

Foraminiferal Thanatocoenoses of Akkeshi Bay and its Vicinity

By

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(Received Feb. 16, 1952)

With 2 plates, 1 table and 2 figures

Abstract

The distribution of foraminiferal tests in Akkeshi Bay and Akkeshi Lake are described. Samples from 27 stations are under consideration. The types of thanatocoenoses of foraminifers indicate almost similar aspects in their distributions to those of other Japanese bays.

Introduction and Acknowledgment

The materials used for this work were collected by two biologists, Messers T. HABA and I. YAMAZI, in August, 1948 for the purpose of making research in the thanatology and ecology of Mollusca and plankton. The data on the physical and chemical observations and the description of plankton may be found in Yamazi's paper (1950).

This work was undertaken as one of the series of researches on the Recent foraminifers in Japanese bays by MORISHIMA with the purpose of a basic study of the paleoecology of smaller foraminifers.

Here, we express our gratitudes to all the people who gave us valuable helps and particular thanks are due to Messers T. HABA and I. YAMAZI and to Prof. JIRO MAKIYAMA for their kind suggestions throughout the study, and to Dr. KIYOSHI ASANO for his proper advice on the classification of foraminifers.

Method of Investigation

Bottom samples were taken at 27 stations within the areas in order to cover all the different environments. EKMAN-LENZ's Bottom Sampler was employed. Approximately 30cc. of each of these samples was screened with a 200-mesh sieve. Foraminifers in the residue were sorted and the population counted. The informations were listed; the percentage densities of the dominant or characteristic species thus obtained, and the results entered on the map. A distribution curve of each species was plotted and the center of distribution of each species as well as the frequency distribution noted. In this way, we are able to obtain types of thanatocoenoses characteristic of the various parts of the bay. The

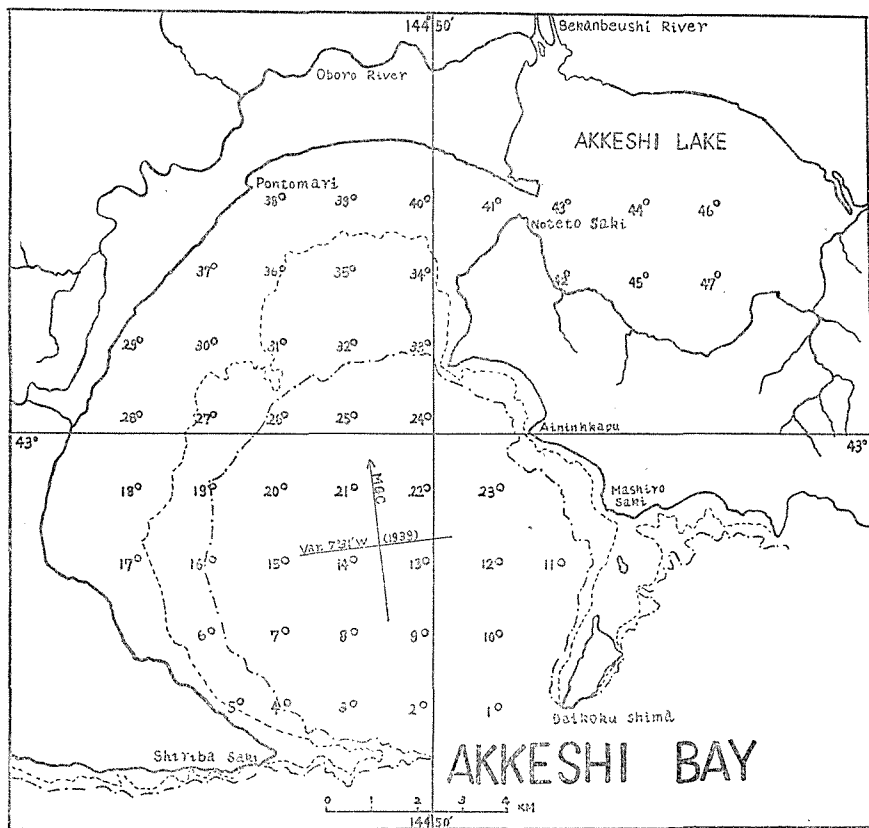


Fig. 1. Map of Akkeshi Bay and Akkeshi Lake showing stations and isobaths.

results are shown on the following table.

The areas under investigation are on the Pacific side of the north-eastern Hokkaido and composed of two parts, Akkeshi Bay and Akkeshi Lake.

The Types of Thanatocoenoses

The distribution of remains of each species was worked out by determining one or more central point for each and with this central point as a working base, the types of thanatocoenoses for the various locations were considered. From the results of these, the characteristic type of thanatocoenoses are determined.

The following 10 species are recognized as characteristic of dominant species in this case; *Buliminella elegantissima tenuis* CUSHMAN and McCULLOCH *Elphidium* sp. A, *Eponides frigidus* CUSHMAN, *Elphidium* cf. *E. etigoense* HUSEZIMA and MARUHASI, *Trochammina globigeriniformis* (PARKER et JONES), *Rotalia* cf. *R. beccarii* (LINNE), *Bolivina decussata* BRADY, *Rotalia japonica* HADA, *Nonion japonicum* ASANO and *Nonionella pulchella* HADA.

Among these species, *Buliminella elegantissima tenuis*, *Elphidium* sp. A, *Elphidium* cf. *E. etigoense*, and *Eponides frigidus* distribute almost over whole areas, on

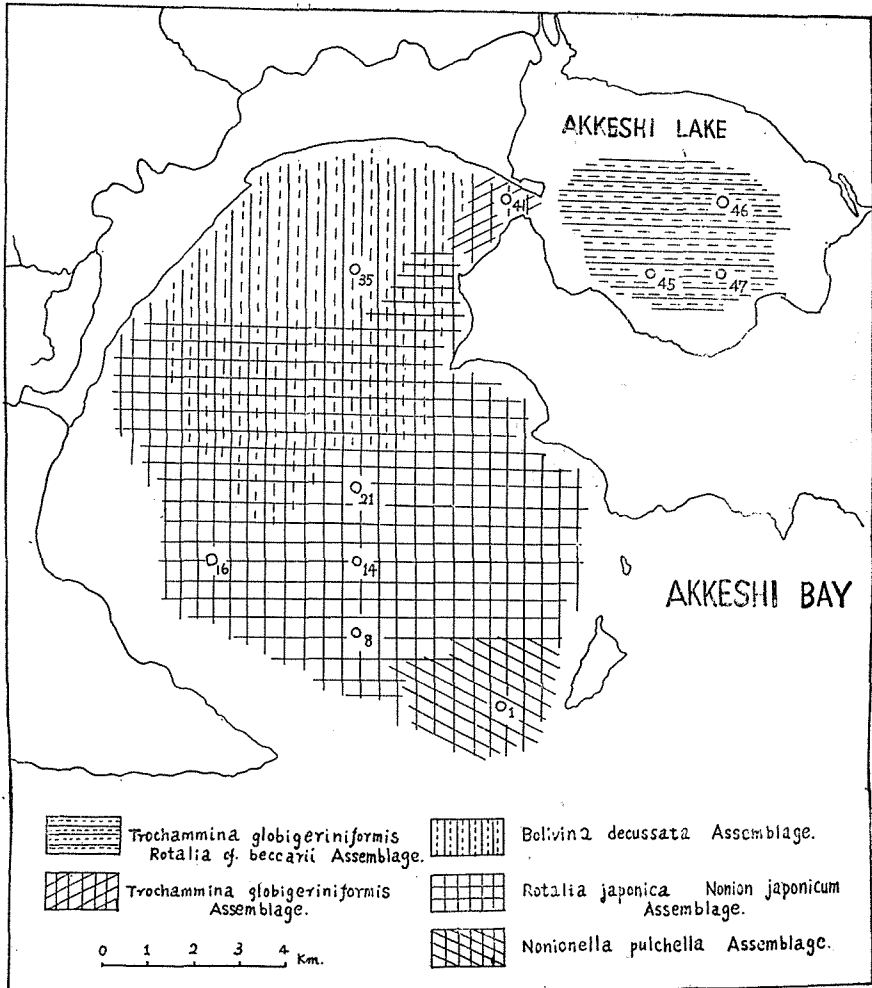


Fig. 2. Distribution of Foraminiferal assemblage.

the other hands, such as *Trochammina globigeriniformis* and *Bolivina decussata* show rather restricted distributions with central point of distributions as shown in the following table :

The types of thanatocoenoses characteristic in these areas are as follows :

- (1) *Trochammina globigeriniformis* - *Rotalia* cf. *R. beccarii* Assemblage.

This type of thanatocoenoses is predominant in Akkeshi Lake, accompanied with *Eponides frigidus*, *Elphidium incertum* (WILLIAMSON), *Buliminella elegantissima tenuis*, *Elphidium* cf. *E. etigoense* etc.

- (2) *Trochammina globigeriniformis* Assemblage.

This type of assemblage occurs only at the innermost part of the bay, and composed of almost one species, *Trochammina globigeriniformis*, with a high percentage (69.7%) in population.

Table. 1

Species of Foraminifera	Station No. of central points
<i>Trochammina globigeriniformis</i>	41 and 45
<i>Rotalia</i> cf. <i>R. beccarii</i>	47
<i>Bolivina decussata</i>	35
<i>Rotalia japonica</i>	21 and 8
<i>Nonion japonicum</i>	16 and 8
<i>Nonionella pulchella</i>	1

(3) *Bolivina decussata* Assemblage.

This assemblage occupies the inner part inside of the centre of the bay, and is characterized by *Bolivina decussata*, accompanied with *Elphidium advenum* CUSHMAN, *Pseudononion japonicum* ASANO, etc. Owing to their low frequency, this assemblage is not a characteristic one. It became obscure towards the central part of the bay, because the area is overlapped by the next assemblage.

(4) *Rotalia japonica* - *Nonion japonicum* Assemblage.

This type of assemblage is found in the area extending the central part to the mouth of the bay. *Rotalia japonica*, *Nonion japonicum* and *Nonionella pulchella* are recognized as characteristic species, and the accompanying species are *Eponides schreibersii* (REUSS), *Nonion nicobarense* CUSHMAN, *Cibicides lobatulus* (WALKER and JACOB), *Elphidiella* cf. *E. sibilica* (GÖES), etc.

This is one of the most distinct assemblages, because of its variability of species. As in other bays these forms distribute on fine sand floor and are large in size.

(5) *Nonionella pulchella* Assemblage.

This assemblage occupies at the mouth of the bay and is composed of almost the same members as in *Rotalia japonica* - *Nonion japonicum* Assemblage, but *Nonionella pulchella* shows the highest percentage in population.

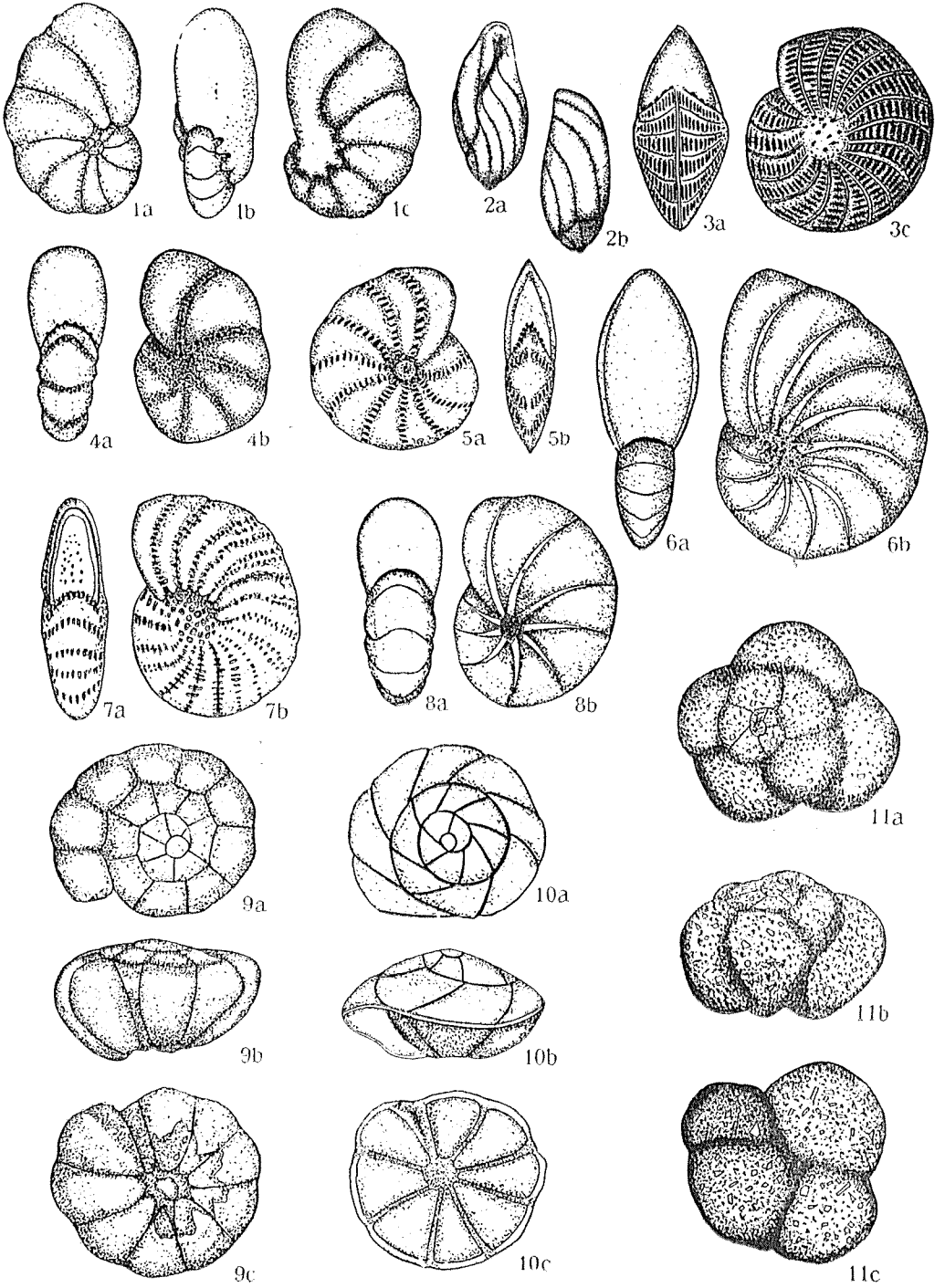
Four assemblages distinguished in Akkeshi Bay are included in one group, *Eponides frigidus* - *Elphidium* sp. A Group, as those two species and *Elphidium* cf. *E. etigoense*, *Buliminella elegantissima tenuis* are very dominant in general, and the major division on foraminiferal thanatocoenoses in these areas under consideration can be recognized between Akkeshi Bay and Akkeshi Lake. The former is represented by the *Trochammina globigeriniformis* - *Rotalia* cf. *R. beccarii* Assemblage and the latter by the *Eponides frigidus* - *Elphidium* sp. A Assemblage.

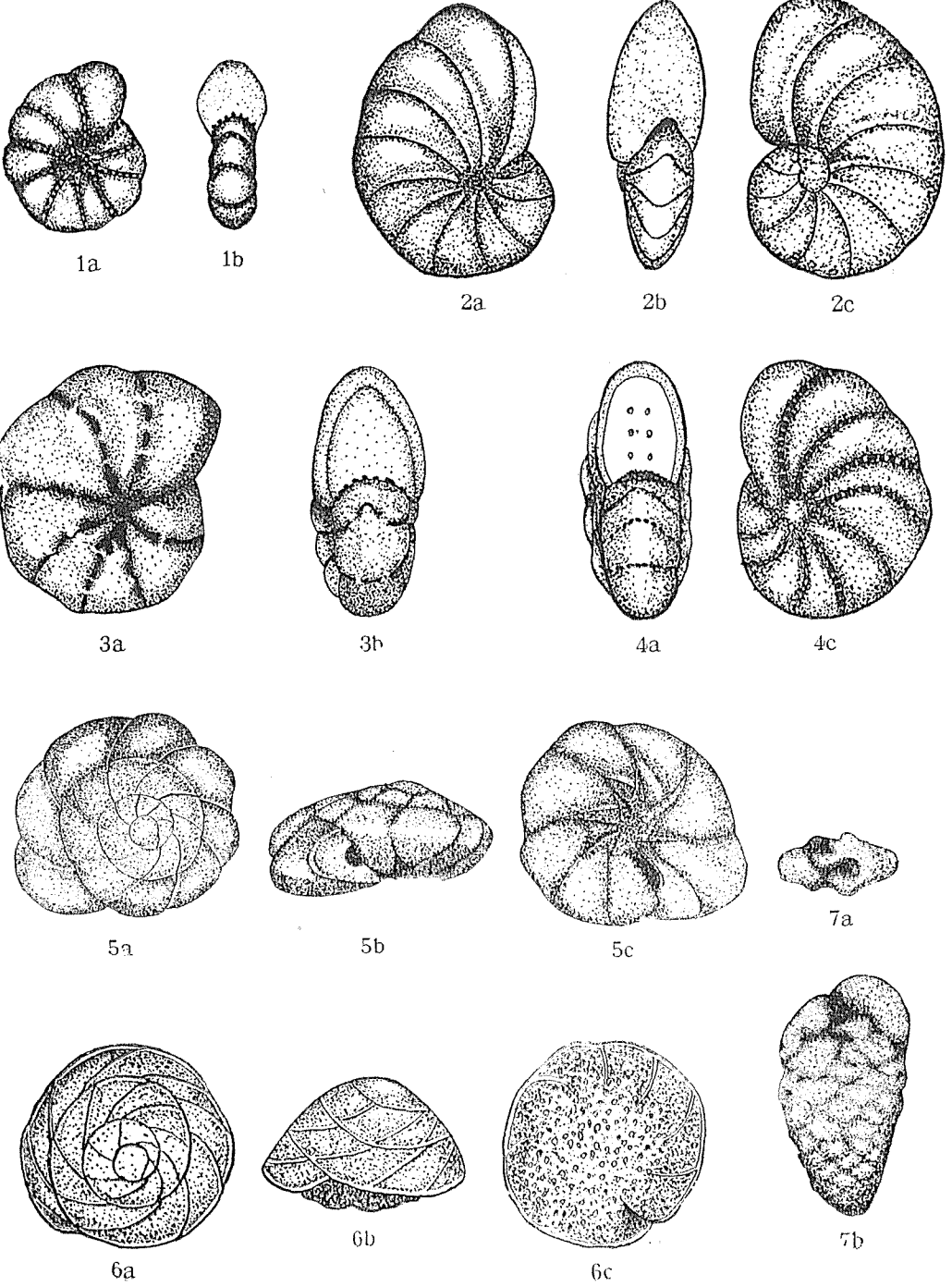
References

- Asano, K. Foraminifera from the Gulf of Onnagawa: Botany and Zoology, Vol. 6, No. 7, 1938.

- Hada, Y.; Notes on the Recent Foraminifera from Mutsu Bay, Scie. Rept. Tohoku Univ. Ser. 4, Vol. 6, No. 1, 1931.
 Studies on the Foraminifera of brakish waters; 1. Hijirippu and Mochirippu Lakes, Zool. Mag. Vol. 48, 1936.
- Morishima, M.: The Accumulation of Foraminiferal tests in Inlet of Wakasa Bay on the Inland Sea of Japan, Rept. Com. Treatise on Marine Ecology and Paleoecology, Nat. Res. Coun. Washington 1946-1947, No. 7.
 Foraminiferal Thanatocenoses of Ago Bay, Kii Peninsula, Japan, ditto. 1947-1948. No. 8.
- Yamazaki, I.; Plankton Investigation in Inlet Water along the Coast of Japan, I. -- Introductory Notes and the Plankton of Akkeshi Bay, Hanasaki Inlet and Nemuro Harbour, Publ. Seto Marine Biol. Laboratory Vol. 1. No. 3. 1950.

- Plate 1. Figs. 1a. b. c.; *Nonionella Pulchella* HADA ($\times 75$)
 Figs. 2a. b.; *Buliminella elegantissima tenuis* CUSHMAN and McCULLOCH ($\times 75$).
 Figs. 3a. b.; *Elphidium fax barbaraense* NICOL ($\times 75$).
 Figs. 4a. b.; *Elphidium* cf. *E. etigoense* HUSEZIMA and MARUHASI ($\times 75$).
 Figs. 5a. b.; *Elphidium advenum* CUSHMAN ($\times 75$).
 Figs. 6a. b.; *Nonion japonicum* ASANO ($\times 75$).
 Figs. 7a. b.; *Elphidiella* cf. *E. sibilica* (GOES) ($\times 75$).
 Figs. 8a. b.; *Nonion nicobalense* CUSHMAN ($\times 75$).
 Figs. 9a. c.; *Rotalia japonica* HADA ($\times 75$).
 Figs. 10a. b. c.; *Eponides frigidus* CUSHMAN ($\times 75$).
 Figs. 11a. b. c.; *Trochammina globigeriniformis* (PARER et JONES)
- Plate 2. Figs. 1a. b.; *Elphidium* sp. A ($\times 57$).
 Figs. 2a. b. c.; *Pseudononion japonicum* ASANO ($\times 150$).
 Figs. 3a. b.; *Elphidium incertum* (WILLIAMSON) ($\times 75$).
 Figs. 4a. b.; *Criboelphidium arcticum* TAPPAN ($\times 57$).
 Figs. 5a. b.; *Rotalia* cf. *R. beccarii* (LINNE) ($\times 75$).
 Figs. 6a. b.; *Eponides schreibersii* (REUSS) ($\times 60$).
 Figs. 7a. b.; *Bolivina de ussta* (BRADY) ($\times 96$).





NAMES OF ASSEMBLAGES	A			B	C					C + D							D					E					
STATION NUMBER	47	46	45	41	40	39	38	37	35	34	33	32	31	29	27	26	25	24	20	23	22	21	19	16	14	8	1
SPECIES OF FORAMINIFERS	M	M	M	m-s	M	f-s	M	f-s	M	M	f-s	M	M	M	f-s	f-s	f-s	M	f-s	f-s	f-s	f-s	M	f-s	M	f-s	f-s
BOTTOM CHARACTER																											
<i>Bulminella elegantissima tenuis</i> Cushman and Mc.Culloch	•	—	—		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
<i>Elphidium</i> cf. <i>E. etigoense</i> Husezima and Maruhasi	•	•	•	•	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
<i>Elphidium incertum</i> (Williamson)	—	—	—	•						•										•	•	•	—	—	—	—	
<i>Eponides frigidus</i> Cushman	—	—	—		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
<i>Rotalia</i> cf. <i>R. beccarii</i> (Linné)	—	—	—	•	•																						
<i>Trochammina globigeriniformis</i> (Parker et Jones)	—	—	—	—						•																	
<i>Elphidium</i> sp. A	—	—	—		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
<i>Rotalia nipponica</i> Asano	•	—	—									—	—	—	—	—	—	—	—	•							
<i>Elphidium advenum</i> Cushman	•	•								•	•			•	•	•				•				•	•	—	
<i>Trochammina squemata</i> Jones et Parker	—	—	—							•																	
<i>Elphidium fax bebaraense</i> Nicol	—	—	—	•						•			•							•	•				•	•	
<i>Eponides praecinctus</i> (Karrer)	—	—	—	•																							
<i>Bolivina decussata</i> Brady	—	—	—		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
<i>Elphidium Jenseni</i> (Cushman)	—	—	—		•					•	•																
<i>Entosofenia marginata</i> (Walker and Boys)	—	—	—		•	•			•					•				•									
<i>Discorbis araucana</i> (d'Orbigny)	—	—	—		•	•																					
<i>Nonionella pulchella</i> Hada	—	—	—				•	•	•	•				—	—	—	—	—	—	—	•			—	—	—	—
<i>Pseudononion japonicum</i> Asano	—	—	—			—	•			—	—			•									•				
<i>Eponides schreiberssi</i> (Reuss)	—	—	—					•		•				—	—	—	—	—	—	—	—	—	•	•	•	—	—
<i>Rotalia japonica</i> Hada	—	—	—					•		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	•
<i>Gyroldina soldani</i> d'Orbigny	—	—	—					•		•		•											•				
<i>Trochammina</i> cf. <i>T. nana</i> (Brady)	—	—	—					•		•																	
<i>Bolivina compacta</i> Sudebtom	—	—	—							•		•	—														
<i>Epistomina elegans</i> (d'Orbigny)	—	—	—							—	—									•			•		•	•	•
<i>Gaudryna</i> cf. <i>G. ogasaensis</i> Asano	—	—	—							•	•																
<i>Nonion</i> cf. <i>N. nicobrense</i> Cushman	—	—	—							•					•	•						•	•				
<i>Nonion</i> cf. <i>N. limbo-striata</i> Cushman	—	—	—							•														•			
<i>Planulina wuellerstorfi</i> (Schwager)	—	—	—							•																	
<i>Cibicides origoense</i> (Cushman and Grant)	—	—	—									•															
<i>Cibicides lotatulus</i> (Walker and Jacob)	—	—	—									•						—		•						•	
<i>Elphidium fughesi foraminosum</i> Cushman	—	—	—									•								—	•					•	•
<i>Nonion japonicum</i> Asano	—	—	—									•			•	•				•	•			—	•	—	
<i>Nodogenerina lepidula</i> Cushman	—	—	—												•												
<i>Bolivina robusta</i> Brady	—	—	—															•								•	
<i>Dyocibicides</i> sp.	—	—	—															•									
<i>Verneuilina</i> sp.	—	—	—															—									
<i>Elphidiella arctica</i> (Parker and Jacob)	—	—	—																	•							
<i>Elphidiella</i> cf. <i>E. sibirica</i> (Goës)	—	—	—																			•		•		•	
<i>Cibicides arcticum</i> Tappan	—	—	—																					•	•		
<i>Globigerina</i>			•		—	—	—	—	—	•	•	•		•		—	—	—	—						•	•	
<i>Globotruncana</i>								—	—																		

A: *Trochammina globigeriniformis* *Rotalia beccarii* Assemblage
 B: *Trochammina globigeriniformis* Assemblage
 C: *Bolivina decussata* Assemblage
 D: *Rotalia japonica*-*Nonion japonicum* Assemblage
 E: *Nonionella pulchella* Assemblage

