

## A New Tabulate Coral from the Silurian of the Southern Kitakami Mountains

**Shuji Niko**

Department of Environmental Studies, Faculty of Integrated Arts and Sciences, Hiroshima University,  
1–7–1 Kagamiyama, Higashihiroshima, Hiroshima, 739 Japan

**Abstract** A new species of tabulate coral, *Tollina kitakamiana*, is described from the basal part of the Kawauchi Formation in the Southern Kitakami Mountains. Only the holotype was found in a micritic limestone of Llandovery age. This species represents the first record of *Tollina* in Japan, and extends the upper stratigraphic range of the genus from the Ordovician to Silurian. It is also noteworthy that *Tollina* is a characteristic genus of the Siberian fauna. Thus, the present discovery provides the first evidence of faunal migration from Siberia to the Southern Kitakami Mountains.

**Key words:** Kawauchi Formation, Silurian, Southern Kitakami Mountains, tabulate coral, *Tollina kitakamiana*.

### Introduction

A single corallum of a new species of *Tollina* was collected from the vicinity of Gyoninzawa in the Onimaru area, Hikoroichi-machi, Ofunato City, Iwate Prefecture, Southern Kitakami Mountains (see fig. 1 in Harashinai, 1981, for detailed locality information). The coral came from a dark-gray micritic limestone at the basal part of the Kawauchi Formation. The limestone includes rich rugose and tabulate corals. These are *Phaulactis* (*Lykophyllum*) *onukii* Murata (1977) (Kato *et al.*, 1980, noted that this species should be referred to *Neocystiphyllum*), *Favosites asper* d'Orbigny, *F. baculoides* Barrande (Minato *et al.*, 1973), *Halysites* sp., *Heliolites* sp. and *Syringopora* sp. (Harashinai, 1981). The age of the Gyoninzawa fauna was discussed by Yoshida *et al.* (1981) and Harashinai (1981) based on conodonts, and it was assigned to Llandovery (Early Silurian) age.

The specimen, NSM PA12950, from which four sections were made, is deposited in the National Science Museum, Tokyo.

### Systematic Paleontology

Order Halysitida Sokolov, 1950  
Suborder Vacuoporina Lin *in* Lin *et al.*, 1988  
Family Vacuoporidae Preobrazhensky, 1965  
Genus *Tollina* Sokolov, 1949

*Type species:* *Halysites keyserlingi* Toll, 1889.

*Remarks*: *Tollina* was placed in the order Sarcinulida by Hill (1981), but is considered here to be much closer to *Halysites* rather than to *Sarcinula*, because it has cateniform coralla with lacunae and lacks pore canals and platforms, as noted by Sokolov (1962) and Lin in Lin *et al.* 1988. I follow Lin's view in that the genus belongs in the family Vacuoporidae of the order Halysitida.

*Tollina kitakamiana* n. sp.

(Figs. 1A–C, 2A–C)

*Holotype*: A single corallum, NSM PA12950.

*Diagnosis*: Species of *Tollina* usually with multiple ranks, subelliptical to labyrinthine longitudinal lacunae; tabularium diameter approximately 1.0 mm; tabulae variable in form, complete or incomplete.

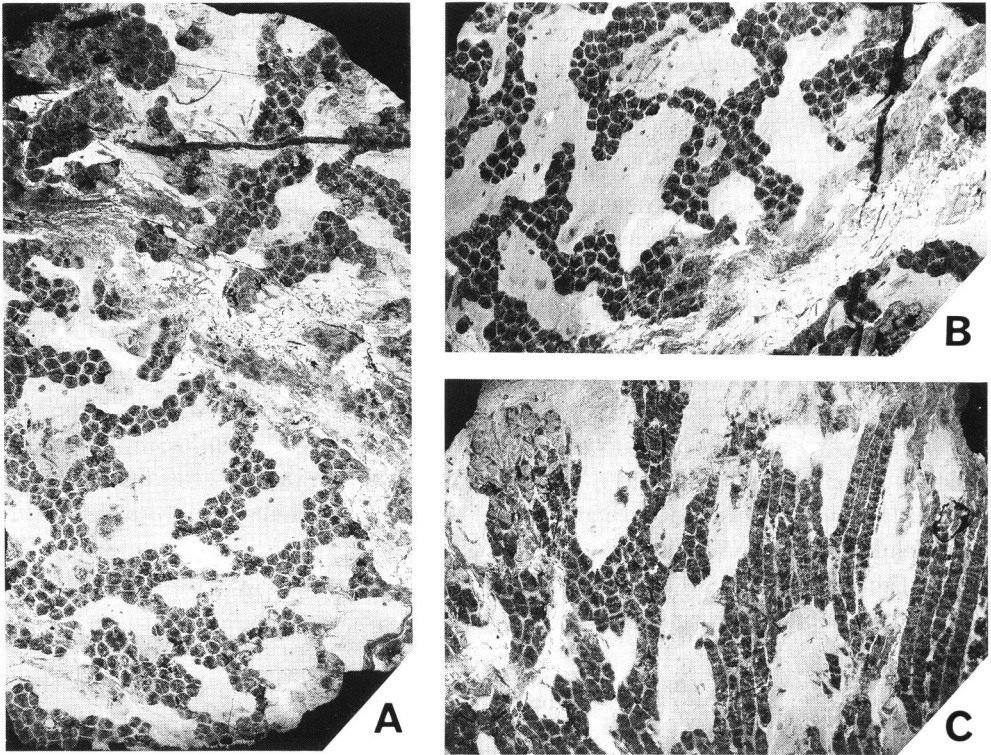
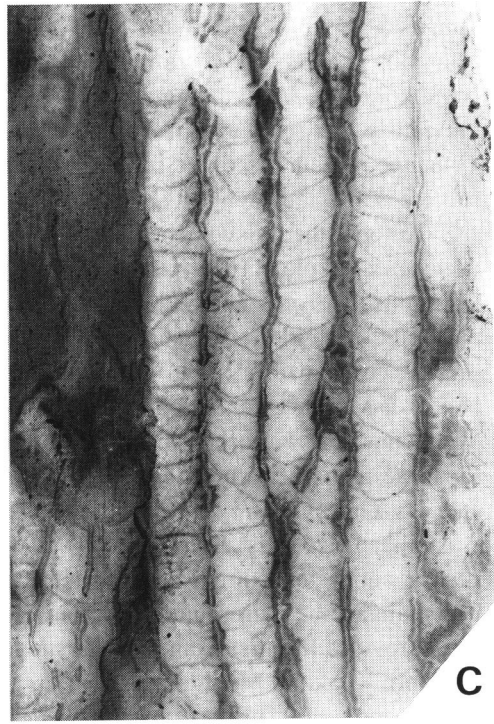
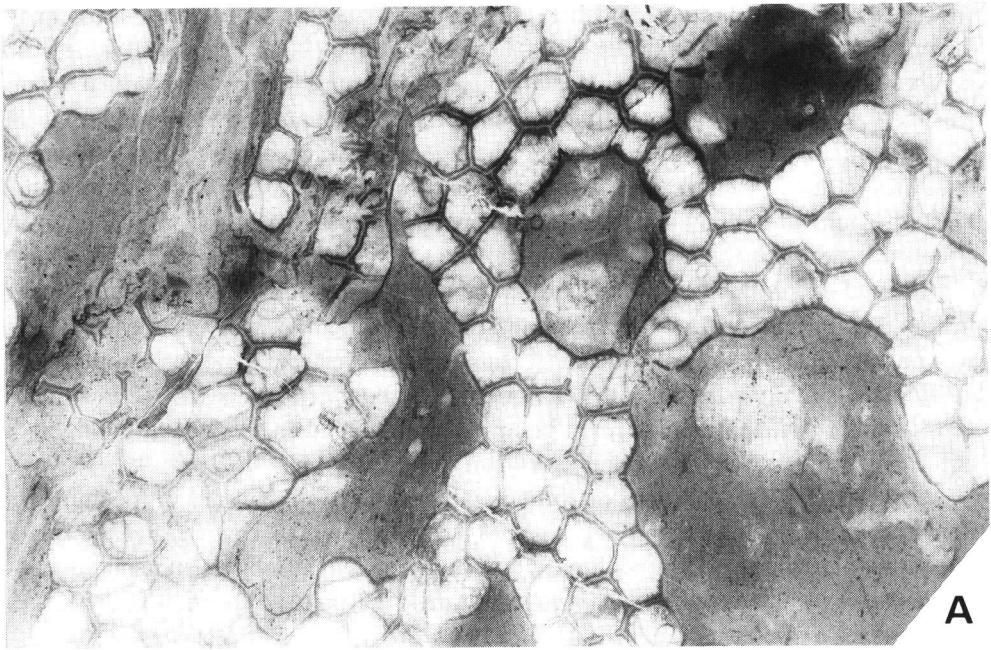


Fig. 1. *Tollina kitakamiana* n. sp., holotype, NSM PA12950, thin sections, negative prints,  $\times 2$ . A, B, transverse sections; C, longitudinal (right) to oblique (left) section.

Fig. 2. *Tollina kitakamiana* n. sp., holotype, NSM PA12950, thin sections,  $\times 8$ . A, transverse section; B, oblique section; C, longitudinal section, note lateral increase in new corallite.



*Description*: Corallum domed in growth form, at least  $83 \times 46$  mm across and 43 mm high, cateniform with 1–4 ranks, usually multiple (2–3), and partial adhesion composed of up to 30 corallites indicating cerioid-like appearance; longitudinal lacunae show somewhat irregular outline in transverse section, ranging from subelliptical to labyrinthine. Each corallite prismatic, hexagonal in transverse section, but some corallites in facing lacunae subtriangular or hemispherical, usually 0.6–1.2 mm, with mean 1.0 mm, in maximum tabularium diameter; increase of new corallite lateral. Corallite wall relatively thick, approximately 0.10 mm, composed of medial transparent line and darker microlamellar zone; mural pores numerous, faces with single row in each corallite face, elliptical, with lateral compression, closed by pore-plates, approximately  $0.33 \times 0.25$  mm in diameter; tabulae thin, variable in form, complete or incomplete, slightly concave or nearly horizontal in complete tabulae, 9–12 in 5 mm; septal spines short, approximately 0.13 mm in length, abundant, horizontal or slightly upturned, forming transverse and longitudinal rows.

*Discussion*: The corallum of *Tollina kitakamiana* n. sp. consists of a combination of cateniform and cerioid-like portions with longitudinal lacunae and the relatively thick corallite wall, in addition it lacks coenenchymal tubules and small lacunae between contiguous side walls. These features confirm the allocation of the Kitakami species to the genus *Tollina*.

*Tollina* flourished in the Siberian fauna in such areas as Taimyr (Sokolov, 1962), Tunguska (Sokolov, 1955) and Kotel'nyi Island (Toll, 1889). Only exception is from Manitoba (Laurentia) where Leith (1944) documented the occurrence of *T.?* *manitoba* Sokolov, as "*Halysites gracilis*". The stratigraphic range of *Tollina* documented previously was restricted in the upper Middle to Upper Ordovician (Sokolov, 1962). Thus, the present discovery is the first record of *Tollina* from Japan. This Llandovery species is also the youngest and the only Silurian occurrence of the genus.

Among the known species of *Tollina*, the present species is most like *T. evenkiana* Sokolov (1955, pl. 34, figs. 1a, b) from Tunguska. The two species can be distinguished from one another in that the ranks of *T. kitakamiana* are usually multiple, and the labyrinthine lacunae are poorly developed in *T. evenkiana*.

Since Hamada's (1958) detailed faunal analysis based on halysitids, a resemblance has been emphasized on the Silurian coral fauna of the Southern Kitakami Mountains, the Kurosegawa Terrane and East Australia (*i.e.*, Kato, 1990). These Japanese faunas clearly indicate such a relationship, and share characteristic genera such as *Labechiellata*, *Kitakamiia*, *Schedohalysites* and *Falsicatenipora* with East Australia. In contrast the Silurian coral fauna of Siberia does not include endemic genera suggesting direct relationship between there and the Southern Kitakami Mountains or the Kurosegawa Terrane. The present new discovery of *Tollina*, therefore, provides the first example that suggests a faunal migration from Siberia to the Southern Kitakami Mountains.

*Etymology*: The specific name is derived from the Kitakami Mountains.

### Acknowledgments

I am grateful to Dr. T. Kawamura (Miyagi University of Education) and Mr. A. Kaneko (Kobe City) for their aid in conducting field work.

### References

- Hamada, T., 1958. Japanese Halysitidae. *Jour. Fac. Sci. Univ. Tokyo, Sec., 2*, **11**: 91–114, pls. 6–10.
- Harashinai, M., 1981. Discovery of Silurian conodonts in the vicinity of Gyoninzawa, Hikoroichi-machi, Ofunato City, Northeast Japan. *Jour. Geol. Soc. Japan*, **87**: 841–843. (In Japanese.)
- Hill, D., 1981. Rugosa and Tabulata, pp. F379–F762. In C. Teichert *et al.* (eds.): *Treatise on Invertebrate Paleontology*, Part F, Coelenterata. Supplement 1, Vol. 2. Boulder, Lawrence, Geological Society of America, University of Kansas.
- Kato, M., 1990. Palaeozoic corals, pp. 307–312. In K. Ichikawa *et al.* (eds.): *Pre-Cretaceous Terranes of Japan*. Osaka, Publication of IGCP Project 224.
- Kato, M., M. Minato, I. Niikawa, M. Kawamura, H. Nakai & S. Haga, 1980. Silurian and Devonian corals of Japan. *Acta Palaeont. Polonica*, **25**: 557–566.
- Leith, E. I., 1944. *Halysites gracilis* from the Ordovician of Manitoba. *Jour. Paleont.*, **18**: 268–270.
- Lin, C., Y. Tchi, C. Jin, Y. Li & Y. Yan, 1988. *Monograph of Palaeozoic Corals. Tabulatomorphic Corals*. Vol. 1, 467 p. Beijing, Geological Press. (In Chinese with English abstract.)
- Minato, M., D. R. Choi & Y. Okabe, 1973. New locality for the Silurian fossils in the Kitakami Mountains. *Jour. Geol. Soc. Japan*, **79**: 47. (In Japanese.)
- Murata, M., 1977. *Phaulactis (Lykophyllum) onukii*, a new Silurian species of Rugosa from the Kitakami Massif, Northeast Honshu, Japan. *Kumamoto Jour. Sci., Geol.*, **10**: 27–35.
- Sokolov, B. S., 1949. Tabulata and Heliolitida: in atlas of the index forms of the USSR fossil fauna. Siluriyskaya sistema, **2**: 75–98, pls. 6–10. (In Russian.) (Not seen.)
- Sokolov, B. S., 1955. Subclass Tabulata, pp. 25–34, 160, 161, 186, 187, 206–211, 242–247. In O. I. Nikiforova: *Field atlas of the Ordovician and Silurian fauna of the Siberian Platform*. Moskova. (In Russian.)
- Sokolov, B. S., 1962. Subclass Tabulata, pp. 293–404. In B. S. Sokolov (ed.): *Fundamentals of Paleontology (Osnovy Paleontologii)*. Vol. 2, Porifera, Archaeocyata, Coelenterata, Vermes. Izdatel'stvo Akademii Nauk SSSR, Moskova. (Translated from Russian, Israel Program for Scientific Translations, Jerusalem, 1971.)
- Toll, E. von, 1889. Die paläozoischen Versteinerungen der Neusibirischen Insel Kotelnj. *Mém. Acad. Imp. Sci. St-Pétersbourg*, Ser. 7, **37**: 1–56, pls. 1–5.
- Yoshida, T., M. Harashinai & C. Aoki, 1981. Silurian conodonts from Gyoninzawa, Ofunato City. *Abstracts 88th Geol. Soc. Japan*, 262. (In Japanese.)

