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## Report

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# Middle Permian (Wordian) fusulinoideans from Takedao, NNW of Takarazuka, Hyogo - Late Paleozoic and Early Mesozoic foraminifers of Hyogo, Japan, Part 7 -

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### Abstract

Middle Permian (Wordian) *Neoschwagerina margaritae* and several other indeterminate foraminifers are distinguished from limestone blocks scattered on a river floor of a small valley flowing into the Muko River, near JR Takedao Station, NNW of Takarazuka. The occurrence of Late Paleozoic foraminifers in the Muko and Ina River basins, southeastern part of Hyogo prefecture is the second example after the first one from Tada, Kawanishi city by Fujimoto in 1950.

**Key words:** Middle Permian (Wordian) fusulinoideans, limestone block, Ultra-Tamba Terrane, Takedao.

### Introduction

The occurrence of Early Permian fusulinoideans, *Schwagerina krotowi* (Schellwien) and *Schwagerina* sp. in the limestone near Tada Shrine, Kawanishi city, southeastern part of Hyogo prefecture by Fujimoto (1950) is only one report of fossil foraminifers in the mountainous region of the Muko and Ina River basins. Recently, T. Munehiro gave me the information of the occurrence of limestone including many fusulinoideans at near JR Takedao Station, NNW of Takarazuka.

The aim of this short report is to announce the occurrence of the Middle Permian (Wordian) fusulinoideans collected at near Takedao, as the seventh paper of the serial descriptive work under the title of Late Paleozoic and Early Mesozoic foraminifers of Hyogo, Japan. I thank Mr. Tadashi Munehiro for his information of the occurrence of fusulinoideans near Takedao. All limestone thin sections used in this paper are stored in the collection of the Museum of Nature and Human Activities, Hyogo, Japan (Fumio Kobayashi Collection, MNHAH).

### Geologic setting, sample, and fauna

Pre-Cretaceous basement rocks in the southeastern part of Hyogo prefecture are assignable to the Jurassic Tamba and the Permian Ultra-Tamba accretionary terranes. They are extensively covered by Upper Cretaceous volcanic-volcaniclastic rocks of the Arima Group in the Muko River basin. In the middle course of the Muko River basin, the basement rocks narrowly distributed near Takedao consist of black mudstone and sandstone and less amount of chert. They are exposed in the topographically low area where the overlying Arima Group was denudated. These rocks have been thought to be tectonically assignable to the Tamba Terrane (Matsuura et al., 1995). However, they are referable to the Ultra-Tamba Terrane instead of the Tamba according to the report on Permian radiolarians from mudstone of this area (Furutani, 2006).

Limestone pebbles to cobbles are scattered on a river floor in a small valley flowing into the Muko River, 800 m northeast of JR Takedao Station, NNW of Takarazuka (Figure 1). Nevertheless,

limestone is not exposed both along this small valley and on its eastern and western slopes. Sandstone and black mudstone are only exposed in 200 m lower streamside and many acidic volcaniclastic rocks of the Takedao Formation (Matsuura et al., 1995) of the Upper Cretaceous Arima Group occur in the upper streamside along this small valley.

Recognized foraminifers from five limestone samples collected at near Takedao are *Neoschwagerina margaritae* Deprat (Pl. 1, Figs. 1, 2, 6–11), *Chusenella* sp. (Pl. 1, Fig. 5), Schwagerinidae gen. and sp. indet., *Pseudoendothyra* sp. (Pl. 1, Fig. 4), *Dunbarula?* sp. (Pl. 1, Fig. 3), *Kahlerina?* sp., and *Pachyphloia* sp. The first species is the index species of the *Neoschwagerina margaritae* Zone distinguished throughout the Wordian (upper Murgabian) in the Tethyan regions. Non-fusulinoidean foraminifers of indeterminate

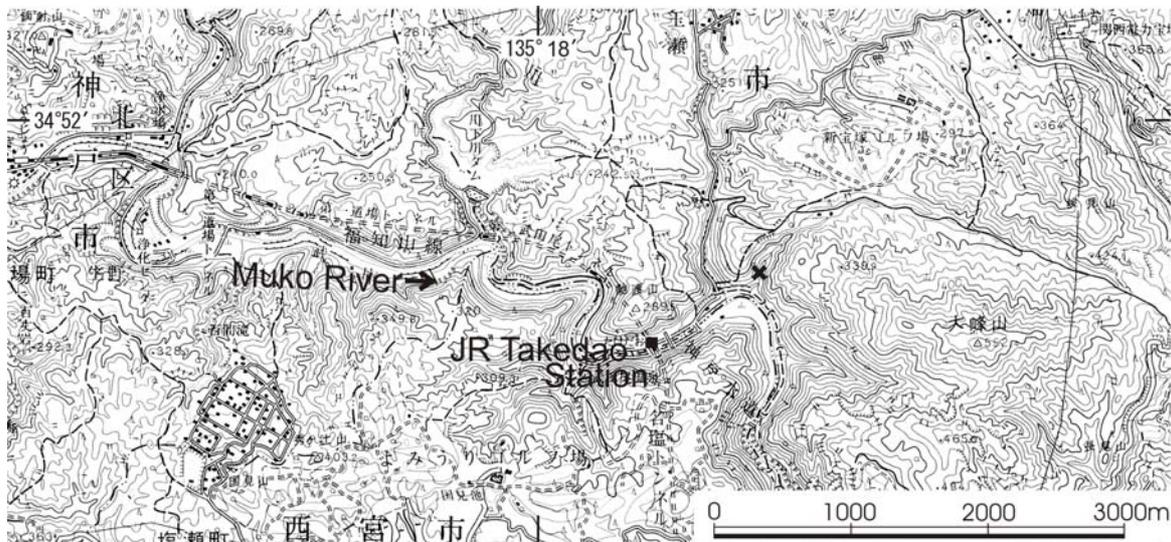
genus and species assignable to Endothyriidae, Biseriamminidae, Palaeotextulariidae, and Hemigordiopsidae are also rarely contained by samples.

## References

- Fujimoto, H.** (1950) Fusulinids occurred in Kuriyama-mura, Shiyoa-gun, Tochigi-ken and in Tada-mura, Kawabe-gun, Hyogo-ken. *Jour. Geol. Soc. Japan*, **56**: 535. (in Japanese)
- Furutani, H.** (2005) Ultra-Tamba Belt. *Takarazuka Daijiten (Takarazuka Encyclopedia)*, Osaka Shoseki, Osaka, p. 152–155. (in Japanese)
- Matsuura, H., T. Kurimoto, C. Sangawa, A. and Bunno, M.** (1995) *Geology of the Hirone district. with geological sheet map at 1: 50,000*, Geol. Surv. Japan, Tsukuba, 110 p. (in Japanese, with English abstract 6 p.)

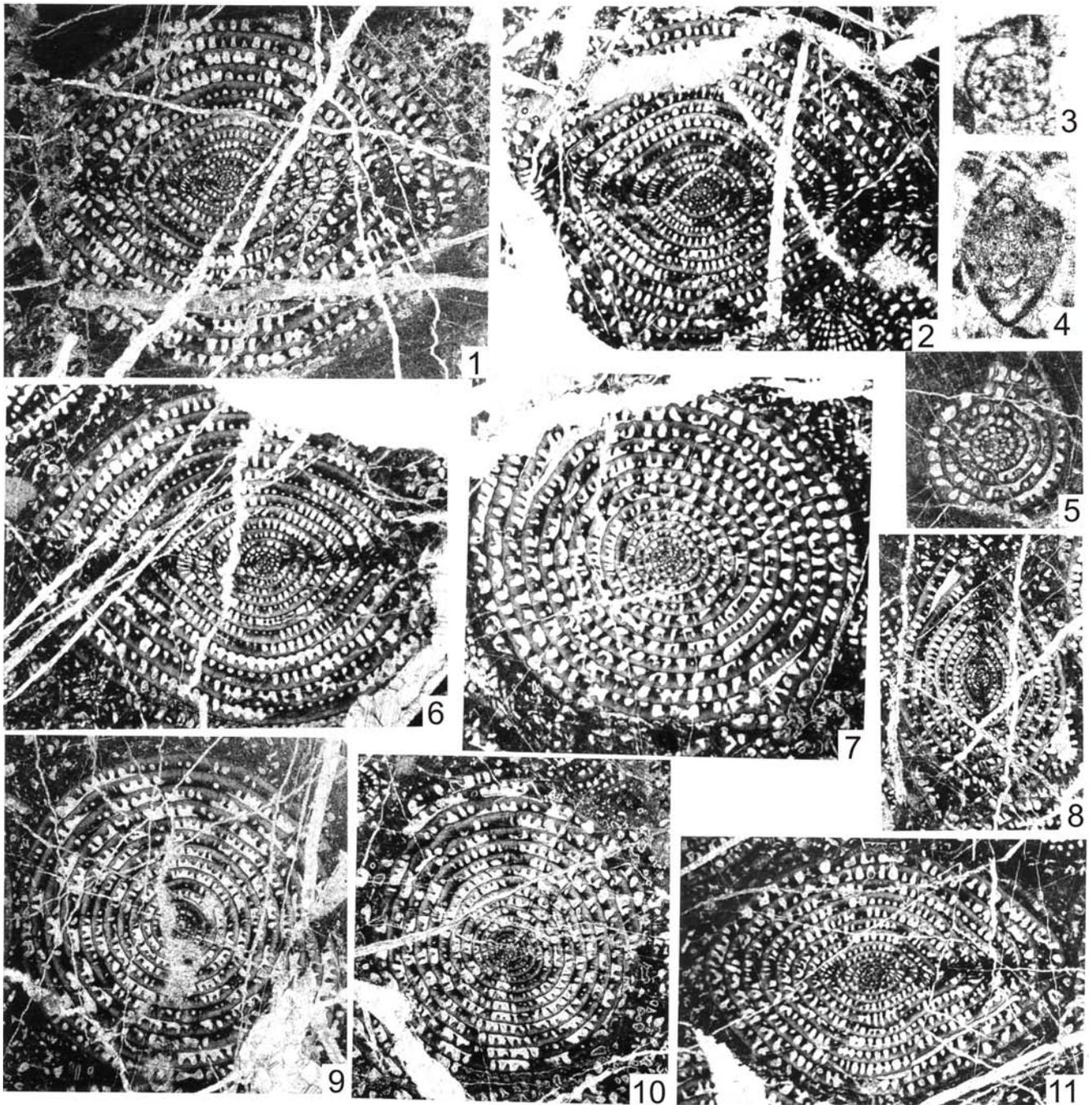
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**Figure 1.** Fossil locality, near Takedao. Topographic map is from 1:50,000 map of Hirone of Geographical Survey Institute of Japan.

Plate 1



**Figs. 1, 2, 6–11.** *Neoschwagerina margaritae* Deprat.

1: D2-035554; 2: D2-035556; 6: D2-035534; 7: D2-035536; 8: D2-035545; 9: D2-035536; 10: D2-035544; 11: D2-035540, all  $\times 10$ .

**Fig. 3.** *Dunbarula?* sp.

D2-035555a,  $\times 50$ .

**Fig. 4.** *Pseudoendothyra* sp.

4: D2-035555b,  $\times 40$ .

**Fig. 5.** *Chusenella* sp.

D2-035553,  $\times 10$ .