

A New Species of Miocene *Entemnotrochus* from the South  
of Nokogiri-yama, Boso Peninsula, Japan

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(With 2 text-figures, 2 tables and 1 plate)

房総半島，鋸山南側産中新世オキナエビスガイ科

*Entemnotrochus* の一新種

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千葉県鋸山南側に分布する千畑礫岩層からオキナエビスガイ科 *Entemnotrochus* 属の一新種を発見した。本種は現生種のリュウグウオキナエビス *E. rumphii* に似ており，アダンソンオキナエビス *E. adansoniana* に形態的に異なるので，ここに *E. shikamai*, sp. nov. として記載する。

### Introduction

In January, 1973 the writer had the opportunity of obtaining a pleurotomariid fossil from the Miocene Senhata conglomerate member from a location south of Nokogiri-yama, Chiba Prefecture. After critical examination of this fossil, he regards it as a new species of the genus *Entemnotrochus*. A diagnosis of this is presented here\*.

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### Geological outline of the Senhata conglomerate member

The Senhata conglomerate member is the lowest unit of the Miocene Miura group in the Nokogiri-yama area, middle Boso Peninsula, and correlates with the Tagoegawa member in the Miura Peninsula which contains many molluscan fossils (SHIKAMA, 1973). The Miura group unconformably overlies the lower Miocene Amatsu mudstone member of the Sakuma group and is overlaid by the Takeoka tuff-breccia member of the Kazusa group. The stratigraphic relations and correlations of the Senhata conglomerate member are as follows (KOIKE, 1951):

\* Yokosuka City Museum, Yokosuka, Japan.

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\*\* The descriptive terms adopted here are from COX (1960) and KNIGHT *et al.* (1960).

	NOKOGIRI-YAMA, BOSO PENINSULA	MIURA PENINSULA
Kazusa group	Takeoka tuff-breccia member	Fukazawa tuffaceous sandstone member
	Ogyu pyrocrastic member	Ikego pyrocrastic member
Miura group	Inakozawa mudstone member	Zushi mudstone member
	Senhata conglomerate member	Tagoegawa conglomerate member
Sakuma group	Amatsu mudstone member	

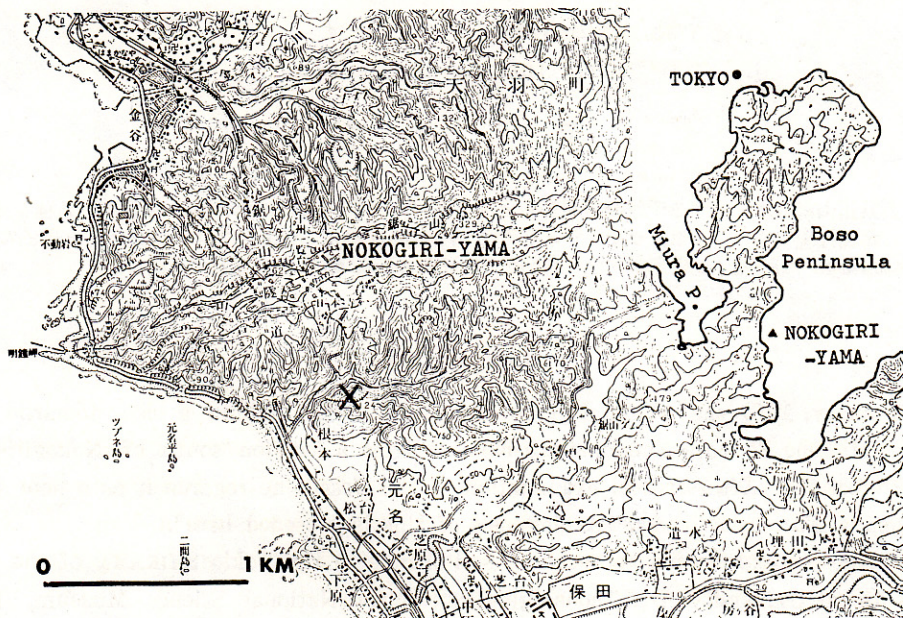


Fig. 1. Index map and location (×) of the fossil *Entemnotrochus*.

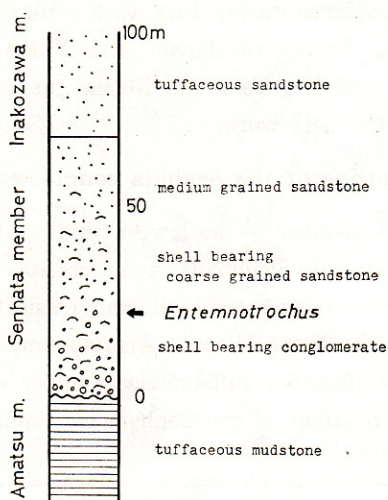


Fig. 2. Columnar section of the Senhata conglomerate member from location shown on map (Fig. 1), south of Nokogiri-yama.



Table 1. List of associated fossils from the Senhata conglomerate member located south of Nokogiri-yama. These fossils are preserved at the Yokosuka City Museum, YCM.GP. 529-1~32. (\*abundant)

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HEXACORALLIA
<i>Conotrochus</i> (?) sp.
<i>Flabellum</i> sp.
CASTROPODA
<i>Hipponix</i> ( <i>Sabia</i> ) <i>conicus</i> (SCHUMACHER)
<i>Turritella</i> sp.
<i>Pupa</i> (?) sp.
PELECYPODA
<i>Glycymeris</i> (?) sp.
<i>Ammusiopecten itomiensis</i> (OTUKA)*
<i>Pecten</i> (s. s.) sp.
<i>Chlamys</i> (s. s.) <i>miurensis</i> (YOKOYAMA)*
<i>C.</i> (s. s.) cf. <i>miurensis</i> (YOKOYAMA)*
<i>C.</i> ( <i>Mimachlamys</i> ) <i>kaneharai</i> (YOKOYAMA)
<i>C.</i> ( <i>M.</i> ) cf. <i>kaneharai</i> (YOKOYAMA)
<i>Lima</i> (s. s.) <i>zushiensis</i> (YOKOYAMA)
<i>L.</i> (s. s.) sp.
<i>Corbicula</i> sp.
<i>Paphia</i> (?) sp.

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Minor structural and gravel compositions of the Senhata member were reported by TAKAHASHI (1954). MITSUNASHI and YAZAKI (1958) correlated the Tertiary systems in the Boso and Miura Peninsulas by pyroclastic key beds, demonstrating that the Senhata conglomerate member is an intercalation of tuffaceous sandstone in the upper part of the Amatsu mudstone member in the middle Boso Peninsula.

The Senhata conglomerate member is 75 meters thick in this area. The conglomerate carries many gravels of the preceding formations (Hota or Hayama group) and hence it is greenish in colour with many gravels of serpentine and contains rounded scoriaceous rocks. Basal conglomerate of the Miura group has similar characteristics. The latter member yields many fossils (Table 1) in which are found algal nodules (rhodolites) about 7 cm in maximum diameter. The fossil *Entemnotrochus* in question was found preserved in good condition, even though it had been a dead shell for a long time before becoming buried in sediments.

#### Description of a new species

Family Pleurotomariidae SWAISON, 1840

Genus *Entemnotrochus* P. FISCHER, 1885

Type-species *Pleurotomaria adansoniana* CROSS and FISCHER, 1861

*Entemnotrochus shikamai*, sp. nov.

(pl. XXI, figs. 1-4).

#### *Material:*

Holotype, YCM. GP. 529-1 (Y. KANIE coll.), from Senhata conglomerate member, south

of Nokogiri-yama, Kyonan-cho, Awa County, Chiba Prefecture.

*Description:*

Shell thin, being 0.8 mm thick on the base and 0.3 mm at the fourth or fifth volution, larger sized, trochiform though deformed by faulting, with the height less than the maximum diameter and the mean spire angle about 80°, apical angle 75°. Whorl with a steep, obtusely angular outer surface, a rounded shoulder and narrow suture ramp; peripheral bulge is subangular. Umbilicus being completely opened widely and touching at just below the apical whorl. Base rather flat. Selenizone at mid-height of whorl above peripheral bulge; width of selenizone appear to be narrow but not accurately known due to being crushed; labral slit seems to extend around about half of last whorl; sculpture of selenizone not preserved. Whorl surfaces with spiral lines and growth lines fourth or fifth volution; the base has weak collabral threads; other decorations are not visible due to shell surface being covered thickly with adhesive calcareous layer. Inner layer of base and last whorl-shell eroded by annerids, some of which are still attached.

*Measurement in mm:*

Maximum diameter (D)	Shell height (H)	Height of last whorl	(H)/(D)	Apical angle	Mean spire angle
144.8	137.0	42.3	0.95	80°	75°

**Comparison**

*Entemnotrochus shikamai* is closely related to the recent species of *E. rumphii* (SCHEPMAN), but is distinguished from the latter by a thinner shell. *E. shikamai* also differs from the recent species of *E. adansoniana* (CROSS and FISCHER) by possessing a maximum diameter (D) a little greater than the height (H). However the author has measured two preserved specimens of *E. adansoniana* in the Toba Aquarium. The results (Table 2) show that (D)>(H) and (H)>(D), depending on the age of the animal. *E. adansoniana* also differs from *E. shikamai* in that the whorls are feebly convex, having widely rounded shoulder and being obtusely angular at the periphery of the base. The selenizone of *E. adansoniana* is also located above the mid-whorl. *Pleurotomaria* (s. l.) sp. (none-published) from the Eocene Umpqua formation, Polk County, Oregon State, U. S. A. (Oregon State Geological Museum, the University of Oregon, Eugene, Oregon) is closely related to *E. adansoniana*. The specimen in Oregon measures about 150 mm in maximum diameter.

The author considers that *E. shikamai* is possibly an ancestor of the Indo-Pacific

Table 2. Measurements (mm) of two specimens of *Entemnotrochus adansoniana*, from the Toba Aquarium collection, Mie prefecture.

(D)	(H)	(H)/(D)
{150.8	{158.0	{1.048
{119.6	{118.1	{0.987
132	112	0.848

species *E. rumphii* and that *P.* (s.l.) sp. also has the same relationship to the Atlantic species *E. adansoniana*.

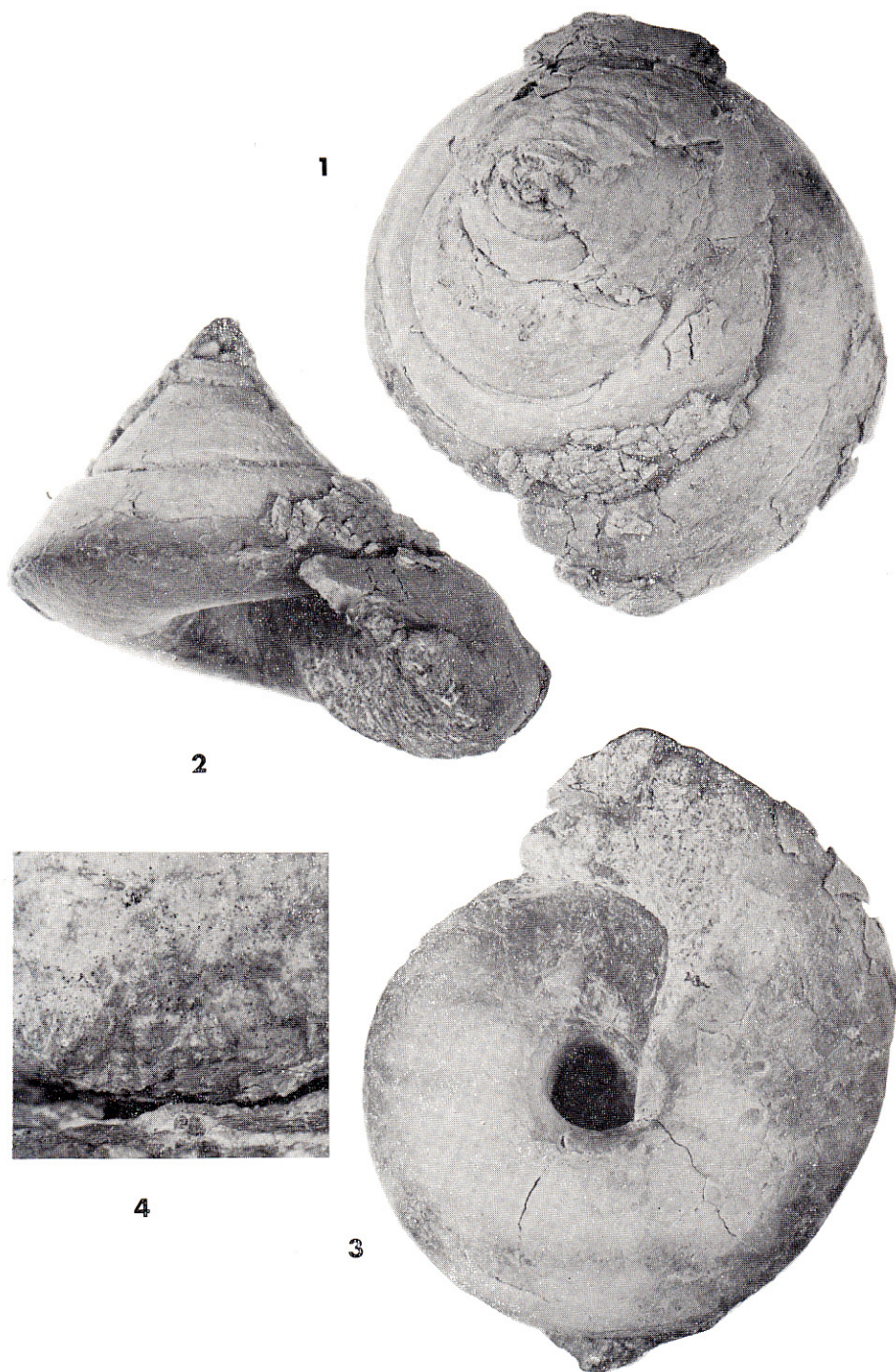
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Kyonancho, Awa County	安房郡鋸南町
Senhata	千畑





**Explation of plate**

Fig. 1~4. *Entemnotrochus shikamai*, sp. nov.

1. Apical. 2. Apertural. 3. Umbilical views.  
4. Surface ornamentations of the whorl faces on the fourth or fifth volution.  
1~3.  $\times 0.4$ ; 4.  $\times 2.5$

Holotype YCM. GP. 529-1. Locality: south of Nokogiriyama, Boso Peninsula;  
Senhata conglomerate member of the Miocene Miura group. (Y. KANIE coll.)  
Photos with whitening by Y. KANIE.