STUDIES ON THE BIOLOGY AND ECOLOGY OF
THE INTERTIDAL ANIMALS OF CHICHIJIMA ISLAND IN THE
OGASAWARA (BONIN) ISLANDS

1. LIST OF COLLECTED SPECIES WITH COMMENTS ON SOME SPECIES

BY
AKIRA ASAKURA, SHIROOU NISHIHAMA, AND YASUO KONDO

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INTRODUCTION

The Ogasawara (Bonin) Islands are subtropical, oceanic islands, located in the northwest Pacific (Lat. 27° N, Long. 142° E). The nearest landmass is the Japan Islands situated ca. 1000 km to the north (Fig. 1). Many endemic species have been found in its terrestrial (Ono & Masuda, 1981; Ono & Sugawara, 1981; Kobayashi, 1978; Habe, 1969; Habe et al., 1978) and marine environments (Okutani, 1986; Shigei, 1970; Hirohito, 1974; Habe et al., 1978; Imajima 1970; Sugano, 1973; Ooishi, 1970; Kurata et al., 1975).

The authors visited Chichijima Island of the Ogasawara Islands three times, in April 1986, May 1989, and June 1990. The purpose of the visits was to study the biological and ecological aspects of the intertidal animals there, which have received little attention to date.

In this paper, a list of species collected through those trips is presented, which includes one new species of a hermit crab, _Pagurus insulæ_ in Asakura (1991a), two new subspecies of gastropods, _Notoacmea schrenckii boninensis_ in Asakura & Nishihama (1987a) and _Monodonta perplexa boninensis_ in Asakura & Nishihama (1987b), and one new record of a hermit crab, _Calcinus guamensis_ Wooster, from Japan (Asakura, 1991b).

PREVIOUS WORK


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Fig. 1. Location of the Ogasawara Islands.
PRESENT WORK

Judging from the photographs of the Chichijima island taken in 1968 (in Toba Aq. and Asahi. Publ., 1970), the landscape has changed drastically. In particular, the west coast has recently been rapidly developed. The natural coastal zones in the inner part of Futami Bay (the largest bay in the island) have also been damaged in order to construct a larger harbor with concrete-protected shore lines, and some species of intertidal invertebrates were exterminated (Asakura & Nishihama, 1988).

In our investigations, we quantitatively sampled many invertebrates from whole coastal areas of Chichijima. Since the destruction of those coastal areas continues, this sample will have the value of recording for posterity the animals that inhabited this region. Many rare and endemic species inhabit the islands, and we feel that the conservation of these coastal areas is important.

LOCATION OF SAMPLING POINTS

All sampling points were located in the intertidal zones of rocky shores on the coast of Chichijima Island (Fig. 2). Detailed descriptions of topography of each site have been already published in Asakura & Nishihama (1987a,b; 1988) and Asakura et al. (1991). Collections were made at low tide during the spring tide. Samples were preserved in 10% formalin solution, brought to the laboratory and identified to species.

Following references were used for identification; Mollusca (Okutani, 1986; Habe & Okutani, 1975), Crustacea (Miyake, 1982, 1983), Annelida (Utinomi, 1975), and Echinodermata (Utinomi, 1975). Unidentified species were sent to an authority for each taxon, and these identifications were followed.

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Fig. 2. Locations of the sampling points along the coast of the Chichijima Island. Abbreviations of the site names are; K: Kiyose, F: Futamiwa, O: Okumura, S1: Sakaiura-1, S2: Sakaiura-2, Mi1: Miyanohama-1, Mi2: Miyanohama-2, Mi3: Miyanohama-3, Mi4: Mi-yanohama-4, Mi5: Miyanohama-5, Ts1: Tsurihama-1, Ts2: Tsuri-hama-2, H1: Hatsuneura-1, H2: Hatsuneura-2, N1: Nishikaigan-1, N2: Nishikagan-2, N3: Nishikaigan-3, J1: John Beach-1, J2: John Beach-2, J3: John Beach-3, J4: John Beach-4, Ma1: Manjyumisaki-1, Ma2: Manjyumisaki-2, Ko1: Kominato-1, Ko2: Kominato-2, Te: Tengu-bana, T: Toufuiwa, Y: Yagyusan
COMMENTS ON SOME SPECIES

1. *Megabalanus occator* (Darwin) (Fig. 3A)
Common to the lower intertidal zone of wave-exposed rocky shores and one of the most important organisms characterizing the zonation pattern of wave-exposed rock platforms (Asakura *et al.*, 1991). This species has also been reported from the Tokara Islands and further south, but details of the geographical distribution have not yet been fully studied (Yamaguchi, 1986).

2. *Callianidea typa* H. Milne Edwards
Two specimens of this ghost shrimp were collected under a boulder in the lower intertidal zone of the Yagyusan coast. This species has been reported from Bismark Island (type locality), Kagoshima, Yaeyama Islands, and the Tokara Islands (Miyake, 1956). Recently Ooishi (1970) recorded *Callianidea planocula* Melin from Futami Bay of Chichijima Island, although the species may be a synonym of *C. typa* (K. Sakai, personal communication).

3. *Pagurus insulae* Asakura (Fig. 3B)
A dominant hermit crab species of the intertidal zones from sheltered to exposed rocky shores. This species resembles *P. geminus*, but *P. geminus* has the single large tubercle on ventral surface of the merus of each cheliped, which this species does not have. One of the authors of this paper made a description of this as a new species in Asakura (1991a).

4. *Leptodius davaoensis* Ward (Fig. 3C)

5. *Ischnochiton computus f. computus* Gould (Fig. 3D)
Inhabiting under boulders in the lower intertidal zone. Morphological characters of the specimens are similar to *Ischnochiton computus* Gould from the temperate Japanese region. However, all of the shells collected from Ogasawara have green color with no obvious patterns. In contrast, the shells from the Japanese temperate region have several distinct color patterns.

6. *Notoacmea schrenckii boninensis* Asakura & Nishihama (Fig. 3E)
*N. schrenckii* is widely distributed in temperate Japanese waters. Specimens from Chichijima Island are small in size and have a different shell color pattern from those in the temperate region. We made a description of this limpet as a new subspecies of *N. schrenckii* in Asakura & Nishihama (1987a).

7. *Monodonta australis* Lamarck (Fig. 3F)
A very abundant snail in boulder beaches. Two types of shells were found; a tall shell with numerous granules on the surface (right in Fig. 3F) and a short shell with smooth surface (only this type has been known to date [Takenouchi, 1986; Habe & Okutani, 1975]) (left in Fig. 3F). The former was found in wave-sheltered beaches such as Kiyose and Okumura, and the latter was found over a wider range, from the wave-moderate to very exposed beaches. This species has also been reported from Hong Kong (Morton & Morton, 1983) and southern Africa (Branch & Branch, 1981), however there has been no record from Okinawa (the Ryukyu Islands). Recently K. Takenouchi (personal communication) found that morphological characteristics of the specimens from Ogasawara (the short type) did not fit those in the original description as well as those specimens collected from Hong Kong. The specimens may belong to a new endemic which requires taxonomic reconsideration.
Fig. 3. Selected species characterizing the intertidal zones of the Chichijima Island. Horizontal bars indicate 1 cm. A. *Megabalanus occator* (Darwin); left: outer view, right: scutum and tergum B. *Pagurus insulæ* Asakura. C. *Leptodius davaoensis* Ward.
Fig. 3 (continued) D. *Ischnochiton comptus* f. *comptus* Gould. E. *Notoacmea schrenckii boninensis* Asakura & Nishihama. F. *Monodonta australis* Lamarck G. *Nodilittorina* sp. H. *Siphonaria* sp.
8. *Monodonta perplexa boninensis* Asakura & Nishihama
Abundant in boulder beaches. This subspecies is endemic to Ogasawara. Only the name was given by Pilsbry, but no valid taxonomic description was made. We described this species in comparison with *M. perplexa perplexa* in Asakura & Nishihama (1987b).

9. *Nodilittorina* sp. (Fig. 3G)
Very abundant in the upper rocky intertidal zones (Asakura et al., 1991). In Japan and its adjacent waters, this species can be found only in Ogasawara, except in a very few cases in Okinawa (Habe, 1951; Nishihira, 1977). Oyama (1940) and Oyama & Takemura (1963) identified this species as *Nodilittorina miliaris*. However, Rosewater (1970) identified it as *N. leucosticta fejeensis* (Reeve), and then Rosewater & Kadolsky (1981) synonymized it as *N. quadricincta fejeensis*. Asakura & Kurozumi (1991) discussed morphological differences between the true *N. quadricincta fejeensis* and specimens from the Ogasawara. We believe that the species in the Ogasawara is endemic and taxonomic re-examination is needed.

10. *Siphonaria* sp. (Fig. 3H)
Inhabiting abundantly the rock platform surfaces and underside of boulders (Asakura et al., 1990, 1991). The shell morphology of this limpet is variable. Kurata et al. (1969) and Shigei (1970) also recorded this species from Ogasawara. Morphologically, its shell is different from any other *Siphonaria* species in Japan and its adjacent waters, and further taxonomic study is needed (Asakura et al., 1991).

**LIST OF SPECIES**

Abbreviations of the name of the sampling sites are as follows (see Fig. 2 for the location of each site). K: Kiyose, F: Futamiwa, O: Okumura, S1: Sakaitura-1, S2: Sakaitura-2, M1: Miyanoahama-1, M2: Miyanoahama-2, M3: Miyanoahama-3, M4: Miyanoahama-4, M5: Miyanoahama-5, Ts1: Tsurihama-1, Ts2: Tsurihama-2, H1: Hatsuneura-1, H2: Hatsuneura-2, N1: Nishikagin-1, N2: Nishikagin-2, N3: Nishikagin-3, J1: John Beach-1, J2: John Beach-2, J3: John Beach-3, J4: John Beach-4, MA1: Manjyumisaki-1, MA2: Manjyumisaki-2, KO1: Kominato-1, KO2: Kominato-2, Te: Tengubana, T: Toufuiwa, Y: Yagyusan

Small capitals after the abbreviations of the site names indicate the shore types; r: steep rock platform, p: rocky shore with many tide pools, b: boulder beach, be: beachrock.

Asterisks indicate cases where only vacant shells were collected, and, for reference, species recorded solely from vacant shells are listed in Appendix 1. Specimens are deposited in the National Science Museum, Tokyo [NSMT], Amakusa Marine Biological Laboratory of Kyushu University [AMBL], and Shikoku Women’s University [SWU]. Other specimens, which are not particularly indicated, are deposited in the Natural History Museum and Institute, Chiba [CBM].

Phylum Arthropoda
Class Crustacea
Subclass Cirripedia
Order Thoracica
Suborder Balanomorpha

**Family Chthamalidae**

*Chthamalus challengeri* Hoek
Fr, O-r, S1-r, S2-r, Te-r, T-r, Y-r, M11-r, M12-r, M13-r, M14-r, Mi5-r, Ts1-r, Ts2-r, H1-r,
H2-r, J1-r, J2-r, J3-be, N1-r, N2-r, N3-r, Ko1-r, Ko2-r, Ma1-r, Ma2-r
Family Tetraclitidae

Tetraclita squamosa japonica Pilsbry
  Y-r, Ts1-r

Family Balanidae

Megabalanus occator (Darwin)
  S2-r, Te-r, T-r, Y-r, Ts1-r, H1-r, N1-r, N2-r, Ma2-r
Subclass Malacostraca
Order Isopoda
Suborder Flabellifera

Family Cirolanidae

Cirolana harfordi japonica Thielemann
  S2-r

Suborder Natantia

Family Alpheidae

Alpheus pacificus Dana
  O-b, S1-b, Y-b
Suborder Reptantia
Infraorder Anomura

Family Porcellanidae

Petrolisthes japonicus (De Haan)
  K-b, O-b, S1-b, Y-b, Ma-b
Family Callianassidae

Callianidea type H. Milne Edwards [SWU]
  Y-b

Family Diogenidae

Calcinus laevoimanus (Randall)
  S1-p, S2-p, S1-b, T-p, Y-p, Y-b, Ha1-p, Ha2-p, Ts1-p, Ts2-p, J1-p, J2-p, J3-be, Ma1-p, Mi3-p, Mi4-p, Mi5-p, N1-p, N2-p, N3-p, H1-p, H2-p
Calcinus gaimardii (H. Milne Edwards)
  O-p
Calcinus latens (Randall)
  O-p, S1-p, T-p, Y-p, N2-p, N3-p
Calcinus elegans (H. Milne Edwards)
  O-p, T-p, Y-p, J1-p, J2-p, Ma1-p, H2-p, Ts1-p, Ts2-p
Calcinus guamensis Wooster
  Ts2-r
Calcinus sp. 1
  O-p, T-p, Y-p, Ma1-p, H1-p, H2-p, Ts1-p, Ts2-p
Calcinus sp. 2 (? C. nitidus Heller)
  Ts2-r
Clibanarius humilis Dana
  K-b, O-b, O-p, S1-p, S1-b, T-p, Y-b, Y-p, H2-p, J1-p, J2-p, Ma1-p, Ma1-b, Mi1-b, M4-p, Mi5-p, N2-p, N3-p, Ts1-p, Ts2-p
Family Paguridae

Pagurus insulai Asakura
  K-b, O-p, O-b, S1-p, S1-b, T-p, Y-p, Ko2-r, Ma1-p, Mi1-p, H2-p, N2-p, N2-b, N3-p, Ts1-p, Ts2-p

Infraorder Brachyura

Family Xanthidae
Leptodius davaoensis Ward
K-b, O-b, S1-b

Xanthias lamarckii (H. Milne Edwards)
O-b, S1-b

Family Menippidae

Epixanthus corrosus A. Milne Edwards
K-b

Family Grapsidae

Metopograpsus messor (Forskål)
K-b

Gaetice depressus (De Haan)
K-b, O-b, O-p, S1-b, S1-p, Y-b, Y-p

Sesarma dehaani H. Milne Edwards
mouth area of Kiyose river

Phylum Mollusca
Subphylum Amphineura
Class Polyplacophora
Order Neoloricata
Suborder Ischnochitonina

Family Ischnochitonidae

Ischnochiton comptus f. comptus (Gould) [AMBL]
O-b, O-p, S1-b, Y-b

Family Chitonidae

Onithochiton hirasei Pilsbry [AMBL]
O-p

Acanthopleura japonica (Lischke) [AMBL]
O-r, S1-r, S2-r, Te-r, T-r, Y-r, Mi2-r, Mi4-r, Ts1-r, H1-r, H2-r, J1-r, J2-r, J4-l, N1-r, Ko2-r, Ma1-r, Ma2-r

Suborder Acanthochitonina

Family Acanthochitonidae

Acanthochiton rubrolineatus (Lischke) [AMBL]
O-p

Subphylum Conchifera
Class Gastropoda
Subclass Prosobranchia
Order Archaeogastropoda

Family Patellidae

Patella flexuosa Quoy & Gaimard
Ma1-r, Ma2-r

Cellana enneagona (Reeve)
O-p, O-r, O-b, S1-r, S2-r, S1-p, S1-b, T-r, T-p, Y-r, Y-p, Y-b, Ts2-r, H2-r, J3-be, Ma2-r

Cellana mazatlandica (Sowerby) [AMBL, CBM]
O-r, S1-r, Te-r, T-r, Y-r, J1-r, J2-r, Ko2-r

Family Acmaeidae

Notoacmea schrenckii boninensis Asakura & Nishihama [NSMT, CBM]
O-b, S1-b, Y-b, Mi1-b, Ts1-b, H2-b, N2-b, Ma1-b, Ko2-b

Notoacmea cf. concinna (Lischke)
Y-b
Family Trochidae

*Diloma suavis* (Philippi)
- O-r, S1-p, S1-r, S2-r, T-p, T-r, Y-p, Y-r, Ma2-r

*Monodonta australis* Lamarck
- K-b, F-r, O-b, O-r, O-p, S1-b, S1-p, S1-r, Te-r, T-p, T-r, Y-b, Y-p, Y-r

*Monodonta perplexa boninensis* Asakura & Nishihama [NSMT, CBM]
- Y-b, Y-p*, T-p*, O-p*

*Clanculus denticulatus* (Gray)
- O-b, O-p*, T-p*, Y-p

*Talopena vernicosa* (Gould)
- S1-b, S1-p*

Family Turbinidae

*Monodonta australis* Lamarck
- K-b, F-r, O-b, O-r, O-p, S1-b, S1-p, S1-r, Te-r, T-p, T-r, Y-b, Y-p, Y-r

*Monodonta perplexa boninensis* Asakura & Nishihama [NSMT, CBM]
- Y-b, Y-p*, T-p*, O-p*

*Clanculus denticulatus* (Gray)
- O-b, O-p*, T-p*, Y-p

*Talopena vernicosa* (Gould)
- S1-b, S1-p*

Family Turbinidae

*Lunella cinerea* (Born)
- O-b, S1-b, S1-p*, O-p*

Family Neritidae

*Nerita (Ritena) plicata* Linnaeus
- O-r, Te-r, K-b*

*Nerita (Theliostyla) squamulata* (Récluz)
- O-b, S1-b

*Nerita (Theliostyla) albicilla* Linnaeus
- O-b, O-p, S1-b, S1-p, T-p, Y-b, Y-p, H2-b, N2-b, Ma1-b, Ko2-b

*Nerita (Amphinerita) polita* Linnaeus
- Y-b

Order Mesogastropoda

Family Littorinidae

*Nodilittorina pyramidalis* (Quoy & Gaimard)
- F-r, O-p, O-r, S1-r, S1-p, S2-r, Te-r, T-p, T-r, Y-p, Y-r, Y-b*, Mi1-r, Mi2-r, Mi3-r, Mi4-r, Mi5-r, Ts1-r, Ts2-r, H1-r, H2-r, J1-r, J2-r, J4-l, N1-r, N2-r, N3-r, Ko1-r, Ko2-r, Ma1-r, Ma2-r

*Nodilittorina* sp.
- F-r, O-p, O-r, S1-r, S1-p, Te-r, T-p, T-r, Y-p, Y-r, Y-b*, Mi1-r, Mi2-r, Mi4-r, Mi5-r, Ts1-r, Ts2-r, H1-r, H2-r, J1-r, J2-r, J3-be, N1-r, N2-r, N3-r, Ko1-r, Ma1-r, Ma2-r

*Littoraria pintado* (Wood)
- O-p, O-r, S1-r, S1-p, S1-b*, S2-r, Te-r, T-p, T-r, Y-p, Y-r, Mi1-r, Mi2-r, Mi4-r, Ts2-r, H4-l, N1-r, N3-r

*Littoraria coccinea* (Gmelin)
- S1-r, S1-b, S2-r

Family Vermetidae

*Dendropoma* sp.
- Ts1-r, Ts2-r, H1-r, H2-r, N1-r, N2-r, N3-r, Ma1-r

*Serpulorbis imbricatus* (Dunker)
- O-r, O-p, S1-r, S1-p, S1-b*, T-p, Y-p, Mi3-r, H1-r, H2-r, N1-r, N2-r, N3-r, Ko1-r, Ko2-r, Ma2-r

*Serpulorbis daidai* Schuwwimmer & Nishiwaki
- Mi4-r, J2-r, Ko2-r

*Vermetus* sp.
- Mi2-r, Mi5-r, J1-r, J2-r, J3-be, Ma1-r

Family Planaxidae

*Angiola inepta* (Gould)
- O-b, O-p, S1-b, S1-p, T-p, Y-b, Y-p
Supplanaxis niger (Quoy & Gaimard)
  S1-b, Y-p, T-p
  Family Naticidae

Natica lurida (Philippi)
  S1-b, S1-p*, T-p*, Y-b*, Y-p*,
  Order Neogastropoda
  Family Muricidae

Nassa serta (Bruguière)
  Y-p, T-p*, O-p*

Mancinella siro (Kiuroda)
  O-p*, H1-r

Mancinella intermedia (Kiener)
  Y-p, O-p*, Mi3-r, N1-r

Drupa ricinus ricinus (Linnaeus)
  O-b, O-p, S1-b, S1-p, T-p, Y-p, Y-b

Drupa ricinus hadari Emerson & Cernohorsky
  Y-p, T-p*

Cronia (Muricodrupa) fiscella (Gmelin)
  Y-p

Maculotriton serrialis (Deshayes)
  Y-p, T-p*

Morula striata (Pease)
  O-p, S1-p, T-p, Y-p

Morula granulata (Duclos)
  O-b, O-p, T-p, Y-p, H1-r, H2-r, N2-r, N3-r, Ma2-r

Morula borealis (Pilsbry)
  T-p, Y-p

Thais (Stramonita) aculeata (Deshayes)
  Y-p

Purpura panama (Röding)
  Hi-r

Family Pyrenidae

Zafia pumila (Dunker)
  S1-b, S1-p, O-b

Family Buccinidae

Pollia undosa (Linnaeus)
  O-p*, S1-b, S1-p, T-p, Y-b, Y-p

Family Mitridae

Strigatella fastigium (Reeve)
  O-p*, Y-p

Subclass Opisthobranchia
  Order Cephalaspidea

Family Haminoeidae

Smaragdinella calyculata (Broderip & Sowerby)
  H1-r, J1-r, J4-r

Subclass Pulmonata
  Order Basommatophora
  Suborder Archaeopulmonata

Family Siphonariidae
**Siphonaria** sp.
O-b, O-p, O-r, S1-b, S1-p, S1-r, T-r, T-p, Y-r, Y-p, M1-r, M2-r, M3-r, M5-r, Ts1-r
Ts2-r, H1-r, H2-r, J1-r, J2-r, J3-be, N1-r, N2-r, N3-r, Ko1-r, Ko2-r, Ma1-r, Ma2-r

**Family Mytilidae**

**Hormomya mutabilis** (Gould) [AMBL, CBM]
O-r, S1-r, S2-r, T-r, Mi4-r, Mi5-r, H1-r, Ko1-r, Ko2-r

**Family Pteriidae**

**Pinctada** sp. [AMBL, CBM]
H1-r

**Family Isognomonidae**

**Isognomon nucleus** Lamarck
F-r, O-r, S1-r, S2-r, T-r, Mi1-r, Mi2-r, Mi3-r, Mi5-r, J1-r, Ko2-r, Ma2-r

**Family Ostreidae**

**Saccostrea mordax** (Gould)
F-r, O-r, S-r, T-r, Y-r, Mi4-r, Mi5-r, Ts1-r, H1-r, J2-r, N1-r, Ko1-r, Ko2-r

**Family Lasaeidae**

**Lasaea** cf *undulata* (Gould)
S-r

**Family Tridacnidae**

**Tridacna maxima** (Roding)
O-r, O-p, S-r, S-p, T-p, T-r

**Phylum Annelida**
**Class Polychaeta**

**Family Serpulidae**

**PomatoLeios kraussii** (Baird)
F-r, O-r, O-b, O-p, S-r, S-b, S-p, T-r, T-p, Y-r, Y-p

**Family Sabellariidae**

**Idanthyrsus pennatus** (Peters)
J4-l, Ma1-r

**Phylum Echinodermata**
**Subphylum Asterozoa**
**Class Ophiuroidea**
**Order Gnathophiurida**

**Family Ophiocomidae**

**Ophiocoma scolopendrina** Lamarck
O-p, S-p, Y-p

**Subphylum Echinozoa**
**Class Echinoidea**
**Subclass Euechinoidea**
**Order Phymosomatoida**

**Family Stomachinoidae**

**Stomopneustes variolaris** (Lamarck)
S-r, T-r, Y-r
Order Aulodonta

Family Diadematidae

*Echinothrix diadema* (Linnaeus)

N3

Order Camarodonta

Family Echinometridae

*Echinometra mathaei* (Blainville) [type B in Uehara et al. (1990)] [AMBL, CBM]

O-b, S-b, S-r, T-r, T-p, Y-r, Y-p, M4-r, Ts1-r, N1-r, N2-r, Ko1-r, Ma1-r

*Echinometra oblonga* (Blainville)

H1-r, H2-r, J4-l, N1-r, N2-r, N3-r, Ko1-r, Ma1-r, Ma2-r

*Heterocentrotus mammillatus* (Linnaeus) [AMBL, CBM]

S-p, T-p, Y-p

*Colobocentrotus mertensi* (Brandt)

Y-r

**REFERENCES**


by Dr. Tokubei Kuroda, no. 14, pp.87-94. Kairui Bunken Kankoukai, Kyoto.


Appendix 1. The list of gastropods (Mollusca) species recorded solely from vacant shells. They were mainly used by the intertidal hermit crabs as their host shells. All of them are deposited in the Natural History Museum and Institute, Chiba (CBM).

Subclass Prosobranchia Order Archaeogastropoda: Family Liotiidae; *Liottina peroni* (Kiener), S-b, O-p; *L. semicinctatula* (Schrenck), S-b, Y-p. Family Trochidae; *Calliostoma simonense* Ikebe, T-p; *Euthalia guamensis* (Quoy & Gaimard), O-b; *Clanculus margaritarius* (Philippi) Y-p; *Clanculus sp.*., S-b; *Trocchus maculatus* Linnaeus, S-p, O-p; *Tectus sp.*., S-p, O-p. Family Turbinidae; *Homalopoma nocturnum* (Gould), S-p; *Collonista glareosa* (Gould), O-p. Order Mesogastropoda: Family Rissoinidae; *Alvania ogasawarana* Pilsbry, Y-p.

Family Turritellidae; *g* sp., S-b. Family Cerithiidae; *Clypeomorus chemnitzianna* (Pilsbry), S-b, Y-p, O-p; *C. trailli* (Sowerby), S-b, O-p; *C. humilis* (Dunker), K-b, O-b; *C. sp.*1, K-b, O-b, 0-p, S-b, S-p, Y-p; *C. sp.*2, 0-b, 0-p, S-b, Y-p; *Conocerithium bavayi* (Vignal), S-b; *Ischnocerithium sp.*., K-b. Family Strombidae; *Canarium mutabilis* (Swainson), T-p, S-p; *C. microurceum* Kira, T-p. Order Neogastropoda: Family Muricidae; *Pascula benedicta* (Melvill & Standen), T-p; *Drupella cornus* (Röding), O-p; *Cronia (Muricodrupa) fusca* (Küster), K-b; *C. (Usilla) fusconigra* (Pease), Y-p, T-p; *Morula uva* (Röding), Y-p; *Thais (Reishia) pseudodiadema* (Yokoyama), T-p; *Ergalatax contractus* (Reeve), K-b. Family Coralliophilidae; *Coralliophila squamosissima* (Smith), T-p, Y-p; *Coralliophila sp.*., O-p. Family Pyrenidae; *Pyrene testudinaria* (Link), S-b, S-p, T-p, Y-p; *P. flavus* (Bruguière), Y-p; *Euplica versicolor* (Sowerby), K-b, O-b, O-p, S-b, S-p, T-p; *Anachis misera nigromaculata* (Tomlin), Y-p; *Zafrona lifuana* (Hervier), T-p. Family Buccinidae; *Enzinopsis menkeana* (Dunker), O-p, S-p. Family Nassariidae; *Telasco velatus* Gould, O-p, T-p; *Zeuxis hepaticus* (Pylteney), T-p; *Zeuxis sp.*1, S-b, *Zeuxis sp.*2, Y-p; *Alectrion glans suturealis* (Lamarch), K-b, O-b, O-p, S-b, S-p, Y-p. Family Fasciolariidae; *Latirus kandai* Kuroda, K-b, S-b, Y-p; *Latirus nagasakienis* (Smith), K-b, Y-p; *Benimakia fastiginda* (Reeve), S-b. Family Mitridae; *Strigatella scutulata* (Gmelin), T-p; *S. littorata* (Lamarch), O-p; *Vexillium unifasciatum* (Wood), O-p. Family Terebridae; *Lienardia planilabrum* (Reeve), Y-p; *Lienardia sp.*1, O-p; *Lienardia sp.*2, S-p. Family Conidae; *Virgiconus flavidus* (Lamarch), O-p; *Virroconus fulgetrum* (Sowerby), T-p; *V. sponsalis* (Hwass), Y-p. Family Terebridae, g sp., O-b, Order Heterogastropoda: Family Epitonidae; *Gyroscala perplexa* (Pease), Y-b; *Spiniscala japonica* (Dunker), S-b. Family Architectonicidae; *Heltacus variegatus* (Gmelin), K-b, O-b. Order Cephalaspidea: Family Acteonidae; *Punctacteon fabreanus* (Grosse), S-p, T-p.