

A New Species of *Cyclina* from the Miocene Hwabongri Formation, Ulsan District, Korea

著者	Yoon Sun, Noda Hiroshi
journal or publication title	The science reports of the Tohoku University. Second series, Geology = 東北大学理科報告. 地質学
volume	46
number	1
page range	27-31
year	1976-03-25
URL	http://hdl.handle.net/10097/28826

A New Species of *Cyclina* from the Miocene Hwabongri Formation, Ulsan District, Korea

Sun Yoon* and Hiroshi Noda**

INTRODUCTION AND ACKNOWLEDGMENTS

In the eastern side of Ulsan-si, Gyeongsangnam-do, Korea (Fig. 1), a small distribution of the Tertiary sediments is confined to the western foot of Mt. Muryong. The Tertiary sediments were mapped as the member of the Jeongja Conglomerate on the Ulsan Sheet in the scale of 1: 50,000. In 1970, Kim renamed the Tertiary sediments the Hwabongri Formation. The formation yields marine molluscan fossils. A new species of *Cyclina* was collected from the Hwabongri Formation, and is described in this paper. The cyclinid species are useful for paleoenvironmental interpretation of geologic formations, because they are commonly known from the Miocene to Recent, and have been flourishing in brackish embayed realm. There are, however, critical taxonomic problems on fossil and Recent *Cyclina* species. In the present paper, the writers will discuss briefly on the Miocene cyclinid based upon the specimens collected from the Miocene Hwabongri Formation in Ulsan district.

The writers take this opportunity to express their sincere thanks to Professor Tamio Kotaka of the Institute of Geology and Paleontology, Faculty of Science, Tohoku University for his kind advice. They also present their hearty thanks to Dr. Katora Hatai, Professor Emeritus of Tohoku University and Professor Bong Kyun Kim of the Department of Geology, Seoul National University, for their continuous encouragements.

BRIEF NOTE ON THE HWABONGRI FORMATION

The Hwabongri Formation is distributed in the north - south direction along the western foot of Mt. Muryong. The formation consists mainly of conglomerates and sandstones, and comprises a small amount of siltstones. The conglomerates are predominant in the central part of the distribution of the formation, and the northern and southern parts are characterized by the alternation of conglomerates and sandstones. The conglomerates in the central part consists of pebbles, which are 3 to 7 cm in long diameter and subangular to subrounded, and are poorly bedded and sorted. Pebbles of 15 to 20 cm in long diameter are rarely contained in these conglomerates. Where thin lenticular sandstone beds are intercalated in these conglomerates at places, heavily broken oyster fragments are found. The Hwabongri Formation measures about 200 m in thickness, and is correlated with the Jeongja Conglomerate distributed in the eastern foot of Mt. Muryong. The geological age of the Hwabongri Formation is considered to be early Middle Miocene.

Present address:

* Department of Geology, Busan National University, Busan, Korea.

** Institute of Geoscience, Tsukuba University.

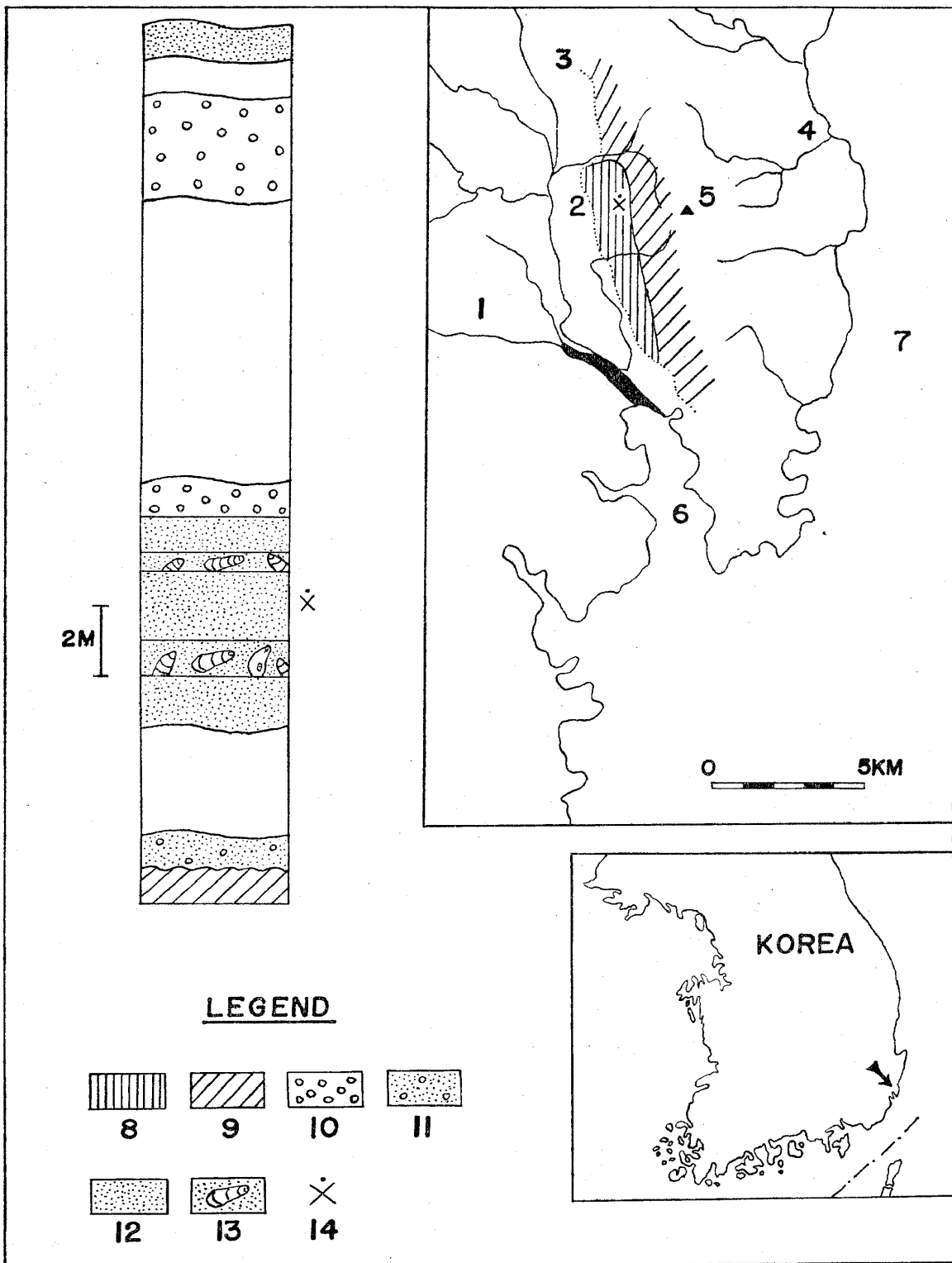


Fig. 1. Index map and fossil locality. 1: Ulsan-si, 2: Hwabong-ri, 3: Hogye-ri, 4: Jeongja-ri, 5: Mt. Muryong, 6: Ulsan Bay, 7: Sea of Japan, 8: Hwabongri Formation, 9: Cretaceous Ulsan Formation, 10: Conglomerate, 11: Conglomeratic sandstone, 12: Fine-grained sandstone, 13: *Crassostrea*-bed, 14: Fossil locality.

DESCRIPTION OF THE NEW SPECIES

Family Veneridae Rafinesque, 1815

Subfamily Cyclininae Frizzell, 1936

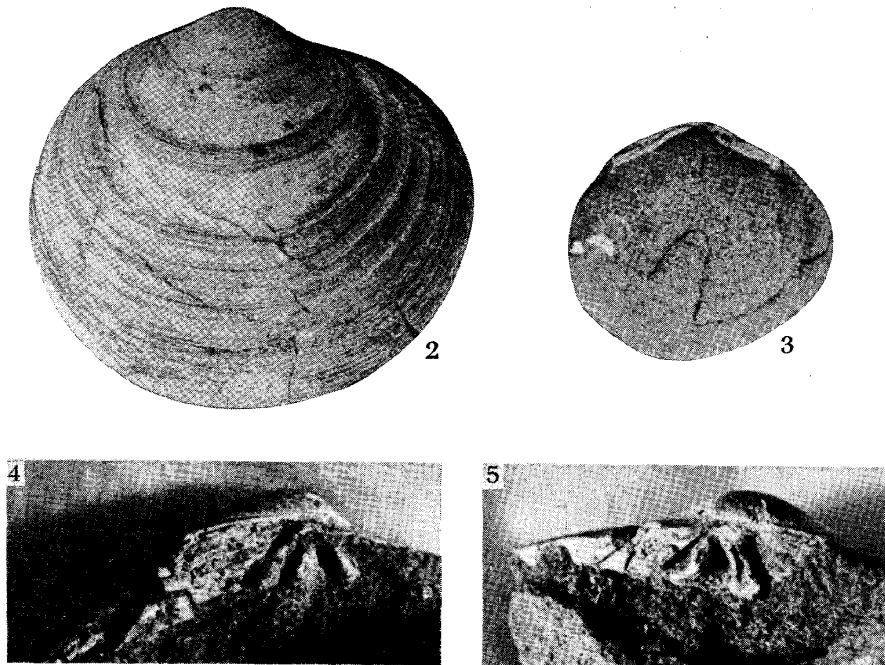
Genus *Cyclina* Deshayes, 1850

Subgenus *Cyclina* s.s.

Cyclina (*Cyclina* ?) *hwabongriensis* Yoon and Noda, n. sp.

Figs. 2-5

Description; Shell medium in size, orbicular in form, almost equilateral, a little longer than height, moderately inflated; anterodorsal margin nearly straight, passing into anterior margin with rounded corner; anterior margin broadly rounded; posterodorsal margin gently rounded, gradually passing into broadly rounded posterior margin; ventral margin regularly rounded. Beaks small, low, pointed, curved forward, situated in the middle part of shell length. Lunule and escutcheon not defined. Surface sculptured with concentric, fine growth lines and radial riblets; radial riblets only in anterior-dorsal part; concentric lines lamellose in ventral part and intervened with lamellose ones several times in upper part. Three cardinals in each valves. In left valve, 2a thin running forward obliquely from beak; 2b thick, obliquely backward from beak; 4b long, thin, oblique backward from beak. In right valve, 3a small, thin, oblique forward from beak; 1 thick, oblique forward from beak; 3b long, curved, thick, bifid, oblique backward from beak. Pallial sinus finger-shaped, the end of it narrowly rounded in shape, obliquely ascending from posteroventral corner toward umbo reaching central part of shell. Inner ventral margin smooth.



Figs. 2-5. *Cyclina* (*Cyclina* ?) *hwabongriensis* n. sp. (2 and 3 in natural size; 4 and 5, $\times 1.5$).
2: Holotype, DGBU coll. cat. no. 10262, 3-5: Paratypes, DGBU coll. cat. nos. 10265, 10264, 10263, respectively.

Dimension;	Height (mm)	Length (mm)	H/L	Depth	Valve
10262 (Holotype)	47.2	49.6	0.95	10.4	Right
10265 (Paratype)	26.7	28.4	0.94	—	Intact

Comparison and Affinities: *Cyclina (Cyclinorbis) lunulata* Makiyama, originally described from the Miocene Pyeongryugdong (=Heirokudo) Formation in northern Korea by Makiyama (1926), closely resembles the new species in its dentition, shell form and smooth inner ventral margin, but is distinguished by its entirely concentric fine growth lines and lunular area. *Cyclina (s.s.) japonica* Kamada described from the Miocene Higashi-Innai Formation in the Noto Peninsula, also resembles the new species, but is distinguished by its radial riblets all over the shell surface like as *Cyclina (s.s.) asagaiensis* Kamada, wider pallial sinus, crenulate inner ventral margin and more inflated shell form. *Cyclina (s.s.) sinensis* (Gmelin), a Recent shell, sometimes considered to be conspecific with *Cyclina (s.s.) orientalis* (Sowerby), is similar to the present species, but the latter is distinguished from the former by its radial riblets restricted to the anterodorsal part, narrower ligamental area, narrower pallial sinus, smooth inner ventral margin and less inflated shell form.

REMARKS ON *CYCLINA HWABONGRIENSIS*

The present new species, *Cyclina hwabongriensis*, was collected from the dark gray, fine grained sandstone of the Hwabongri Formation overlying the Cretaceous Ulsan Formation with unconformity. More than ten specimens were collected, but most of them were broken in process of collection because of the fragility of the shell material and the fine grained sandstone, and of their state of preservation. Four specimens have both valves attached, and others are separate ones. Some of these specimens remain shell material showing original surface sculptures and dentition as already described above. The new species has dentition and pallial sinus which suggest an alliance to those of the genus *Cyclina*. The genus *Cyclina* includes two subgenera, that is, *Cyclina* s.s. and *Cyclinorbis*. *Cyclina* s.s. is characterized by lack of lunule and escutcheon, and possession of radial riblets and crenulated internal ventral margin, whereas *Cyclinorbis* proposed by Makiyama (1926) is distinguished from *Cyclina* s.s. by faint lunular area, entirely concentric surface sculpture and smooth inner ventral margin. The new species has characters intermediate between the two subgenera, and its subgeneric assignment is still in suspense, because the new species has no lunule and no escutcheon but smooth inner ventral margin. The former two characters are those of subgenus *Cyclina* s.s. and the last one is of *Cyclinorbis*. The present form has surface sculptures of concentric fine growth lines and radial riblets only on anterodorsal part. The radial riblets is an important character of the subgenus *Cyclina*. However, the present form has radial riblets only on the anterior dorsal part, but nearly whole surface excluding the anterodorsal part is sculptured with concentric growth lines like as subgenus *Cyclinorbis*. Among the Japanese Miocene species, *Cyclina (Cyclina) japonica* Kamada, recorded from various localities mainly in the Japan Sea borderland, allies to *hwabongriensis* in carrying the intermediate characters between *Cyclina* s.s. and *Cyclinorbis*, which should be clarified in a future.

The present new species is occurred in association with *Anadara (Anadara) makiyamai* Hatai and Nisiyama, *Anadara (Hataiarca)* cf. *daikudoensis* (Makiyama), *Crassostrea gravitesta* (Yokoyama), *Siratoria siratoriensis* (Otuka) and others. These characteristic species are also known from the Middle Miocene formations in Japanese Islands and are important elements of the Arcid-Potamid Fauna. According to Kamada (1952), *Cyclina*, in general, had flourished under a warm embayed condition as was inferred from the associated species.

Type locality: A cliff at the opposite side of a temple about 1 km east of Hwabong-ri,

Ulsan-si, Gyeongsangnam-do, Korea.

Depository: Holotype, DGBU coll. cat. no. 10262; Paratype, DGBU coll. cat. nos. 10263, 10264, 10265. All specimens preserved in the Department of Geology, Busan National University, Busan, Korea.

REFERENCES

- Cox, L.R., *et al.* in Moore, 1969, Treatise on Invertebrate Paleontology, Part N, Mollusca, vol. 2, p. 491-952. *Geol. Soc. Amer. and Univ. Kansas.*
- Kamada, Y., 1952, On some species of *Cyclina* from Japan and Korea. *Trans. Proc. Palaeont. Soc. Japan, N.S.*, no. 6, p. 167-173, pl. 15.
- Kim, B.K., 1970, A study on the Neogene Tertiary deposits in Korea. *Jour. Geol. Soc. Korea*, vol. 6, no. 2, p. 77-96, pls. 1-3. (*in Korean with English abstract*).
- , Noda, H., and Yoon, S., 1974, Molluscan fossils from the Miocene Eoil Formation, Gampo and Ulsan districts, southeastern-side of Korea. *Trans. Proc. Palaeont. Soc. Japan, N.S.*, no. 93, p. 266-285, pls. 38-39.
- Makiyama, J., 1926, Tertiary fossils from north Kankyo-do, Korea. *Mem. Coll. Sci., Kyoto Imp. Univ., Ser. B*, vol. 2, no. 3, p. 143-160, pls. 12-13.
- Park, Y., and Yoon, H.D., 1968, Explanatory text of the geological map of Ulsan sheet. *Geol. Surv. Korea*, p. 1-20, 1-5, pls. 1-20, 1 geol. map. (*in Korean with English text*).

Gyeongsangnam-do
Hwabong-ri
Hogye-ri
Jeongja-ri

慶尚南道
華峰里
虎湊里
亭子里

Muryong
Pyeongryugdong
Ulsan-si

無龍
坪六洞
蔚山市