr. T. Uehara of University of Ryukyu for making information available.

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