

# Four new species of the genus *Semisulcospira* (Mollusca: Caenogastropoda: Semisulcospiridae) from the Plio–Pleistocene Kobiwako Group, Mie and Shiga Prefectures, central Japan

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## Abstract

Four new species of the freshwater snail in the genus *Semisulcospira* are described from the early Pleistocene Gamo Formation and the late Pliocene Ayama and Koka Formations of the Kobiwako Group in central Japan. These four new species belong to the subgenus *Biwamelania*. *Semisulcospira* (*Biwamelania*) *reticulataformis*, sp. nov., *Semisulcospira* (*Biwamelania*) *nojirina*, sp. nov., *Semisulcospira* (*Biwamelania*) *gamoensis*, sp. nov., and *Semisulcospira* (*Biwamelania*) *tagaensis*, sp. nov. are newly described herein. The authorship of *Biwamelania* is attributed to Matsuoka and Nakamura (1981) and *Melania niponica* Smith, 1876, is designated as the type species of *Biwamelania* by Matsuoka and Nakamura (1981).

*Key words:* Semisulcospiridae, *Semisulcospira*, *Biwamelania*, Pliocene, Pleistocene, Kobiwako Group, Japan

## Introduction

*Semisulcospira* Boettger, 1886 is a freshwater gastropod genus widely distributed in East Asia. A group of *Semisulcospira* has adapted to the environments of Lake Biwa and has acquired unique morphological characters, forming an endemic group called the subgenus *Biwamelania*. The species in the subgenus *Biwamelania* is distinguishable from the other *Semisulcospira* species by a conical elongated shell with fewer basal cords (2–6) and larger embryonic shell whose number is fewer when brooded (Matsuoka, 1985; Matsuoka and Miura, 2018).

There are fifteen Recent *Biwamelania* species in the current Lake Biwa (Watanabe and Nishino, 1995) and ten morphologically distinct species have been recognized in the Plio–Pleistocene fossils from the Kobiwako Group that is composed of the deposit from the Paleo Lake Biwa (Matsuoka, 1987; Nishino and Watanabe, 2000; Matsuoka and Miura, 2018). Of the ten fossil *Biwamelania* species previously reported,

six were already described; *Semisulcospira* (*Biwamelania*) *praemultigranosa* Matsuoka, 1985, was described from the Pliocene Iga Formation that is the lower part of the Kobiwako Group (Matsuoka, 1985) and five species, *Semisulcospira* (*Biwamelania*) *nakamurai* Matsuoka and Miura, 2018, *Semisulcospira* (*Biwamelania*) *pseudomultigranosa* Matsuoka and Miura, 2018, *Semisulcospira* (*Biwamelania*) *spinulifera* Matsuoka & Miura, 2018, *Semisulcospira* (*Biwamelania*) *kokubuensis* Matsuoka & Miura, 2018, and *Semisulcospira* (*Biwamelania*) *pusilla* Matsuoka & Miura, 2018 were recently described from the Pleistocene Katata Formation that is the upper part of the Kobiwako Group (Matsuoka and Miura, 2018).

We describe the remaining four Plio–Pleistocene *Biwamelania* species in this study: two species obtained from the Pliocene Ayama and Koka Formations and the other two species found from the early Pleistocene Gamo Formation.

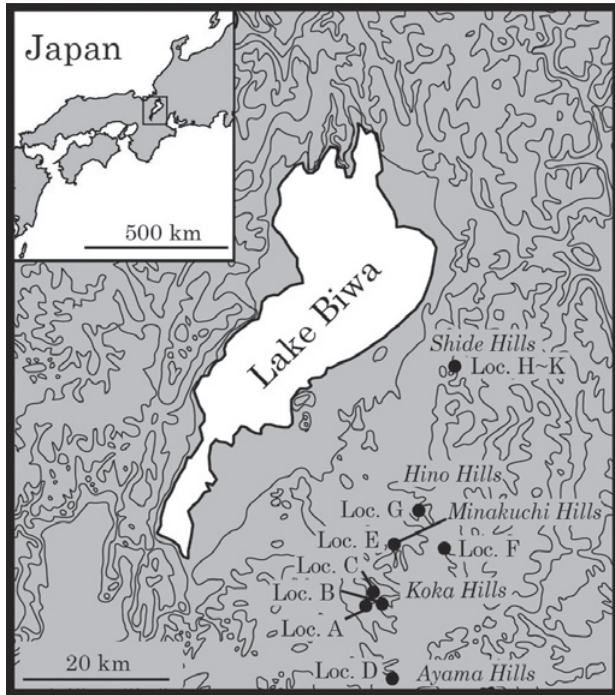


Fig. 1. Fossil collecting sites in the Koka Hills (Loc. A–C), Ayama Hills (Loc. D), Hino Hills (Loc. E–G), and Shide Hills (Loc. H–K).

### Collecting Sites and Geologic Settings

Fifty-one specimens of study materials, including type specimens, were obtained from 11 localities in the Ayama, Koka, and Gamo Formations of the Kobiwako Group. These formations are distributed in the Ayama, Koka, Minakuchi, Hino, and Shide Hills in Mie and Shiga Prefectures (Fig. 1).

*Loc. A:* A small cliff about 750 m south-southeast of Nojiri, Konan-cho, Iga City, Mie Prefecture ( $34^{\circ}54'22''\text{N}$ ;  $136^{\circ}10'58''\text{E}$ ).

This locality has yielded molluscan fossils, *Cuneopsis gracilentata*, *Anodonta* sp. and *Semisulcospira* (*Biwamelania*) *nojirina*. The fossiliferous grayish silt is the horizon below the Ichiuno volcanic ash layer in the Konan Member. The Masugi volcanic ash layer under the Ichiuno volcanic ash layer was dated to 3.1 MYA by the fission-track method (Nishimura and Sasajima, 1970).

*Loc. B:* A cliff about 750 m south south-west of Oki, Koka-cho, Koka City, Shiga Prefecture ( $34^{\circ}55'19''\text{N}$ ;  $136^{\circ}12'4''\text{E}$ ).

Grayish silt of this locality contains molluscan fossils, *S. (B.) nojirina*, *Cuneopsis gracilentata*, and *Anodonta kobiwakoensis* which were deformed by post-mortem compressions. The horizon is 1 m above the Sunasaka volcanic ash layer. The Sunasaka volcanic ash layer is intercalated in the Sajigawa Member of the Koka Formation.

*Loc. C:* A cliff about 450 m west of Oki, Koka-cho,

Koka City, Shiga Prefecture ( $34^{\circ}55'39''\text{N}$ ;  $136^{\circ}11'52''\text{E}$ ).

Grayish silt intercalated Sunasaka volcanic ash layer has yielded molluscan fossils *S. (B.) nojirina* and *A. kobiwakoensis*. The interval is of 6 m thick. Tanaka and Matsuoka (1985) listed 12 diatom fossils species including forma and varieties from Loc. C.

*Loc. D:* A small exposure about 900 m west of Nakatsuge, Iga City, Mie Prefecture ( $34^{\circ}49'54''\text{N}$ ;  $136^{\circ}13'17''\text{E}$ ).

This outcrop is correlated with about 8 m below the Takamine volcanic ash layer in the Wata Member of the Ayama Formation. Grayish silt containing quartz grains has yielded plants fragments, *Semisulcospira* (*Biwamelania*) *reticulataformis* and pharyngeal teeth of the genus *Carassius*.

*Loc. E:* A long exposure about 1.3 km south-southwest Besho, Hino-cho, Gamo-gun ( $34^{\circ}59'41''\text{N}$ ;  $136^{\circ}12'40''\text{E}$ ).

This locality has yielded molluscan fossils from the grayish silt beds with bioturbation structures. The occurrence is 5 m above the Yokigaoka volcanic ash layer in the Hino Clays of the Gamo Formation. The molluscan assemblage consisted of *Semisulcospira* (*Biwamelania*) *gamoensis*, *Semisulcospira* (*Biwamelania*) *tagaensis*, *Ptychorhynchus* sp., *Inversidens* sp., and “*Anodonta*” sp.

*Loc. F:* Riverbed on the River Hino east-southeast of Otowa, Hino-cho, Gamo-gun, Shiga Prefecture ( $34^{\circ}59'55''\text{N}$ ;  $136^{\circ}17'34''\text{E}$ ).

Hard and grayish silt contains plants fragments, molluscs, and fish scales and bones. The molluscan assemblage is characterized by *S. (B.) gamoensis*. The mollusc-bearing bed is probably correlative with the upper part of the Nunobikiyama Alternations of the Gamo Formation.

*Loc. G:* Riverbed of the River Sakura of southwest of Sakura, Hino-cho, Gamo-gun ( $35^{\circ}2'23''\text{N}$ ;  $136^{\circ}15'11''\text{E}$ ).

Well-sorted medium sand about 7 m below the Murasaki volcanic ash layer (Tokutani volcanic ash layer in Kawabe, 1989) in the Hino Clays of the Gamo Formation has yielded fossil molluscs. The fission-track age of the volcanic ash layer had been estimated to be  $2.1 \pm 0.4$  MYA (Yokoyama *et al.*, 1977).

*Loc. H:* Shide, Taga-cho, Inukami-gun, Shiga Prefecture ( $35^{\circ}12'55''\text{N}$ ;  $136^{\circ}18'37''\text{E}$ ).

The fossiliferous massive clay intercalated the Minamishidegawa volcanic ash layer in the upper Shide Member of the Gamo Formation has yielded *Cristaria* sp., *Cipangopaludina* sp., *Anodonta* sp., *Anodonta* (*Oguranodonta*) sp., *S. (B.) gamoensis*, *S. (B.) tagaensis* and *Cuneopsis* sp. (Tamura *et al.*, 1993; Tamura, 2017). The Shide volcanic ash layer is about 32 m below the Minamishidegawa volcanic ash layer. It's age,  $1.8 \pm 0.3$  MYA, was determined by the fission-

track method (Hayashida and Amemori, 1993). The Shide volcanic ash layer is correlated to the distal tephra Kd44-NK (Satoguchi and Nagahashi, 2012).

*Loc. I:* Shide, Taga-cho, Inukami-gun, Shiga Prefecture (35°12'59"N; 136°18'31"E).

This locality corresponds to the Mp-3 in Tamura *et al.* (1993). Massive clay in the upper Shide Member of the Gamo Formation has yielded *Cristaria* sp., *Inversidens* sp., *Anodonta* sp., *Anodonta* (*Oguranodonta*) sp., *S. (B.) gamoensis* and *S. (B.) tagaensis*.

*Loc. J:* Shide, Taga-cho, Inukami-gun, Shiga Prefecture (35°13'01"N; 136°18'34"E).

This locality corresponds to the Mp-1 in Tamura *et al.* (1993). Massive clay in the upper Shide Member of the Gamo Formation has yielded *Cipangopaludina* sp. and *S. (B.) tagaensis*.

*Loc. K:* Shide, Taga-cho, Inukami-gun, Shiga Prefecture (35°12'51"N; 136°18'44"E).

This locality corresponds to the Su-3 in Tamura *et al.* (1993). Massive clay below the Shide volcanic ash layer in the lower Shide Member of the Gamo Formation yields *Cristaria* sp., *Inversidens* sp., *Lanceolaria* sp., *Anodonta* (*Oguranodonta*) sp. and *S. (B.) gamoensis*.

## Methods

We measured shell height and shell width of studied specimens using calipers to 0.01 millimeter. Specimens were photographed using digital camera DP26 and TG-4 (Olympus Co., Tokyo, Japan) mounted on stereomicroscope. The measurements of angle were made with these images and by the measurement function of the software cellSens (Olympus Co., Tokyo, Japan). We used Adobe Illustrator (Adobe Systems Inc, San Jose, California, USA) to draw a ventral sketch of shell for each species. Since most of fossil specimens used in this study were partly broken, schematic reconstructions were made by gathering a piece of fragments from multiple specimens, including holotype, paratype, and specimens in a good condition at least in part.

Fossil specimens used in this study were deposited in paleontological collections of the Taga Town Museum, Taga-cho, Shiga Prefecture (TG), Mizunami Fossil Museum, Mizunami City, Gifu Prefecture (MFM), and of the Toyohashi Museum of Natural History, Toyohashi City, Aichi Prefecture (TMNH).

Abbreviations used: H = shell height, W = shell width, BWL = body whorl length, AH = aperture height, AA = apical angle.

## Systematic description

Family Semisulcospiridae Morrison, 1952

Genus *Semisulcospira* Boettger, 1886

Subgenus *Biwamelania* Matsuoka and Nakamura, 1981

*Type species:* *Melania niponica* Smith, 1876, by original designation.

*Remarks:* The authorship and type species of the subgenus *Biwamelania* have been confused and thereby we reexamine this subgenus here. The generic name *Biwamelania* was first proposed by Habe (1978). However, the name *Biwamelania* was not an available name since neither description nor designation of the type species was made in his paper. Matsuoka and Nakamura (1981) defined the subgenus *Biwamelania* to include species in the *Semisulcospira niponica* species group of Davis (1969) and they designated *Semisulcospira niponica* as type species of this subgenus. Although Matsuoka and Nakamura (1981) did not describe the diagnostic characters, they cited Davis (1969) to define the subgenus *Biwamelania*, satisfying requirement of ICZN Art. 13.1.2. Therefore, the authorship of the subgenus *Biwamelania* should be Matsuoka and Nakamura (1981) and the type species should be *Melania niponica* Smith, 1876. Although Matsuoka (1985) attempted to change the type species of this subgenus to *Melania niponica* var. *decipiens* Westerlund, 1883, this is not acceptable because the type species have already been fixed (ICZN Art. 61.1.3). Matsuoka and Miura (2018) also exhibited *M. niponica* var. *decipiens* as the type species of this subgenus by referring to Matsuoka (1985). This, however, was inappropriate due to the same reason.

### *Semisulcospira (Biwamelania) reticulataformis*, sp. nov.

(Figs. 2.1–4, Fig. 3.1)

*Semisulcospira (Biwamelania)* sp. A, Matsuoka, 1987, fig. 26.

*Material studied:* Holotype, MFM111138 (main body, MFM111138a and its counterpart, MFM111138b), Paratype, MFM111139, *Loc. D*, Ayama Formation, late Pliocene; Eight specimens (MFM111138–111141; TMNH10732–10735) from *Loc. D*.

*Type locality:* Nakatsuge, Iga City, Mie Prefecture, Japan (*Loc. D*).

*Derivation of name:* This species is named from the specific name of *Semisulcospira reticulata* and *formis* (Latin, meaning shape).

*Diagnosis:* Shell large, narrow, conic, posterior whorls

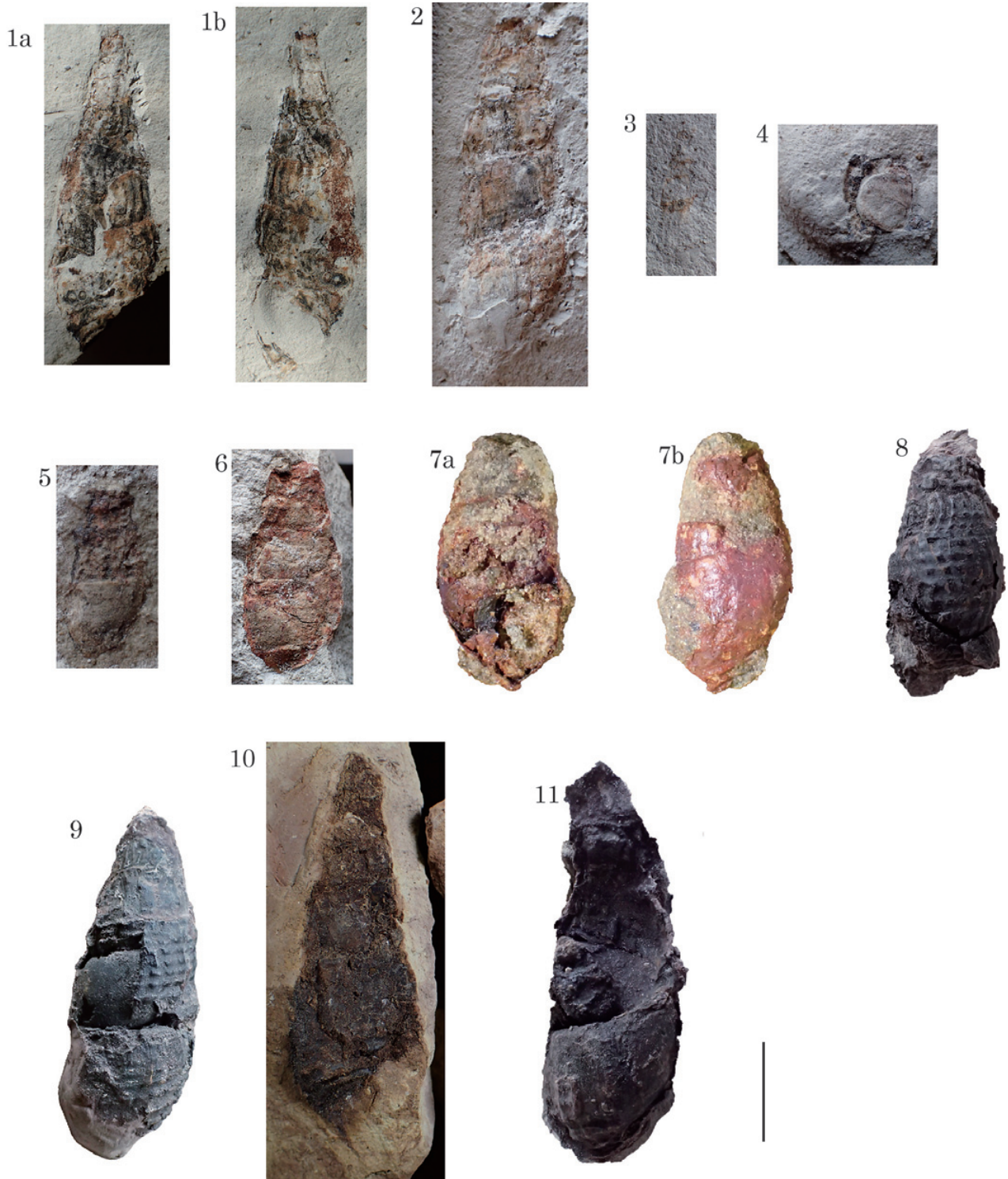


Fig. 2. 1–4. *Semisulcospira (Biwamelania) reticulataformis*, sp. nov.: 1a, holotype, MFM111138a, apertural view; 1b, dorsal view; 2, paratype, MFM111139a, apertural view; 3, juvenile specimen, MFM1111340, dorsal view; 4, outer view of operculum, MFM111141; 5–6. *Semisulcospira (Biwamelania) nojirina*, sp. nov. : 5, holotype, MFM111174, dorsal view; 6, paratype, MFM111172, dorsal view; 7–8. *Semisulcospira (Biwamelania) gamoensis*, sp. nov.: 7a–b, holotype, MFM111177, apertural and dorsal views, respectively; 8, paratype, apertural view, TG-Inv-000416; 9–11. *Semisulcospira (Biwamelania) tagaensis*, sp. nov.: 9, holotype, TG-Inv-000413, dorsal view; 10, paratype, TG-Inv-000405, apertural view; 11, TG-Inv-000411, dorsal view. Scale bar: 1 cm.

cylindrical, flat-sided profiles. Whorls sculptured with distinct axial ribs.

*Description:* Shell large for genus, narrow conic, whorls preserved count 5.5 and 8 in number. Spire high, turreted, more than three-fifth of shell height; apical angle 17 degrees. Last and penultimate whorls weakly convex, spire whorls more cylindrical, rather straight. Early whorls of spire cylindrical in juvenile specimen. Suture impressed, straight. Sculpture of spire whorls comprise five to six nodes on axial ribs, and feeble spiral cords. Spiral cords of last whorl prominent, more widely spaced than the interspace. Growth lines irregularly spaced, weak, and opisthoclinal. Basal cords with carinate top, distinct, three in number. Aperture elongate-ovate.

*Remarks:* This fossil species corresponds with *Semisulcospira (Biwamelania)* sp. A of Matsuoka (1987). This species appeared in the Ayama Formation of the Kobiwako Group. *S. (B.) praemultigranosa* from the Iga Formation (Ueno Formation in Kawabe, 1989) closely resembles *S. (B.) reticulataformis*, but differs both in having the large shell size and in almost flat slope on the spire whorls. *S. (B.) tagaensis* from the Taga-cho, also resembles this species in a narrowly conic shell outline, but *S. (B.) reticulataformis* differs in having cylindrical spires. A recent species *Semisulcospira (Biwamelania) reticulata* which is found in several meters deep in Lake Biwa (e.g., Kajiyama and Habe, 1961) show close resemblance to *S. (B.) reticulataformis* in their shell profile. However, it is distinguishable from *S. (B.) reticulataformis* by having distinct axial ribs on spire whorls. Note that the semisulcospirid operculum from Loc. D (Fig. 1) is likely to be derived from *S. (B.) reticulataformis*, because *S. (B.) reticulataformis* is the only semisulcospirid fossil species found in this sampling location.

*Measurements (in mm):*

	H	W	BWL	AA
MFM111138 (Holotype)	40.6	11.8	19.6	17
MFM111139 (Paratype)	37.3	11.4	26.8	16
MFM111140	11.0	3.4	-	-

***Semisulcospira (Biwamelania) nojirina*, sp. nov.**

(Figs. 2.5, 2.6; Fig. 3.2)

*Semisulcospira (Biwamelania)* sp. B, Matsuoka, 1987, fig. 26.

*Material studied:* Holotype, MFM111174, Ayama Formation, late Pliocene; Paratype, MFM111172, Loc. B, Koka Formation, late Pliocene; MFM111173, Loc. B; MFM111175, Loc. A; MFM 111176, Loc. C.

*Type locality:* Nojiri, Konan-cho, Iga City (Loc. A).

*Derivation of name:* This species is named after the name of place, Nojiri, Konan-cho, Koka City, from which the fossil specimens were collected.

*Diagnosis:* Shell small, elongate conic. Whorls rounded, weakly sculptured. Suture distinct, not undulate.

*Description:* Shell small for the genus, elongate conic. Spire about 1/2 of whorl height; apical angle about 18 degrees. Last whorl rounded with feeble spiral cords. Apex missing, about three whorls remaining in type specimens. Spiral whorls weakly convex. Suture shallow, finely impressed. Spire whorls consisting spiral ribs with beaded and delicate growth lines. Number of spiral cords on the last whorl four to five. Basal cords narrow, fine, two to three in number, intercostal spaces wide, and flat. The width of last whorl about a half of height.

*Remarks:* *Semisulcospira (Biwamelania) nojirina* sp. nov. corresponds to *Semisulcospira (Biwamelania)* sp. B of Matsuoka (1987). This fossil species is found in the Ayama Formation and the Koka Formation of the Kobiwako Group. *S. (B.) nojirina* resembles a recent species, *Semisulcospira (Biwamelania) fluvialis*, inhabiting sand-gravelly bottoms of the Seta River, but is distinguishable from *S. (B.) fluvialis* by its fine spiral and basal cords, and in its small shell.

*Measurements (in mm):*

	H	W	BWL	AH	AA
MFM111172 (Paratype)	22.0	9.4	-	-	18
MFM111173	15.2	10.0	-	-	-
MFM111174 (Holotype)	18.0	8.3	9.0	-	18
MFM111175	17.5	10.5	10.3	-	-
MFM111176	16.0	7.6	-	-	-

***Semisulcospira (Biwamelania) gamoensis*, sp. nov.**

(Figs. 2.7, 2.8, Fig. 3.3)

*Semisulcospira (Biwamelania)* sp. C, Matsuoka, 1987, fig. 26.

*Material studied:* Holotype, MFM111177, Loc. G, Gamo Formation, Gelasian (early Pleistocene); Paratype, TG-Inv-000416, Loc. I, Gamo Formation, Gelasian/Calabrian (early Pleistocene); TMNH10737, 10738, Loc. E; MFM111181, Loc. F; MFM111178-111180, Loc. G; TG-Inv-000412, 000418, Loc. H; TG-Inv-000414, Loc. K.

*Type locality:* The riverbed of the Sakura River, southwest of Sakura, Hino-cho, Gamo-gun, Shiga Prefecture, Japan (Loc. G).

*Derivation of name:* This species is named after the

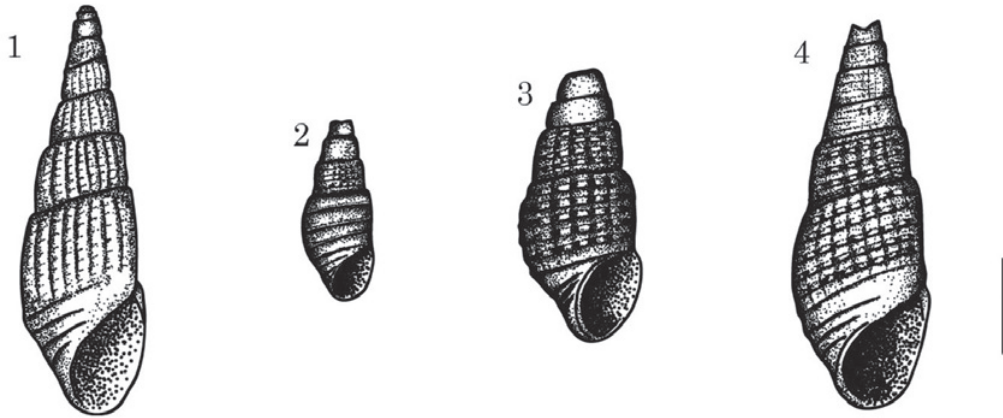


Fig. 3. Schematic reconstruction. 1. *Semisulcospira (Biwamelania) reticulataformis*, sp. nov., 2. *Semisulcospira (Biwamelania) nojirina*, sp. nov., 3. *Semisulcospira (Biwamelania) gamoensis*, sp. nov., 4. *Semisulcospira (Biwamelania) tagaensis*, sp. nov. scale bar: 1 cm.

name of district, Gamo-gun where the fossil specimens were collected.

**Diagnosis:** Shell medium, elongate conic. All whorls weakly sculptured. Outer slope in spiral whorls nearly straight, spiral cords distinct with periodical cusps. Suture distinct, not undulate. Basal cords distinct, about three in number.

**Description:** Shell medium for the genus, elongate conic. Embryonic and early postembryonic shell missing. Apical angle about 21 degrees. Apex eroded, about three spire whorls remaining. Whorls weakly convex. Suture shallow, slightly impressed, not undulated. Sculpture of spire whorls consisting spiral cords crossed by axial ribs, forming periodical cusps. Number of cords on spire whorls five to seven in number. Basal cords strong, three in number. Axial ribs weak, presumably ~25 in number. The growth lines feeble. Shell width about a half of shell height. The aperture ovate, about three-seventh of shell height.

**Remarks:** *Semisulcospira (Biwamelania) gamoensis* corresponds with *Semisulcospira (Biwamelania)* sp. C of Matsuoka (1987) and its stratigraphic range is restricted within the Nunobikiyama Alternations to the Hino Clays of the Gamo Formation (2.5–1.8 MYA). *S. (B.) gamoensis* has a similar shell outline to *S. (B.) spinulifera* from the Nijigaoka Clays to Hiraen Clays of the Katata Formation. However, *S. (B.) gamoensis* is easily separated from *S. (B.) spinulifera* by its straight suture. *S. (B.) gamoensis*, sp. nov. also resembles the recent species, *Semisulcospira (Biwamelania) habei* widely distributed in Lake Biwa. However, *S. (B.) gamoensis* is distinguishable from *S. (B.) habei* by its dumpy shell outline.

**Measurements (in mm):**

	H	W	BWL	AH	AA
MFM111177 (Holotype)	25.0	13.0	17.4	12.0	22.0
TG-Inv-000416 (Paratype)	25.2	12.2	-	-	20.0
TG-Inv-000412	33.0	17.7	-	-	20.0

***Semisulcospira (Biwamelania) tagaensis*, sp. nov.**

(Figs. 2.9–2.11, Fig. 3.4)

*Semisulcospira (Biwamelania)* sp. D, Matsuoka, 1987, fig. 26.

**Material studied:** Holotype, TG-Inv-000413, Loc. I, Gamo Formation, Gelasian/Calabrian (early Pleistocene); Paratype, TG-Inv-000405, Loc. H, Gamo Formation, Gelasian/Calabrian (early Pleistocene); TG-Inv-000406, Loc. J; TG-Inv-000411, Loc. I; TMNH-10736, Loc. G.

**Type locality:** Shide, Taga-cho, Inukami-gun, Shiga Prefecture, Japan (Loc. I).

**Derivation of name:** This species is named after the name of place, Taga-cho, from where the type specimens were collected.

**Diagnosis:** Shell large, elongate conic, 3–5 remaining whorls with eroded apex. Spiral cords distinct with periodical cusps, the number of the cords about seven. The suture distinct, not undulate. The basal cords distinct, two to three in number.

**Description:** Shell large for the genus, elongate conic. Spire high, turreted, lacking embryonic and early postembryonic shell. Apical angle about 13 degrees. Apex eroded only 3 to 5 whorls remaining in the specimen in our hands. Spire whorls slightly convex. Suture shallow, slightly impressed, not undulate. Spiral cords distinct crossed by axial ribs, forming periodical rectangular spots, but weakened

as close to suture; the number of the cords ~7. The basal cords strong, two to three in number. Axial ribs weak, presumably ~20 in number. Growth lines often distinct near aperture. Shell width about one-third of shell height. Aperture ovate, about two-fifth of the shell height.

*Remarks:* This species corresponds with *Semisulcospira* (*Biwamelania*) sp. D of Matsuoka (1987) and its geologic occurrence is restricted to the upper part of the Gamo Formation (about 1.8 MYA). The shell outline and size of *S. (B.) tagaensis* resemble those of recent *S. (B.) reticulata*. However, a flat outer slope profile in spiral whorls observed in this species is distinct from *S. (B.) reticulata* which has a convex whorl profile.

*Measurements (in mm):*

	H	W	BWL	AH	AA
TG-Inv-000405 (Paratype)	42.0	13.0	20.0	-	15.0
TG-Inv-000406	38.2	13.6	28.9	15.8	13.0
TG-Inv-000413 (Holotype)	32.4	12.6	-	-	14.0
TG-Inv-000411	38.0	13.4	20.9	12.6	12.0
TMNH-10736	33.0	11.5	-	-	-
MFM111182	22.3	10.3	-	-	13.0
MFM111183	26.2	10.1	-	-	-

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#### 補遺：修正および新称の提唱

瑞浪市化石博物館 44 号概要 —掲載論文の紹介— 修正 (4 ページ目)

Matsuoka K., and O. Miura. 2018 (*Bulletin of the Mizunami Fossil Museum*, no. 44: 59–67) の論文紹介本文を下記に差し替えます。

滋賀県に分布する古琵琶湖層群堅田層から発見されたカワニナ属の化石の詳細な観察を行った結果、5 種の新種が発見されました。これらの新種は、それぞれ *Semisulcospira (Biwamelania) nakamurai*, sp. nov. (新称：ナカムラカワニナ)、*Semisulcospira (Biwamelania) pseudomultigranosa*, sp. nov. (新称：イボカワニナモドキ)、*Semisulcospira (Biwamelania) spinulifera*, sp. nov. (新称：トゲカワニナ)、*Semisulcospira (Biwamelania) kokubuensis*, sp. nov. (新称：コクブカワニナ)、*Semisulcospira (Biwamelania) pusilla*, sp. nov. (新称：マメカワニナ) と名付けられました。

この論文で記載された 5 種の新称は以下の通りです。

- Semisulcospira (Biwamelania) nakamurai*, sp. nov. (新称：ナカムラカワニナ)  
*Semisulcospira (Biwamelania) pseudomultigranosa*, sp. nov. (新称：イボカワニナモドキ)  
*Semisulcospira (Biwamelania) spinulifera*, sp. nov. (新称：トゲカワニナ)  
*Semisulcospira (Biwamelania) kokubuensis*, sp. nov. (新称：コクブカワニナ)  
*Semisulcospira (Biwamelania) pusilla*, sp. nov. (新称：マメカワニナ)