Syscioscenium velamen gen. et sp. nov., a new sethoformid Radiolaria from the Lower to Middle Miocene of central Japan

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中部日本下部～中部中新統より得られた，Sethoformidae 科（放散虫類）の新属新種 *Syscioscenium velamen* について

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(要　　旨)

瑞浪層群生俵累層および師崎層群豊浜累層から得られた放散虫化石から，新属新種として *Syscioscenium velamen* を記載した．その外見は，明瞭に識別される第二殻室を持つことなど，従来知られている一部の Lophophaenidae 科放散虫に類似性が高い．しかしながら第一殻室が cephalis 全体に相当していること，基本骨格中に vertical ray を持たないこと，また骨格を連結する arch の構造に *Protoscenium simplex* 等と共通性が認められることにより，Sethoformidae 科に所属するものと判断される．

(Abstract)

Syscioscenium velamen gen. et sp. nov. is described from the Middle Miocene Oidawara Formation, Mizunami Group, and Lower Miocene Toyohama Formation, Morozaki Group. Although its bell-shaped test is generally characteristic for some lophophaenids, this new species has a sethoformid skeletal structure.

Introduction

Sugiyama and Furutani (1992, in this volume) reported the occurrence of 47 characteristic radiolarians from the Oidawara Formation (corresponding to the *Calocycletta costata* Zone by Riedel and Sanfilippo, 1978), Mizunami Group, Gifu Prefecture, but there remain a large number of undescribed taxa. Of them this study establishes a characteristic sethoformid genus *Syscioscenium* gen. nov., having a two-segmented test, similar to some lophophaenids, with sethoformid skeletal structure. Moreover, although the abundance is extremely rare, it has been obtained from the Lower Miocene Toyohama Formation, Morozaki Group, Aichi Prefecture. Therefore, this study should provide valuable information concerning sethoformid evolution, of which we are considerably scarce at the present time. Illustrated specimens are from the samples TH-3, TH-4 and OD-26 (Sugiyama, 1992; in press).

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Systematic Description

For most descriptive terms see Sugiyama (in press). All described specimens are deposited in the Department of Earth and Planetary Sciences, School of Science, Nagoya University.

Order Nassellaria
Family Sethoformidae Haeckel, 1881, emend. Petrushevskaya, 1971

Genus *Syscioscenium* Sugiyama gen. nov.

Etymology: From the Greek *syskios*, shaded, and *skene*, a tent.

Type species: *Syscioscenium velamen* Sugiyama sp. nov. (by monotypy).

Diagnosis: Test small, bell-shaped, consisting of two segment. Internal skeleton composed of MB, A, D, two L (Lr and Ll) and Ax. V completely absent. MB short, situating at the center of the test. A free in cephalis, lying approximately in vertical direction, commonly three-bladed, having three branches in the distal part, and sometimes penetrating cephalic wall to form a small spine outside. Those branches, termed AD-, ALr- and ALl-branches in the following, are parallel to D, Lr and Ll, and distally fused with cephalic wall. AD-branch commonly comes from a slightly higher level than the other two branches (Pl. 22, fig. 3 c). D and two L extending nearly laterally, generally having two, thick, horizontal branches at the middle to distal parts, rapidly bent downward beyond the branches, and possibly penetrating shell wall at the collar region. D and two L are often three-bladed near the junctions of the branches. Thick arches, usually visible from the basal side, are well-developed between six branches from D and two L. Ax moderately developed.

Remarks: The schematic illustration of skeletal structure is given in Fig. 1. To clarify the family assignment, it is useful to compare the skeletal structure with that of *Protoscenium simplex* (Cleve, 1899) (Fig. 2; Pl. 22, figs. 5 a, 5 b), which is one of representative sethoformids. *P. simplex* has short MB from which arise vertical A and lateral D and two L. V is absent. Each of A, D and two L has characteristic branches at the distal part; A has three, corresponding to AD-, ALr- and ALl-branches, and D and two L have two branches as with *Syscioscenium* gen. nov.

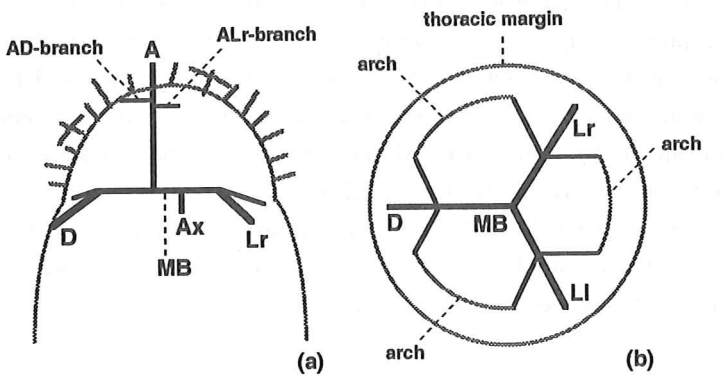


Fig. 1. Schematic illustrations of skeletal structure of *Syscioscenium velamen* gen. et sp. nov. (a): Right lateral view. (b): Basal view.

Jørgensen (1905) mentioned that three branches from A of *P. simplex* come from one verticil but, according to my observation, its AD-branch always arises from a slightly higher level than ALr- and ALl-branches (Pl. 22, fig. 5 a). The fact also agrees with *Syscioscenium* gen. nov. In conclusion, one can recognize close affinities between the skeletal structures of both the genera, although the general shape of *Syscioscenium* is rather similar to some lophophaenids whose first segments correspond not to the whole cephalis but to the upper part of eucephalis. Vertically or obliquely developed arches of *Protoscenium* is very peculiar since they have no direct connection with D and two L, as described by Jørgensen (1905). Unfortunately, such arches in *Syscioscenium* are parts of thick lattice bars constituting cephalic wall, so that the detailed features are not well understood.

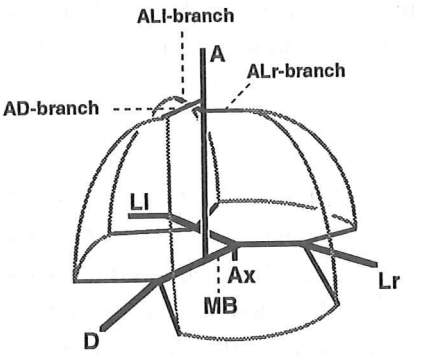


Fig. 2. Schematic illustration of skeletal structure of *Protoscenium simplex* (Cleve), oblique dorsal view.

Syscioscenium velamen Sugiyama sp. nov.

Pl. 21, figs. 1 a-4 b; Pl. 22, figs. 1 a-4

Description: Internal skeletal structure as with genus. Cephalis hemispherical, commonly with numerous by-spines of various length. The by-spines sometimes bear branches connecting neighboring ones. Cephalic pores irregular in size, shape and arrangement; they are often larger near the junction of A and cephalic wall. Thorax frustum; pores usually larger than those of cephalis, subcircular, irregularly disposed; wall much smoother than cephalic one. Collar stricture is often marked by a weak change in contour.

Remarks: Refer to the generic remarks. *Syscioscenium velamen* is rare in abundance but the occurrence is constant through the examined samples from the Oidawara Formation, whereas only five specimens have been found from the Toyohama Formation so far. This forms a sharp contrast with *Protscenium simplex*, which is common in the latter formation but absent in the former. Moreover, the size of pores, especially thoracic ones, seems to be larger in specimens from the Toyohama Formation, probably reflecting some paleoenvironmental differences between both the formations.

Dimensions (in μm): Based on 25 specimens. Total height of test; 68-105. Maximum width of test; 60-90.

Holotype: ESN 147001 (Pl. 21, figs. 1 a, 1 b) from the sample OD-26.

Etymology: From the Latin noun *velamen* meaning a covering.

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Plate 21

Figs. 1 a-4 b: *Syscioscenium velamen* gen. et sp. nov.

1 : Holotype, ESN 147001, OD-26. A is just hidden by D in Fig. 1 b. Black arrows of 1 b indicate ALr- and ALl-branches, whereas white arrow points AD-branch.

2 : ESN 147002, TH-4. Arrow of 2 a indicates columella-like A in the cephalic cavity. A is just hidden by D in Fig. 2 b.

3 : ESN 147003, TH-4. Arrow of 3 a indicates a small spine prolonged from A. Arrows 3 b indicate AD- and ALr-branches.

4 : ESN 147004, TH-3. Arrow of 4 a indicates columella-like A in the cephalic cavity. Arrows of 4 b indicate AD-, ALr- and ALl-branches.

Scale bars: 1 b, 3 b and 4 b = 20 μm; others = 50 μm.

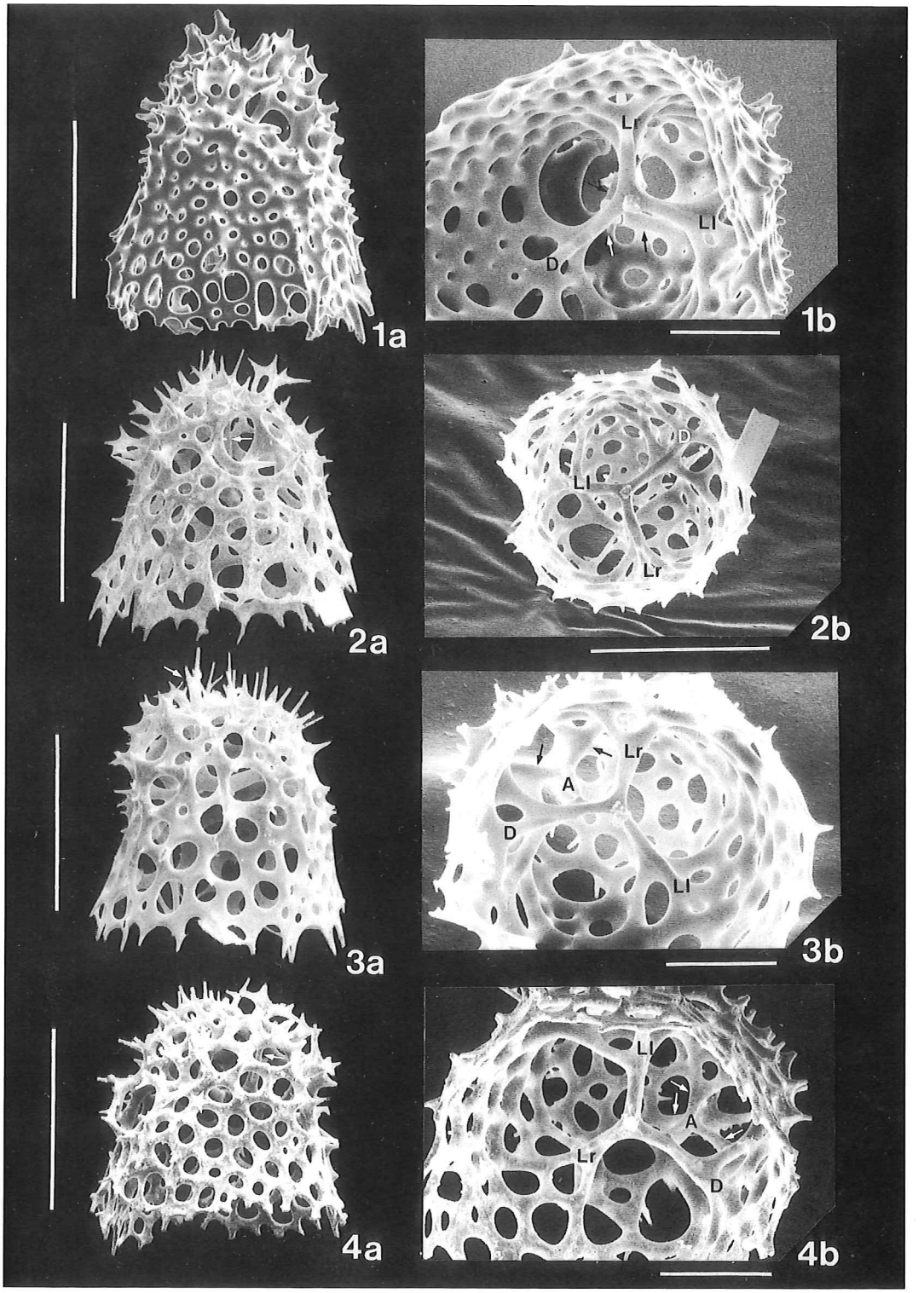

1a
1b
Lr
Ll
D
2a
2b
D
Ll
Lr
3a
3b
Lr
A
D
Ll
4a
4b
Ll
A
Lr
D

Plate 22

Figs. 1 a-4 : *Syscioscenium velamen* gen. et sp. nov.

1 : ESN 147005, OD-26. Arrow of 1 a indicates a small spine prolonged from A. Arrows of 1 b indicate ALr- and ALl- branches. A is hidden by D in Fig. 1 b.

2 : ESN 147006, OD-26. Arrow of 2 a indicates a small spine prolonged from A. Arrows of 2 b indicate AD- and ALl-branches, but they are not parallel to D and Ll.

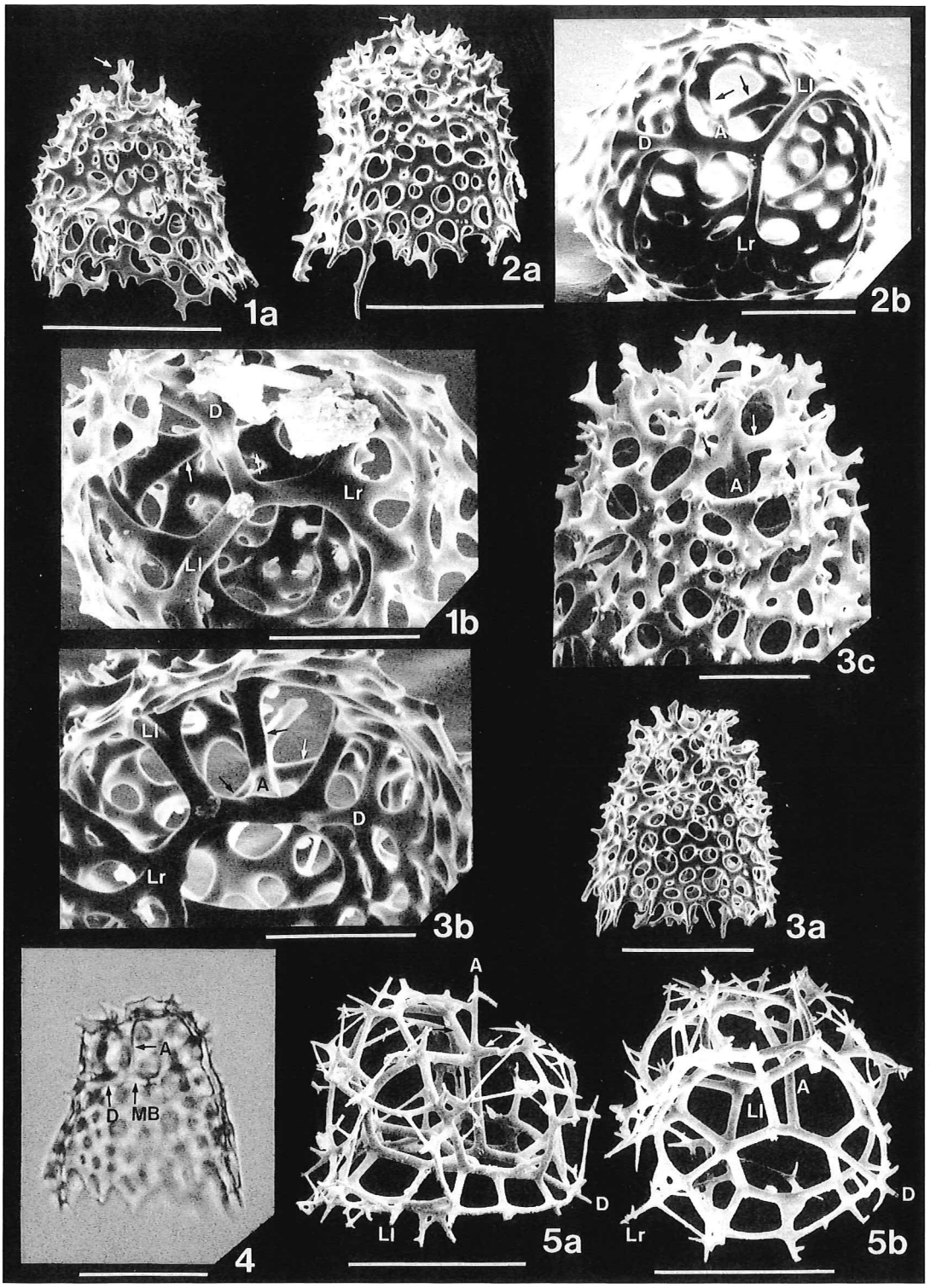
3 : ESN 147007, OD-26. White arrows of 3 b and 3 c indicate AD-branch, whereas black ones point ALr- and ALl-branches (only ALl-branch in Fig. 3 c). Note that the position of AD-branch is slightly higher than ALl-branch in Fig. 3 c.

4 : ESN 147008, OD-26.

Figs. 5 a, 5 b: *Protoscenium simplex* (Cleve).

5 : ESN 147009, TH-3. White arrow of 1 a indicates AD-branch, whereas black ones point ALr- and ALl-branches. Note that the position of AD-branch is slightly higher than ALr-and ALl-branches. 5 b is oblique basal view of 5 a .

Scale bars: 1 b, 2 b, 3 b and 3 c = 20 μm; others = 50 μm.


1a
2a
2b
A
D
Ll
Lr
1b
D
Lr
Ll
3c
A
3b
Ll
A
D
Lr
3a
4
A
D
MB
5a
A
Ll
D
5b
A
Ll
Lr
D