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**PRELIMINARY CHECK-LIST OF PLANKTON ORGANISMS  
FOUND IN TANABE BAY AND ITS ENVIRONS<sup>1)</sup>**

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This list of common plankton organisms found in Tanabe Bay and its environs is prepared mainly for the use of planktologists and for researchers or students learning the practical exercises in marine biology at our Laboratory, in order to indicate the general distribution of plankton organisms around the coast and to form a basis for a more complete list of the species occurring in our waters. The environmental conditions are briefly described for each common or characteristic species, with some short notes on their ecology.

In this list is excluded either of the transitory plankton such as those benthic forms that have a planktonic larval stage or the epibionts on planktonic or floating objects or organisms. The holoplankton organisms comprising both phyto- and zooplankton listed herein are summarized below.

|                                 | Class | Subclass<br>or<br>Order | Family | Genus | Species |
|---------------------------------|-------|-------------------------|--------|-------|---------|
| Cyanophyceae (Blue-green Algae) | 1     | 1                       | —      | 1     | 1       |
| Bacillariaceae (Diatoms)        | 1     | 2                       | 17     | 47    | 175     |
| Mastigophora                    | 1     | 2                       | 4      | 21    | 82      |
| Sarcodina                       | 1     | 2                       | —      | 37    | 41      |
| Ciliophora                      | 1     | 1                       | 12     | 26    | 54      |
| Hydrozoa                        | 1     | 3                       | —      | 47    | 54      |
| Scyphozoa                       | 1     | 3                       | —      | 10    | 10      |
| Anthozoa                        | 1     | 1                       | —      | 1     | 1       |
| Ctenophora                      | 1     | 4                       | —      | 9     | 9       |
| Rotifera                        | 1     | 1                       | —      | 2     | 2       |
| Chaetopoda                      | 1     | —                       | —      | 6     | 18      |
| Chaetognatha                    | 1     | —                       | —      | 5     | 16      |
| Gastropoda                      | 1     | 3                       | —      | 16    | 34      |
| Crustacea                       | 1     | 8                       | 36     | 81    | 244     |
| Tunicata                        | 1     | 3                       | —      | 15    | 37      |
| Total                           | 15    | 34                      | 69     | 324   | 778     |

1) Contributions from the Seto Marine Biological Laboratory, No. 319.

The genera are listed alphabetically under the order or family and species alphabetically under the genus. Main synonyms are shown in brackets, when necessary.

The present list includes also the species that have been recorded by many authors and some unpublished species sketched or recorded by the late Mr. Jiro IKARI, formerly a member of our Laboratory staff.

The macroplankton samples have been collected with larval net which is one meter in diameter at the mouth and 2.6 meters long with silk bolting gauze at the upper and middle part (29 meshes/inch) and at the bottom (39 meshes/inch). The net was hauled horizontally for three minutes at each station from July, 1955 to January, 1957 in Tanabe Bay (HARADA, 1957).

The microplankton samples have been at times collected with KITAHARA's standard net, modified from HENSEN's net, with ca. 20 cm mouth diameter and 100 cm long, stretched with silk bolting gauze (XX-14), hauling vertically from the bottom to the surface during the years from 1954 to 1958 (YAMAZI, 1955; YAMAZI, 1958).

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## LIST OF THE SPECIES

### Class **CYANOPHYCEAE** (Blue-green Algae)

#### Order HORMOGONEAE

**Trichodesmium erythraeum** EHRENBERG

**Trichodesmium Tiebauti** GOM.

Occurs in swarms, in open sea water outside the bay, chiefly in summer and autumn. Oceanic, tropical form. (YAMAZI, 1959, p. 38, 53, 160)

### Class **BACILLARIACEAE** (Diatoms)

#### Order CENTRALES

#### Suborder *DISCINEAE*

#### Family 1. Melosiraceae

**Melosira numuloides** (DILLW.) AGARDH

Rare, in littoral and brackish water area. Tichopelagic, eurythermal form.

**Melosira sulcata** (EHRENBERG) KÜTZING

Not very common, inside the bay, in winter and spring. Tichopelagic, north-temperate form.

#### Family 2. Coscinodiscaceae

**Actinoptychus undulatus** (BAIL.) RALFS

Very rare in all seasons, occurs accidentally in plankton. Neritic and littoral, north and south temperate species. (YAMAZI, 1959, p. 22, 136)

**Arachnoidiscus ornatus** (BRÉB.) GREV.

**Asteromphalus heptactis** (BRÉB.) RALFS

Very rare, occasionally in winter and spring. Oceanic, temperate or subtropical species. (YAMAZI, 1959, p. 214)

**Coscinodiscus asteriomphalus** EHRENBERG

Common in spring and summer, outside and inside the bay. South-temperate species.

**Coscinodiscus centralis** EHRENBERG

Rare, inside and outside the bay, in the cold season. Oceanic and neritic, temperate or north temperate species. (YAMAZI, 1959, p. 134)

**Coscinodiscus concinnus** W. SMITH

Rare, widely distributed, chiefly in winter and spring. Neritic, north temperate, euryhaline species.

**Coscinodiscus excentricus** EHRENBERG

Rare in the bay, in autumn and winter. Chiefly oceanic but frequently neritic.

**Coscinodiscus gigas** EHRENBERG

Commonest, especially in the cold season, inside and outside the bay, widely distributed, in almost all seasons. (YAMAZI, 1959, p. 21, 33, 135)

**Coscinodiscus Granii** GOUGH.

Very common, in winter and spring, inside and outside the inlet. Neritic, north-temperate and boreal species. (YAMAZI, 1959, p. 24, 136)

**Coscinodiscus Janischii** A. SCHMIDT

Rare, in warm seasons, widespread form.

**Coscinodiscus lineatus** EHRENBERG

Rare, off Sirahama, inside the bay, from winter to early summer, widespread form.

**Coscinodiscus marginatus** EHRENBERG

Not very common, from autumn to early summer, widely distributed. (YAMAZI, 1959, p. 136)

**Coscinodiscus nitidus** GREGORY

Rare, inside the bay, in spring and early summer, neritic species.

**Coscinodiscus oculus-iridis** EHRENBERG

Not common in the bay, chiefly in winter and spring, oceanic but frequently neritic. (YAMAZI, 1959, p. 134)

**Coscinodiscus perforatus** EHRENBERG

Very rare, outside the bay, in winter season, widespread temperate form. (YAMAZI, 1959, p. 134)

**Coscinodiscus radiatus** EHRENBERG

Rare, inside and outside the bay, in cold season. Oceanic and neritic, temperate species. (YAMAZI, 1959, p. 136, 207, 214)

**Coscinodiscus stellaris** ROPER

Rare, in the bay in autumn. Oceanic, widespread species. (YAMAZI, 1959, p. 22, 214)

**Coscinodiscus wailiesii** GRAN & ANGST

One of the most abundant diatoms in winter, outside and inside the bay, northerly distributed species. (YAMAZI, 1959, p. 135)

**Coscinodiscus** sp.**Ethmodiscus Gazellae** (JANISCH) HUSTEDT

Rare, in tow-netting, in open sea water outside the inlet, in spring and early summer. Oceanic, tropical species. (YAMAZI, 1959, p. 156)

**Hemidiscus cuneiformis** WALLICH

Very rare, outside the bay, in summer and autumn. Oceanic, tropical or subtropical form. (YAMAZI, 1959, p. 23, 156)

**Planktoniella sol** (WALLICH) SCHÜTT

Rare, found occasionally in spring and summer, chiefly outside the bay. Oceanic tropical species. (YAMAZI, 1959, p. 34, 201)

## Family 3. Thalassiosiraceae

**Lauderia borealis** GRAN

Not very common, in spring and summer. Neritic, widely distributed, temperate species.

**Lauderia flaccida** (CAST.) PÉRAGALLO

Inside the bay. (IKARI, MS.)

**Lauderia gracialis** GRUN.

Very rare, found in winter in the bay. Neritic, north-temperate species.

**Schröderella delicatula** (PÉRAGALLO)

Rare in the bay, in spring and summer. Neritic, temperate species.

**Thalassiosira condensata** (CLEVE)

**Thalassiosira decipiens** (GRUN.)

Very rare, found occasionally in winter and early spring. Neritic, north-temperate species. (YAMAZI, 1959, p. 208)

**Thalassiosira gravida** CLEVE

Rare, found in winter and early spring. Neritic but frequently oceanic, north-temperate species. (YAMAZI, 1959, p. 208)

**Thalassiosira rotula** MEUNIER

Not common, outside and inside the inlet. Neritic, temperate and south-temperate species. (YAMAZI, 1959, p. 48)

**Thalassiosira subtilis** (OSTENFELD)

Very common in the bay, chiefly in coldest season. North-temperate, oceanic but frequently neritic species. (YAMAZI, 1959, p. 46)

#### Family 4. Skeletonemaceae

**Skeletonema costatum** (GREVILLE) CLEVE

Most abundant inside the bay, in almost all season. Eurythermal and euryhaline, neritic, widely distributed in all seas. (YAMAZI, 1959, p. 40, 132)

**Stephanopyxis palmeriana** (GREV.) GRUNOW

Fairly common, inside and outside the bay. Neritic, warm-water species. (YAMAZI, 1959, p. 40, 132)

**Stephanopyxis turris** (GREVILLE)

Very rare, in winter and spring, temperate and subtropical species. (YAMAZI, 1959, color pl. 4)

#### Family 5. Leptocylindraceae

**Dactyliosolen antarcticus** CASTRACANE

Rare, in winter and spring, outside the bay. Oceanic, temperate species. (YAMAZI, 1959, p. 40)

**Dactyliosolen mediterraneus** PÉRAGALLO [= *D. tenuis* (CL.) GRAN]

Common in the bay, chiefly in summer and autumn. Neritic, sporadically oceanic, widely distributed species. (YAMAZI, 1959, p. 216)

**Guinardia flaccida** (CASTRACANE) PÉRAGALLO

Common in the bay, in summer and autumn. Neritic south-temperate species. (YAMAZI, 1959, p. 40)

**Leptocylindrus danicus** CLEVE

Common in inner part of the bay, in autumn and winter. Neritic, temperate or north-temperate, widespread species. (YAMAZI, 1959, p. 40)

## Family 6. Corethronaceae

**Corethron hystrix** HENSEN [= *C. criophilum* CASTR.]

Fairly common but never abundant, in winter. Oceanic, north-temperate species. (YAMAZI, 1959, p. 206)

**Corethron pelagicum** BRUN

Rare, in open water, outside the bay, from early summer to autumn. Oceanic, warm-water form. (YAMAZI, 1959, p. 156)

## Suborder SOLENIINEAE

## Family 7. Rhizosoleniaceae

**Rhizosolenia acuminata** (PÉRAG.) GRAN

Fairly common but not abundant in open water outside, from summer to autumn. Oceanic, subtropical or temperate species.

**Rhizosolenia alata** BRIGHTWELL

Common, in spring and autumn. Oceanic, sporadically neritic, temperate species. (YAMAZI 1959, p. 32, 206)

**Rhizosolenia alata** f. *gracillima* (CLEVE) GRUNOW

Common in the bay, in spring and summer, neritic, temperate species.

**Rhizosolenia alata** f. *indica* (PÉRAG.) OSTENFELD

Common, sometimes abundant, in warm season of summer and autumn. Oceanic, warm-water form. (YAMAZI, 1959 p. 204)

**Rhizosolenia Bergonii** PÉRAGALLO

Rare, outside the bay, in summer and autumn. Oceanic, south-temperate or subtropical warm-water species. (YAMAZI, 1959, p. 157, 204)

**Rhizosolenia calcar avis** M. SCHULTZE

Common or very abundant, in summer and autumn. Oceanic, tropical or subtropical warm-water species. (YAMAZI, 1959, p. 63, 157, 204)

**Rhizosolenia Clevei** OSTENFELD

Very rare in summer and autumn. Oceanic, warm-water species.

**Rhizosolenia cylindrus** CLEVE

Rarer in warm season. Neritic, tropical or subtropical form. (YAMAZI, 1959, p. 157)

**Rhizosolenia delicatula** CLEVE

Rarer in the bay, in warm season. Neritic, temperate species.

**Rhizosolenia hebetata** (BAILEY) GRAN f. *semispina* (HENSEN) GRAN

Common in warm season, chiefly in summer and autumn. Oceanic, warm-water species. (YAMAZI, 1959, p. 217)

**Rhizosolenia imbricata** BRIGHTWELL

Rarer in the bay, in summer and autumn. Oceanic, warm-water species.

**Rhizosolenia imbricata** var. *Schrubsolei* CLEVE

Rare in the bay, in spring and summer. Neritic, north-temperate species.

**Rhizosolenia robusta** NORMAN

Common in warm season, inside and outside the bay. Oceanic, widely distributed, especially in warm water. (YAMAZI, 1959, p. 157, 203)

**Rhizosolenia setigera** BRIGHTWELL

Commonest from early spring to early summer. Neritic, north-temperate or temperate species. (YAMAZI, 1959, p. 157)

**Rhizosolenia stolterfothii** PÉRAGALLO

Very common, from spring to summer, neritic sometimes oceanic, very widespread, south-temperate or tropical species. (YAMAZI, 1959, p. 42)

**Rhizosolenia styliformis** BRIGTWELL

Common from spring to autumn. Oceanic, temperate and north-temperate species.

**Rhizosolenia styliformis** var. **latissima** BRIGHTWELL

Commonest in early summer but frequently in warm season. Oceanic, temperate and north-temperate species. (YAMAZI, 1959, p. 204)

Suborder *BIDDULPHIINEAE*

Family 8. Bacteriastreae

**Bacteriastrum comosum** PAVILLARD

IKARI (1927); YAMAZI, (1959, p. 160)

**Bacteriastrum comosum** var. **hispida** (CASTR.) SCHRÖDER

IKARI (1927); YAMAZI, (1959, p. 160)

**Bacteriastrum delicatulum** CLEVE

Common in the bay, in summer and autumn. Oceanic, temperate species.

**Bacteriastrum elongatum** CLEVE

Rare, in summer and autumn. Oceanic, temperate species. (IKARI, 1927)

**Bacteriastrum elongatum** CLEVE var. **diversum** IKARI

IKARI (1927).

**Bacteriastrum hyalinum** LAUDER

Common in the bay, in almost all seasons. Neritic, littoral form. (YAMAZI, 1959, p. 64)

**Bacteriastrum hyalinum** LAUDER var. **princeps** (CASTRACANE) IKARI

Nertic, warm-water species, common.

**Bacteriastrum mediterraneum** PAVILLARD

IKARI (1927).

**Bacteriastrum minum** KARSTEN

In summer, rarer in the bay (IKARI, 1927).

**Bacteriastrum biconicum** PAVILLARD

Rare in the bay (IKARI, 1927).

**Bacteriastrum varians** LAUDER

Commonest *Bacteriastrum* in our region, in almost all seasons, sometimes in swarms inside. Neritic and littoral, widespread form.

Family 9. Chaetoceraceae

**Chaetoceros (Phaeoceros) atlanticus** CLEVE

Rarer in the bay, in coldest season. Oceanic, typically northern, arctic and boreal form. (YAMAZI, 1959, p. 205, 213)



- Chaetoceros (Phaeoceros) atlanticus** var. **neapolitanus** (SCHRÖDER) HUSTEDT  
Oceanic southern, temperate or subtropical form. Rarer, found occasionally in summer and autumn. (YAMAZI, 1959, p. 157, 203)
- Chaetoceros (Phaeoceros) coarctatus** LAUDER  
Rather common but never abundant. Oceanic, subtropical or tropical form. (YAMAZI, 1959, p. 103, 158)
- Chaetoceros (Phaeoceros) castracanei** KARSTEN  
Oceanic form. (IKARI, 1926)
- Chaetoceros (Phaeoceros) dadayi** PAVILLARD  
Very rarely found in warm season, in open sea water off Sirahama. Oceanic, tropical form.
- Chaetoceros (Phaeoceros) danicus** CLEVE  
Rarer in littoral zone. North-temperate species.
- Chaetoceros (Phaeoceros) densus** CLEVE  
Commonly found in cold season. Widespread, northern species.
- Chaetoceros (Phaeoceros) denticulatum** LAUDER  
Rare in the bay, in open sea water off Sirahama. Oceanic, subtropical species. (YAMAZI, 1959, p. 158)
- Chaetoceros (Phaeoceros) Eibonii** GRUNOW  
Fairly common, in open sea water. Neritic, temperate species. (YAMAZI, 1959, p. 158)
- Chaetoceros (Phaeoceros) indicum** KARSTEN [= *C. nanodenticulatum* OKAMURA]
- Chaetoceros (Phaeoceros) okamurai** IKARI  
Rarely found in the bay. (IKARI, 1928)
- Chaetoceros (Phaeoceros) pendulus** KARSTEN  
Rarely found in open sea water, in summer and autumn. Oceanic, temperate or subtropical form.
- Chaetoceros (Phaeoceros) peruvianus** BRIGHTWELL  
Commonly found in open water almost in warm season. Oceanic, temperate or tropical form. (YAMAZI, 1959, p. 159)
- Chaetoceros (Phaeoceros) pseudodichaeta** IKARI  
(IKARI (1926).
- Chaetoceros (Phaeoceros) rostratus** LAUDER  
Very rare in the bay, in warm season. Oceanic, subtropical species.
- Chaetoceros (Phaeoceros) tetrastichon** CLEVE  
Very rarely found, occasionally in warm season, in open sea water. Oceanic, subtropical and south-temperate species.
- Chaetoceros (Hyalochaete) affinis** LAUDER [= *C. Schüttii* CLEVE ; *C. javanicum* CLEVE]  
Commonest *Chaetoceros* in our region, throughout the year, from spring to autumn. Neritic, south-temperate but frequently widespread. (YAMAZI, 1959, p. 139)
- Chaetoceros (Hyalochaete) anastomosans** GRUNOW  
Rare, occasionally met with in warm season. Neritic, south-temperate species.
- Chaetoceros (Hyalochaete) brevis** SCHÜTT  
Rare, in warm season. Neritic, south-temperate warm-water species. (YAMAZI, 1959, p. 140)

**Chaetoceros (Hyalochaete) compactum** IKARI

Rare, in the innermost part of the bay, in summer. Neritic and littoral form. (YAMAZI, 1959, p. 142)

**Chaetoceros (Hyalochaete) compressus** LAUDER

One of the most abundant species, everywhere, throughout the year, especially in spring and autumn. Neritic, from boreal to south temperate. (YAMAZI, 1959, p. 138)

**Chaetoceros (Hyalochaete) constrictus** GRAN

Common in winter and spring. Neritic, north-temperate, cold water species. (YAMAZI, 1959, p. 139)

**Chaetoceros (Hyalochaete) costatus** PAVILLARD

Rare, in late summer and autumn, inside the bay. Neritic, warm-water subtropical species. (YAMAZI, 1959, p. 140)

**Chaetoceros (Hyalochaete) curvisetus** CLEVE

Very common, in the innermost part of the bay. Neritic, south-temperate species. (YAMAZI, 1959, p. 203)

**Chaetoceros (Hyalochaete) debilis** CLEVE

Common but not abundant, in cold seasons. Neritic, north-temperate species. (YAMAZI, 1959, p. 142)

**Chaetoceros (Hyalochaete) decipiens** CLEVE

Very abundant, chiefly in winter and spring, inside and outside the bay, one of the most abundant *Chaetoceros*. Oceanic and neritic widely distributed, northern form. (YAMAZI, 1959, p. 137)

**Chaetoceros (Hyalochaete) decipiens f. singularis** GRAN

North-temperate species.

**Chaetoceros (Hyalochaete) didymus** EHRENBERG

Common in spring and summer. Neritic, south-temperate species. (YAMAZI, 1959, p. 137)

**Chaetoceros (Hyalochaete) didymus var. protuberans** (LAUDER) GRAN & YENDO

Very common in cold seasons. Euryhaline and eurythermal species.

**Chaetoceros (Hyalochaete) didymus var. anglica** (GRUNOW) GRAN

Very common, in warm seasons than var. *protuberans*, from early summer to autumn. Eurythermal form. (YAMAZI, 1959, p. 138)

**Chaetoceros (Hyalochaete) distans** CLEVE

Common in the inlet waters, in summer. Neritic, warm-water species. (YAMAZI, 1959, p. 18, 140)

**Chaetoceros (Hyalochaete) diversus** CLEVE

Very rare, in outside waters, in summer and autumn. Neritic, tropical and subtropical species. (YAMAZI, 1959, p. 24, 159)

**Chaetoceros (Hyalochaete) Frichei** HUSTEDT

In the inlet waters. (IKARI, 1926)

**Chaetoceros (Hyalochaete) hispidum** BRIGHTWELL

Warm-water species (IKARI, 1926)

**Chaetoceros (Hyalochaete) lacinosus** SCHÜTT

Fairly common, in summer, inside the bay. Neritic, south-temperate and subtropical species.

**Chaetoceros (Hyalochaete) lauderi** RALFS.

Not common, chiefly in summer. Neritic, warm-water species. (YAMAZI, 1959, p. 137)

**Chaetoceros (Hyalochaete) Lorenzianus** GRUNOW

Very common almost everywhere, from early summer to autumn. Neritic, subtropical and temperate, widespread form. (YAMAZI, 1959, p. 25, 137)

**Chaetoceros (Hyalochaete) messanensis** CASTRACANE [=*C. furca* CLEVE]

Found occasionally in open sea water outside the bay, in summer and autumn. Oceanic tropical and subtropical species. (YAMAZI, 1959, p. 159)

**Chaetoceros (Hyalochaete) paradoxus** CLEVE

Common inside, in warm season. Neritic, subtropical, warm-water species. (YAMAZI, 1959, p. 140)

**Chaetoceros (Hyalochaete) pelagicus** CLEVE

Common inside the bay, in warm season. Neritic, temperate form.

**Chaetoceros (Hyalochaete) pseudocurvisetus** MANGIN

Not common, in the inlet, in warm season. Neritic. Tropical and subtropical species. (YAMAZI, 1959, p. 141)

**Chaetoceros (Hyalochaete) radicans** SCHÜTT [=*C. scolopendra* CLEVE]

Very abundant in the inlet waters, throughout the year, especially in spring and summer. Neritic, north temperate species. (YAMAZI, 1959, p. 142)

**Chaetoceros (Hyalochaete) seiracanthus** GRAN

Rare, in winter and spring, inside the inlet. Neritic and bittoral zone, north-temperate form but widely distributed. (YAMAZI, 1959, p. 64, 141)

**Chaetoceros (Hyalochaete) setoensis** IKARI

Common, inside the inlet. Neritic, warm-water form.

**Chaetoceros (Hyalochaete) siamensis** OSTENFELD

Rare, in the inlet, from summer to autumn. Neritic, warm-water species. (YAMAZI, 1959, p. 139)

**Chaetoceros (Hyalochaete) socialis** LAUDER

Common and often very abundant inside the bay, in winter and early spring. Neritic, north-temperate, cold-water species. (YAMAZI, 1959, p. 48)

**Chaetoceros (Hyalochaete) subsecundus** (GRAN) HUSTEDT [=*C. diadema* (EHRENBERG) CLEVE]

Common from winter to spring, inside the inlet. Neritic. Cold water species but widespread. (YAMAZI, 1959, p. 39, 141)

**Chaetoceros (Hyalochaete) tortissimus** GRAN

Very rare, in the inlet, in the cold season during winter and spring. Neritic, north-temperate species. (YAMAZI, 1959, p. 142)

**Chaetoceros (Hyalochaete) Van Heurckii** GRAN

Common, inside the bay, from winter to early spring. Neritic, widespread, probably confused with *Ch. constrictus*. (YAMAZI, 1959, p. 64, 139)

**Chaetoceros (Hyalochaete) Weissflogii** SCHÜTT

Not common inside the bay, especially in summer and autumn. Neritic, warm-water form. (YAMAZI, 1959, p. 137)

Family 10. Biddulphiaceae

**Bellerochea malleus** (BRIGHTWELL) VAN HEURCK

Very rare, in the bay, and in the open water, in summer. Neritic, warm-water species. (YAMAZI, 1959, p. 151)

**Biddulphia aurita** (LYNGB.)

Rare in the bay, in cold season. Neritic and littoral, widely distributed, but northern species. (YAMAZI, 1959, p. 207)

**Biddulphia longicuris** GREVILLE var. **japonica** GRUNOW

Rare in the bay, in summer and autumn. Neritic. Warm-water species. (YAMAZI, 1959, p. 150)

**Biddulphia mobiliensis** BAILEY

Not very common, in summer season. Neritic, widely distributed, truly planktonic, temperate and south-temperate species. (YAMAZI, 1959, p. 149)

**Biddulphia pulchella** GRAY [= *B. biddulphiana* BAYER]

Occurs in plankton accidentally (tichopelagic) in spring and summer but a bottom form. (YAMAZI, 1959, p. 149)

**Biddulphia sinensis** GREVILLE

Found occasionally in warm seasons, outside the bay. Oceanic. Warm-water species, but sometimes common in littoral. (YAMAZI, 1959, p. 65, 150)

**Biddulphia Tuomeyi** (BAIL)

Very rare, widely distributed, neritic form.

**Cerataulina Bergonii** H. PÉRAGALLO

Rare in the inlet, in summer and autumn. Neritic, south-temperate species. (YAMAZI, 1959, p. 150)

**Cerataulina compacta** OSTENFELD

Rare, in the open sea water at the mouth, in summer and autumn. Neritic, south-temperate and subtropical species.

**Ditylum Brightwelli** (WEST) GRUNOW

Common in the inlet, in autumn and winter. Neritic, south-temperate species. (YAMAZI, 1956, p. 63)

**Ditylum sol** GRUNOW

Common but not abundant, in the open sea water, in summer and autumn. Neritic, south-temperate and subtropical species. (YAMAZI, 1959, p. 23, 63)

**Hemiaulus Haucki** GRUNOW

Very rare, found occasionally in open sea water, in summer and autumn. Oceanic or neritic, temperate and subtropical form.

**Hemiaulus membranaceus** CLEVE

Very rare, in the offshore water near the mouth of the bay, in warm season. Probably oceanic, tropical species.

**Hemiaulus sinensis** GREVILLE

Not very common, in open sea water outside the bay, from summer to autumn. Neritic. South-temperate or subtropical form. (YAMAZI, 1959, p. 204)

**Lithodesmium undulatum** EHRENBERG

Very rare, in summer season. Neritic, south-temperate species.

**Triceratium favus** EHRENBERG

Very rare, occasionally in warm seasons. Tichopelagic, widely distributed in the bay. (YAMAZI, 1959, p. 151)

**Triceratium gibbosum** BAIL

Common inside in the bay, in spring. Neritic, tichopelagic species, widely distributed. (YAMAZI, 1959, p. 149)

**Triceratium reticulum** EHRENBERG

Very rare, in the bay, in warm seasons. (YAMAZI, 1959, p. 151)

**Triceratium revale** A. SCHMIDT

Very rare, in spring and autumn, neritic, tichopelagic, widely distributed. (YAMAZI, 1959, p. 151)

## Family 11. Eucampiaceae

**Climacodium biconcavum** CLEVE

Very rare, in the open sea water, in summer and autumn. Oceanic, south-temperate and tropical species. (YAMAZI, 1959, p. 39, 160)

**Climacodium Frauenfeldianum** GRUNOW

Very rare, in the open sea water, outer part of the bay, in warm season. Oceanic, tropical or subtropical species. (YAMAZI, 1959, p. 41, 203)

**Eucampia cornuta** (CLEVE) GRUNOW

Rarely found in the open sea water, in warm season. Neritic, tropical species. Warmer water species than *E. zodiacus*.

**Eucampia zodiacus** EHRENBERG

Abundant, sometimes in swarms, from autumn to spring. Neritic, south-temperate form. (YAMAZI, 1959, p. 42, 133)

**Streptotheca indica** KARSTEN

Very rare, in open sea water, in summer and autumn. (YAMAZI, 1959, p. 39, color pl. 4)

**Streptotheca thamensis** SCHRUBSOLE

Very rare, in the inlet, from autumn to spring. Neritic, north-temperate species.

## Order PENNALES

## Suborder ARAPHIDINEAE

## Family 12. Fragilariaceae

**Asterionella japonica** CLEVE

Common in the bay, in winter and spring, rare in summer. Neritic, south-temperate, widely distributed species. (YAMAZI, 1959, p. 44)

**Asterionella kariana** GRUNOW

Rarer in the bay, in cold season. Neritic, cold-water species.

**Asterionella notata** GRUNOW

Rarer in the bay, in cold season. (YAMAZI, 1959, p. 147)

**Thalassionema** (=Thalassiothrix) **nitzschioides** GRUNOW

Present throughout the year common inside the bay, especially in summer and autumn. Neritic and littoral, widespread, temperate species. (YAMAZI, 1959, p. 49)

**Thalassiothrix Frauenfeldii** GRUNOW

Very abundant in neritic, littoral and oceanic zone. Occurs in almost all seasons, especially in summer and autumn. South-temperate form. (YAMAZI, 1959, p. 44, 133)

**Thalassiothrix longissima** CLEVE & GRUN.

Common, in the bay, especially from autumn to spring. Oceanic, north-temperate and boreal species, widespread. (YAMAZI, 1959, p. 32)

Family 13. Tabellariaceae

**Climacosphenia moniligera** EHRENBERG

Littoral, in innermost region, abundant in warm seasons. Tichopelagic form. (YAMAZI, 1959, p. 152)

**Climacosphenia** sp.

**Licmophora abbreviata** AGARDH [=*L. Lyngbyei* (KÜTZ.) GRAN]

Littoral, occurs in plankton accidentally but a bottom species. Widely distributed. (YAMAZI, 1959, p. 146)

**Licmophora flabellata** (GARM.) AGARDH.

Common in the inlet waters, in spring and summer, neritic, tichopelagic. (YAMAZI, 1959, p. 145)

**Rhabdonema adriaticum** KÜTZING

Ubiquitous, temperate-water species. (YAMAZI, 1959, p. 41, 151)

**Striatella unipunctata** (LYN.) AGARDH

Common in the innermost area. Tichopelagic, temperate species. (YAMAZI, 1959, p. 41, 148)

Family 14. Achnanthaceae

**Achnanthes longipes** AGARDH

Tichopelagic, littoral, north-temperate species. (YAMAZI, 1959, p. 18)

**Cocconeis scutellum** EHRENBERG

Very rare, often found in plankton but a bottom form.

Suborder *BIRAPHIDINEAE*

Family 15. Naviclaceae

**Amphora laevis** GREG. [=*A. nobilis* FLÖGEL]

Very rare, in inlet waters, littoral, tichopelagic species. Rare in warm season. (YAMAZI, 1959, p. 148)

**Pleurosigma angulatum** (QUEK.) W. SMITH

Occurs in plankton accidentally (tichopelagic), widespread, neritic and littoral species, very rare. (YAMAZI, 1959, p. 155)

**Pleurosigma intermedium** W. SMITH

Very rare, in inlet waters, in summer season, tichopelagic, littoral species. (YAMAZI, 1959, p. 154)

## Family 16. Epithemiaceae

**Denticula** sp. 1

Very rare, in the inner part of the inlet.

**Denticula** sp. 2

(YAMAZI, 1959, p. 207, 208)

## Family 17. Nitzschiaceae

**Nitzschia closterium** W. SMITH

Common, in the inlet waters, throughout the year, frequently in the plankton, widely distributed, euryhaline species. (YAMAZI, 1959, p. 153)

**Nitzschia delicatissima** CLEVE

Common in the inlet waters, from autumn to spring, ubiquitous but northern species.

**Nitzschia longissima** (BRÉB.) GRAN

Rare, in the bay water, in spring and summer. Littoral, tichopelagic species. Never in large numbers. (YAMAZI, 1959, p. 153)

**Nitzschia longissima** var. **reversa** W. SMITH

Very rare, in bay water in summer to winter. Tichopelagic, littoral species.

**Nitzschia pacifica** CUPP

Rare in the bay, in spring and summer, neritic, sporadically oceanic, temperate-water species. Present with *N. seriata*. (YAMAZI, 1959, p. 45, 133, 153)

**Nitzschia** (=Bacillaria) **paradoxa** GMELIN

Rare in inlet waters, in spring and summer. Widespread, euryhaline, littoral, marine and brackish-water, tichopelagic species. (YAMAZI, p. 45, 133, 153)

**Nitzschia seriata** CLEVE

Very common, all the year round, inside and outside the bay, ubiquitous. Euryhaline and eurythermal, neritic and littoral species. (YAMAZI, 1959, p. 133)

**Nitzschia sigma** (KÜTZ.) W. SMITH

Very rare, in the inlet waters. Widespread, tichopelagic species. (YAMAZI, 1959, p. 153)

Suborder *SURIRELLINEAE*

## Family 18. Surirellaceae

**Campylodiscus undulatus** GREV.

Very rare, in the inlet waters. Littoral, tichopelagic species.

**Surirella cuneata** A. S.

Very rare, in spring and autumn. Littoral, tichopelagic species.

## Phylum PROTOZOA

### Class MASTIGOPHORA

#### Order CHRYSOMONADINA

**Dictiocha fibula** (EHRENBERG)

Very common, centrifuged, in the inner part of the bay. (YAMAZI, 1959, p. 128)

**Dictiocha fibula** var. **stapedia** (HAECKEL) LEMMERMANN

Occasionally common, centrifuged, in the inner part of the bay. Found in Sept. (IKARI, MS)

**Distephanus speculum** (EHRENBERG)

Rare, centrifuged, inside the bay. (YAMAZI, 1959, p. 212; IKARI, MS)

**Distephanus speculum** var. **pentagonum** SCHULZ

Rare, centrifuged in the innermost part of the bay. Found in October. (IKARI, MS)

**Distephanus speculum** var. **polyactis** (EHRENBERG) LEMMERMANN

Rare, centrifuged, in the innermost part of the inlet, in July. (IKARI, MS)

**Mesocera polymorpha** var. **bioctonaria** (EHRBG.) LEMMERMANN

Rare, centrifuged, inside the bay. Found in October. (IKARI, MS)

#### Order DINOFLAGELLATA

##### Family 1. Noctilucidae

**Noctiluca scintillans** MACARTNEY

Very common, throughout the year, almost everywhere, especially in the innermost area of inlets, sometimes very abundant in swarms from early winter to spring. Ubiquitous species. (YAMAZI, 1959, p. 52, 62, 118)

##### Family 2. Phytodinidae

**Pyrocystis fusiformis** MURRAY

Very rare, found in warm seasons, in the open sea water outside the bay. Oceanic, warm-water form. (YAMAZI, 1959, p. 172)

**Pyrocystis hamulus** CLEVE var. **inaequalis** SCHRÖDER

Very rare, in summer, outside the bay. Oceanic, warm-water species. (YAMAZI, 1959, p. 61, 172)

**Pyrocystis hamulus** CLEVE var. **semicircularis** SCHRÖDER

Very rare, in open sea water outside the bay. Oceanic, warm-water species.

**Pyrocystis lunula** SCHÜTT

Rare, in open-sea water, in late spring and summer. Oceanic, widespread species.

**Pyrocystis noctiluca** MURRAY

Fairly common, in warm season, in open sea waters. Oceanic, ubiquitous, warm-water species. (YAMAZI, 1959, p. 52, 61, 123, 172)



## Family 3. Prorocentridae

**Prorocentrum micans** EHRENBERG

Rare, in the innermost part of the inlet but sometimes common, centrifuged, neritic and littoral form. (YAMAZI, 1959, p. 161)

## Family 4. Peridiniidae

**Amphysolenia bidentata** SCHRÖDER

Occasionally caught outside the bay, in summer and autumn. Oceanic, warm-water species. (YAMAZI, 1959, p. 162)

**Amphysolenia thrinax** SCHÜTT

Rare, in open sea outside the bay, in summer and autumn. Oceanic, warm-water species. (YAMAZI, 1959, p. 162)

**Blepharocysta splendor maris** EHRENBERG

Very rare but occasionally found in open sea water near the mouth, in summer and autumn. Oceanic, warm-water species.

**Ceratium belone** CLEVE

Rare, in the mouth of the bay, in warm season. (YAMAZI, 1959, p. 166)

**Ceratium candelabrum** (EHRENBERG) STEIN

Very rare, found outside the bay, in summer and autumn. Warm-water, oceanic species. (YAMAZI, 1959, p. 171).

**Ceratium candelabrum** var. **dilatatum** (GOURR.) JÖRGENSEN

Very rare, in open sea water outside, in warm seasons. (YAMAZI, 1959, p. 62)

**Ceratium carriense** GOURRET

Rare, at the mouth of the bay, in summer and autumn. Oceanic, warm-water species, in Kuroshio Current. (YAMAZI, 1959, p. 167)

**Ceratium carriense** f. **ceylanicum** (B. SCHRÖD.) JÖRGENSEN

Outside, rare, in warm water season. Oceanic, in warm Kuroshio Current. (YAMAZI, 1959, p. 28, 168)

**Ceratium contortum** (GOURR.) CLEVE

Very rare, in open sea water, warm seasons. Oceanic species.

**Ceratium deflexum** (KOFROID) JÖRGENSEN

Very rare, in open sea outside the bay, in summer and autumn. Oceanic, warm-water species. (YAMAZI, 1959, p. 167)

**Ceratium extensum** (GOURRET) CLEVE

Very rare, open-sea water, summer and autumn. Ubiquitous, warm-water species.

**Ceratium furca** (EHRENBERG) DUJARDIN

Very common, found almost everywhere, especially inside the bay, in spring and summer. Widespread species. (YAMAZI, 1959, p. 128, 165).

**Ceratium furca eugrammum** JÖRGENSEN

Common, inside the bay, spring and summer.

**Ceratium fusus** (EHRENBERG) DUJARDIN

Common, inside and outside the inlet, in summer. (YAMAZI, 1959, p. 32, 166)

- Ceratium fusus seta** (EHRENBERG) JÖRGENSEN  
Common, inside and outside the bay, in summer (YAMAZI, 1959, p. 166)
- Ceratium gibberum** GOURRET  
Outside the inlet, rare, in summer and autumn. Warm-water species. (YAMAZI, 1959, p. 170)
- Ceratium gibberum f. sinistrum** GOURRET  
Outside the inlet, rare, in summer and autumn. (YAMAZI, 1959, p. 43)
- Ceratium gravidum** GOURRET  
Very rare, found outside the inlet, in summer and autumn. Oceanic, warm-water species. (YAMAZI, 1959, p. 36)
- Ceratium incisum** (KARSTEN) JÖRGENSEN  
Very rare, found in the open sea water off the inlet, in summer and autumn. Warm water species. (YAMAZI, 1959, p. 166)
- Ceratium inflexum** (GOURRET) KOFOID  
In open sea water, very rare, in summer and autumn. Offshore-water form.
- Ceratium intermedium** (JÖRG.) JÖRGENSEN  
Found almost everywhere, throughout the year, especially in summer and autumn. (YAMAZI, 1959, p. 168, 169)
- Ceratium Kofoidi** JÖRGENSEN  
Rare, in open sea water near the mouth, in summer and autumn. Warm water form. (YAMAZI, 1959, p. 165)
- Ceratium macroceros** (EHRENBERG) CLEVE  
Occasionally common, outside the bay, in summer and autumn. Warm water form. (YAMAZI, 1959, p. 168).
- Ceratium massiliense** (GOURRET) JÖRGENSEN  
Common, open sea water near the mouth, in summer and autumn. (YAMAZI, 1959, p. 169)
- Ceratium molle** KOFOID  
Rare, outside the inlet, in warm season. Oceanic, warm-water species. (YAMAZI, 1959, p. 169)
- Ceratium palmatum var. ranipes** (CLEVE) JÖRGENSEN  
Very rare, found occasionally outside the bay, in warm seasons. (YAMAZI, 1959, p. 31)
- Ceratium pentagonum** GOURRET  
Sometimes in numbers in open sea waters, in warm season.
- Ceratium pennatum** KOFOID  
Rare, in open sea water, warm-water form. (YAMAZI, 1959, p. 166)
- Ceratium platycorne** V. DADAY  
Very rare, in open water, summer and autumn, oceanic, warm-water species.
- Ceratium pulchellum** SCHRÖDER  
Rare, outside the inlet, in summer and autumn. Oceanic, warm-water species.
- Ceratium reticulum** (POCHET) f. **contortum** (LEMM.)  
Very rare, in summer, warm water species.
- Ceratium strictum** (OKAMURA et NISHIKAWA) KOFOID  
Outside the bay, very rare, in summer and autumn. Warm-water form. (YAMAZI, 1959, p. 166)

**Ceratium sumatranum** (KARSTEN) JÖRGENSEN

Fairly common, outside the bay, in summer and autumn, warm-water species. (YAMAZI, 1959, p. 43, 62)

**Ceratium sumatranum f. angulatum** JÖRGENSEN

Rare, outside the bay, in summer and autumn. Oceanic, warm-water species. (YAMAZI, 1959, p. 170)

**Ceratium tenue** (OSTF. et SCHM.) JÖRGENSEN

Outside the inlet, warm water species.

**Ceratium tenue** var. **buceros** (ZACHARIAS) JÖRGENSEN

Warm water species. (YAMAZI, 1959, p. 168)

**Ceratium trichoceros** (EHRENBERG) KOFOID

Very common at times in swarm, in warm seasons. (YAMAZI, 1959, 168)

**Ceratium tripos** (O. F. MÜLLER) NITSCH.

Very common, inside and outside the inlet, in summer and autumn. Widely distributed (YAMAZI, 1959, p. 171)

**Ceratium vultur** CLEVE

Very rare, in open sea waters near the mouth, in summer. Oceanic, warm-water species. (YAMAZI, 1959, p. 169)

**Ceratium** sp. 1

(YAMAZI, 1959, p. 166)

**Ceratium** sp. 2

(YAMAZI, 1959, p. 170)

**Ceratocoris horrida** STEIN

Fairly common, in open sea water, in summer and autumn. Oceanic, warm-water species.

**Dinophysis hastatus** STEIN

Very rare, in open water outside the bay, in summer and autumn.

**Dinophysis homunculus** STEIN

Rare, in open sea outside the bay, in warm seasons. YAMAZI, 1959, p. 161)

**Dinophysis homunculus f. pedunculatus** SCHMIDT

Occasionally outside the bay, summer and autumn. Warm-water species.

**Dinophysis ovum** SCHÜTT

Early spring and summer, very rare in inner part of the bay.

**Diplopsalis lenticula** BERGH

Rare, found inside and outside the bay, in early spring and summer. (YAMAZI, 1959, p. 163)

**Glenodinium danicum** PAULSEN?

Common at times, in summer, inside the inlet. (YAMAZI, 1959, p. 128)

**Goniaulax polygramma** STEIN

Rare, in the inlet. Warm-water, neritic species.

**Goniodoma polyedricum** (POUCHET)

Very rare, in open sea water, in summer. Oceanic, warm-water species.

**Orinthocercus magnificus** STEIN

Only once found outside the bay, in summer, oceanic, warm-water species. (YAMAZI, 1959, p. 161)

**Orinthocercus splendidus** STEIN

Very rare, found occasionally in summer. Oceanic, warm-water species.

**Oxytoxum milneri** MÜRR. et WHITT.

Very rare, in the open sea, in summer. Tropical, oceanic form.

**Oxytoxum scolopax** STEIN

Very rare, in open sea water, in summer. Oceanic, tropical species.

**Peridinium conicum** (GRAN) OSTENFELD et SCHMIDT

Common, inside and outside the bay, widespread. (YAMAZI, 1956, p. 163)

**Peridinium crassipes** KOFOID

Fairly common, in open-sea water outside and inside the bay, from winter to early summer.

**Peridinium depressum** BAILEY

Common, in open sea water outside the bay, in summer and autumn, widespread. (YAMAZI, 1959, p. 53, 163)

**Peridinium globulum** STEIN

Very rare, inside and outside the bay, in summer and autumn.

**Peridinium grande** KOFOID

Common, inside and outside the bay, widely distributed.

**Peridinium Granii** OSTENFELD

Rare, inside and outside, in summer and autumn.

**Peridinium longipes** KARSTEN

Very rare in open sea water, in summer and autumn. (YAMAZI, 1959, p. 161)

**Peridinium oceanicum** VANHÖFFEN var. **oblongum** AURIV.

Common, in the innermost part of the bay, in summer and autumn. Neritic and littoral species. (YAMAZI, 1959, p. 128, 164)

**Peridinium pallidum** OSTENFELD

Not very common in the bay, from early summer to autumn.

**Peridinium pentagonum** GRAN

Not common, in spring and summer, inside and outside the bay. (YAMAZI, 1959, p. 164)

**Peridinium pyriforme** PAULSEN

Rarer, inside and outside the bay, in summer and autumn.

**Peridinium sphaericum** OKAMURA

Very rare, in the inner part, in summer and autumn.

**Peridinium steinii** JÖRGENSEN

Rare, inside and outside the bay, in summer and autumn.

**Pyrophacus horologicum** STEIN

Common in the open sea, in warm season. Oceanic, tropical or subtropical species. (YAMAZI, 1959, p. 34)

**Triposolenia bicornis** (KOFOID)

Very rare, outside the bay, in summer. Oceanic, tropical species.

## Class SARCODINA

## Order FORAMINIFERA

**Globigerina bulloides** D'ORBIGNY

Sometimes frequent, in summer and autumn. Oceanic, warm-water species. (YAMAZI, 1959, p. 26)

**Orbulina universa** D'ORBIGNY

Very rare, outer part of the bay, in warm season. Oceanic, warm-water species.

**Tretomphalus bulloides** (D'ORBIGNY)

Very rare, only once found outside the inlet, in summer. Oceanic, warm-water species.

## Order RADIOLARIA

|   |                        |
|---|------------------------|
| <b>Abyla</b> sp.                            | (YAMAZI, 1959, p. 177) |
| <b>Abylopsis</b> sp.                        | (YAMAZI, 1959, p. 177) |
| <b>Acanthochiasma</b> sp.                   | (YAMAZI, 1959, p. 173) |
| <b>Acanthometron pellucidum</b> (J. MÜLLER) | (YAMAZI, 1959, p. 174) |
| <b>Acanthonina crux</b> CLEVE               | (YAMAZI, 1959, p. 173) |
| <b>Amphilonche belonoides</b> HAECKEL       |                        |
| <b>Amphibelone</b> sp.                      | (YAMAZI, 1959, p. 173) |
| <b>Amphipule</b> sp.                        | (IKARI, MS.)           |
| <b>Anchylometra</b> sp.                     | (YAMAZI, 1959, p. 180) |
| <b>Astroma</b> sp.                          | (YAMAZI, 1959, p. 175) |
| <b>Aulacantha scolimantha</b> HAECKEL       | (YAMAZI, 1959, p. 173) |
| <b>Aulosphaera cruciata</b> HAECKEL         |                        |
| <b>Cladococcus</b> sp.                      | (IKARI, MS.)           |
| <b>Coelodendrum</b> sp.                     | (IKARI, MS.)           |
| <b>Colozoum amoeboides</b> HAECKEL          | (IKARI, MS.)           |
| <b>Colozoum inerme</b> HAECKEL              | (YAMAZI, 1959, p. 47)  |
| <b>Cromyomma</b> sp.                        | (YAMAZI, 1959, p. 174) |
| <b>Diploconcus</b> sp.                      | (IKARI, MS.)           |
| <b>Drymosphaera polygonalis</b> HAECKEL     | (YAMAZI, 1959, p. 174) |
| <b>Eusyngium</b> sp.                        | (IKARI, MS.)           |
| <b>Gazelletta hexanema</b> HAECKEL          |                        |
| <b>Gazelletta</b> sp.                       |                        |
| <b>Heliocladus</b> sp.                      | (YAMAZI, 1959, p. 175) |
| <b>Hexalonche</b> sp.                       | (YAMAZI, 1959, p. 174) |
| <b>Lychnocanium</b> sp.                     | (YAMAZI, 1959, p. 202) |
| <b>Lithophyllum</b> sp.                     | (IKARI, MS.)           |
| <b>Octopyle</b> sp.                         | (IKARI, MS.)           |
| <b>Polysolenia</b> sp.                      | (YAMAZI, 1959, p. 202) |

|                                      |                        |
|--------------------------------------|------------------------|
| <b>Pterocanium</b> sp.               |                        |
| <b>Sphaerozoum geminatum</b> HAECKEL | (YAMAZI, 1959, p. 46)  |
| <b>Sphaerozoum</b> sp.               | (IKARI, MS.)           |
| <b>Staurocantha</b> sp.              | (YAMAZI, 1959, p. 175) |
| <b>Staurosphaera</b> sp.             | (YAMAZI, 1959, p. 174) |
| <b>Tetraspyris</b> sp.               | (IKARI, MS.)           |
| <b>Trizone brandti</b> POP.          | (YAMAZI, 1959, p. 175) |
| <b>Zonidium</b> sp.                  | (YAMAZI, 1959, p. 202) |

Order HELIOZOA

**Sticholonche zanclea** (O. SCHRÖDER)

Very abundant, in the inner part of the inlet, throughout the year, especially in spring and autumn. Neritic and littoral, ubiquitous species. (YAMAZI, 1959, p. 26, 212)

Class CILIOPHORA

Subclass CILIATA

Order HOLOTRICHA

Suborder TINTINNOINEA

Family 1. Tintinnidae

**Leptotintinnus nordqvisti** (BRANDT)

Rare, inside and outside the bay, from early summer to autumn. Neritic, warm-water species. In October (IKARI, MS.)

Family 2. Codonellidae

**Codonella inflata** KOFOID et CAMPBELL

Warm water species. Found in September (IKARI, MS.)

**Tintinnopsis aperta** var. **tocantinensis** KOFOID et CAMPBELL

Rare, inside the bay, in warm seasons. Neritic, warm-water species. In October (IKARI, MS.)

**Tintinnopsis beroidea** STEIN

Very common, throughout the year, especially in spring and summer. Neritic, eurythermal, from tropical to boreal. (YAMAZI, 1959, p. 129)

**Tintinnopsis cylindrica** DADAY

Common, inside the inlet, in summer season. Neritic, warm-water form.

**Tintinnopsis gracilis** KOFOID et CAMPBELL

Rare, inside the inlet, in summer. Neritic, warm-water form. (YAMAZI, 1959, p. 129)

**Tintinnopsis karajacensis** BRANDT

Rare, inside and outside the bay, in warm seasons. Neritic, warm-water species. In September. (IKARI, MS.)

**Tintinnopsis mortensenii** SCHMIDT

Rare, found occasionally in summer and spring. Neritic, warm-water species. (YAMAZI, 1959, p. 129)

**Tintinnopsis radix** (IMHOF)

Very common, at sometimes in swarms, in the innermost part of the bay. Neritic, stenothermal, warm-water form. (YAMAZI, 1959, p. 128, 129)

**Tintinnopsis tubulosa** LEVANDER

Very rare, in winter and spring. Neritic, cold-water species.

## Family 3. Codonellopsidae

**Codonellopsis morchella** (CLEVE)

Very rare, found occasionally throughout the year. Neritic, eurythermal from tropical to boreal. (YAMAZI, 1959, p. 176). In September (IKARI, MS.)

**Codonellopsis nipponica** HADA

Very rare, neritic, warm water form.

**Codonellopsis parva** KOFOID et CAMPBELL

Rare, in summer, oceanic, warm-water species. (YAMAZI, 1959, p. 176, 202). In September (IKARI, MS.)

**Codonellopsis ostenfeldi** (SCHMIDT)

Very rare, neritic, warm-water species.

**Stenosemella nivalis** (MEUNIER)

Rare, all the year round, in inlet area. Neritic, eurythermal, from tropical to boreal. In September. (IKARI, MS.)

## Family 4. Coxiellidae

**Coxiella ampula** (JÖRGENSEN)

Very rare, in cold seasons, inside the inlet. Neritic, widespread species. In March. (IKARI, MS.)

**Coxiella longa** (BRANDT)

Oceanic, warm-water species. In September. (IKARI, MS.)

**Helicostomella subulata** (EHRENBERG)

Very rare, outside and inside the bay, in winter and spring. Widely distributed, cold-water species. In March. (IKARI, MS.)

**Helicostomella longa** (BRANDT)

Fairly common, in the innermost part, in spring and summer. Neritic, warm-water species. In September (IKARI, MS.)

## Family 5. Cytarocylidae

**Cytarocylis acutiformis** KOFOID et CAMPBELL

Very rare, outside, in summer. Oceanic, warm-water species. In November. (IKARI, MS.)

**Cytarocylis brandti** KOFOID et CAMPBELL

Very rare, outside the bay, in summer.

**Favella azorica** (CLEVE)

Rare, occasionally found in the bay. Widespread, neritic. Tropical warm-water species.

**Favella ehrenbergii** CLAPARÉDE et LACHMANN

Common in the inlet, summer and autumn. Neritic, warm-water species.

**Favella taraikaensis** HADA

Very common, in the inner part of the bay, late spring and summer. Widespread. Neritic, temperate species. (YAMAZI, 1959, p. 56, 103, 129)

**Poroecus apiculatus** (CLEVE)

Very common, inside, in early summer. Neritic, warm-water species.

Family 6. Ptychocylidae

**Epiplocylix calyx** (BRANDT)

Very rare, in open sea water. Oceanic tropical species. In November. (IKARI, MS.)

**Epiplocylix undella** (OSTENFELD et SCHMIDT)

Very rare, inside and outside the inlet, especially, in summer. Oceanic, tropical warm-water species.

**Epiplocylix undella constricta** KOFOID et CAMPBELL

Very rare, in open sea water near the mouth. Oceanic, warm-water species. (YAMAZI, 1959, p. 202). In September (IKARI, MS.)

**Epiplocyloides lata** KOFOID et CAMPBELL

Very rare, found in open water outside the bay, in summer. In November. (IKARI, MS.) Oceanic, tropical warm-water species.

Family 7. Petalotrichidae

**Metacyclis corbula** KOFOID et CAMPBELL

Very rare. In September (IKARI, MS.)

**Metacyclis mediterranea** (MERESCHKOWSKY)

Very rare, found in open water, summer and autumn. Oceanic, tropical warm-water species.

**Petalotricha ampulla** (FOL)

Oceanic, tropical warm-water species. In October. (IKARI, MS.)

Family 8. Rhabdonellidae

**Protorhabdonella simplex** (CLEVE)

Warm-water species.

**Rhabdonella amor** (CLEVE)

Oceanic. In October. (IKARI, MS.)

**Rhabdonella elegans** JÖRGENSEN

Very rare, in the open sea water outside the inlet, in warm seasons. Oceanic, warm-water species. In October. (IKARI, MS.)



**Rhabdonella poculum** (OSTENFELD et SCHMIDT)

Very rare. Oceanic, warm-water species.

**Rhabdonellopsis apophysata** (CLEVE)

Very rare, open sea water, in summer. Oceanic, warm-water species. In July. (IKARI, MS.)

## Family 9. Xystonellidae

**Xystonellopsis heros** (CLEVE)

Very rare. Oceanic, warm-water species (YAMAZI, 1959, p. 176). In October. (IKARI, MS.)

**Xystonella scandens** (BRANDT)

Oceanic. In November. (IKARI, MS.)

**Xystonella treforti** (DADAY)

Oceanic, warm-water species.

## Family 10. Undellidae

**Undella** (=Proplectella) **claparédei** (ENTZ.)

Very rare, tropical, warm-water species. In October. (IKARI, MS.)

**Undella californiensis** KOFOID et CAMPBELL

Very rare, inside and outside the bay, in cold seasons. Stenothermal, north-temperate species.

## Family 11. Dictyocystidae

**Dictyocysta reticulata** KOFOID et CAMPBELL

Very rare, outside the inlet, in summer. Oceanic, warm-water species.

## Family 12. Tintinnidae

**Amphorella quadrilineata** (CLAP. et LACHMANN)

Rare, inside and outside, in winter and spring. Neritic, ubiquitous, eurythermal form, tropical to boreal.

**Amphorellopsis acuta** (SCHMIDT)

Very rare, occasionally found in summer. Oceanic, warm-water species.

**Dadayiella bulbosa** (BRANDT)

Very rare, found in summer. Oceanic, warm-water species.

**Dadayiella ganimedes** (ENTZ.)

Very rare, found in summer. Oceanic, warm-water species. In September. (IKARI, MS.)

**Salpingella acuminata** (CLAPARÉDE & LACHMANN)

Rare, inside and outside, in spring and summer. Eurythermal, from tropical to boreal. In November. (IKARI, MS.)

**Steenstrupiella steenstrupi** (CLAPARÉDE & LACHMANN)

Very rare, in summer. Oceanic, warm-water species. In November. (IKARI, MS.)

**Tintinnus exiguus** HADA

Rare, all the year round, but in early summer and spring. Stenothermal, north-temperate species.

**Tintinnus fraknoii** DADAY

Very rare, in summer. Tropical, warm-water species.

**Tintinnus lusus-undae** ENTZ.

Common but not abundant, in all seasons, especially in summer. Neritic, warm-water species.

**Tintinnus lusus-undae** var. **tenuis** KOFOID & CAMPBELL

Neritic, warm-water species.

**Tintinnus rectus** WOLFES

Very rare, inside and outside the bay, in cold seasons. Stenothermal, temperate species. (YAMAZI, 1959, p. 176). In February. (IKARI, MS.)

Phylum **COELENTERATA**

Subphylum **CNIDARIA**

Class **HYDROZOA**

Order **HYDROMEDUSAE**

Suborder **ANTHOMEDUSAE**

**Bougainvillia bitentaculata** UCHIDA

Found in early summer, rare, neritic.

**Cladonema radiatum** var. **Mayeri** PERKINS

From early summer to late summer, neritic, common.

**Cytaeis japonica** UCHIDA

Common in early summer. (KOMAI, 1931, p. 252)

**Dipurena ophigaster** HAECKEL

Summer, found almost everywhere, temperate species, rare.

**Euphysa bigelowi** (MAAS)

Summer, found everywhere, warm-water species, rare.

**Gotoea typica** UCHIDA

In spring and early summer, rare.

**Halitriaria formosa** FEWKES

Rare, in late summer, in the bay.

**Hybocodon forbesii** MAYER

Rare, in late summer, in the bay.

**Leuckartiaria octona** (FLEMING)

HIRO (1939, p. 170)

**Nemopsis dofeini** MAAS

Common, in spring, in the outer and inner part of the inlet.

**Podocoryne simplex** KRAMP

In summer, common.

**Proboscidactyla ornata** BROWN

Rare, inside the bay.

**Proboscidactyla ornata** var. **gemmifera** MAAS

In summer, almost everywhere, rare. (YAMAZI, 1959, p. 131)

**Proboscidactyla typica** (UCHIDA) [= *Misakia typica* UCHIDA]

Rare, in early summer.

**Rathkea octopunctata** (SARS)

Rare, from winter to spring.

**Sarsia nipponica** UCHIDA

Rare, in late autumn, neritic. Warm-water species.

**Spirocodon saltatrix** (TILESUS)

From winter to early summer, common inlet waters.

**Stomotoca rugosa** MAYER

Rare, in winter and early spring, neritic.

**Tiaranna ikarii** UCHIDA

Rare, in autumn.

**Turritopsis nutricula** MCCRADY

Rare, in summer, anywhere in the bay.

Suborder *LEPTOMEDUSAE***Aequorea coerulescens** BRANDT

In spring and early summer, common inside the bay.

**Eucheilota paradoxa** MAYER

In summer, rare, near the mouth.

**Eutima japonica** UCHIDA

In summer season, inner part of the bay.

**Gastroblasta chenghanensis** LING

Common, in spring and early summer. Neritic form. (KOMAI et YAMAZI, 1944; YAMAZI, 1959, p. 131)

**Irenopsis hexanemalis** GOETTE

Very common, in inner part of the bay, in warm seasons.

**Obelia** sp. 1

Very common in spring and early summer. Neritic form (YAMAZI, 1959, p. 30, 131)

**Obelia** sp. 2

## Order TRACHYLINA

Suborder *TRACHOMEDUSAE***Aegina rosea** ESCHSCHOLTZ

In winter and early spring. Common, almost anywhere in the inlet.

**Aglaura hemistoma** PÉRON et LESUEUR

From spring to summer, warm-water form. (YAMAZI, 1959, p. 30)

**Geryonia proboscidalis** FORSKÅL

In winter season, rarely found in the bay.

**Liriope tetraphylla** CHAMISSO et EYSENHARDT

Common, in autumn and winter. At times in swarms. (YAMAZI, 1959, p. 130)

**Rhopalonema velatum** GEGENBAUR

In common in the inlet waters.

**Solmaris corona** HAECKEL

Common in winter and spring, almost anywhere. (YAMAZI, 1959, p. 131)

**Solmundella bitentaculata** QUOY et GAIMARD

Common in spring and summer season. Oceanic, warm-water form. (YAMAZI, 1959, p. 130)

Suborder *LIMNOMEDUSAE*

**Gonionemus depressus** GOTO

Very rare, in early summer, lodged on *Zostera*.

**Olindias formosus** (GOTO)

Common, in early summer, inside and outside the bay. (YAMAZI, 1959, p. 131)

**Scolionema gemmifera** KISHINOUE

In spring and early summer, off Ezura. Very common. Lodged on *Zostera*.

Order SIPHONOPHORA

Suborder *CALYCOPHORAE*

**Abylopsis tetragona** (OTTO)

Very common in our waters, in winter and spring.

**Diphyes bojani** (ESCHSCHOLTZ)

Common in the outer part of the inlet, in spring and early summer. (YAMAZI, 1959, p. 177)

**Diphyes chamissonis** HUXLEY

Rare, in the bay, in spring and early summer. Warm-water form.

**Diphyes contorta** LENS et VAN RIEMSDIJK

Rare, in open sea water near the mouth, in spring season. (YAMAZI, 1959, p. 178)

**Diphyes dispar** CHAMISSO et EYSENHARDT

Rare, in the bay, in spring and early summer. Warm-water form. (YAMAZI, 1959, p. 54, 178)

**Hippodius ungulatus** HAECKEL

Rare in our waters, in spring.

**Muggiaca atlantica** CUNNINGHAM

Very common, in almost all seasons, especially in winter. Eurythermal species. (YAMAZI, 1959, p. 178)

**Muggiaca spiralis** (BIGELOW)

Common, in winter and spring seasons, in open sea water. (YAMAZI, 1959, p. 177)

**Praya cymbiformis** DELLE CHIAJE

Rare, in the open-sea water near the mouth, in spring and early summer. Oceanic, warm-water form.

Suborder *PHYSOPHORAE***Agalma elegans** (SARS)

Rare, found in spring and early summer. Warm-water form.

**Nanomia bijuga** (DELLE CHIAJE) [= *Cupulita picta* CHUN]

Rare in the bay, occasionally found in spring season. Oceanic, warm-water form.

**Physophora hydrostatica** FORSKÅL

Rare in the bay, in spring. Warm-water form.

Suborder *CYSTONECTAE***Physalia physalis utriculus** LA MARTINIÈRE

Occasionally common, especially in summer, drifted ashore. (YAMAZI, 1959, color pl. 1.)

**Rhizophysa eysenhardtii** GEGENBAUR

Rare, in spring season.

**Rhizophysa filiformis** (FORSKÅL)

Rare near shore, in open water near the mouth, in spring.

Suborder *DISCONNECTAE***Porpita porpita** (LINNÉ) [= *P. umbella* O. F. MÜLLER]

Very common in late spring and early summer. Sometimes in swarms, drifted ashore. (YAMAZI, 1959, p. 30)

**Veleva velella** (LINNÉ) [= *V. lata* CHAMISSE et EYSENHARDT]

At times very common, drifted ashore, in late spring and summer.

Class **SCYPHOMEDUSAE** (SCYPHOZOA)

## Order CUBOMEDUSAE

**Charybdea rastoni** HAECKEL

Common in summer and autumn.

**Tamoya bursalis** HAECKEL [= *T. alata* RAYNAUD; *T. vir lenta* KISHINOUE]

Rather rare, sometimes in swarms, in late summer and autumn. Known as a stinging medusa. (UCHIDA, 1926)

Order CORONATAE

**Nausithoë punctata** KÖLLIKER

Common in winter and spring. Scyphopolype named "*Stephanoscyphus racemosus* Komai" are common on submerged rocks along an islet Tōsima in front of the Laboratory. (UCHIDA, 1926; KOMAI, 1935)

Order SEMAEOSTOMAE

**Aurellia aurita** (LINNÉ) LAMARCK

Most abundant in the inner part of the bay, in spring and summer. Ephyrae appear in aquarium. (UCHIDA, 1926; OKADA, 1949, p. 355; YAMAZI, 1959, p. 60)

**Cyanea nozakii** KISHINOUE

Rare in the bay, in winter.

**Dactylometra pacifica** GOETTE [=*D. ferruginaster*; *D. longicirra*]

Very common in the bay, in spring and early summer. (UCHIDA, 1926)

**Pelagia panopyra** PÉRON et LESUEUR

Fairly common near the mouth of the bay, in spring and early summer. Warm current form. (UCHIDA, 1926)

**Sanderia malayensis** GOETTE

Common in summer. Warm-water form. (UCHIDA, 1926)

Order RHIZOSTOMAE

**Cephea cephea** (FORSKÅL)

Very rare, in open sea water near the mouth of the bay, in autumn. Warm-water form.

**Mastigias papua** L. AGASSIZ

Very common, in the inner part of the bay, in autumn. Inlet warm-water form. (YAMAZI, 1959, color pl. 1.)

**Netrostoma setouchiana** KISHINOUE

Rare in the bay, occasionally in autumn, in coastal waters. (UCHIDA, 1926)

Class ANTHOZOA

Order ZOANTHARIA

Suborder ACTINIARIA

**Bocerooides mcmurricchi** (KWIETNIEWSKI)

Common, near the shore found throughout the year.

Subphylum CTENOPHORA

Order CYDIPPIDEA

**Euchlora rubra** (KÖLLIKER)

Very rare. (KOMAI et TOKIOKA, 1942)

**Hormiphora palmata** CHUN

Rare, in the outer part of the bay, in spring and early summer.

**Pleurobrachia pileus** VANHÖFFEN

Very rare, in spring, in the mouth. (YAMAZI, 1959, p. 60, 123)

## Order LOBATEA

**Bolinopsis mikado** (MOSER)

Common in the coastal waters, in spring season, sometimes very abundant.

**Eurhamphaea vexilligera** GEGENBAUR

Very rare. (KOMAI et TOKIOKA, 1942)

**Kiyohimea aurita** KOMAI et TOKIOKA

Very rare, found only in winter. (KOMAI et TOKIOKA, 1940)

**Leucothea japonica** KOMAI

Abundant in the bay, in winter and spring.

**Ocyropsis fusca** (RANG)

Rare, sometimes in swarms, in spring season.

## Order CESTIDEA

**Cestum amphitrites** MERTENS

Very rare in the bay, in spring season.

## Order BEROIDEA

**Beroë cucumis** FABRICIUS

Very common, inside the bay, occasionally very abundant, in spring and early summer.

## Phylum ASCELMINTHES

## Class ROTIFERA

**Encentrum** sp.

Common but never abundant, in the inner part of the bay, early summer. Neritic and littoral form. (YAMAZI, 1959, p. 103)

**Synchaeta** sp.

Rarely found, inside the bay, chiefly in spring and summer. Neritic and littoral species.

## Phylum ANNELIDA

## Class CHAETOPODA

**Alciopa cantrainii** DELLE CHIAJE

Very rare, in summer, near the mouth of the bay.

**Autolitus** sp.

Very rare, in summer, near the mouth of the bay.

**Rhyncherella fulgens** GREEFF

Very rare, in summer.

**Sagitella kowalewskii** N. WAGNER

Very rare, in summer. Warm-water form.

**Tomopteris elegans** CHUN

Very rare, found occasionally in summer, in open sea water outside the bay. Oceanic, warm-water form. (YAMAZI, 1959, p. 110, 120)

**Tomopteris pacifica** IZUKA

Very rare, oceanic, warm-water form.

**Tomopteris septentrionalis** DE QUATREFAGES

Very rare, oceanic, warm-water form.

**Tomopteris** sp.

Rare, found in warm seasons. Oceanic, warm-water form.

**Typhloscolex Mülleri** BUSCH

Very rare, found in warm season, near the mouth of the bay.

**Typhloscolex** sp. 1

**Typhloscolex** sp. 1

**Vanadis grandis** IZUKA

Pelagic polychaete sp. 1

Pelagic polychaete sp. 2

Pelagic polychaete sp. 3

Pelagic polychaete sp. 4

Pelagic polychaete sp. 5

Pelagic polychaete sp. 6

## Phylum CHAETOGNATHA

**Eukrohnia hamata** (MÖBIUS)

Very rare, in the outer part of the bay. Oceanic, warm-water form. (YAMAZI, 1959, p. 211)

**Krohnitta pacifica** (AIDA)

Very rare, in February. (TOKIOKA, 1954)

**Pterosagitta draco** (KROHN)

Very rare, in the inlet, but sometimes common in early spring in front of the Laboratory. (YAMAZI, 1959, p. 190). Found in winter (TOKIOKA, 1954).

**Sagitta bedoti** BÉRANECK

Very common in the bay, especially the outer parts, in summer. Oceanic, tropical species. (YAMAZI, 1959, p. 190)

**Sagitta bipunctata** QUOY et GAIMARD

Oceanic, subtropical and temperate species. (YAMAZI, 1959, p. 192)



**Sagitta delicata** TOKIOKA

Very common, in the inner part of the bay, throughout the year, especially in summer. Neritic and littoral, south-temperate species. (YAMAZI, 1959, p. 58, 126)

**Sagitta enflata** GRASSI

Very common, in the open sea water out of the bay, in almost all seasons. Oceanic, tropical species. (TOKIOKA, 1954; YAMAZI, 1959, p. 57, 110, 191)

**Sagitta hexaptera** KROHN

Rare, outside the bay, in spring and summer. Oceanic, subtropical and temperate species.

**Sagitta lyra** KROHN

Common, in the bay, from late spring to autumn. Oceanic, warm-water form. (YAMAZI, 1959, p. 190). In early summer relatively common. (TOKIOKA, 1954)

**Sagitta minima** GRASSI

Very common, in warm seasons. Oceanic, south-temperate species. (YAMAZI, 1959, p. 192)  
Common in spring. (TOKIOKA, 1954)

**Sagitta neglecta** AIDA

Rare, occasionally abundant, in warm seasons. Oceanic, warm water-species. (YAMAZI, 1959, p. 193)

**Sagitta regularis** AIDA

Common in open sea water near the mouth, in spring and summer. Oceanic, warm-water species. (YAMAZI, 1959, p. 193)

**Sagitta robusta** DONCASTER

Rare, near the mouth, in warm season, oceanic, tropical species. (YAMAZI, 1959, p. 193)

**Sagitta serratodentata atlantica** f. **pseudoserratodentata** TOKIOKA

Rare, in the bay, in warm season. Oceanic, warm-water species. Very rare, in February. (TOKIOKA, 1954)

**Sagitta serratodentata pacifica** KROHN

Very common, in the bay, in warm season, oceanic, warm-water form (YAMAZI, 1959, p. 191). Very abundant in early spring (TOKIOKA, 1954).

**Spadella cephaloptera** (BUSCH)

Rare, in February (TOKIOKA, 1954).

Phylum **MOLLUSCA**Class **GASTROPODA**Subclass **PROSOBRANCHIA**Order **PTENOGLOSSA****Ianthina janthina** (LINNÉ)

Commonly drifted ashore in summer and autumn. Oceanic, warm-water form. (YAMAZI, 1959, p. 55)

**Ianthina prolongata** BLAINVILLE [= *I. globosa* SWAINSON]

Commonly drifted ashore, in summer. (YAMAZI, 1959, p. 55)

**Ianthina umbilicata** D'ORBIGNY

Very commonly drifted ashore in summer and autumn. Oceanic, warm-water form.  
(YAMAZI, 1959, p. 50)

**Peraclis reticulata** (D'ORBIGNY)

Very rarely drifted ashore, in warm season. Oceanic, warm-water form. (YAMAZI, 1959, p. 50)

**Recluzia montrouzieri** BRAZIER

Rarely drifted ashore, in warm season. Oceanic, warm-water form. (TOKIOKA, 1953, p. 57)

Section Heteropoda

**Atlanta gaudichaudi** SOULEYET

Rare, often in tow-netting. Oceanic, warm-water form.

**Atlanta inclinata** SOULEYET

Very rare, often in tow-netting. Oceanic, warm water-form.

**Atlanta lesueuri** SOULEYET [=*A. oligogyra* TESCH]

Very rare, found in warm season. Oceanic, warm-water form.

**Atlanta pacifica** TOKIOKA

Very rare, found occasionally in tow-netting. Oceanic, warm-water form.

**Atlanta peroni** LESUEUR

Rarely found in the inlet. Oceanic, warm water form.

**Carinaria cristata** (LINNÉ)

Rare, found in tow-netting, in warm season, very rarely drifted ashore.

**Firoloida desmaresti** LESUEUR [=*F. kowalewskyi* VAYSSIÈRE]

Very rarely drifted ashore in front of the Laboratory. (YAMAZI, 1959, p. 184)

**Oxygyrus keraudreni** (LESUEUR)

Very rarely drifted ashore.

**Pterotrachea coronata** FORSKÅL [=*P. challengerii* TESCH]

Very rarely drifted ashore. Oceanic, warm-water form. (YAMAZI, 1959, p. 58)

Subclass *OPISTHOBRANCHIA*

Order NUDIBRANCHIA

**Cephalopyge orientalis** BABA

One specimen was found by Mr. Y. MIYASITA. (BABA, 1933)

Order PTEROPODA

**Cavolina columnella columnella** (RANG)

Very rare, drifted ashore. Oceanic, warm-water form.

**Cavolina gibbosa gibbosa** (RANG)

Very rare, drifted ashore. Oceanic, warm-water form.

**Cavolina globulosa** (RANG)

Very rare. Oceanic, warm water form.

**Cavolina inflexa labiata** (D'ORBIGNY)

Rare, drifted ashore. Oceanic, warm-water form. (YAMAZI, 1959, p. 50)

**Cavolina longirostris longirostris** (LESUEUR)

Rare occasionally in swarms, in summer and autumn. Oceanic, warm-water form. (YAMAZI, 1959, p. 186)

**Cavolina quadridentata** (LESUEUR)

Rare, occasionally in swarms but not abundant, in summer. Oceanic warm-water form. (YAMAZI, 1959, p. 186)

**Cavolina tridentata** (FORSKÅL)

Very rare, occasionally in swarms. Oceanic, warm water form. (YAMAZI, 1959, p. 185)

**Cavolina uncinata** (RANG)

Rare, in open sea water near the mouth of the bay. Oceanic, warm-water form. (YAMAZI, 1959, p. 186)

**Clio pyramidata lanceolata** TESCH

Occasionally found in swarms, but not abundant, in late spring and summer. Oceanic, warm-water form. (YAMAZI, 1959, p. 51)

**Creseis acicula acicula** RANG

Common in our region, occasionally very abundant in summer. Oceanic, warm-water form. (YAMAZI, 1959, p. 122, 189)

**Creseis acicula clava** RANG

Common, oceanic, warm-water form.

**Creseis virgula conica** (ESCHSCHOLTZ)

Rare, in summer. Oceanic, warm-water form. (YAMAZI, 1959, p. 51, 189)

**Creseis virgula virgula** RANG

Occasionally common, in late spring to summer. (YAMAZI, 1959, p. 51, 189) Oceanic, warm-water form.

**Desmopterus papilio** CHUN

Rare, in open water near the mouth, in almost all seasons, especially in summer. Oceanic, warm-water species.

**Diacria quadridentata** (LESUEUR)

Very rare. Oceanic, warm-water form. Young form is *Cleodora pigmaeus* BOAS.

**Diacria trispinosa** (LESUEUR)

Very rare, found occasionally in open sea water near the mouth of the bay. Oceanic, warm-water form. Young form is *Cleodora compressa* SOULEYET. (YAMAZI, 1959, p. 185)

**Hyalaea complanata** GEGENBAUR

Young form of *Cav. tridentata tridentata* FORSKÅL.

**Hyalaea depressa** TESCH

Young form of *Cav. inflexa labiata* (D'ORBIGNY). Rare, in open sea water near the mouth of the bay. (YAMAZI, 1959, p. 187)

**Hyalaea laevigata** D'ORBIGNY

Larval form of *Cav. longirostris longirostris* (LESSON). (YAMAZI, 1959, p. 187)

**Hyalaea rotundata** BOAS

Larval form of *Cav. globulosa* (RANG).

**Hyalocylix striata** (RANG)

Very rare, occasionally drifted ashore in front of the Laboratory. (YAMAZI, 1959, p. 188)

**Limacina trochiformis** (D'ORBIGNY)

Very rare, in warm season.

**Styliola subula** QUOY et GAIMARD

Rare, found occasionally in open sea waters near the mouth of the bay. Oceanic, warm-water form. (YAMAZI, 1959, p. 188)

Phylum **ARTHROPODA**

Class **CRUSTACEA**

Subclass **BRANCHIOPODA**

Order **CLADOCERA**

**Evadne nordmanni** LOVÉN

Very common, almost anywhere from winter to early summer. Neritic species. Widely distributed form.

**Evadne tergestina** CLAUS

Very common almost anywhere, especially in the inner part of the bay. Neritic and littoral form. (YAMAZI, 1959, p. 65, 127)

**Penilia schmackeri** RICHARD

Very common, almost anywhere, in winter and early summer. Neritic and littoral, warm-water form. (YAMAZI, 1959, p. 65, 127)

**Podon leuckarti** G. O. SARS

Rare, almost anywhere, in early summer. Neritic and littoral form. (YAMAZI, 1959, p. 127)

**Podon polyhemoides** (LEUCKART)

Common, almost anywhere in the bay, in early summer. Neritic and littoral form. (YAMAZI, 1959, p. 65)

Subclass **OSTRACODA**

Family 1. **Halocypridae**

**Conchoecia hamata** VÉVRA

Found in open sea water near the mouth of the bay. Oceanic form. (YAMAZI, 1959, p. 182)

**Conchoecia** sp. 1

**Conchoecia** sp. 2

**Conchoecia** sp. 3

**Conchoecia** sp. 4

**Conchoecia** sp. 5

**Conchoecia** sp. 6

**Conchoecia** sp. 7

**Conchoecia** sp. 8

**Conchoecia** sp. 9

**Conchoecia** sp. 10

**Euconchoecia** sp.

Rare, in open sea water near the mouth of the bay. Oceanic form. (YAMAZI, 1959, p. 182)

## Family 2. Cypridinidae

**Cylindroleberis oblonga** (GRUBE)

Rare, near the coast. Tichopelagic form.

**Cylindroleberis ovalis** KAJIYAMA

Rare, near the coast. Tichopelagic form.

**Cylindroleberis** sp.

Rare, around the coast. Tichopelagic form.

**Cypridina hilgendorfi** G. W. MÜLLER

Rare, all round the coast. Tichopelagic form.

**Cypridina noctiluca** KAJIYAMA

Very common, all round the coast. Tichopelagic form. (YAMAZI, 1959, p. 118, 143)

**Cypridina pellucida** KAJIYAMA

Very rare, all round the coast. Tichopelagic form.

**Cypridina** sp. 1

Tichopelagic form. All the year round, near the coast.

**Cypridina** sp. 2

Tichopelagic form. All the year round, near the coast.

**Philomedes ijimai** KAJIYAMA

Tichopelagic form, coming up to the surface at night. (YAMAZI, 1959, p. 143)

## Subclass COPEPODA

### Order EUCOPEPODA

#### Suborder CALANOIDA (GYMNOPLEA)

## Family 1. Calanidae

**Calanus finmarchicus** (GUNNERUS) [= *C. helgolandicus* (CLAUS)]

Common, throughout the year, especially in early summer and autumn, outside the inlet. Widespread species. (YAMAZI, 1959, p. 68, 107, 111, 115)

**Calanus minor** (CLAUS)

Rare, in open sea water near the mouth of the bay, in summer and autumn. Warm-water species.

**Calanus tenuicornis** (DANA)

Rare, in open sea water near the mouth of the bay, in summer. Oceanic, subtropical and south-temperate form.

**Canthocalanus pauper** (GIESBRECHT)

Common near the mouth, in all seasons, especially in warm season. Oceanic, tropical and subtropical species.

**Neocalanus gracilis** (DANA)

Very rare, in open sea water near the mouth of the bay, in summer and autumn. Oceanic, warm-water species.

**Neocalanus robustior** (GIESBRECHT)

Rather rare, in open sea water near the mouth of the bay, in summer. Warm-water species.

**Undinula darwini** (LUBBOCK)

Rare, near the mouth of the bay, more or less common in warm season. Oceanic, tropical species.

**Undinula vulgaris** (DANA)

Rare, in open sea water near the mouth of the bay, in warm season. Tropical, warm-water form.

## Family 2. Eucalanidae

**Eucalanus attenuatus** (DANA)

Commonly throughout the year, especially in warm seasons. Oceanic, tropical and subtropical form. (YAMAZI, 1959, p. 107)

**Eucalanus crassus** GIESBRECHT

Rare, at the mouth, in summer and autumn. Oceanic, warm-current form.

**Eucalanus elongatus** (DANA)

Very rare, at the mouth of the bay, in spring and early summer. Oceanic, north-temperate species.

**Eucalanus mucronatus** GIESBRECHT

Rare, near the mouth, in summer. Oceanic, warm-water species.

**Eucalanus subcrassus** GIESBRECHT

Very rare, outside and inside the bay, in warm seasons. Oceanic, tropical species.

**Eucalanus** sp.

**Mecynocera clausi** THOMPSON

Not common in open sea water outside the bay, in warm seasons. (YAMAZI, 1959, p. 184)

**Rhincalanus cornutus** DANA

More or less common in open sea, especially in warm seasons. Oceanic, tropical and subtropical form.

**Rhincalanus nasutus** GIESBRECHT

Very rare, off Tanabe, in summer season. Oceanic, warm-water species.

## Family 3. Paracalanidae

**Acrocalanus gibber** GIESBRECHT

Very rare outside the bay, in warm season. Oceanic, warm-water species.

**Acrocalanus gracilis** GIESBRECHT

More or less common, in open sea waters, in warm season. Oceanic, warm-water species.

**Acrocalanus longicornis** GIESBRECHT

Very rare, in open sea water, in summer and autumn. Oceanic, warm-water form.

**Calocalanus pavo** (DANA)

Rare, in open sea water, in summer season. Oceanic, tropical species. (YAMAZI, 1959, p. 107, color pl. 2.)

**Calocalanus plumulosus** (CLAUS)

Very rare, in open sea water, in summer season. Oceanic, tropical species.

**Calocalanus styliremis** GIESBRECHT

Very rare, in open sea water, in summer and autumn. Oceanic, tropical species.

**Paracalanus aculeatus** GIESBRECHT

Fairly frequent in open sea water outside the bay, in warm season. Oceanic, tropical and subtropical form.

**Paracalanus parvus** GIESBRECHT

Most abundant. The minor form inside the inlet, especially in warm season, while the major form outside the inlet, in warm season widely distributed, from oceanic and neritic to littoral, eurythermal species. (YAMAZI, 1959, p. 111, 125)

## Family 4. Pseudocalanidae

**Clausocalanus arcuicornis** (DANA)

Very rare, in open sea water, in summer and autumn. Oceanic, warm-water species.

**Clausocalanus pergens** FARRAN

Very rare, in open sea water near the mouth, in summer. Oceanic warm-water species.

## Family 5. Aetideidae

**Aetideus armatus** (BOECK)

Very rare, in open sea water, in warm season. Oceanic, tropical and subtropical species.

**Aetideus giesbrechti** CLEVE

Very rare, in open sea water near the mouth, in summer. Oceanic, tropical and subtropical species.

**Euchirella amoena** GIESBRECHT

Very rare, in open water, in warm season. Oceanic, warm-water species.

**Euchirella rostrata** GIESBRECHT

Very rare, in open sea water near the mouth, in warm season. Oceanic, warm-water form.

**Euchirella** sp.

## Family 6. Euchaetidae

**Euchaeta flava** GIESBRECHT

Very rare, outside, in warm season. Temperate species. (YAMAZI, 1959, color pl. 2)

**Euchaeta marina** PRESTENDREA

Very common in all seasons, especially in warm season. (YAMAZI, 1959, p. 108)

**Euchaeta plana** MORI

Very rare, outside, in warm season. Oceanic, warm-water form.

**Euchaeta wolfendeni** A. SCOTT

Very rare, in warm season. Oceanic, tropical and subtropical species.

**Euchaeta** sp. 1

**Euchaeta** sp. 2

Family 7. Phaennidae

**Phaenna spinifera** CLAUS

Very rare, in open water, in summer. Oceanic, tropical and subtropical form.

Family 8. Scolecithriciidae

**Scolecithrix danae** (LUBBOCK)

Fairly common, near the mouth, in warm seasons.

Family 9. Centropagidae

**Centropages abdominalis** SATO

Rare, inside the inlet, in winter and early spring. Neritic, north-temperate species.

**Centropages bradyi** WHEELER

Very rare, inside and outside the bay, in winter and early summer. North-temperate species.

**Centropages calaninus** (DANA)

Rare, outside the bay, in summer season. Oceanic, warm-water form.

**Centropages elongatus** GIESBRECHT

Very rare, outside, in warm season. Warm-water species.

**Centropages furcatus** (DANA)

Rare, Oceanic, frequently neritic. Widely distributed, warm-water form.

**Centropages gracilis** (DANA)

Rare, in open sea water, in warm season.

**Centropages orsinii** GIESBRECHT

Rare, inside and outside the bay, in summer. Warm-water species.

**Centropages yamadai** MORI [=*C. tenuiremis* THOMPSON & SCOTT]

Rare, in the inlet, in autumn and spring. Temperate species.

**Centropages** sp. 1

**Centropages** sp. 2

Family 10. Diaptomidae

**Pseudodiaptomus marinus** SATO

Fairly common in the inlet, in winter and early summer, neritic. (YAMAZI, 1959, p. 111, 115)



## Family 11. Temoridae

**Temora discaudata** GIESBRECHT

Fairly common inside and outside the bay, in warm water season. South-temperate and subtropical species.

**Temora stylifera** (DANA)

Very rare, outside the inlet, in summer and autumn. Oceanic, subtropical species.

**Temora turbinata** (DANA)

Very rare, in open sea waters, in summer and autumn. Oceanic, south-temperate species.

## Family 12. Metriidae

**Pleuromamma abdominalis** (LUBBOCK)

Very rare, outside the inlet, in warm season. Oceanic, southern warm-water form. (YAMAZI, 1959, p. 121)

**Pleuromamma gracilis** (CLAUS)

Very rare, southern temperate species.

**Pleuromamma robusta** GIESBRECHT

Very rare, in open sea water, in warm season, Oceanic, southern warm-water form.

**Pleuromamma xiphias** GIESBRECHT

Very, rare, southern warm-water form.

## Family 13. Lucicutiidae

**Lucicutia flavicornis** (CLAUS)

Very rare. Oceanic, warm-water form.

**Lucicutia ovalis** WOLFENDEN

Very rare, in open sea water, in warm season. Oceanic, warm-water form.

**Lucicutia** sp.

## Family 14. Heterorhabdidae

**Heterorhabdus papilliger** (CLAUS)

Very rare, in summer and autumn. Oceanic, warm-water form.

## Family 15. Augaptilidae

**Haloptilus acutifrons** (GIESBRECHT)

Very rare, oceanic warm-current species, in summer and autumn.

**Haloptilus longicornis** (CLAUS)

Very rare, in summer and autumn. Oceanic, warm-current species.

**Haloptilus mucronatus** (CLAUS)

Very rare, in summer. Oceanic, warm-current species.

***Haloptilus oxycephalus*** (GIESBRECHT)

Very rare, in summer and autumn. Oceanic, warm-current form.

Family 16. Candaciidae

***Candacia aethiopia*** (DANA)

Very rare, in open water, in summer. Oceanic, warm-current form.

***Candacia armata*** (BOECK)

Rare, in open sea water near the mouth, in summer and autumn. Warm-current form.

***Candacia bispinosa*** (CLAUS)

Rare, in open sea water near the mouth, in summer. Oceanic, warm-water form.

***Candacia bipinnata*** (GIESBRECHT)

Rare, outside and inside the bay, in spring and early summer. North-temperate species.

***Candacia bradyi*** A. SCOTT

Very rare, outside the bay, in summer. Oceanic, warm-water species.

***Candacia catula*** (GIESBRECHT)

Very rare, at the mouth, in summer. Oceanic, tropical warm-current species.

***Candacia curta*** (DANA)

Very rare, in open sea water near the mouth, in warm season. Oceanic, warm-water species.

***Candacia longimana*** (CLAUS)

Very rare, at the mouth, in summer. Oceanic, warm-current species.

***Candacia pachydactyla*** (DANA)

Very rare, in warm season, near the mouth. Oceanic, warm-water form.

***Candacia pectinata*** BRADY

Very rare, near the mouth, in summer.

***Candacia truncata*** (DANA)

Rare, at the mouth, in warm season. Warm-water form.

***Candacia* sp. 1**

***Candacia* sp. 2**

Family 17. Pontellidae

***Calanopia elliptica*** (DANA)

Rare, near the mouth, in summer. Oceanic, warm-current species.

***Calanopia thompsoni*** SCOTT

More or less common, widely distributed in inlet waters. Ubiquitous, warm-water form.  
(YAMAZI, 1959, p. 114)

***Labidocera acuta*** (DANA)

Common, in open sea water, in summer and autumn. Oceanic, subtropical species.

***Labidocera acutifrons*** (DANA)

Very rare, at the mouth, in summer and autumn. Oceanic, warm-current species.

**Labidocera bipinnata** TANAKA

Rare, found almost everywhere in the bay, especially outside. Widely distributed, warm-water species. (YAMAZI, 1959, p. 114)

**Labidocera detruncata** (DANA)

Very rare, near the mouth, in summer, subtropical and south-temperate species.

**Labidocera japonica** MORI

More or less common, inside and outside the bay, in summer.

**Labidocera kröyeri** (BRADY)

Rare, outside and inside the bay, in warm season. Warm-water form.

**Labidocera pavo** GIESBRECHT

Common inside and outside the bay, in summer season, chiefly oceanic, but frequently neritic, and littoral.

**Labidocera** sp. 1**Labidocera** sp. 2**Labidocera** sp. 3**Labidocera** sp. 4**Labidocera** sp. 5**Labidocera** sp. 6**Labidocera** sp. 7**Pontella chierchiae** GIESBRECHT

Very rare, in open sea water near the mouth, in summer. Oceanic, warm-water species.

**Pontella surrecta** WILSON?

Very rare, near the mouth, in summer.

**Pontella** sp.**Pontellina plumata** (DANA)

Rare, in summer and autumn. Oceanic, warm-water form.

**Pontellopsis armata** GIESBRECHT

Very rare, near the mouth, in summer. Oceanic, warm-water species.

**Pontellopsis tenuicauda** GIESBRECHT

Very rare, near the mouth, in summer. Warm-current species.

**Pontellopsis yamadai** MORI

Very rare, inside and outside the bay, in autumn and winter.

**Pontellopsis** sp. 1**Pontellopsis** sp. 2

## Family 18. Acartiidae

**Acartia clausi** GIESBRECHT

Most abundant inside the inlet, from winter to early summer. Euryhaline, neritic, and littoral, temperate species. (YAMAZI, 1959, p. 71, 111, 124)

**Acartia danae** GIESBRECHT

Temperate species, rare in the bay.

**Acartia erythraea** GIESBRECHT

Very common inside the inlet, in warm season, in early summer and autumn. Neritic

and littoral, warm-water species. (YAMAZI, 1959, p. 111, 124)

**Acartia hamata** MORI

Common inside the inlet, in summer and autumn. Neritic and littoral, warm-water form.

**Acartia negligens** DANA

Rare in the bay, in summer and autumn. Neritic warm-water species.

**Acartia pacifica** STEUER

Common in the inlet, in warm seasons.

**Acartia spinicauda** GIESBRECHT

Rare, in littoral area of the bay, in summer and autumn. Neritic and littoral, warm-water form.

### Family 19. Tortanidae

**Tortanus forcipatus** GIESBRECHT

Common, in coastal and inlet waters, in warm seasons. Warm-water form. (YAMAZI, 1959, p. 111, 115)

### Suborder CYCLOPOIDA (PODOPLEA)

### Family 20. Oithonidae

**Oithona decipiens** FARRAN

Rare, in open sea water outside the bay, in warm season. Oceanic, warm-water species.

**Oithona farax** FARRAN

Rare, oceanic, south-temperate, warm-water form.

**Oithona nana** GIESBRECHT

The most abundant copepod in the innermost part of the bay, in almost all seasons. Neritic or littoral, south-temperate, widespread form. (YAMAZI, 1959, p. 66, 124)

**Oithona plumifera** BAIRD

Common but not abundant in open sea water. Oceanic, south-temperate species. (YAMAZI, 1959, p. 184)

**Oithona rigida** GIESBRECHT

Sometimes abundant outer part of the bay in summer and autumn. Neritic warm-water form. (YAMAZI, 1959, p. 124, color pl. 2)

**Oithona robusta** GIESBRECHT

Very rare found occasionally in summer and autumn. Oceanic, warm-water form.

**Oithona setigera** DANA

Rare, found in open sea water out of the bay. Oceanic, warm-water form.

**Oithona similis** CLAUS

Common in tow-netting in the outer part of the bay, in colder season. Neritic and oceanic, north-temperate but widely distributed form. (YAMAZI, 1959, p. 125)

### Family 21. Macrosetellidae

**Macrosetella gracilis** (DANA)

Rare, in the open sea water outside the bay, in summer and autumn. Oceanic, tropical

or subtropical species. (YAMAZI, 1959, p. 32, 67)

**Miracia efferata** DANA

Only one species in the bay, in summer. Female in dark greenish blue.

Family 22. Ectinosomidae

**Microsetella norvegica** (BOECK)

Common, in winter and spring, outside the bay. Neritic, wide spread, occasionally oceanic, temperate species.

**Microsetella rosea** (DANA)

Fairly common, in warm season, outer part of the bay. Neritic, warm-water form. (YAMAZI, 1959, p. 125)

Family 23. Tachidiidae

**Euterpe acutifrons** (DANA)

Common, in the outer part of the bay, all the year round, neritic, sporadically oceanic, warm-water form.

Family 24. Clytemnestridae

**Clytemnestra rostrata** (BRADY)

Very rare, found occasionally in warm season, outside the bay. Oceanic, subtropical and south-temperate warm-water species.

**Clytemnestra scutellata** DANA

Very rare, oceanic subtropical warm-water species.

Family 25. Oncaeidae

**Lubbockia marukawai** MORI

Rare, in open sea water outside the bay, in summer. Warm-water form.

**Lubbockia squillimana** CLAUS

Rare, in open sea water outside the bay, in summer. Warm-water form.

**Oncaea media** GIESBRECHT

Abundant, sometimes in swarms, commonest in summer. Neritic and oceanic, subtropical and south-temperate, widespread form.

**Oncaea venusta** PHILIPPI

Most abundant in the outer part of the bay. Oceanic but frequently neritic, north-temperate species. (YAMAZI, 1959, color pl. 2)

**Oncaea** sp. 1

**Oncaea** sp. 2

Family 26. Corycaeidae

**Copilia mirabilis** DANA

Rare, in open sea not far from the Laboratory, chiefly in summer and autumn. Oceanic,

tropical species. (YAMAZI, 1959, p. 57, 66, color pl. 2)

**Copilia quadrata** DANA

Very rare, outside, open sea water, in summer and autumn. Oceanic, tropical and subtropical form. (YAMAZI, 1959, p. 57)

**Corycaeus affinis** MURRICH (= *Corycaeus japonicus* MORI; *Corycaeus anglicus*)

Very common, inside and outside the inlet, in winter and spring season. Neritic, north temperate species.

**Corycaeus asiaticus** F. DAHL

Very rare, oceanic warm-water species.

**Corycaeus catus** F. DAHL

Rare, outside open water, in summer and autumn.

**Corycaeus concinnus** DANA

Very rare, outside, in summer. Oceanic, warm-water form.

**Corycaeus crassiusculus** DANA

Common, inside and outside the bay, in warm season. Oceanic form.

**Corycaeus flaccus** GIESBRECHT

More or less common, in summer and autumn. Oceanic, tropical species. (YAMAZI, 1959, color pl. 2)

**Corycaeus gibbulus** GIESBRECHT

Rare, inside and outside the bay, in summer and autumn. Oceanic, warm-water form.

**Corycaeus lautus** DANA

Common, inside and outside the bay, in summer season. Oceanic, warm southern form.

**Corycaeus longistylis** DANA

Common, outside the bay, in summer. Oceanic, southern species.

**Corycaeus speciosus** DANA

Very rare, outside the inlet, in summer and autumn. Oceanic, tropical and subtropical species.

**Corycaeus** sp. 1

**Corycaeus** sp. 2

**Corycaeus** sp. 3

**Corycaeus** sp. 4

**Corycaeus** sp. 5

**Corycaeus** sp. 6

**Pachysoma dentatum** MORI

Very rare, open sea, in summer season. Oceanic, warm-water southern form.

**Sapphirina angusta** DANA

Very rare, in open sea water, in summer. Oceanic, warm-water species.

**Sapphirina gastrica** GIESBRECHT

Very rare, outside the inlet, in summer. Oceanic, warm-water species.

**Sapphirina gemma** DANA

Rare, in open sea water, in summer and autumn. Oceanic, warm-water species.

**Sapphirina intestinata** GIESBRECHT

Very rare, in open sea water, in summer. Oceanic, tropical and subtropical warm-current form.

**Sapphirina nigromaculata** CLAUS

Very rare, in open sea water, in summer. Oceanic, warm-current form. (YAMAZI, 1959, p. 122)

**Sapphirina opalina** DANA

Rare, in open sea water, in summer and autumn. Oceanic, tropical and subtropical warm-current species. (YAMAZI, 195, color pl. 2)

**Sapphirina stellata** GIESBRECHT

More or less common, in open sea water, in summer. Oceanic, tropical and subtropical warm-current species. (YAMAZI, 1959, p. 35, 122)

Suborder *MONSTRILLOIDA*

## Family 27. Monstrillidae

**Haemocera morii** TOKIOKA

Very rare, in summer, in the bay. (TOKIOKA, 1949)

**Monstrilla** sp. 1

Very rare, in the bay, in warm season. (YAMAZI, 1959, p. 114)

**Monstrilla** sp. 2**Monstrilla** sp. 3**Monstrilla** sp. 4**Monstrilla** sp. 5**Monstrilla** sp. 6Suborder *HARPACTICOIDA*

## Family 28. Harpacticidae

**Tigriopus japonicus** MORI

Very abundant in rock pools above high water mark, throughout the year, especially from spring to autumn. (YAMAZI, 1959, p. 104, 144)

**Harpacticus** sp. 1**Harpacticus** sp. 2**Harpacticus** sp. 3**Harpacticus** sp. 4

## Family 29. Idyidae

**Idya** sp. 1**Idya** sp. 2**Idya** sp. 3**Idya** sp. 4Subclass *MALACOSTRACA*Order *LEPTOSTRACA***Nebalia bipes** FABRICIUS

Very rare. Tichopelagic, saprofagous form.

Order CUMACEA

**Bodotria** sp.

Tichopelagic form, coming up to the surface at night. (YAMAZI, 1959, p. 143)

**Diastylis** sp.

Tichopelagic form, coming up to the surface at night. (YAMAZI, 1959, p. 143)

**Paradiastylis** sp.

Order MYSIDACEA

**Proneomysis misakiensis** II

Common, all the year round, usually near the bottom in daytime and comes up to the surface at night.

**Siriella watasei** NAKAZAWA

Very common, in almost all seasons, widely distributed in the bay. Neritic, and littoral form, comes up to the surface at night. (YAMAZI, 1959, p. 116)

Order AMPHIPODA

Suborder *HYPERIIDEA*

Family 1. *Vibiliidae*

**Vibilia gibbosa** BOVALLIUS

Very rare, found in open water near the mouth, in summer. Oceanic, warm-water form.

Family 2. *Paraphronimidae*

**Phronima colletti** BOVALLIUS

Very rarely found in open water near the mouth, in summer. Oceanic, warm-water form.

**Phronima sedentaria** (FORSKÅL)

Very rarely found in open water near the mouth, in summer. Oceanic, warm-water form. (YAMAZI, 1959, p. 109, 179)

**Phronimella elongata** CLAUS

Very rarely, found in open sea water near the mouth, in summer. Oceanic, warm-water form. (YAMAZI, 1959, p. 179)

Family 3. *Hyperiididae*

**Hyperia galba** (MONTAGU)

Very rare, found chiefly in open sea water near the mouth, in summer.

**Hyperia latissima** BOVALLIUS

Fairly common, almost all seasons, inside and outside the bay.

**Hyperia schizogeneios** STEBBING

Very rare, found in open sea water.



**Hyperia** sp. 1

**Hyperia** sp. 2

**Hyperia** sp. 3

**Hyperia** sp. 4

**Hyperia** sp. 5

**Hyperia** sp. 6

**Hyperia** sp. 7

**Hyperia** sp. 8

**Hyperia** sp. 9

**Hyperia** sp. 10

**Hyperioides longipes** CHEVREUX

Very rare, in open sea water outside the bay, in summer and autumn. Oceanic, warm-water form.

**Parascelus tyhoides** CLAUS

Very rare, in open water outside the inlet, in summer. Oceanic, warm-water form.

**Phronimopsis spinifera** CLAUS

Very rare, in open sea water near the mouth, in summer. (YAMAZI, 1959, p. 180)

**Themisto gracilipes** NORMAN

Very rare, in open sea water outside the inlet, in summer. Oceanic, warm-current form.

#### Family 4. Anchylomeridae (Phrosinidae)

**Anchylomera Blossvillei** MILNE EDWARDS

Very rare, near the mouth of the bay, in summer and autumn. Oceanic, warm-water form.

**Euprimno macropus** (CRERIN)

Very rare, in open sea water near the mouth, in summer and autumn. Oceanic. Warm-water form.

**Phrosina semilunata** RISSO

Rare, found occasionally met with near the mouth of the bay, in summer. Warm-water species. (YAMAZI, 1959, p. 109)

#### Family 5. Platyscelidae

**Platyscelus serratulus** STEBBING

Very rare, found occasionally near the mouth, in summer. Oceanic, warm-water species.

**Platyscelus** sp.

**Tetrathyrus forcipatus** CLAUS

Very rare, found only near the mouth of the bay, in summer. Warm-water species.

#### Family 6. Scelidae

**Eupronoe minuta** CLAUS

Rare, found only near the mouth, in summer and autumn.

**Parascelus typhoides** CLAUS

Rare, found occasionally in summer, near the mouth. Warm-water species.

Family 7. Lycaeidae

**Brachyscelus cruscus** BATE

Very rare, outside and near the mouth of the bay, in warm season. Warm-water, oceanic species.

**Brachyscelus latipes** STEBBING

Very rare, near the mouth of the bay, in summer. Warm-water species. (YAMAZI, 1959, p. 109)

Family 8. Oxycephalidae

**Glosocephalus** sp. 1

Very rare, near the mouth of the bay, in summer. (YAMAZI, 1959, p. 180)

**Glosocephalus** sp. 2

Very rare, near the mouth of the bay, in summer. (YAMAZI, 1959, p. 180)

**Oxycephalus porcellus** CLAUS

Very rare, found only near the mouth of the bay, in warm seasons. Oceanic, warm-water form. (YAMAZI, 1959, p. 180)

**Oxycephalus** sp.

**Rhabdosoma** sp.

Very rare, near the mouth of the bay, in summer. (YAMAZI, 1959, p. 180)

Order EUPHAUSIACEA

**Euphausia** sp.

Oceanic, warm-water form.

Order DECAPODA

**Lucifer typus** MILNE EDWARDS [= *L. raynaudii* BATE]

Very common, inside and outside the bay, in summer and autumn. Widely distributed, warm-water species. (YAMAZI, 1959, p. 32, 118, 121)

Phylum PROCHORDATA

Class UROCHORDA (TUNICATA)

Subclass APPENDICULARIA (COPELATA)

**Appendicularia sicula** FOL

Rare in the bay, in warm seasons. Oceanic, warm-water form.

**Fritillaria charybdae** LOHMANN

Very rare, in open sea water.

**Fritillaria fraudax** LOHMANN

Very rare, occasionally found in open sea water.

**Fritillaria haplostoma** FOL

Commonest in the bay, in summer and autumn, at times in swarms. Oceanic, warm-water form. (YAMAZI, 1959, p. 198)

**Fritillaria formica** FOL

Fairly common in the bay. Oceanic, south-temperate form.

**Fritillaria megachile** FOL

Very rare. Oceanic, warm-water form.

**Fritillaria pellucida** (BUSCH)

Commonest in the bay, in warm seasons. Oceanic, warm-water form.

**Fritillaria tenella** LOHMANN

Common, inside and outside the bay. Oceanic, warm-water form. (YAMAZI, 1959, p. 198)

**Fritillaria venusta** LOHMANN

Very rare, in open sea water near the mouth of the bay. Oceanic, warm-water form. (YAMAZI, 1959, p. 198)

**Megacercus huxleyi** (RITTER)

Rare, found almost anywhere, especially outside the bay in early summer. Oceanic, warm-water form. (YAMAZI, 1959, p. 200)

**Oikopleura cophocerca** GEGENBAUR

Rare, in open sea water near the mouth of the bay. Oceanic, warm-water form. (YAMAZI, 1959, p. 47, 105, 200)

**Oikopleura dioica** FOL

Very common in the bay throughout the year, especially in warm seasons. Inlet water form. (YAMAZI, 1959, p. 127)

**Oikopleura fusiformis** FOL

Common, in open sea water near the mouth of the bay, frequently inside, in late spring and summer. Oceanic, warm water form. (YAMAZI, 1959, p. 200)

**Oikopleura gracilis** LOHMANN

Rare, in open sea water near the mouth of the bay, from early summer to autumn. Oceanic form.

**Oikopleura intermedia** LOHMANN [= *O. macrostoma* AIDA]

Very rare, found occasionally in open sea water near the mouth of the bay. Oceanic, warm-water form.

**Oikopleura longicauda** (VOGT)

Commonest, especially in late spring and summer. Oceanic, warm-water form. (YAMAZI, 1959, p. 200)

**Oikopleura parva** LOHMANN

Rare, in open sea water near the mouth of the bay. Oceanic form.

**Oikopleura rufescens** FOL

Common, in open sea water near the mouth of the bay, in summer and autumn. Oceanic, warm-water form. (YAMAZI, 1959, p. 200)

**Stegosoma magnam** (LANGERHANS)

Common, in open sea water near the mouth of the bay. (YAMAZI, 1959, p. 200)

Subclass *THALIACEA*

Order DOLIOLIDA (CYCLOMYARIA)

**Doliolum denticulatum** QUOY et GAIMARD

Moderately frequent in the bay, in summer and autumn. Abundant at times in swarms. Oceanic, warm-water form. (YAMAZI, 1959, p. 59, 101, 194) Found almost throughout the year. (TOKIOKA, 1937, p. 219)

**Doliolum gegenbauri** ULJANIN [=*D. tritonis* HERDMAN]

Rare, in open sea water near the month of the bay, in spring and summer, sometimes in swarms. Oceanic, warm-water form. (YAMAZI, 1959, p. 104, 194)

**Doliolum nationalis** BORGERT

Very common outside the bay, sometimes in swarms, in spring and summer. (YAMAZI, 1959, p. 194)

Order SALPIDA (HEMIMYARIA)

**Cyclosalpa affinis** (CHAMISSO)

Abundant at times in swarms in summer. Oceanic, warm-water species. Found in water (TOKIOKA, 1937, p. 221)

**Cyclosalpa komaii** IHLE et IHLE-LANDENBERG [=*C. virgula* KOMAI]

Very rare, in open sea water, in winter and spring. (KOMAI, 1932, TOKIOKA, 1937, p. 221)

**Cyclosalpa pinnata** (FORSKÅL)

Very rare, in warm seasons. Oceanic, warm-water form.

**Cyclosalpa pinnata** var. **polae** (SIGL.)

Rare, in spring and summer, in the outer part of the bay. Oceanic, warm-water form. (YAMAZI, 1959, p. 195) Found in autumn and winter. (TOKIOKA, 1937 p. 220)

**Iasis zonaria** (PALLAS)

Rare, occasionally found in the outer part of the bay. (YAMAZI, 1959, p. 195) In autumn and winter. (TOKIOKA, 1937, p. 224)

**Ihlea asymmetrica** (FOWLER)

Rare, in open sea water, in spring and early summer. Oceanic, warm-water form. (YAMAZI, 1959, p. 195) Found in spring. (TOKIOKA, 1937, p. 222)

**Pegea confoederata** (FORSKÅL)

Common but not abundant, in winter and early summer, very abundant in February. (YAMAZI, 1959, p. 104, 196)

**Ritteriella picteti** (APSTEIN)

Very rare, from early spring to summer, in open sea water near the mouth of the bay. Oceanic, warm-water form. Found in winter. (TOKIOKA, 1937, p. 222)

**Salpa cylindrica** CUVIER

Common, in open sea water, especially in early spring and summer. (YAMAZI, 1959, p. 59, 197) Found in spring. (TOKIOKA, 1937, p. 230)

**Salpa fusiformis** CUVIER

Fairly common in open sea water outside the bay, in almost all seasons, especially in spring and early summer. Oceanic, warm-water form. Found in winter. (TOKIOKA, 1937 p. 223)

**Thalia democratica** (FORSKÅL) var. **echinata** TOKIOKA

Rare. Oceanic, warm-water form. Found in winter. (TOKIOKA, 1937, p. 229)

**Thalia democrarica** (FORSKÅL) var. **orientalis** TOKIOKA

Very common in almost all seasons, especially in spring and early summer. Oceanic, warm-water form. (YAMAZI, 1959, p. 196) Found almost throughout the year. (TOKIOKA, 1937, p. 226-229)

**Thetys vagina** (TILESIIUS)

Rare in the outer part of the bay, in spring and early summer. Oceanic, warm-water form. (YAMAZI, 1959, p. 197) Found in winter and spring. (TOKIOKA, 1937, p. 226)

## Order PYROSOMATA

**Pyrosoma atlanticum atlanticum** PÉRON

Rare, in open sea water outside the bay, in spring and summer, very rarely drifted ashore. Oceanic, warm-water form. (YAMAZI, 1959, p. 119)

**Pyrosoma** sp.

Very rare, drifted ashore in front of the Laboratory, in warm season. (YAMAZI, 1959, p. 195)

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