Study of Ostracoda in Territorial Nusawere, Bay of Pangandaran, West Java (Heritage of Sediment Quarter).

by Siti Umiyatun Choiriah

Submission date: 24-Jan-2020 02:52PM (UTC+0700)
Submission ID: 1245793852
File name: 5._Study_of_Ostracoda.pdf (351.57K)
Word count: 3635
Character count: 19681

Study of Ostracoda in the Territorial Nusawere, Bay of Pangandaran, West Java (Heritage of Sediment Quaternary)

By

Siti Umiyatun Choiriah Mahap Maha [1] Doni Nugroho Aji [2)], Kresna Tri Dewi [3)]
^ Staf Pengajar, [2)] Alumni Geologi UPN, 2003, [3)] PPPGL Bandung
[1)] T. Geologi, FTM, UPN "Veteran" Yogyakarta

ABSTRACT

Study area is located in the border province of West Java and Central Java, the southern part. Geographically located at coordinates 07°42' - 07°45' LS and 108° 38'-108°50' BT. The area is bounded by Cape Pangandaran (western part), Nusakambangan Island (eastern) and the Indian Ocean (southern). Ostracoda research conducted based on analysis of sediment samples washed residues are drawn at random. Analyses were performed on 30 samples from the seabed surface Nusawere Waters, Bay of Pangandaran.

The analysis showed that in the Nusawere Waters there are 37 genus with 70 species dominated by seven species of which *Cytherella* sp., *Mutilus* sp., *Leptocythere* sp., *Mutilus parallelicostatus, Keijella multisulcus, Neomonoceratina* sp., and *Ruggieria indopacifica*. Ostracoda abundance and diversity is strongly influenced by sediment type, currents, sediment thickness and other ecological factors such as distance from the mainland, depth,and nutrients. In the northern part of the location of the NW-18, has a 20-50 m bathymetry and sediment silty sand is a location point with a level of abundance and diversity of the optimum Ostracoda.

Ostracoda that found in the study area generally reflect splow-water environment Inner to midle neritic (0-50 meters). This environment is characterized by a collection of genus ostracoda *Cytherelloidea, Javanella, Neomonoceratina, Loxoconchella, Mutilus, Praemunita, Callistocythere, Keijella, Lanckacythere, Stigmatocythere, Muellerina, Heterocythereis, Argilloicea, Ilyocypris, Parakrithella, Neocytheretta, Spinoceratina*.

Key words: Ostracoda, Nusawere Waters,Pangandaran

1. INTRODUCTION

1.1. Background

Research areas of alluvial sediments have a very broad and flat. This area is very important because once the tsunami (2006). The tsunami resulted in alluvial sediments become mixed with material from other neighborhoods. Ostracoda research has not been done so that the results of this study is a comparison how the microfauna distribution before and after the tsunami.

Nusawere encountered alluvial-marine biota that is possible once there is an abundant ostracoda. The existence of this alluvial be very interesting to study with the hope found ostracoda to study other alternatives as fossil bathymetry environmental determinants. The development and deployment ostracoda greatly influenced by changes in the ecology and environment have largely splow marine bathymetry and a small part in the deep ocean, so it can determine the development paleobatimetri ostracoda.

Research with age has been widely applied especially ostracoda various territorial waters of Indonesia such as the Malacca Strait, Java Sea, East Kalimantan and others. But research ostracoda in waters south of Java Island, especially around Pangandaran has never been done.

1.2. Location

Picture 1. Map of Pangandaran and its surroundings (Sarmili dkk., 2000).

1.3. Objectives

This study aimed to study the ostracoda on alluvial deposits in the waters of the usawere Bay of Pangandaran in order to learn how to preparation, to determine the genus and species ostracoda, knowing the abundance and variety of the genus and species ostracoda, linking of ostracoda with environmental factors, determine the range of ages and environments bathymetry.

1.4. Overview

Ostracoda included Superfilum Arthropoda, Filum Crustacea, appearance since Cambrium until Resen (Whatley, 1983). Ostracoda research in the waters of Indonesia have been carried out by Whatley & Zhao (1987, 1988) in the Strait of Malacca, Mostafawi (1992) in Borneo and Peninsular Malaysia (found a new species).

Muller (1906, in Hanai et al., 1980) in Sumatra and the Mentawai islands and McKenzie & Keij, 1977 in the sea of Flores (found of a new genus). Ostracoda Researchers from Indonesia are researching Sudijono: ostracoda at Sangiran, Hadiwisastra (1978) Cluster analysis in the Delta Cimanuk ostracoda Resen, Java Sea, and the Goddess (1988) conducted a study in the same area. Goddess (1997) also has examined the Java Sea region (Bawean Islands), the result found as many as 113 species in the sediment Resen.

2. METHODOLOGY

The research was conducted in the field and laboratory. Ostracoda analysis done of the 30 samples taken at the seafloor surface waters of the Bay of Nusawere Pangandaran (sample are taken from PPPGL parties gathered in Bandung and Cirebon PPGL, so researchers pick and choose the sample in Pertamina Cirebon.

The data was collected by sampling methods Grab Sampling / random (2.1), number 30 of 70 samples are then analyzed in a laboratory mikropaleontologi PPGL (GRDC / *Geology Research and Development Centre)* Bandung.

2.2. Preparation

The sample are dried by heater / oven, after a dry freshly washed with mineral water in a sieve / mesh size of 0.063 mm/63 pm. Residue remaining on the sieve and dried accommodated (taken 100gr) recently determined with 75x magnification binocular microscope to observe the genus and species

2.3. Determination

Sample preparation results in the form of residue is determined to continue weighing is done to determine the genus and species by using a microscope. Results of determination calculated number, genus and species. Naming ostracoda by Van Morkhoven (1962), Whatley and Zhao (1987, 1988), Mostafawi (1992), Yassini & Jones (1994) and the Goddess (1997 and 2000a).

2.4. Processing Data

Results of determination processed by using tables and graphs about the number of samples, calculation of specimens, species abundance, species diversity, for age interpretation, the range of bathymetry.

The research was conducted in the field and laboratory. Ostracoda analysis done of the 30 samples taken at the seafloor surface waters of the Nusawere, Bay of Pangandaran (sample be taken PPGL parties gathered in Bandung and Cirebon PPGL, so researchers pick and choose the sample in Pertamina Cirebon.
The data was collected by sampling methods Grab Sampling / random, number 30 of 70 samples are then analyzed in a laboratory mikropaleontology PPGL Bandung

3. GENERAL GEOLOGY

Pangandaran and surrounding areas has been much studied by geologists, among others Kastowo (1975) in Geology Sheet Majenang, TO Simanjuntak and Surono (1982) in Geology Sheet Pangandaran and Budhitrisna T. (1982) in Geology Sheet Tasikmalaya.

Regional and local stratigraphy of the study, the authors use the stratigraphy proposed by TO.Simanjuntak and Surono (1982) in Geology Sheet Pangandaran (Figure 2).

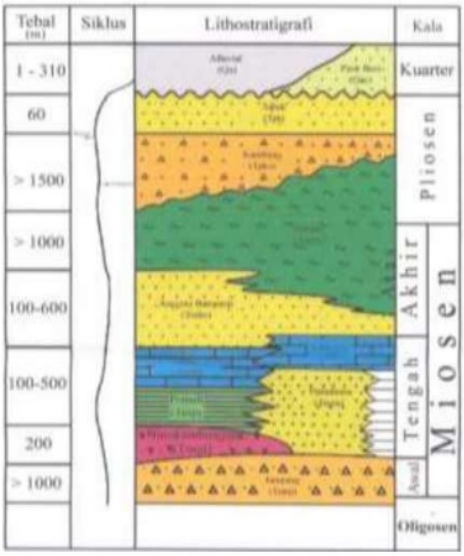

Figure 2. Regional Stratigrafi of Pangandaran (Simanjuntak and Surono, 1992)

4. ANALYSIS RESULT AND DISCUSSION

The results of sample analysis for the study ostracoda is in fact contain many types and vary widely mokrofauna ostracoda ie, planktonic and bentonic foraminifera and particles of mineral / rock (Table 1)

4.1.1. The Abundance of Genus and species ostracoda

The abundance of genus and species affected several factors, including depth and distance from the mainland. Distribution of the genus and species in the waters Nusawere ostracoda consists of 38 genus with 70 species. Species naming based on the reference / previous researchers identified 58 species, the rest can be known only to genus level only. For naming as many as eight species using initials sp., And 4 species which cannot be identified so that naming using initials (Unidentified). Naming (Identified) due to two factors, such as ostracoda the form is not intact or perhaps have never been found by previous researchers.

The abundance of genus and species are calculated from the number of shells (valves) left or right hemisphere and when found in the form of the carapace shell then calculated as 2 (Table 1). Species found in the Bay of Pangandaran is very diverse but for a number of very small specimens. This can be influenced by factors of sedimentary research areas, a growing current fluctuation, and other ecological factors. Species is common and abundant existence, namely: *Cytherella* sp.1., *Neomonoceratina* sp., *Keijella multisulcus* and *Mutilus* sp.

1. *Cytherella* sp.1 very dominant, evenly spread than any *Lanilla*. This species is found in 14 locations (NW-03, NW-08, NW-18, NW-36, NW-41, NW-47, NW-53, NW-54, NW-57, NW-63, NW-66, NW-67, NW-68, NW-69).

This species is most numerous in the NW-66, which is 200 spesimen. In NW-66, grainsize silt, has a 3035 m bathymetry and shell condition and good preservation.

2. *Neomonoceratina* sp. It dominates almost every location, including at 14 locations (NW-07, NW-08, NW-09, NW-10, NW-18, NW-21, NW-22, NW-27, NW-29, NW-31, NW-40, NW-41, NW-44, NW-53). This species dominated in the NW-08 as many as 31 specimens, has a distribution based on the seafloor surface sediment grain size analysis of sandy silt, bathymetry 20-25 m and the shells are relatively good condition.

3. *Keijella multisulcus,* ditemukan di 13 lokasi (NW-NW-08NW-10NW-18NW-35NW-44NW-53NW-54 NW-63NW-66NW-67NW-68NW-69). This species dominates in the NW-68 by the number of specimens 75. At this location, has a distribution based on the seafloor surface sediment grain size analysis of sandy silt, bathymetry 15-20 m and the shells are relatively good conditions.

4. *Mutilus* sp., found at 12 locations (NW-03, NW-07, NW-08, NW-09, NW-10, NW-18, NW-29, NW-34, NW-40, NW-53, NW -54, NW-63). The species is dominant in the NW-08, the number of 31 specimens, the sandy silt, bathymetry 20-25 m, shell condition is relatively good.

4. Mutilus sp., Found at 12 locations (NW-03, NW-7, NW-08, NW-09, NW-10, NW-18, NW-29, NW-34, NW-40, NW-53, NW -54, NW-63). The species is dominant in the NW-08, the number of 31 specimens, the silt Pasiran, bathymetry 20-25 m, shell condition is relatively good.

5. *Leptocythere* sp., was found at 8 locations (NW-8, NW-18, NW-20, NW-29, NW-53, NW-54, NW-63, NW-69). This species most at NW-18, with the number of specimens 31. At this location has silty sand sediment distribution, has bathymetry 15-20 m, shell condition is relatively good.

4.2. Diversity (Diversity Index)

Levels of diversity of the ostracoda (diversity index / H') in the Nusamere variated. This calculation based on the number of species and specimens are then calculated in a computer program which has known limitations. The analysis revealed the existence of differences in diversity index at the location of one another. Maximum diversity index (3.091) in the sample NW-18, and the lowest index reach the over-flow or a very small amount of the sample (NW-22, NW-27, NW-34, NW-35, NW-36, NW-47, NW-48) (Table 2 and Table 3).

Classification of diversity index in this area include:

- Diversity index (H') 0-1 (Over flow)
  Locations that have a very low diversity index, characterized by the level of species diversity and a very small number of specimens, often found in central and southern parts of the Bay of Pangandaran. Its location (NW-21, NW-22, NW-35, NW-36, NW-48). Locations with this index are in Central and Southern Bay of Pangandaran
- Diversity index (H') 1-2 (Medium)
  Locations with low index, characterized by the level of diversity and low number of specimens. There are 10 locations that range is divided in three regions, namely the Western Gulf, Bay and Midle East from the Bay of Pangandaran. And south from bay to open marine.
- Diversity index (H') > 2-3 (High)

This group with this index, characterized by the diversity and high number of specimens. There are 10 locations that are divided four ranges covering the different regions: North-western Bay of Pangandaran, Southwest, and northern bay timars

Pangandaran. This index is characterized by a level of diversity and number of specimens from the site is very high, there is at one location.

4.3.Factors affecting occurence of Ostracoda.

Flow Energy: The environmental factors that influence the distribution and diversity among ostracoda flow pattern that developed in waters at low tide Nusawere is trending southeast with a maximum surface current speed of 0.93 m / s and at high tide trending east-southeast with a maximum speed of 0, 05 m / s. From this could lead to material accumulated west of Plawangan (Sarmili et al., 2000).

4.4. Distribution of Surface Sediment Seafloor based on analysis of grain size

According Sarmili et al., 2000 based on the analysis of grain size distribution of sediment contained seven units on the seafloor surface waters Nusawere, namely sand, silty sand (SS), muddy sand (mS), muddy sand (granule) {(g) mS} , granule sand (GS), sandy silt (SZ) and silt (Z).

1. Silty sand (SS): spread about 50% of the area, around the estuary to the Bay Cipanareukan Parigi. The unit is dark brown-yellowish, sandy sediment silty, dispersed following the shoreline shape due to the dominant southeasterly winds at this location compared to the energy flow Cikidang river.
2. Muddy sand (mS): occupies about 10%, the local spread in the Bay of Pangandaran. This unit is gray-green, very fine sand-sized, containing pieces molusca more than 5%. This unit generally occupies in the distribution of the dominant currents are formed due to temporary mechanism when an investigation on the season (dry, south-east wind). This unit has a sea depth of about 25 m to 30 m.
3. Granule sand (GS): occupies about 20%, only found locally in the Bay of Pangandaran. Terlokalisirnya lithological unit consisting of sand kerikilan biogenic sediments are in situ sedimentation process.
4. Muddy sand (granule) ({(g) mS}): occupy 5% and spread is uniquely Tombolo Pananjung eastern waters.
5. Silt (Z): occupies 15%, usually far from the source, where the unit is formed with the current condition of relative calm and dominated in the bay of Pangandaran.
6. Sandy silt (Sz): occupies 20%, a transition area, there is a mixture of coarse fraction originating from the south-west Pananjung which is around the bay of Parigi and fine fraction originating from the Bay of Pangandaran.
7. Sand (S): occupies the widest distribution, but in areas not visible because this area distributed in the south-west region Pananjung.

4.5. Environmental Determination Depth

Determination of the depth of the environment there are several factors that affect the factors of physics, chemistry, and biology. Physical factors that were found based on the data distribution is the distribution of sediment grain size analysis of sediment consisting of sandy silt, silty sand sand and muddy silt, and is generally dominated by sand and sandy silt. Biological aspects of them in the form of salinity, temperature, depth, substrate and nutrient. Ostracoda research has never been done on Nusawere Waters, Bay of Pangandaran so that references to ostracoda the area does not already exist.

In general, abundance and distribution of species ostracoda in the study area is uneven. Based on the analysis contained in the territorial Nusawere can be seen that the diversity of species ostracoda have similarities with the South China Sea. From this the author uses references from the South China Sea by Wang Pinxian et al, 1985.

Based on the analysis of the distribution ostracoda sediment from this area, many dominated by the marine environment ostracoda Nusawere depth waters, the Bay is splow marine Pangandaran Inner - midle neritic (0-50 m).

4.6. Age Determination Ostracoda

Base analysis result ostracoda at Nusawere Bay of Pangandaran got that genus that found predominated by Subordo Podoopina Sars, 1866 that have age Ordovisium-Resen. From data referred [as] concluded that territorial water Nusawere have an age resen (Holocen). Age determine based on genus. Age from genus that found at this Genus Nusawere Teluk Pangandaran as (Table 3)

5. CONCLUSION

Based on discussion at previous chapters can be concluded:

1. Nusawere waters contain many and greatly varied microfauna ostracoda ie, foraminifera and planktonic foraminifera, bentonik and particles of mineral / rock.
2. The results of 30 samples analyzed ostracoda showen that the abundance of the genus and species in the waters Nusawere ostracoda, greatly influenced by deepness factor and distance from the mainland.
3. The spread of the genus and species of ostracoda consists of 38 genus with 70 species and 58 species identified, the rest can be known only to genus level only. For naming of 8 (eight) species using initials sp., And 4 species which cannot be identified so that naming use initials (Unidentified).

4. The abundance genus and species Ostracoda are common and abundant existence, namely: *Cytherella* sp.1., *Neomonoceratina* sp., *Keijella multisulcus* and *Mutilus* sp.
5. Diversity Index maximum (3.091) in the sample NW-18, and the lowest index reach the Over-flow / 0-1 in the sample (NW-22, NW-27, NW-34, NW-35, NW-36, NW-47, NW-48)

- Diversity index (H ') 0-1 (Over flow), characterized by the diversity and number of specimens is very low, the location of the index is in the Central and Southern Bay of Pangandaran
- Diversity index (H ') > 1-2 (Medium), characterized by the diversity and number of specimens are medium in 10 locations that range is divided in three regions, namely West Bay, Midle Bay and East Bay and south towards the sea bay off.
- Diversity index (H ')> 2-3 (High), there are 10 locations that are divided 4 (four) different areas where the range includes: North-western Bay of Pangandaran, Southwest, and northern bay timars Pangandaran. This index is characterized by a level of diversity and number of specimens from the site is very high, there is at one location.

6. Factors affecting the availability ostracoda is the pattern of flow energy and distribution of sea floor surface sediments.

- Environmental factors "flow pattern"/ "current pattern" that developed at low tide that is trending southeast with a maximum surface flow speed 0.93 m / s and at high tide trending east-southeast with a maximum speed of 0.05 m / s that caused accumulation of material.
- Distribution sediment sea floor surface based on the analysis of grain size distribution of sediment contained 7 (seven) units on the seafloor territorial Nusawere, namely sand (S), Silty sand (SS), muddy sand (mS), muddy sand (granule) {(g) mS}, pebbly sand

7. Nusawere aquatic environment have the same depth with the South China Sea are dominated ostracoda sea that range from splow marine (Inner-Midle Neritic / 0-50 m).
8. Based on the genus ostracoda, age Territorial Nusawere is Resen (Holocene),

ACKNOWLEDGEMENTS

This research is inseparable from aid samples from PPGL Cirebon and Bandung PPGL Laboratory, as well as research grants from the Research Institute of UPN "Veteran" Yogyakarta. To the authors would like to thank all those who have helped smooth the research. Do not forget to Mrs. Kresna PPGL Bandung who has done this ostracoda research mentoring.

REFERENCES

Dewi, K. T., 1997. *Ostracoda from the Java sea, west of Bawean Island, Indonesia,* Ministry of Mines and Energy, Directorate General of Geology and Mineral Resources, Marine Geological institute Special Publication No. 4, Bandung. 86 p.

Dewi, K. T. & Kapid, R., 2000. Seri Mikrofosil, *Ostracoda: Objek Alternatif untuk Penelitian Mikropaleontologi,* 103 p, 53 fig.

McKenzie, K. G. & Sudijono, 1981. Plio- Pleistocene Ostracoda from Sangiran, Jawa, *Indonesian Paleontology Series 1.*

Mostafawi, N., 1992. Rezente Ostracoden aus Dem Mittleren Sunda - Schelf, Zwischen der Malaiishen Pbinsel und Borneo (abstract in English), *Senckenbergiana lethaea* 72, 129 - 168.

Tim Peneliti Proses Sedimentasi Perairan Nusawere., 2000. *Penelitian Proses Sedimentasi Perairan Nusawere Teluk Pangandaran Kabupaten Ciamis Jawa Barat*. Pusat Pengembangan Geologi Kelautan.Direktorat Jendral Geologi dan Sumber Daya Mineral. Departemen Energi dan Sumberdaya Mineral. Proyek Penyelidikan Geologi Wilayah Pantai No: 181, Bandung. 74 p.

Van Morkhoven, F. P. C. M., 1963, Post - Paleozoic *Ostracoda: Their morphologi, Taxonomy and Economic* Used, vol. 1. Elsevier, Amsterdam, 204 p.

Whatley, R., & Zhao, Q., 1988. Recent Ostracoda of the Malacca Strait, Part 2, *Revista Espanola de Micropaleontologia* 20, 5 - 37.

Yassini, I. and Jones, B. G., 1995. *Foraminifera and Ostracoda from Estuarine and Shelf Environments on the Southern Coast of Australia*, The University of Wollongong Press, Wollongong, 484 p.

Yassini, I., *et al,* 1993. Ostracods from the Bay of Carpentaria, Northeastern Australia. *Senckenbergiana lethaea* 73 (2), 375 - 406.

Zhou, B., 1995. Recent Ostracode Fauna in the Pacific off South West Japan, *Kyoto* University, *Series of Geology & Mineralogy*, vol LVII, No 2.

Table 1. Diversity index of genus and species ostracoda in Nusawere Bay of Pangandaran (H ').

No Sample	Total Specimen	Total Species	Diversity Index
NW- 03	62	15	2,70805
NW- 06	3	3	1,098612
NW- 07	25	5	1,609438
NW-08	103	12	2,484907
NW-09	15	3	1,098612
NW-10	9	6	1,791759
NW-18	141	22	3,091043
NW-20	3	3	1,098612
NW-21	9	2	0,6931472
NW-22	1	1	-
NW-27	2	2	-
NW-29	22	10	2,302585
NW-31	9	2	0,6931472
NW-33	4	4	1,386294
NW-34	3	2	-
NW-35	1	1	-
NW-36	12	1	-
NW-40	14	4	1,386294
NW-41	9	3	1,098612
NW-44	53	10	2,302585
NW-47	16	1	-
NW-48	3	2	-
NW-53	141	19	2,944439
NW-54	120	11	2,397895
NW-57	6	3	1,098612
NW-63	180	18	2,890372
NW-66	249	11	2,397895
NW-67	171	6	1,791759
NW-68	125	17	2,833213
NW-69	84	14	2,639057

Table 2. Table of the age range based on genus ostracoda according to some references

No	Genus Ostracoda	Age
	Stimagtocythere Siddiqui, 1971	Holocene
2	*Muellerina* Kingma, 1948	Holocene
3	*Heterocythereis* Elofson, 1941	Pliocene to Holocene
4	*Xestoleberis* Sars, 1928	Upper Cretaceous - Holocene
5	*Macocypris* Brady, 1867	Lower Cretaceous - Holocene
6	*Bythocythere* Sars, 1866	Oligocene - Holocene
7	*Baltraella* Pokorny, 196	Holocene
8	*Paracytheridea* Muller, 1894	Holocene
9	*Copytus* Skogsberg, 1939	Holocene
10	*Argilloicea* Sars, 1866	Upper Cretaceous - Holocene
11	*Ilyocypris* Brady & Norman, 1889	Upper Yura - Holocene
12	*Aglaiocypris* Sylvester-Bradley, 1946	Pleistocene - Holocene
13	*Parakrithella* Mandelstam, 1960	Upper Cretaceous - Holocene
14	*Eucythere* Brady, 1868	Lower Cretaceous - Holocene
15	*Neocytheretta* Van Morkhoven, 1963	Miocene - Holocene
16	*Spinoceratina* Mostafawi, 1992	Holocene
17	*Bythoceratina* Hornibrook, 1953	Kapur Atas - Holocene
18	*Paracypris* Sars, 1866	Cambrium - Holocene
19	*Paracypris* Sars, 1866	Cambrium - Holocene
20	*Triebelina* Sars, 1988	Paleocene - Holocene

Table 3. Range Age based on the content of Ostracoda

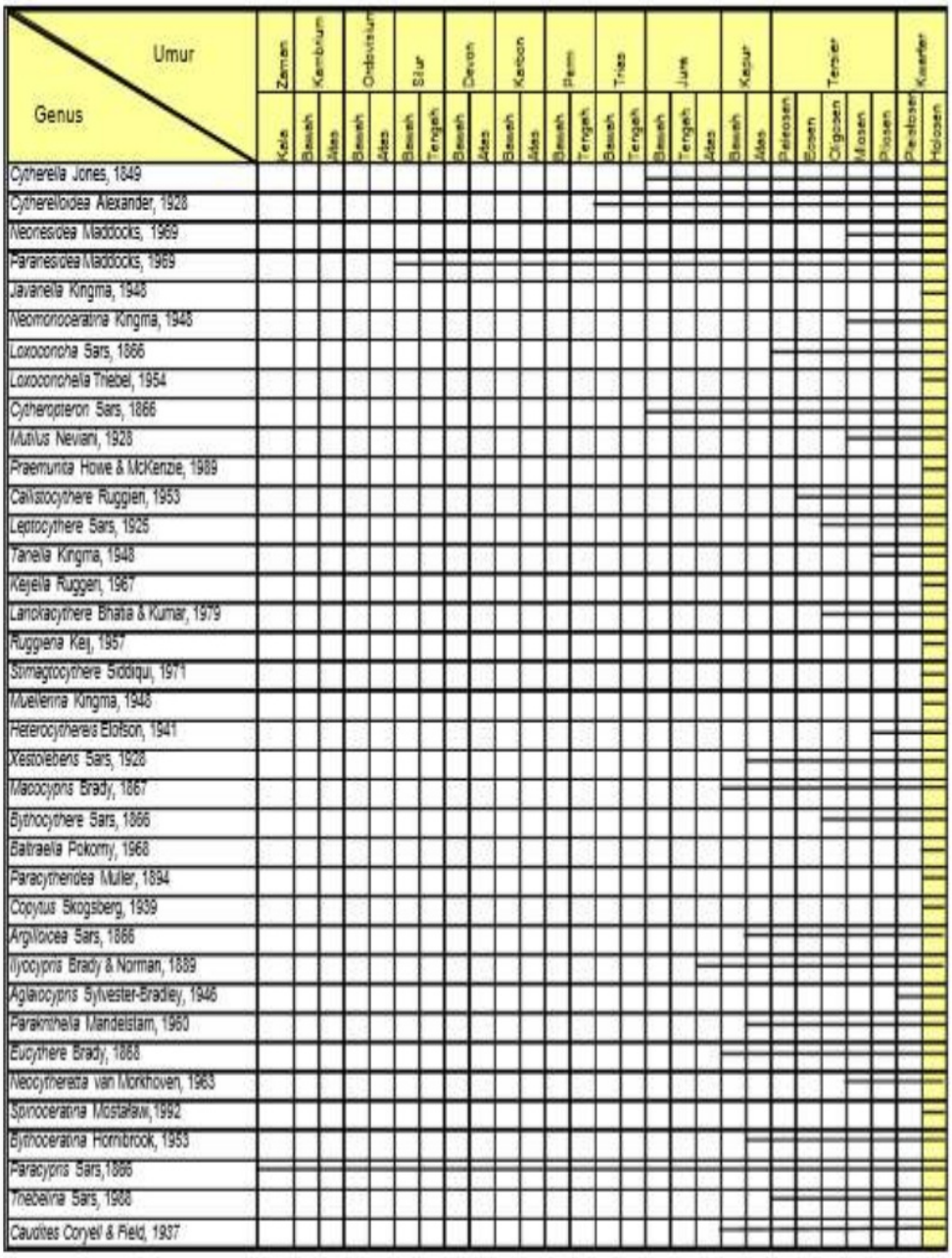

Table 4. Range depth Ostracoda of the Nusawere bay Pangandaran

Study of Ostracoda in Territorial Nusawere, Bay of Pangandaran, West Java (Heritage of Sediment Quarter).

ORIGINALITY REPORT

2%	2%	3%	2%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	media.neliti.com Internet Source	2%

Exclude quotes	Off	Exclude matches	< 2%
Exclude bibliography	Off		