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Additional Material of Silurian Tabulate Corals from the Gionyama Formation, Miyazaki Prefecture

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Abstract Five tabulate coral species are described from the Gionyama Formation, Miyazaki Prefecture. The upper Wenlock (Lower Silurian) G2 Member yields *Egosiella* sp. cf. *E. ningqiangensis* Lin *in* Li and Lin, 1982, and *Syringopora utsunomiyai* sp. nov. The remaining species, namely *Thamnopora senzaii* Niko, 2003, parastriatoporid, gen. et sp. indet. and *Syringoporella*? sp. indet., are obtained from the lower Ludlow (Upper Silurian) G3 Member. *Egosiella* was not previously known in Japan. The conspecific and closely related species are reported from the Suberidani Group in Tokushima Prefecture and the Daba Shian Mountains in South China. The similar species to *S. utsunomiyai* are known from Baltica and South China.

Key words: Wenlock, Ludlow, Silurian, tabulate corals, *Egosiella*, *Thamnopora*, *Syringopora*, *Sylingoporella*, Gionyama Formation, Miyazaki.

Introduction

During our subsequent investigations since Niko (1998; Auloprida) and Niko and Adachi (1999; Pachyporicae), five undocumented species belonging to these groups were obtained from the Gionyama Formation in the Kuraoka area, Miyazaki Prefecture, southern Japan. This paper deals with the present additional material as the sixth part of a series that describes the Silurian tabulate coral fauna in this formation. The geologic setting and geographic information of fossil localities are provided by Niko (1998). All specimens studied herein are deposited with the paleontological collections of the National Science Museum Tokyo (abbreviation NSM).

Systematic Paleontology

Order Favositida Wedekind, 1937

Suborder Favositina Wedekind, 1937

Superfamily Pachyporicae Gerth, 1921

Family Pachyporidae Gerth, 1921

Genus ***Egosiella*** Dubatolov *in* Sokolov, 1955

Type species: *Egosiella safonoviensis* Dubatolov *in* Sokolov, 1955.

Egosiella sp. cf. ***E. ningqiangensis*** Lin *in* Li and Lin, 1982

(Figs. 1-1–3, 5, 6)

Compare:
Egosiella ningqiangensis Lin *in* Li and Lin, 1982, p. 68, pl. 21, fig. 7.

Material examined: A single corallum, NSM PA15009.

Description: Corallum anastomosing, composed of subcylindrical, relatively narrow branches with 2.2–3.2 mm, exceptionally attaining 9.2 mm at anastomozed portion, in diameter, cerioid; lacunae usually have lenticular to subrhomboidal profiles in longitudinal section; total corallum diameter and growth form unknown owing to its fragile nature. Corallites prismatic, 3–6 sided, 0.19–1.05 mm, with 0.83 mm mean in adult ones, in diameter; each corallite consists of

proximal straight portion and distal outwardly curved portion, latter of which forms deep calice with nearly perpendicular in direction to branch surface; arrangement of calices forms longitudinal rows; calices circular in profile, their diameters range from 0.27 to 0.42 mm; lateral increase of new corallites occurs in basal part of distal corallite. Intercorallite walls thin, approximately 0.06 mm, in proximal corallites that represent axial zone of branch, then abruptly thickened, usually 0.20–0.44 mm rarely attaining 0.71 mm in thickness, in distal corallites to form wide peripheral stereozone; ratios of width of peripheral stereozone per branch diameter are approximately 0.7; median dark line and stereoplasm are component parts of intercorallite walls; this structural differentiation is distinct in proximal corallites, but it becomes obscure in distal ones; microstructure of stereoplasm may be lamellar; mural pores subcircular in cross section, small, approximately 0.08 mm in diameter, forming a single row on corallite faces, abundant in proximal and absent in distal corallites; septal spine not detected; tabulae complete, rare, nearly flat in profile.

Occurrence: Scarce in limestone cobble of the upper Wenlock (Lower Silurian) G2 Member at locality 1.

Discussion: Several characters, such as the relatively narrow branch diameters, abruptly thickening of the intercorallite walls at the distal corallites, the wide peripheral stereozone and the absence of the septal spine, make this specimen distinctive and suggest affinities with *Egosiella ningqiangensis* from the Middle Silurian in the Daba Shian Mountains, Shanxi whose locality situates on northwestern margin of South China. Unfortunately, insufficient documentation and illustration of the Chinese holotype have resulted in the present specimen being left under open nomenclature. *Egosiella* sp. cf. *E. ningqiangensis* represents the first record of the genus in Japan.

Genus ***Thamnopora*** Steininger, 1831

Type species: *Thamnopora madreporacea* Steininger, 1831.

Thamnopora senzaii Niko, 2003

(Figs. 1-4, 7)

Thamnopora senzaii Niko, 2003, p. 10, 12, figs. 2-1–9; 4-6–8.

Material examined: A single corallum, NSM PA15010.

Occurrence: Scarce in massive limestone of the lower Ludlow (Upper Silurian) G3 Member at locality 3.

Remarks: *Thamnopora senzaii* thoroughly described by Niko (2003). The Gionyama specimen agrees well with the types from the lowest Suberidani Group in the Katuura area, Tokushima Prefecture. There is little to be added to the original description. As noted by Hamada (1959) and Niko (2001, 2003), the both faunas show a strong similarity.

Family Parastriatoporidae Chudinova, 1959

Parastriatoporid, gen. et sp. indet.

(Figs. 2-1–3, 5, 6)

Material examined: A single corallum, NSM PA15011.

Description: Cylindrical branch of 7.5–10.3 mm in diameter, cerioid. Corallites prismatic, attain to 1.39 mm in diameter, differentiate into narrowly divergent proximal and outwardly directed distal portions; calical opining nearly perpendicular to branch surface. Intercorallite walls thin in proximal portion of corallites, then

Fig. 1. **1**–**3**, **5**, **6**, *Egosiella* sp. cf. *E. ningqiangensis* Lin *in* Li and Lin, 1982, NSM PA15009, thin sections. **1**, **2**, longitudinal to oblique sections of corallum, ×5. **3**, partial enlargement of Fig. 1-1 to show longitudinal section of branch, ×10. **5**, transverse section of branch, ×10. **6**, partial enlargement of Fig. 1-2 to show transverse sections of distal corallites, ×10. **4**, **7**, *Thamnopora senzaii* Niko, 2003, NSM PA15010, thin sections. **4**, transverse section of branch, ×10. **7**, longitudinal to oblique section of branch, ×10.


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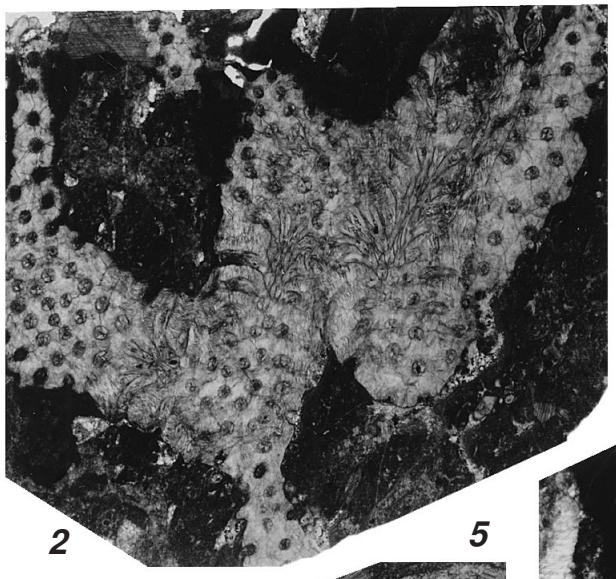
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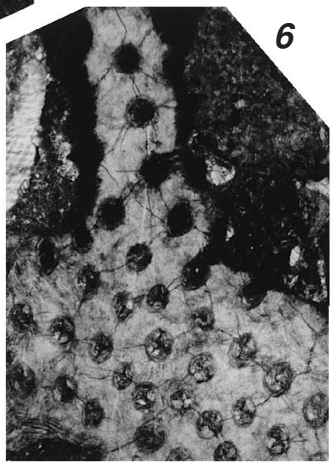
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abruptly thickened by contiguous, stout septa in distal portion of corallites to form narrow peripheral stereozone; tabulae complete, crowded at turning point of proximal corallite to distal one; distal tabulae thickened.

Occurrence: Scarce in brecciated limestone of the G3 Member at locality 3.

Discussion: This poorly preserved specimen is assigned to Parastriatoporidae on the basis of its cylindrical branch shape, differentiated corallites, and thickened intercorallite walls forming a peripheral stereozone by the contiguous septa. Furthermore, the species may belong to *Paratsriatopora* Sokolov, 1949, or *Kolymopora* Preobrazhenskiy, 1964, but without well preserved specimens it cannot be identified.

Order Auloporida Sokolov, 1947

Superfamily Syringoporicae Fromentel, 1861

Family Syringoporidae Fromentel, 1861

Genus ***Syringopora*** Goldfuss, 1826

Type species: *Syringopora ramulosa* Goldfuss, 1826.

Syringopora utsunomiyai sp. nov.

(Figs. 3-1–8)

Holotype: NSM PA15012, from which 17 thin sections were made, and an external view of the corallites on weathered surface was examined.

Diagnosis: Species of *Syringopora* with approximately 2.06 mm in corallite diameter and well-developed connecting tubuli; corallite walls usually 0.19–0.33 mm in thickness; septal spines numerous, but almost enclosed in stereoplasm; tabulae abundant, 19–25 tabulae in 5 mm of corallite length; axial tabellae common.

Description: Corallum turf-like in growth form with maximum observed size 66 mm in diameter and 16 mm in height, phaceloid. Corallites cylindrical with circular to subcircular cross sections, range from 1.69 to 2.67 mm, with 2.06 mm mean, in diameter; corallite spacing moderate for genus, usually 2.7–4.4 mm in distance (center-to-center) between corallites; external surface of corallites ornamented by transverse growth lines; increase of new corallites is lateral, relatively common; each offset arises as short stolone, 2.2–2.9 mm in length, then abruptly bents upward to form usual corallite having parallel orientation with parent one; connecting tubuli well-developed, occur in nearly same level, with approximately 1.0–2.1 mm in length and 0.4–1.1 mm in diameter; tabularia subcircular in cross section, and terminate funnel-shaped deep calices. Corallite walls moderate for genus in thickness, range from 0.13 to 0.56 mm, usually 0.19–0.33 mm, differentiated into epitheca and stereoplasm; microstructure of stereoplasm is lamellar; septal spines rod-like, numerous, but almost enclosed in stereoplasm, 0.23–0.36 mm in length; protruded parts of septal spines into tabularia indicate low conical appearance by modification of stereoplasm, up to 0.06 mm in length; tabulae thin, incomplete indicating infundibuliform or dissepiment-like forms, abundant; there are 19–25 tabulae in 5 mm of corallite length; septal spine-like projections rarely recognized on tabulae; axial syrinxes developed at central to subcentral position of corallites, subcircular in cross section, 0.31–0.48 mm in diameter, shift to calical pits distally; axial tabellae common, partly crowded, complete with uparched profiles or dissepiment-like in rare variations.

Etymology: The specific name honors Mr. Satoshi Utsunomiya, who discovered the holotype of this coral.

Occurrence: Scarce in calcareous shale pebble in the G2 Member at locality 1.

Fig. 2. **1**–**3**, **5**, **6**, parastriatoporid, gen. et sp. indet., NSM PA15011, thin sections. **1**, longitudinal to oblique section of branch, ×5. **2**, oblique section of branch, ×5. **3**, partial enlargement of Fig. 2-1 to show peripheral stereozone, ×10. **5**, partial enlargement of Fig. 2-1 to show transverse sections of proximal corallites, ×10. **6**, transverse sections of distal corallites, ×10. **4**, **7**, *Syringoporella*? sp. indet., NSM PA15013, thin sections. **4**, transverse sections of corallites, ×10. **7**, longitudinal and oblique sections of corallites, ×10.


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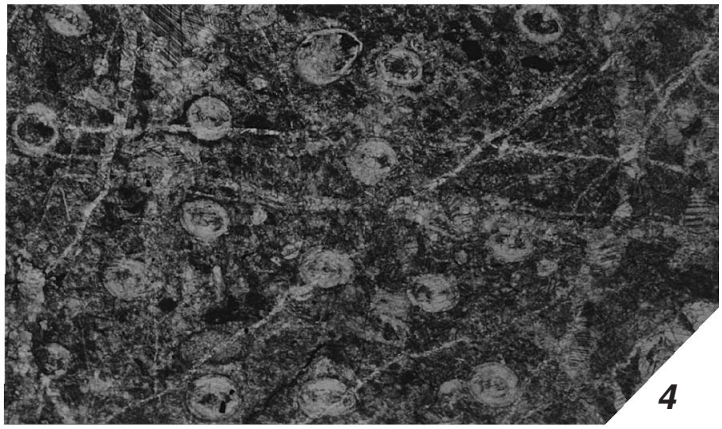
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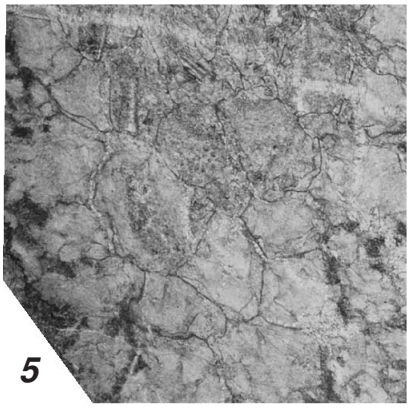
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Discussion: *Syringopora utsunomiyai* sp. nov. has similarities to *S. novella* Klaamann (1961, p. 95, 96, pl. 13, fig. 1, 2; Chudinova, 1971, p. 67, 68, figs. 1a, b) from the Wenlock of Estonia and Podoria in Baltica and *S. qianbeiensis* Yang *in* Yang, Kim and Chow (1978, p. 207, pl. 77, figs. 6a, b) from the Lower Silurian of Guizhou in South China. This new species differs from *S. novella* by having the slightly thicker corallite walls (usually 0.19–0.33 mm versus 0.12–0.2 mm in *S. novella*) and the less prominent septal spines into the tabularia. *Syringopora qianbeiensis* can be distinguished from this new species by possessing the fewer tabulae (10–13 in 5 mm of corallite length versus 19–25 in ditto of *S. utsunomiyai*).

Family Multithecoporidae Sokolov, 1950

Genus ***Syringoporella*** Kettner, 1934

Type species: *Syringopora moravica* Roemer, 1883.

Syringoporella? sp. indet.

(Figs. 2-4, 7)

Material examined: A single corallum, NSM PA15013.

Description: Corallum phaceloid, consists of cylindrical corallites whose diameters are 0.38–0.63 mm; adjoining two corallites rarely anastomosed; no connecting tubule observable. Corallite walls variable in thickness, range from 0.06 to 0.29 mm, differentiated into epitheca and stereoplasm; septal spine and tabula are not recognized in sectioned parts of corallites.

Occurrence: Scarce in massive limestone of the G3 Member at locality 2.

Discussion: This specimen suggests affinities with *Syringoporella* and *Eofletcheria* Bassler, 1950. Assignment to the former genus lies upon its lacking the cerioid and/or cateniform portions. However, information about the connecting tubule and tabula needs for a confident determination.

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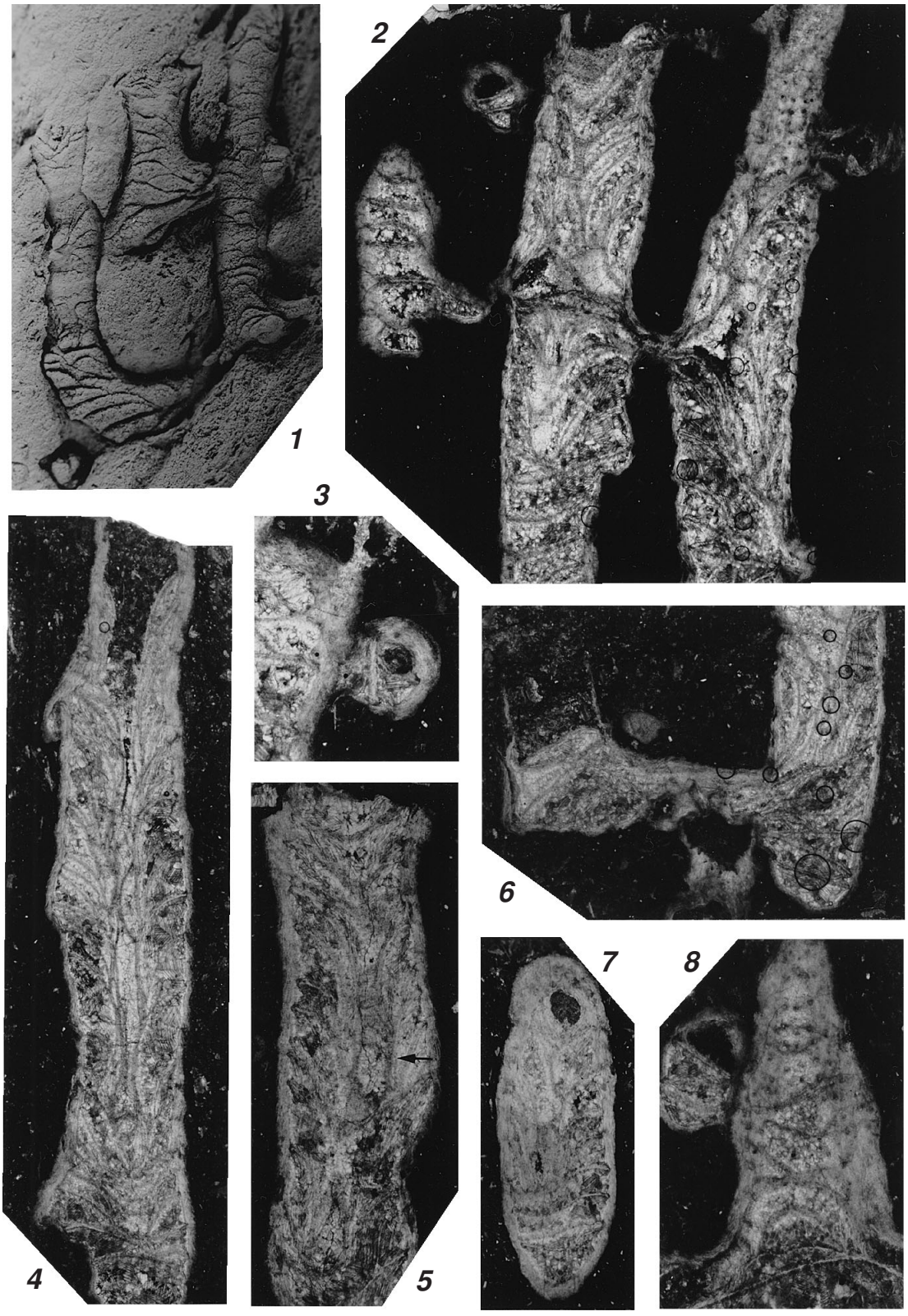
Fig. 3. *Syringopora utsunomiyai* sp. nov., holotype, NSM PA15012, thin sections except for Fig. 3-1 which is weathered surface of corallites. **1**, lateral view, steinkern, ×5. **2**, longitudinal sections of corallites, ×10. **3**, transverse section of stolone (=immature corallite) and longitudinal section of parent corallite, ×14. **4**, longitudinal section of corallite, ×10. **5**, longitudinal section of corallite, arrow indicates axial tabella, ×14. **6**, longitudinal section of offset, ×10. **7**, oblique section of corallite, ×10. **8**, oblique section of corallite, to show wall structure and numerous septal spines, ×14.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