

Supplementary Material

Systematic revision of the Japanese freshwater snail *Semisulcospira decipiens* (Mollusca: Semisulcospiridae): implications for diversification in the ancient Lake Biwa

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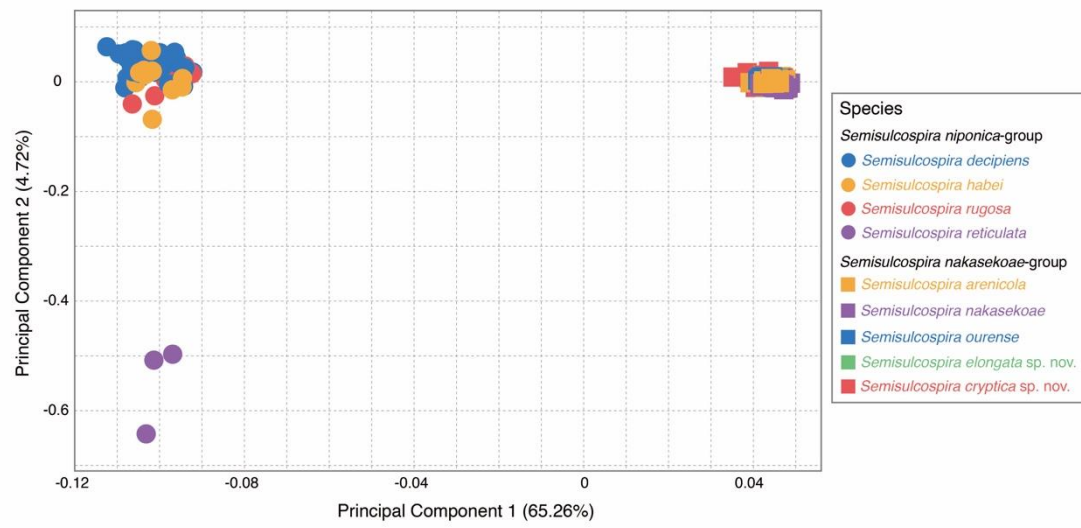


Fig. S1. Results of the principal components analysis based on 394 SNPs conducted for the nine *Semisulcospira* species.

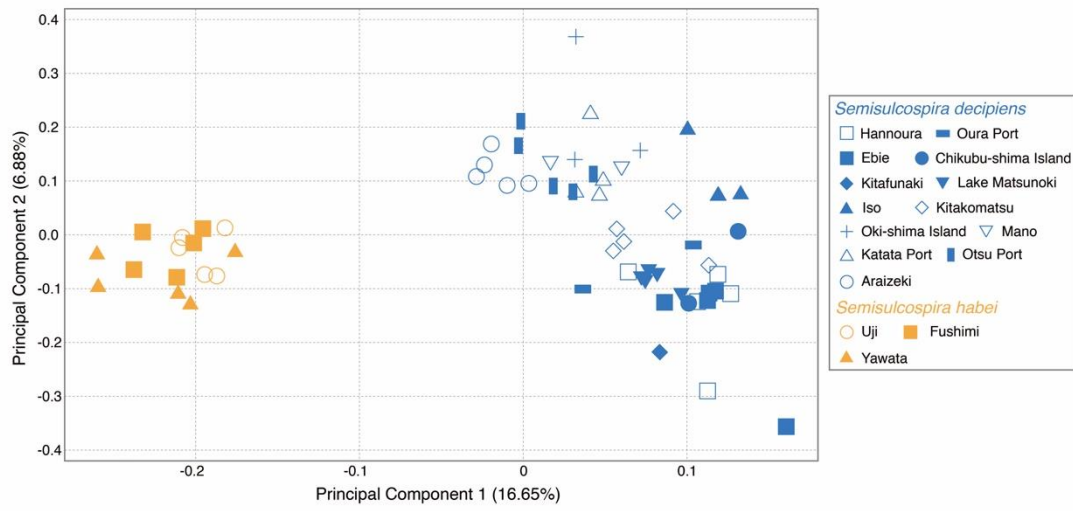


Fig. S2. Results of the second principal components analysis based on 622 SNPs conducted for *Semisulcospira decipiens* and *S. habei*.

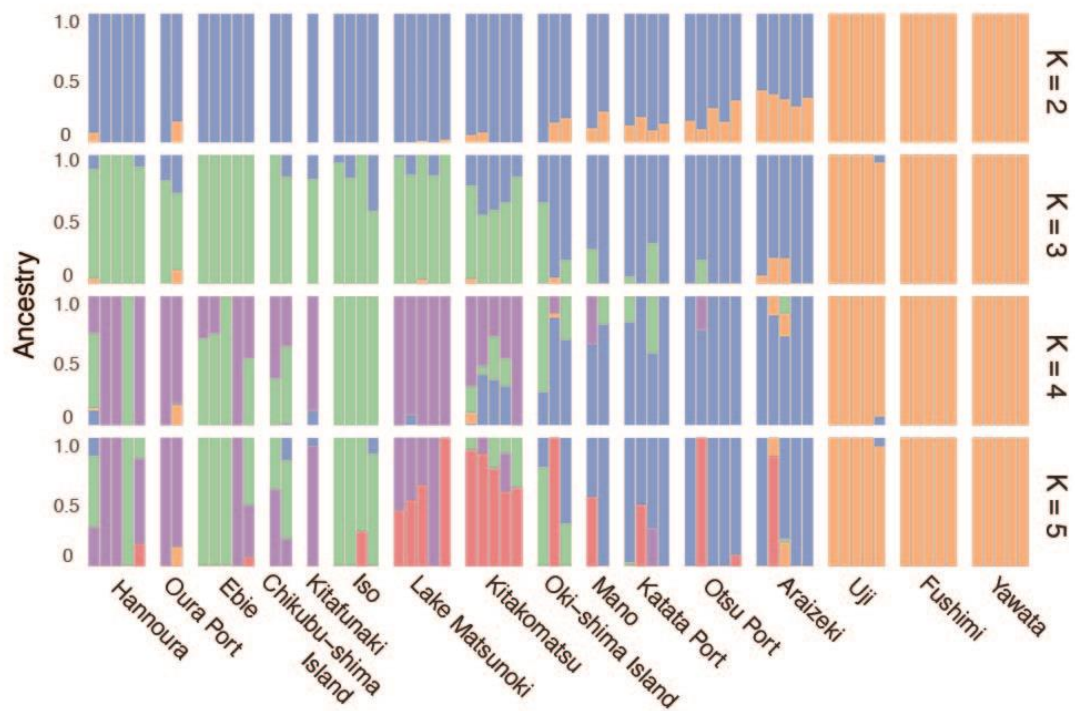


Fig. S3. Results of the second ADMIXTURE analysis based on 622 SNPs conducted for *Semisulcospira decipiens* and *S. habei*.

Table S1. Morphometric characters of the four *Semisulcospira niponica*-group species examined in the present study.

Species	<i>Semisulcospira decipiens</i>					
Locality	Hannoura	Oura Port	Ebie	Chikubu-shim a Island	Kitafunaki	Lake Matsunoki
Substrate	Piled rock	Piled rock	Mud	Rock	Sand	Mud
Water depth	0–1 m	0–1 m	0–1 m	2–3 m	3–4 m	0–1 m
specimen number of shells (mature male teleoconch; mature female; protoconch)	3; 14; 9	0; 7; 7	7; 13; 8	0; 2; 2	0; 9; 5	5; 13; 10
specimen number of radulae	3	3	3	2	3	3
specimen number of reproductive organs (male; female)	3; 8	0; 7	5; 10	0; 0	0; 0	5; 7
Morphological characters of mature female teleoconchs						
Aperture height (AH) (mm)	11.0–14.5 (12.4 ± 0.9)	11.5–13.2 (12.2 ± 0.5)	10.1–13.0 (11.7 ± 0.9)	12.5–12.7 (12.6 ± 0.1)	8.6–14.8 (10.7 ± 1.9)	12.0–15.9 (14.1 ± 1.4)
Aperture length (AL) (mm)	11.4–14.9 (12.8 ± 0.9)	11.6–13.6 (12.3 ± 0.7)	10.4–12.8 (11.7 ± 0.8)	12.8–12.9 (12.8 ± 0.1)	8.8–14.9 (11.0 ± 1.9)	12.4–15.8 (14.2 ± 1.3)
Aperture slenderness ratio (ASR)	1.59–1.81 (1.7 ± 0.1)	1.51–1.75 (1.6 ± 0.1)	1.56–1.81 (1.7 ± 0.1)	1.65–1.67 (1.7 ± 0.1)	1.62–1.83 (1.7 ± 0.1)	1.61–1.81 (1.7 ± 0.1)
Aperture width (AW) (mm)	6.9–8.5 (7.5 ± 0.6)	6.7–8.1 (7.6 ± 0.5)	6.1–7.5 (6.9 ± 0.4)	7.6–7.8 (7.7 ± 0.1)	5.2–9.2 (6.5 ± 1.2)	7.2–9.8 (8.3 ± 0.9)
Basal cord number (BCN)	4–6 (4.6 ± 0.7)	2–5 (3.7 ± 1.0)	3–5 (4.1 ± 0.5)	4–6 (5 ± 1.4)	3–5 (3.7 ± 0.7)	4–6 (4.8 ± 0.7)
Body whorl length (BWL) (mm)	18.9–23.9 (20.9 ± 1.5)	19.7–21.3 (20.5 ± 0.6)	17.1–21.7 (19.6 ± 1.4)	20.3–20.7 (20.5 ± 0.3)	15.1–24.2 (17.9 ± 2.9)	20.5–26.0 (23.2 ± 1.9)
Fourth whorl length (FWL) (mm)	3.9–5.0 (4.4 ± 0.2)	4.3–4.8 (4.6 ± 0.2)	3.6–5.3 (4.3 ± 0.5)	4.2–4.3 (4.3 ± 0.1)	3.3–5.1 (3.9 ± 0.5)	4.2–5.7 (4.9 ± 0.4)
Penultimate whorl length (PWL) (mm)	6.4–8.7 (7.5 ± 0.7)	6.9–8.2 (7.6 ± 0.4)	6.3–8.6 (7.2 ± 0.7)	7.1–7.3 (7.2 ± 0.1)	5.5–8.7 (6.5 ± 0.9)	7.7–9.7 (8.4 ± 0.6)
Longitudinal rib number of penultimate whorl (RN)	16–20 (17.7 ± 1.5)	14–20 (18.3 ± 2.2)	14–22 (17.3 ± 2.4)	19–21 (20.0 ± 1.4)	13–21 (16.6 ± 2.2)	13–18 (15.8 ± 1.6)
Spire angle (SA) (degrees)	18.0–24.5 (20.8 ± 1.7)	18.2–23.2 (19.9 ± 1.9)	15.0–21.2 (18.2 ± 1.9)	18.9–22.8 (20.8 ± 2.8)	14.3–22.5 (18.7 ± 2.8)	16.3–22.0 (19.2 ± 1.8)
Spiral cord number of penultimate whorl (SCN)	6–8 (6.9 ± 0.7)	6–7 (6.8 ± 0.5)	5–7 (5.9 ± 0.5)	7–8 (7.5 ± 0.7)	4–7 (6.0 ± 1.1)	5–6 (5.4 ± 0.5)
Shell height (SH) (mm)	32.1–38.4 (34.9 ± 1.9)	30.8–40.6 (35.7 ± 3.2)	28.7–42.8 (35.2 ± 3.7)	33.8–33.9 (33.9 ± 0.1)	28.1–45.5 (33.0 ± 5.4)	35.3–47.7 (40.7 ± 3.6)
Shell width (SW) (mm)	11.7–15.8	12.3–14.0	10.8–13.1 (12.0)	12.8–12.9	9.6–15.0	12.5–16.9 (14.5)

Third whorl length (TWL) (mm)	(13.2 ± 1.0) 5.0–6.2 (5.6 ± 0.4)	(13.3 ± 0.7) 5.1–6.1 (5.7 ± 0.3)	± 0.7) 4.5–6.3 (5.5 ± 0.6)	(12.8 ± 0.1) 5.4–5.7 (5.5 ± 0.2)	(11.2 ± 1.7) 3.6–6.0 (4.9 ± 0.7)	± 1.3) 5.6–7.9 (6.3 ± 0.6)
Whorl elongation ratio (WER)	2.48–3.11 (2.8 ± 0.2)	2.41–2.94 (2.7 ± 0.2)	2.47–3.28 (2.7 ± 0.2)	2.90–3.02 (3.0 ± 0.1)	2.25–3.27 (2.8 ± 0.3)	2.56–3.32 (2.9 ± 0.3)
Whorl number (WN)	4.00–5.00 (4.4 ± 0.4)	3.50–6.25 (4.8 ± 1.1)	4.00–6.50 (4.9 ± 0.9)	4.25–4.50 (4.4 ± 0.2)	4.50–6.50 (5.4 ± 0.7)	4.00–6.00 (5 ± 0.7)
Sculpture Type (node; granulated rib; smooth rib; spiral cord; smooth) (%)	93; 7; 0; 0; 0	29; 57; 14; 0; 0	8; 92; 0; 0; 0	0; 100; 0; 0; 0	22; 78; 0; 0; 0	0; 100; 0; 0; 0
Morphological characters of mature male teleoconchs						
Aperture height (AH) (mm)	9.7–12.6 (11.4 ± 1.5)		10.2–12.7 (11.6 ± 0.9)			12.2–14.7 (13.4 ± 1.2)
Aperture length (AL) (mm)	10.1–13.1 (11.9 ± 1.6)		10.6–12.8 (11.9 ± 0.9)			12.0–14.8 (13.4 ± 1.3)
Aperture slenderness ratio (ASR)	1.63–1.79 (1.7 ± 0.1)		1.65–1.85 (1.7 ± 0.1)			1.60–1.77 (1.7 ± 0.1)
Aperture width (AW) (mm)	5.7–8.0 (7.1 ± 1.3)		6.4–7.1 (6.8 ± 0.3)			7.1–8.6 (7.9 ± 0.7)
Basal cord number (BCN)	3–5 (4.0 ± 1.0)		2–5 (3.4 ± 1.3)			2–5 (4.0 ± 1.2)
Body whorl length (BWL) (mm)	15.7–20.8 (18.8 ± 2.7)		17.3–20.8 (19.2 ± 1.4)			19.7–23.4 (21.5 ± 1.7)
Fourth whorl length (FWL) (mm)	3.7–4.5 (4.1 ± 0.4)		3.8–4.2 (4.0 ± 0.2)			4.4–5.2 (4.8 ± 0.3)
Penultimate whorl length (PWL) (mm)	5.6–7.4 (6.8 ± 1.0)		6.3–7.5 (6.9 ± 0.5)			6.9–8.1 (7.6 ± 0.5)
Longitudinal rib number of penultimate whorl (RN)	16–19 (17.0 ± 1.7)		14–18 (14.9 ± 1.6)			12–16 (14.2 ± 1.5)
Spire angle (SA) (degrees)	19.2–23.8 (21.5 ± 2.3)		15.9–18.6 (17.3 ± 1.0)			14.2–19.3 (16.3 ± 1.9)
Spiral cord number of penultimate whorl (SCN)	5–7 (6.0 ± 1.4)		5–6 (5.6 ± 0.6)			5–6 (5.3 ± 0.5)
Shell height (SH) (mm)	28.6–35.5 (32.3 ± 3.5)		32.0–37.7 (34.8 ± 2.1)			37.6–43.8 (41.0 ± 2.3)
Shell width (SW) (mm)	10.0–13.4 (12.1 ± 1.9)		10.3–12.6 (11.5 ± 0.8)			12.0–14.6 (13.4 ± 1.0)
Third whorl length (TWL) (mm)	4.4–5.5 (4.9 ± 0.4)		4.6–5.5 (5.1 ± 0.4)			5.7–6.2 (5.9 ± 0.4)

Whorl elongation ratio (WER)	0.5) 2.61–2.97 (2.8 ± 0.2)		0.3) 2.49–3.38 (2.9 ± 0.3)			0.2) 2.63–2.97 (2.8 ± 0.1)
Whorl number (WN)	4.50–6.00 (5.2 ± 0.8)		5.00–7.25 (5.8 ± 0.8)			5.00–7.25 (5.7 ± 0.9)
Sculpture Type (node; granulated rib; smooth rib; spiral cord; smooth) (%)	67; 33; 0; 0; 0		29; 71; 0; 0; 0			0; 100; 0; 0; 0
Morphological characters of protoconchs						
Number of protoconchs (PN)	42–158 (108.4 ± 34.1)	56–122 (88.1 ± 26.7)	24–88 (46.4 ± 19)	25–27 (26.0 ± 1.4)	8–56 (26.4 ± 20.3)	25–166 (81.2 ± 50.2)
Longitudinal rib number on body whorl of the largest protoconch (RNP)	10–13 (11.6 ± 1.1)	11–13 (12.1 ± 0.9)	10–12 (11.1 ± 0.9)	11–14 (12.5 ± 2.1)	8–13 (11.8 ± 2.2)	11–15 (12.8 ± 1.1)
Shell height of the largest protoconch (SHP) (mm)	1.3–3.1 (2.5 ± 0.5)	2.2–3.1 (2.5 ± 0.4)	2.3–2.9 (2.6 ± 0.2)	1.9–2.3 (2.1 ± 0.2)	1.6–2.2 (1.8 ± 0.3)	2.2–3.3 (2.8 ± 0.3)
Shell width of the largest protoconch (SWP) (mm)	1.3–2.2 (1.8 ± 0.3)	1.7–2.1 (1.9 ± 0.2)	1.7–2.0 (1.8 ± 0.1)	1.9–1.9 (1.9 ± 0.1)	1.3–1.8 (1.6 ± 0.2)	1.7–2.3 (2.1 ± 0.2)
Whorl number of the largest protoconch (WNP)	2.25–3.50 (3.1 ± 0.4)	2.75–3.50 (3.1 ± 0.2)	3.25–3.50 (3.3 ± 0.1)	2.50–3.25 (2.9 ± 0.5)	2.00–2.75 (2.5 ± 0.3)	3.00–3.75 (3.3 ± 0.3)
Number of nodes on body whorl of the largest protoconch (Node Number) (3; 2; 1; 0) (%)	11; 22; 66; 0	0; 0; 100; 0	0; 0; 100; 0	0; 0; 100; 0	0; 0; 100; 0	0; 0; 100; 0
Spiral cord type on body whorl of the largest protoconch (Spiral Cord Type) (prominent; weak; absent) (%)	100; 0; 0	100; 0; 0	100; 0; 0	100; 0; 0	80; 0; 20	100; 0; 0
Morphological characters of radulae						
cuspid number of rachidian	5–6	5–7	7	6–7		5–7
cuspid number of lateral teeth	4–6	4–6	5–7	6–7		4–6
cuspid number of interior marginal teeth	4–5	4–5	4–5	4–6		4–6
cuspid number of exterior marginal teeth	4–5	4–5	4–6	4–6		4–5
Shape of the largest cuspid of rachidian (pointed; rounded; flat) (%)	0; 33; 67	0; 67; 33	100; 0; 0	50; 0; 50		100; 0; 0
Shape of the largest cuspid of lateral teeth (pointed; rounded; flat) (%)	0; 0; 100	0; 67; 33	0; 100; 0	0; 0; 100		0; 100; 0
<i>Semisulcospira decipiens</i>						
Species	<i>Semisulcospira decipiens</i>					
Locality	Iso	Kitakomatsu	Oki-shima Island	Katata Port	Otsu Port	Araizeki
Substrate	Rock	Piled rock	Rock	Concrete block	Piled rock	Sand and concrete block
Water depth	0–1 m	0–1 m	2–3 m	0–1 m	0–0.5 m	0–0.5 m
specimen number of shells (mature male teleoconch; mature female teleoconch; protoconch)	6; 14; 7	7; 6; 4	2; 10; 4	3; 11; 4	4; 8; 4	3; 10; 8

specimen number of radulae	3	3	3	3	3	3
specimen number of reproductive organs (male; female)	5; 10	6; 7	2; 5	3; 4	5; 7	3; 8
Morphological characters of mature female teleoconchs						
Aperture height (AH) (mm)	9.4–12.8 (11.4 ± 1.0)	9.6–12.2 (11.2 ± 0.9)	8.1–10.8 (9.4 ± 0.8)	5.8–10.1 (8.7 ± 1.2)	8.8–10.3 (9.6 ± 0.5)	9.2–10.7 (10.0 ± 0.6)
Aperture length (AL) (mm)	9.9–13.6 (11.7 ± 1.1)	10.4–12.5 (11.5 ± 0.8)	8.4–11.0 (9.6 ± 0.8)	5.7–10.2 (8.8 ± 1.3)	8.9–10.6 (9.8 ± 0.6)	9.3–11.1 (10.2 ± 0.7)
Aperture slenderness ratio (ASR)	1.54–1.81 (1.7 ± 0.1)	1.62–1.78 (1.7 ± 0.1)	1.49–1.78 (1.7 ± 0.1)	1.52–1.72 (1.7 ± 0.1)	1.68–1.88 (1.8 ± 0.1)	1.53–1.80 (1.6 ± 0.1)
Aperture width (AW) (mm)	5.9–7.7 (7.0 ± 0.5)	5.8–7.4 (6.8 ± 0.6)	5.1–6.5 (5.8 ± 0.4)	3.5–6.0 (5.3 ± 0.7)	5.3–6.2 (5.6 ± 0.3)	5.7–6.7 (6.2 ± 0.3)
Basal cord number (BCN)	3–6 (4.4 ± 1.0)	4–6 (4.7 ± 0.8)	2–5 (3.1 ± 1.0)	2–5 (3.1 ± 0.8)	2–4 (3.0 ± 0.5)	2–5 (3.8 ± 0.9)
Body whorl length (BWL) (mm)	15.9–20.5 (18.7 ± 1.5)	16.0–19.8 (18.6 ± 1.6)	13.7–17.7 (15.7 ± 1.2)	9.2–16.7 (14.3 ± 2.0)	14.6–17.0 (15.8 ± 0.9)	15.6–18.2 (16.8 ± 0.9)
Fourth whorl length (FWL) (mm)	3.2–4.4 (3.8 ± 0.3)	3.2–4.3 (3.8 ± 0.4)	3.3–4.3 (3.7 ± 0.3)	2.0–3.7 (3.2 ± 0.5)	3.1–3.8 (3.5 ± 0.2)	3.3–4.4 (3.9 ± 0.3)
Penultimate whorl length (PWL) (mm)	5.6–7.2 (6.6 ± 0.5)	5.6–7.4 (6.5 ± 0.8)	4.6–6.4 (5.7 ± 0.5)	3.1–6.1 (5.1 ± 0.8)	5.3–6.3 (5.7 ± 0.3)	5.8–6.6 (6.3 ± 0.3)
Longitudinal rib number of penultimate whorl (RN)	14–19 (17.3 ± 1.9)	14–25 (17.5 ± 3.8)	14–19 (15.4 ± 1.6)	12–19 (14.8 ± 2.0)	14–16 (15.3 ± 0.9)	14–23 (18.1 ± 2.5)
Spire angle (SA) (degrees)	19.0–24.8 (21.8 ± 1.7)	17.6–24.8 (21.7 ± 2.6)	16.4–20.7 (18.1 ± 1.5)	14.5–22.5 (19.0 ± 2.4)	14.8–20.7 (18.3 ± 1.9)	14.5–20.6 (17.0 ± 1.9)
Spiral cord number of penultimate whorl (SCN)	4–7 (5.9 ± 1.0)	5–7 (6.0 ± 1.1)	5–7 (5.6 ± 0.7)	4–6 (5.1 ± 0.7)	5–7 (6.1 ± 0.7)	5–7 (6.3 ± 0.7)
Shell height (SH) (mm)	26.8–36.4 (32.3 ± 2.6)	26.7–34.2 (31.1 ± 2.7)	25.6–32.7 (29.2 ± 2.3)	17.1–31.0 (25.2 ± 3.5)	25.7–33.0 (29.5 ± 2.4)	26.3–36.2 (31.6 ± 3.2)
Shell width (SW) (mm)	10.7–13.4 (12.2 ± 0.8)	10.4–12.7 (11.6 ± 0.7)	9.3–11.4 (10.3 ± 0.6)	6.1–10.2 (9.2 ± 1.1)	9.2–10.5 (9.7 ± 0.5)	9.8–11.4 (10.8 ± 0.5)
Third whorl length (TWL) (mm)	4.0–5.5 (5.0 ± 0.4)	4.0–5.4 (4.7 ± 0.6)	4.1–5.2 (4.6 ± 0.4)	2.7–4.9 (4.2 ± 0.6)	4.3–5.0 (4.6 ± 0.2)	4.6–5.4 (5.0 ± 0.2)
Whorl elongation ratio (WER)	2.51–3.48 (3.0 ± 0.3)	2.60–3.38 (3.0 ± 0.3)	2.34–2.91 (2.6 ± 0.2)	2.29–3.01 (2.7 ± 0.2)	2.64–2.84 (2.7 ± 0.1)	2.37–2.85 (2.6 ± 0.2)
Whorl number (WN)	4.00–6.00 (5.0 ± 0.6)	4.00–5.50 (4.6 ± 0.5)	4.00–6.50 (5.0 ± 0.7)	3.25–5.50 (4.5 ± 0.7)	4.75–7.00 (5.8 ± 0.8)	3.25–7.00 (5.2 ± 1.2)
Sculpture Type (node; granulated rib; smooth rib; spiral cord; smooth) (%)	29; 14; 7; 14; 36	50; 50; 0; 0; 0	0; 100; 0; 0; 0	45; 45; 0; 9; 0	0; 88; 0; 13; 0	0; 100; 0; 0; 0

Morphological characters of mature male teleoconchs

Aperture height (AH) (mm)	9.8–12.3 (10.9 ± 0.9)	8.9–11.4 (10.2 ± 1.0)	9.5–10.3 (9.9 ± 0.5)	7.5–9.3 (8.2 ± 1.0)	9.9–11.6 (10.7 ± 0.9)	10.4–12.0 (11.3 ± 0.8)
Aperture length (AL) (mm)	10.1–13.1 (11.5 ± 1.1)	9.4–11.8 (10.6 ± 1.0)	9.7–10.2 (10.0 ± 0.4)	7.9–9.6 (8.5 ± 1.0)	10.2–11.9 (10.9 ± 0.8)	11.0–12.2 (11.6 ± 0.6)
Aperture slenderness ratio (ASR)	1.71–1.88 (1.8 ± 0.1)	1.61–1.81 (1.7 ± 0.1)	1.59–1.64 (1.6 ± 0.1)	1.57–1.77 (1.7 ± 0.1)	1.65–1.85 (1.7 ± 0.1)	1.58–1.85 (1.7 ± 0.1)
Aperture width (AW) (mm)	5.5–7.3 (6.4 ± 0.7)	5.6–7.2 (6.3 ± 0.6)	6.1–6.2 (6.2 ± 0.1)	4.5–6.1 (5.2 ± 0.9)	5.5–7.2 (6.3 ± 0.8)	6.6–7.3 (6.9 ± 0.4)
Basal cord number (BCN)	4–6 (4.5 ± 0.8)	4–7 (5.0 ± 1.0)	3–4 (3.5 ± 0.7)	3–5 (3.7 ± 1.2)	2–4 (3.0 ± 0.8)	3–4 (3.3 ± 0.6)
Body whorl length (BWL) (mm)	16.0–19.7 (17.8 ± 1.5)	14.5–18.7 (16.6 ± 1.6)	15.2–16.8 (16.0 ± 1.1)	12.5–16.0 (14.0 ± 1.8)	15.7–19.5 (17.7 ± 2.0)	18.2–19.2 (18.8 ± 0.5)
Fourth whorl length (FWL) (mm)	3.1–3.8 (3.5 ± 0.3)	3.0–3.8 (3.4 ± 0.3)	3.4–4.2 (3.8 ± 0.5)	3.1–3.7 (3.3 ± 0.3)	3.3–4.3 (3.8 ± 0.6)	4.2–4.4 (4.3 ± 0.1)
Penultimate whorl length (PWL) (mm)	5.4–6.9 (6.1 ± 0.6)	5.0–6.6 (5.8 ± 0.6)	5.1–6.1 (5.6 ± 0.7)	4.6–6.1 (5.3 ± 0.8)	5.2–7.4 (6.4 ± 1.2)	6.6–7.1 (6.9 ± 0.3)
Longitudinal rib number of penultimate whorl (RN)	14–22 (17.0 ± 3.8)	12–18 (15.3 ± 1.9)	15–16 (15.5 ± 0.7)	13–16 (14.7 ± 1.5)	13–17 (14.3 ± 2.3)	14–16 (15.3 ± 1.2)
Spire angle (SA) (degrees)	19.4–27.6 (22.9 ± 2.8)	19.9–24.7 (22.0 ± 1.6)	15.1–19.9 (17.5 ± 3.4)	16.4–20.2 (18.2 ± 1.9)	16.8–21.7 (19.7 ± 2.4)	15.5–19.9 (17.6 ± 2.2)
Spiral cord number of penultimate whorl (SCN)	5–7 (5.8 ± 0.8)	6–8 (6.7 ± 0.8)	5	5–6 (5.5 ± 0.7)	6	5–6 (5.3 ± 0.6)
Shell height (SH) (mm)	26.0–33.2 (29.9 ± 2.6)	24.0–32.1 (28.4 ± 3.1)	27.7–32.2 (30.0 ± 3.2)	23.8–25.3 (24.4 ± 0.8)	28.6–37.9 (33.1 ± 4.3)	33.0–33.7 (33.3 ± 0.4)
Shell width (SW) (mm)	9.4–12.9 (11.2 ± 1.3)	9.7–12.0 (10.8 ± 1.0)	10.2–10.7 (10.4 ± 0.4)	8.0–10.2 (8.8 ± 1.2)	9.7–11.8 (10.7 ± 1.0)	11.6–12.0 (11.7 ± 0.2)
Third whorl length (TWL) (mm)	4.2–4.6 (4.4 ± 0.1)	3.7–5.1 (4.3 ± 0.5)	4.6–5.1 (4.9 ± 0.4)	3.6–4.2 (4.0 ± 0.3)	4.3–5.8 (5.0 ± 0.7)	5.1–5.5 (5.3 ± 0.2)
Whorl elongation ratio (WER)	2.90–3.27 (3.1 ± 0.1)	2.76–3.27 (3.0 ± 0.2)	2.47–2.80 (2.6 ± 0.2)	2.39–2.54 (2.5 ± 0.1)	2.61–3.02 (2.8 ± 0.2)	2.46–2.83 (2.6 ± 0.2)
Whorl number (WN)	4.25–6.25 (5.2 ± 0.8)	4.50–5.50 (5.0 ± 0.4)	5.00–6.00 (5.5 ± 0.7)	4.00–6.00 (4.8 ± 1.0)	4.50–7.00 (5.9 ± 1.1)	4.50–5.25 (4.9 ± 0.4)
Sculpture Type (node; granulated rib; smooth rib; spiral cord; smooth) (%)	29; 71; 0; 0; 0	43; 57; 0; 0; 0	0; 100; 0; 0; 0	0; 100; 0; 0; 0	0; 100; 0; 0; 0	33; 67; 0; 0; 0

Morphological characters of protoconchs

Number of protoconchs (PN)	9–83 (42.6 ± 0.8)	17–89 (64.3 ± 0.8)	19–32 (26.0 ± 0.8)	16–33 (25.0 ± 0.8)	18–42 (33.8 ± 0.8)	18–75 (42.6 ± 0.8)
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Longitudinal rib number on body whorl of the largest protoconch (RNP)	31.0 11–13 (12.1 ± 0.9)	32.6 11–13 (12.3 ± 1.0)	6.1 10–12 (11.0 ± 0.8)	8.8 12–13 (12.8 ± 0.5)	11.1 11–13 (12.0 ± 1.2)	20.4 11–16 (13.1 ± 1.5)
Shell height of the largest protoconch (SHP) (mm)	2.0–3.1 (2.5 ± 0.3)	2.3–2.7 (2.5 ± 0.2)	1.7–2.3 (2.1 ± 0.3)	1.5–2.5 (2.0 ± 0.4)	1.3–2.6 (2.1 ± 0.6)	1.7–2.7 (2.2 ± 0.4)
Shell width of the largest protoconch (SWP) (mm)	1.8–2.3 (2.0 ± 0.2)	1.8–1.9 (1.8 ± 0.1)	1.5–1.8 (1.6 ± 0.1)	1.4–1.9 (1.7 ± 0.2)	1.2–1.9 (1.6 ± 0.3)	1.4–1.9 (1.7 ± 0.2)
Whorl number of the largest protoconch (WNP)	2.50–3.50 (2.9 ± 0.3)	3.00–3.50 (3.1 ± 0.3)	2.25–3.00 (2.6 ± 0.3)	2.25–3.25 (2.9 ± 0.4)	2.00–3.00 (2.6 ± 0.4)	2.50–3.50 (2.9 ± 0.3)
Number of nodes on body whorl of the largest protoconch (Node Number) (3; 2; 1; 0) (%)	0; 0; 100; 0	0; 0; 100; 0	0; 0; 75; 25	0; 0; 100; 0	0; 0; 100; 0	0; 0; 100; 0
Spiral cord type on body whorl of the largest protoconch (Spiral Cord Type) (prominent; weak; absent) (%)	100; 0; 0	100; 0; 0	100; 0; 0	75; 0; 25	75; 0; 25	100; 0; 0
Morphological characters of radulae						
cusp number of rachidian	5–7	5–7	5–7	5–7	6–7	6–7
cusp number of lateral teeth	4–6	4–6	4–6	4–6	5–6	5–6
cusp number of interior marginal teeth	4–5	4–5	4–5	4–5	4–5	4–5
cusp number of exterior marginal teeth	5	4–5	4	4–5	4–6	5
Shape of the largest cusp of rachidian (pointed; rounded; flat) (%)	0; 100; 0	0; 100; 0	33; 67; 0	0; 100; 0	33; 67; 0	67; 33; 0
Shape of the largest cusp of lateral teeth (pointed; rounded; flat) (%)	0; 0; 100	0; 0; 100	0; 0; 100	0; 0; 100	0; 0; 100	0; 0; 100
Species	<i>Semisulcospira habei</i>			<i>Semisulcospira rugosa</i>		<i>Semisulcospira reticulata</i>
Locality	Uji	Fushimi	Yawata	Imazu Beach	Kitafunaki	Mano
Substrate	Piled rock	Rock and sand	Sand and concrete block	Piled rock	Piled rock	Mud
Water depth	0–0.5 m	0–0.5 m	0–0.5 m	0–1 m	0–1 m	6–12 m
specimen number of shells (mature male teleoconch; mature female teleoconch; protoconch)	2; 14; 5	1; 13; 8	2; 13; 10	1; 11; 9	0; 13; 9	4; 4; 3
specimen number of radulae	3	3	3	3	2	3
specimen number of reproductive organs (male; female)	2; 9	1; 8	2; 7	1; 7	0; 0	5; 4
Morphological characters of mature female teleoconchs						
Aperture height (AH) (mm)	9.7–12.1 (10.7 ± 0.7)	9.9–12.2 (10.6 ± 0.8)	9.0–10.6 (9.7 ± 0.6)	10.1–13.0 (11.4 ± 0.9)	9.8–12.4 (10.8 ± 0.7)	8.0–12.0 (10.3 ± 1.7)
Aperture length (AL) (mm)	9.7–12.4 (11.0 ± 0.8)	10.1–12.1 (10.8 ± 0.7)	9.1–10.6 (9.7 ± 0.5)	10.3–13.5 (11.7 ± 1.0)	10.1–12.8 (11.2 ± 0.8)	8.7–12.1 (10.7 ± 1.4)
Aperture slenderness ratio (ASR)	1.58–1.85 (1.7 ± 0.1)	1.62–1.92 (1.8 ± 0.1)	1.61–1.83 (1.7 ± 0.1)	1.62–1.78 (1.7 ± 0.1)	1.59–2.10 (1.8 ± 0.1)	1.30–1.50 (1.4 ± 0.1)

Aperture width (AW) (mm)	5.5–6.9 (6.3 ± 0.4)	5.6–6.9 (6.1 ± 0.4)	5.2–6.5 (5.6 ± 0.4)	5.9–7.8 (6.8 ± 0.7)	5.6–7.4 (6.3 ± 0.5)	6.1–8.4 (7.6 ± 1.0)
Basal cord number (BCN)	3–5 (3.9 ± 0.8)	3–6 (4.0 ± 0.9)	3–5 (3.6 ± 0.7)	2–5 (3.7 ± 0.9)	3–5 (3.8 ± 0.8)	3–4 (3.5 ± 0.6)
Body whorl length (BWL) (mm)	16.0–19.1 (17.6 ± 1.1)	16.5–20.0 (17.8 ± 1.0)	15.1–17.7 (16.1 ± 0.8)	16.8–20.9 (18.8 ± 1.5)	16.5–20.4 (18.3 ± 1.3)	13.7–19.9 (17.6 ± 2.8)
Fourth whorl length (FWL) (mm)	3–4 (3.5 ± 0.3)	3.1–4.5 (3.7 ± 0.3)	2.9–4.0 (3.5 ± 0.3)	3.4–4.4 (3.8 ± 0.3)	3.2–4.8 (3.8 ± 0.4)	3.4–4.4 (4.1 ± 0.5)
Penultimate whorl length (PWL) (mm)	5.4–6.9 (6.2 ± 0.5)	5.9–7.2 (6.5 ± 0.4)	5.5–6.7 (5.9 ± 0.3)	5.6–7.5 (6.7 ± 0.7)	5.7–7.9 (6.8 ± 0.7)	5.1–7.4 (6.7 ± 1.1)
Longitudinal rib number of penultimate whorl (RN)	16–23 (19.9 ± 1.8)	15–22 (19.5 ± 1.9)	17–23 (19.6 ± 1.7)	14–16 (14.7 ± 1.2)	10–22 (15.9 ± 3.4)	25–34 (29.3 ± 4.4)
Spire angle (SA) (degrees)	14.5–23.6 (20.0 ± 2.0)	14.8–21.3 (18.3 ± 1.8)	13.7–21.9 (16.7 ± 2.5)	19.2–25.6 (22.2 ± 2.2)	15.1–24.9 (20.3 ± 3.0)	18.5–20.3 (19.5 ± 0.8)
Spiral cord number of penultimate whorl (SCN)	5–8 (6.4 ± 0.9)	6–8 (6.9 ± 0.5)	5–7 (6.2 ± 0.7)	5–6 (5.2 ± 0.4)	4–8 (6.0 ± 1.4)	5–6 (5.5 ± 0.6)
Shell height (SH) (mm)	25.6–34.1 (29.3 ± 2.9)	26.9–36.3 (30.8 ± 2.7)	25.5–31.1 (28.4 ± 1.6)	27.4–33.7 (30.8 ± 2.3)	25.1–32.6 (29.8 ± 2.0)	28.2–41.2 (36.6 ± 5.7)
Shell width (SW) (mm)	9.8–12.1 (11.2 ± 0.7)	10.1–12.7 (10.9 ± 0.7)	9.1–11.2 (9.7 ± 0.6)	10.6–13.4 (12.1 ± 1.0)	10.4–12.8 (11.4 ± 0.8)	10.8–14.6 (13.3 ± 1.7)
Third whorl length (TWL) (mm)	4.3–5.5 (4.8 ± 0.3)	4.2–5.6 (4.9 ± 0.4)	4.0–5.4 (4.5 ± 0.4)	4.4–5.4 (4.9 ± 0.3)	4.1–6.2 (4.9 ± 0.5)	4.2–5.9 (5.4 ± 0.8)
Whorl elongation ratio (WER)	2.72–3.58 (3.1 ± 0.2)	2.53–3.21 (2.9 ± 0.2)	2.44–3.52 (2.8 ± 0.3)	2.71–3.24 (3.0 ± 0.2)	2.38–3.22 (2.9 ± 0.3)	2.37–2.73 (2.5 ± 0.2)
Whorl number (WN)	3.50–7.00 (4.8 ± 1.0)	4.25–5.75 (5.0 ± 0.5)	3.75–6.50 (5.2 ± 0.9)	4.00–5.00 (4.4 ± 0.4)	3.50–5.00 (4.2 ± 0.4)	6.25–7.00 (6.7 ± 0.4)
Sculpture Type (node; granulated rib; smooth rib; spiral cord; smooth) (%)	100; 0; 0; 0; 0	92; 8; 0; 0; 0	62; 38; 0; 0; 0	0; 18; 36; 9; 36	8; 54; 0; 0; 38	100; 0; 0; 0; 0
Morphological characters of mature male teleoconchs						
Aperture height (AH) (mm)	7.8–9.8 (8.8 ± 1.4)	9.2	7.4–9.8 (8.6 ± 1.7)	10.2		8.0–8.6 (8.2 ± 0.3)
Aperture length (AL) (mm)	8.3–10.1 (9.2 ± 1.3)	9.4	7.3–9.7 (8.5 ± 1.7)	10.4		8.3–8.9 (8.6 ± 0.3)
Aperture slenderness ratio (ASR)	1.72–1.95 (1.8 ± 0.2)	1.75	1.71–1.74 (1.7 ± 0.1)	1.80		1.47–1.69 (1.6 ± 0.1)
Aperture width (AW) (mm)	4.2–5.9 (5.1 ± 1.2)	5.4	4.2–5.7 (4.9 ± 1.0)	5.8		5.3–5.7 (5.5 ± 0.2)

Basal cord number (BCN)	4	3	3	3	2–3 (2.8 ± 0.5)	
Body whorl length (BWL) (mm)	12.7–16.7 (14.7 ± 2.8)	15.9	11.7–16.2 (14.0 ± 3.2)	16.6	13.9–14.4 (14.1 ± 0.2)	
Fourth whorl length (FWL) (mm)	2.5–3.3 (2.9 ± 0.5)	3.5	2.6–3.6 (3.1 ± 0.8)	3.2	3.6–3.8 (3.7 ± 0.1)	
Penultimate whorl length (PWL) (mm)	4.4–6.1 (5.3 ± 1.2)	5.9	4.1–5.9 (5.0 ± 1.3)	5.6	5.0–5.8 (5.5 ± 0.4)	
Longitudinal rib number of penultimate whorl (RN)	13–21 (17.0 ± 5.7)	18	15–17 (16.0 ± 1.4)	13	20–21 (20.7 ± 0.6)	
Spire angle (SA) (degrees)	20.5–22.4 (21.5 ± 1.3)	19.0	14.2–15.6 (14.9 ± 1.0)	22.1	14.8–19.5 (16.7 ± 2.0)	
Spiral cord number of penultimate whorl (SCN)	6	6	6		4–6 (4.8 ± 1.0)	
Shell height (SH) (mm)	20.5–25.7 (23.1 ± 3.6)	27.2	21.6–28.7 (25.2 ± 5.0)	26.1	28.7–31.1 (29.8 ± 1.1)	
Shell width (SW) (mm)	8.1–10.4 (9.3 ± 1.6)	9.5	7.1–9.4 (8.2 ± 1.6)	10.2	10.0–11.0 (10.6 ± 0.5)	
Third whorl length (TWL) (mm)	3.3–4.3 (3.8 ± 0.7)	4.1	3.4–4.4 (3.9 ± 0.7)	3.8	4.3–5.1 (4.5 ± 0.4)	
Whorl elongation ratio (WER)	3.00–3.12 (3.1 ± 0.1)	2.58	2.71–2.88 (2.8 ± 0.1)	3.14	2.11–2.41 (2.2 ± 0.1)	
Whorl number (WN)	4.00–5.00 (4.5 ± 0.7)	5.00	5.25–6.00 (5.6 ± 0.5)	4.75	6.00–8.00 (6.8 ± 0.9)	
Sculpture Type (node; granulated rib; smooth rib; spiral cord; smooth) (%)	50; 50; 0; 0; 0	100; 0; 0; 0; 0	100; 0; 0; 0; 0	0; 100; 0; 0; 0	100; 0; 0; 0; 0	
Morphological characters of protoconchs						
Number of protoconchs (PN)	22–55 (34.6 ± 12.5)	8–82 (30.9 ± 22.1)	16–43 (29.8 ± 7.7)	28–160 (99.4 ± 46.3)	10–75 (41.9 ± 19.0)	2–4 (3.0 ± 1.0)
Longitudinal rib number on body whorl of the largest protoconch (RNP)	11–14 (12.4 ± 1.1)	11–13 (11.9 ± 0.8)	11–15 (12.9 ± 1.1)	9–12 (10.8 ± 1.0)	9–12 (11.0 ± 1.1)	10–15 (12.7 ± 2.5)
Shell height of the largest protoconch (SHP) (mm)	2.2–2.7 (2.5 ± 0.2)	2.8–3.6 (3.1 ± 0.3)	1.9–2.9 (2.5 ± 0.4)	1.7–2.9 (2.3 ± 0.4)	1.6–2.5 (2.0 ± 0.3)	2.7–4.5 (3.9 ± 1.0)
Shell width of the largest protoconch (SWP) (mm)	1.9–2.2 (2.0 ± 0.1)	2.1–2.6 (2.3 ± 0.2)	1.6–2.2 (2.0 ± 0.2)	1.6–2.2 (1.9 ± 0.2)	1.4–1.8 (1.6 ± 0.1)	2.8–3.7 (3.3 ± 0.5)
Whorl number of the largest protoconch (WNP)	2.50–3.25 (2.9 ± 0.3)	2.50–4.00 (3.4 ± 0.4)	2.75–3.50 (3.1 ± 0.3)	2.25–3.25 (2.9 ± 0.3)	2.50–3.25 (2.8 ± 0.3)	2.50–3.50 (3.1 ± 0.5)
Number of nodes on body whorl of the largest protoconch (Node Number) (3; 2; 1; 0) (%)	0; 80; 20; 0	33; 56; 11; 0	20; 70; 10; 0	0; 11; 89; 0	0; 0; 100; 0	0; 67; 33; 0

Spiral cord type on body whorl of the largest protoconch (Spiral Cord Type) (prominent; weak; absent) (%)	100; 0; 0	100; 0; 0	100; 0; 0	22; 78; 0	44; 56; 0	0; 0; 100
Morphological characters of radulae						
cusp number of rachidian	5–6	5–7	5–6	5–7	6–7	5–8
cusp number of lateral teeth	5–6	5–7	6–7	5	3–5	6–7
cusp number of interior marginal teeth	4–6	4–5	4–6	4–5	4–5	3–5
cusp number of exterior marginal teeth	4–5	4–5	4–6	4–5	4–5	3–6
Shape of the largest cusp of rachidian (pointed; rounded; flat) (%)	33; 33; 33	100; 0; 0	100; 0; 0	33; 0; 67	100; 0; 0	100; 0; 0
Shape of the largest cusp of lateral teeth (pointed; rounded; flat) (%)	0; 0; 100	67; 0; 33	0; 100; 0	0; 0; 100	0; 0; 100	100; 0; 0

Measurements and counts: minimum–maximum value (mean \pm s.d.).

Table S2. Morphometric characters of the five *Semisulcospira nakasekoeae*-group species and the putative hybrids between *S. arenicola* and *S.**nakasekoeae* examined in the present study.

Species	<i>Semisulcospira arenicola</i>						
	Minamihama	Tamura	Kitafunaki	Yokoehama	Satsuma	Hirikiri Port	Wani Beach
Locality	Sand	Sand	Sand	Sand	Sand	Rock	Sand
Substrate	Sand	Sand	Sand	Sand	Sand	Rock	Sand
Water depth	0–1 m	0–1 m	2–3 m	0–2 m	0–1 m	0–1 m	0–2 m
specimen number of shells (mature male teleoconch; mature female teleoconch; protoconch)	3; 12; 9	7; 13; 6	1; 13; 7	0; 11; 9	2; 13; 9	6; 12; 7	5; 13; 9
specimen number of radulae	3	3	3	3	3	3	3
specimen number of reproductive organs (male; female)	3; 8	6; 10	0; 8	0; 7	3; 9	5; 7	4; 8
Morphological characters of mature female teleoconchs							
Aperture height (AH) (mm)	7.4–8.7 (8.1 ± 0.3)	7.4–9.0 (8.2 ± 0.5)	8.9–11.1 (10.1 ± 0.6)	8.7–10.1 (9.3 ± 0.5)	6.8–8.8 (7.6 ± 0.6)	7.6–8.9 (8.1 ± 0.4)	7.5–9.1 (8.2 ± 0.5)
Aperture length (AL) (mm)	7.2–8.4 (7.8 ± 0.4)	7.5–8.8 (8.1 ± 0.4)	8.5–10.9 (9.8 ± 0.7)	8.1–9.7 (8.8 ± 0.5)	6.8–8.8 (7.6 ± 0.6)	7.2–8.6 (8.0 ± 0.4)	7.3–8.8 (8.1 ± 0.5)
Aperture slenderness ratio (ASR)	1.48–1.72 (1.6 ± 0.1)	1.51–1.77 (1.6 ± 0.1)	1.52–1.75 (1.6 ± 0.1)	1.44–1.69 (1.5 ± 0.1)	1.5–1.74 (1.6 ± 0.1)	1.48–1.73 (1.6 ± 0.1)	1.55–1.74 (1.6 ± 0.1)
Aperture width (AW) (mm)	4.5–5.2 (4.9 ± 0.2)	4.5–5.7 (5.0 ± 0.3)	5.1–6.7 (6.0 ± 0.4)	5.3–6.4 (5.7 ± 0.3)	4.3–5.3 (4.7 ± 0.3)	4.7–5.5 (5.0 ± 0.2)	4.6–5.6 (5.0 ± 0.3)
Basal cord number (BCN)	2–3 (2.2 ± 0.4)	1–3 (2.2 ± 0.7)	2–3 (2.5 ± 0.5)	1–3 (1.8 ± 0.6)	2–3 (2.5 ± 0.5)	2–4 (2.6 ± 0.7)	1–3 (2.2 ± 0.6)
Body whorl length (BWL) (mm)	13.1–15.0 (14.0 ± 0.5)	13.4–15.2 (14.1 ± 0.6)	15.1–18.9 (17.2 ± 1.1)	15.3–17.1 (16.0 ± 0.6)	12.0–15.8 (13.1 ± 1.1)	12.9–14.6 (13.9 ± 0.5)	13.3–16.4 (14.5 ± 0.8)
Fourth whorl length (FWL) (mm)	3.2–3.8 (3.6 ± 0.2)	3.0–4.1 (3.5 ± 0.3)	3.6–4.8 (4.2 ± 0.4)	3.6–4.6 (4.0 ± 0.3)	2.9–3.7 (3.2 ± 0.3)	3.2–4.0 (3.5 ± 0.2)	3.3–4.7 (3.7 ± 0.4)
Penultimate whorl length (PWL) (mm)	5.1–5.9 (5.5 ± 0.2)	5.1–6.0 (5.5 ± 0.3)	5.6–7.5 (6.7 ± 0.4)	6.1–7.1 (6.5 ± 0.3)	4.4–6.3 (5.1 ± 0.5)	5.1–5.7 (5.5 ± 0.2)	5.5–6.9 (5.9 ± 0.4)
Longitudinal rib number of penultimate whorl (RN)	15–21 (17.6 ± 2.0)	14–19 (16.6 ± 1.6)	14–19 (17.1 ± 1.7)	14–20 (17.0 ± 3.0)	15–19 (16.7 ± 2.1)	10–15 (11.8 ± 1.4)	16–19 (17.3 ± 1.2)
Spire angle (SA) (degrees)	11.1–14.8 (13.3 ± 1.0)	11.5–16.6 (14.2 ± 1.8)	10.9–16.0 (13.5 ± 1.5)	10.2–15.0 (12.5 ± 1.3)	10.5–16.7 (13.1 ± 1.6)	10.9–15.7 (13.6 ± 1.4)	10.4–17.6 (12.7 ± 1.9)
Spiral cord number of penultimate whorl (SCN)	7–9 (7.8 ± 0.6)	6–8 (6.8 ± 0.9)	6–9 (7.9 ± 0.8)	6–9 (7.4 ± 0.9)	7–9 (8.0 ± 0.7)	6–9 (7.4 ± 0.8)	6–7 (6.8 ± 0.4)
Shell height (SH) (mm)	22.6–30.6	23.0–30.2	27.1–39.8	27.8–33.3	21.9–26.0	22.0–27.6	24.0–28.7 (26.4 ±

Shell width (SW) (mm)	(26.7 ± 2.4) 7.9–8.7 (8.3 ± 0.3)	(25.8 ± 2.0) 7.8–9.8 (8.6 ± 0.6)	(32.2 ± 3.1) 9.1–11.5 (10.3 ± 0.6)	(30.5 ± 1.9) 9.0–10.6 (9.6 ± 0.4)	(23.9 ± 1.5) 7.1–8.8 (7.7 ± 0.6)	(24.7 ± 1.9) 8.2–9.2 (8.7 ± 0.3)	1.6 7.7–9.5 (8.4 ± 0.5)
Third whorl length (TWL) (mm)	4.2–4.8 (4.5 ± 0.2)	3.9–5.0 (4.4 ± 0.4)	5.1–6.2 (5.4 ± 0.4)	4.8–6.6 (5.3 ± 0.5)	3.6–4.7 (4.3 ± 0.3)	4.0–4.6 (4.3 ± 0.2)	4.4–5.4 (4.8 ± 0.3)
Whorl elongation ratio (WER)	2.17–2.48 (2.3 ± 0.1)	2.12–2.74 (2.4 ± 0.2)	2.15–2.90 (2.4 ± 0.2)	2.17–2.54 (2.3 ± 0.1)	1.99–2.58 (2.4 ± 0.2)	2.11–2.62 (2.3 ± 0.1)	1.93–2.60 (2.2 ± 0.2)
Whorl number (WN)	3.75–7.00 (5.1 ± 1.1)	3.50–6.00 (4.3 ± 0.7)	3.50–7.75 (4.9 ± 1.1)	4.00–6.00 (4.6 ± 0.6)	3.50–5.50 (4.4 ± 0.6)	3.25–5.25 (4.3 ± 0.5)	4.00–5.00 (4.3 ± 0.4)
Sculpture Type (node; granulated rib; smooth rib; spiral cord; smooth) (%)	0; 92; 0; 8; 0	8; 62; 8; 8; 15	15; 85; 0; 0; 0	0; 36; 0; 36; 27	0; 8; 0; 15; 77	17; 75; 8; 0; 0	31; 8; 15; 31; 15
Morphological characters of mature male teleoconchs							
Aperture height (AH) (mm)	6.9–8.1 (7.6 ± 0.6)	6.4–8.0 (7.1 ± 0.6)	9.6		6.2–6.9 (6.5 ± 0.5)	6.7–9.7 (7.7 ± 1.1)	7.2–8.6 (7.7 ± 0.6)
Aperture length (AL) (mm)	6.6–7.9 (7.2 ± 0.7)	6.1–7.9 (7.0 ± 0.7)	9.5		6.1–6.5 (6.3 ± 0.3)	6.9–9.7 (7.8 ± 1.1)	6.8–8.8 (7.5 ± 0.8)
Aperture slenderness ratio (ASR)	1.49–1.72 (1.6 ± 0.1)	1.56–1.68 (1.6 ± 0.1)	1.56		1.56–1.58 (1.6 ± 0.1)	1.50–1.69 (1.6 ± 0.1)	1.50–1.65 (1.6 ± 0.1)
Aperture width (AW) (mm)	4.4–4.6 (4.5 ± 0.1)	3.9–4.9 (4.4 ± 0.4)	6.1		3.9–4.1 (4.0 ± 0.1)	4.2–5.9 (4.9 ± 0.6)	4.2–5.6 (4.7 ± 0.5)
Basal cord number (BCN)	1–3 (2.3 ± 1.2)	1–3 (2.3 ± 0.8)	3		2	2–4 (2.3 ± 0.8)	2–3 (2.2 ± 0.5)
Body whorl length (BWL) (mm)	12.3–13.8 (13.1 ± 0.8)	11.3–13.9 (12.5 ± 1.1)	16		11.2–11.7 (11.4 ± 0.4)	11.5–16.3 (13.3 ± 1.7)	12.3–15.1 (13.4 ± 1.1)
Fourth whorl length (FWL) (mm)	3.4–3.6 (3.5 ± 0.2)	2.6–3.8 (3.1 ± 0.4)	3.6		2.9–3.7 (3.3 ± 0.5)	3.2–3.8 (3.4 ± 0.2)	3.3–3.8 (3.6 ± 0.2)
Penultimate whorl length (PWL) (mm)	5.0–5.3 (5.2 ± 0.2)	4.3–5.8 (5.0 ± 0.6)	6.1		4.6–4.7 (4.7 ± 0.1)	4.6–6.2 (5.3 ± 0.5)	4.9–6.2 (5.5 ± 0.5)
Longitudinal rib number of penultimate whorl (RN)	16–21 (18.5 ± 3.5)	12–16 (15.0 ± 2.0)				9–13 (10.8 ± 1.6)	12–20 (16.4 ± 2.9)
Spire angle (SA) (degrees)	11.3–12.7 (12.0 ± 0.7)	10.5–17.2 (13.3 ± 2.2)	12.9		9.0–9.5 (9.2 ± 0.3)	9.7–16.2 (13.1 ± 2.8)	8.2–13.7 (11.4 ± 2.4)
Spiral cord number of penultimate whorl (SCN)	7–8 (7.7 ± 0.6)	7–8 (7.6 ± 0.6)				7–8 (7.8 ± 0.5)	6–7 (6.8 ± 0.5)
Shell height (SH) (mm)	24.3–28.5 (26.1 ± 2.2)	22.0–24.3 (23.4 ± 0.9)	31.6		19.3–21.6 (20.5 ± 1.6)	22.2–28.6 (24.1 ± 2.3)	25.6–27.3 (26.2 ± 0.7)
Shell width (SW) (mm)	7.4–7.7 (7.6)	6.4–8.3 (7.3)	10.0		6.4–6.8 (6.6)	7.5–10.0 (8.4)	6.9–9.0 (7.6 ± 0.5)

Third whorl length (TWL) (mm)	4.1–4.5 (4.3 ± 0.2)	3.7–4.5 (4.0 ± 0.8)	5.1		3.8–4.0 (3.9 ± 0.3)	3.8–4.6 (4.2 ± 0.9)	4.0–4.8 (4.4 ± 0.8)
Whorl elongation ratio (WER)	2.04–2.41 (2.2 ± 0.2)	1.88–2.82 (2.4 ± 0.3)	2.65		1.87–2.13 (2.0 ± 0.2)	2.02–2.58 (2.3 ± 0.2)	1.94–2.33 (2.1 ± 0.2)
Whorl number (WN)	4.50–6.75 (5.3 ± 1.2)	4.00–6.25 (5.0 ± 0.8)	5.25		3.75–4.00 (3.9 ± 0.2)	4.00–5.00 (4.3 ± 0.4)	4.00–6.25 (5.0 ± 1.0)
Sculpture Type (node; granulated rib; smooth rib; spiral cord; smooth) (%)	33; 67; 0; 0; 0	0; 86; 0; 14; 0	0; 0; 100; 0; 0		0; 0; 100; 0; 0	33; 67; 0; 0; 0	0; 100; 0; 0; 0
Morphological characters of protoconchs							
Number of protoconchs (PN)	7–24 (14.9 ± 6.3)	6–30 (19.5 ± 9.8)	4–59 (25.7 ± 21.0)	20–50 (33.3 ± 9.7)	4–33 (16.7 ± 8.7)	9–29 (19.4 ± 7.0)	4–30 (16.6 ± 8.0)
Longitudinal rib number on body whorl of the largest protoconch (RNP)	10–11 (10.4 ± 0.5)	10–12 (11.3 ± 0.8)	10–11 (10.6 ± 0.5)	9–12 (10.2 ± 1.0)		9–12 (11.1 ± 1.1)	8–12 (9.9 ± 1.4)
Shell height of the largest protoconch (SHP) (mm)	2.0–2.9 (2.5 ± 0.4)	2.2–2.9 (2.6 ± 0.3)	2.0–3.1 (2.7 ± 0.4)	2.3–3.2 (2.7 ± 0.3)	1.8–3.4 (2.5 ± 0.5)	2.3–3.2 (2.6 ± 0.3)	2.1–3.3 (2.6 ± 0.4)
Shell width of the largest protoconch (SWP) (mm)	1.4–1.9 (1.7 ± 0.2)	1.5–1.9 (1.8 ± 0.1)	1.4–2.0 (1.8 ± 0.2)	1.5–1.9 (1.7 ± 0.1)	1.3–1.9 (1.6 ± 0.2)	1.7–2.2 (1.9 ± 0.2)	1.4–1.8 (1.6 ± 0.1)
Whorl number of the largest protoconch (WNP)	3.00–4.00 (3.5 ± 0.3)	3.25–4.00 (3.6 ± 0.3)	3.00–3.75 (3.4 ± 0.2)	3.00–3.75 (3.3 ± 0.3)	3.00–4.25 (3.5 ± 0.4)	3.00–3.50 (3.3 ± 0.3)	3.25–4.00 (3.4 ± 0.3)
Number of nodes on body whorl of the largest protoconch (Node Number) (3; 2; 1; 0) (%)	0; 0; 44; 56	0; 0; 33; 67	0; 29; 71; 0	0; 22; 33; 44	0; 0; 33; 67	0; 0; 57; 43	0; 0; 22; 78
Spiral cord type on body whorl of the largest protoconch (Spiral Cord Type) (prominent; weak; absent) (%)	33; 67; 0	67; 33; 0	86; 14; 0	56; 44; 0	0; 78; 22	0; 86; 14	22; 67; 11
Morphological characters of radulae							
cuspid number of rachidian	5–6	5–7	5–7	5–7	5–7	5–7	5–7
cuspid number of lateral teeth	5–6	3–5	4–7	5–7	4–7	5–7	5–7
cuspid number of interior marginal teeth	4–6	4–6	4–6	4–6	5–7	5–7	5–6
cuspid number of exterior marginal teeth	4–6	4–6	4–6	4–6	5–7	5–7	5–6
Shape of the largest cuspid of rachidian (pointed; rounded; flat) (%)	100; 0; 0	67; 33; 0	33; 67; 0	100; 0; 0	100; 0; 0	100; 0; 0	100; 0; 0
Shape of the largest cuspid of lateral teeth (pointed; rounded; flat) (%)	33; 67; 0	67; 33; 0	0; 100; 0	67; 33; 0	100; 0; 0	33; 67; 0	67; 33; 0
Species	<i>Semisulcospira arenicola</i>		<i>Semisulcospira nakasekoeae</i>				
Locality	Mano	Otsu Port	Araizeki	Nango	Uji	Fushimi	Higashiyama
Substrate	Mud	Piled rock	Sand and concrete	Sand and concrete	Piled rock	Mud	Piled rock

Water depth	6–12 m	0–0.5 m	block 0–0.5 m	block 0–0.5 m	0–0.5 m	0–1 m	0–0.5 m
specimen number of shells (mature male teleoconch; mature female teleoconch; protoconch)	3; 14; 10	4; 5; 4	3; 3; 3	7; 19; 13	7; 13; 10	4; 12; 10	5; 14; 7
specimen number of radulae	3	3	2	5	3	3	3
specimen number of reproductive organs (male; female)	3; 8	6; 7	2; 2	4; 15	3; 10	5; 7	3; 7
Morphological characters of mature female teleoconchs							
Aperture height (AH) (mm)	7.2–8.7 (7.9 ± 0.3)	8.3–10.0 (8.8 ± 0.7)	8.1–9.1 (8.6 ± 0.5)	7.7–11.0 (9.2 ± 0.9)	9.3–11.4 (10.0 ± 0.7)	8.9–10.2 (9.4 ± 0.3)	5.5–7.6 (6.2 ± 0.6)
Aperture length (AL) (mm)	6.9–8.5 (7.6 ± 0.5)	8.3–10.1 (8.9 ± 0.7)	8.5–9.6 (9.0 ± 0.6)	8.1–11.1 (9.5 ± 0.9)	10.1–12.8 (11.2 ± 0.7)	8.6–10.0 (9.3 ± 0.4)	5.8–7.7 (6.5 ± 0.5)
Aperture slenderness ratio (ASR)	1.43–1.67 (1.5 ± 0.1)	1.48–1.8 (1.6 ± 0.1)	1.64–1.74 (1.7 ± 0.1)	1.60–1.82 (1.7 ± 0.1)	1.50–1.74 (1.6 ± 0.1)	1.59–1.76 (1.7 ± 0.1)	1.50–1.86 (1.6 ± 0.1)
Aperture width (AW) (mm)	4.6–5.3 (5.0 ± 0.2)	4.8–6.0 (5.4 ± 0.5)	4.9–5.9 (5.4 ± 0.5)	4.6–6.5 (5.5 ± 0.6)	6.2–7.3 (6.9 ± 0.3)	5.3–5.8 (5.6 ± 0.2)	3.4–4.4 (3.9 ± 0.3)
Basal cord number (BCN)	1–3 (2.2 ± 0.8)	2–3 (2.6 ± 0.5)	4	2–5 (3.4 ± 0.8)	3–6 (4.8 ± 0.9)	3–6 (4.2 ± 1.1)	2–4 (3.4 ± 0.7)
Body whorl length (BWL) (mm)	12.9–14.8 (13.7 ± 0.5)	14.4–17.1 (15.2 ± 1.1)	14.3–15.8 (14.9 ± 0.8)	13.0–18.8 (15.8 ± 1.4)	16.3–19.2 (17.8 ± 0.9)	14.5–16.1 (15.6 ± 0.4)	9.4–12.1 (10.6 ± 0.8)
Fourth whorl length (FWL) (mm)	2.9–3.8 (3.4 ± 0.3)	3.0–3.8 (3.4 ± 0.3)	2.7–3.5 (3.0 ± 0.4)	2.3–4.0 (3.0 ± 0.4)	1.2–2.2 (1.6 ± 0.3)	2.3–3.5 (2.9 ± 0.4)	1.5
Penultimate whorl length (PWL) (mm)	5.1–6.0 (5.5 ± 0.2)	5.7–6.6 (5.9 ± 0.4)	5.3–6.2 (5.6 ± 0.5)	4.8–7.5 (6.0 ± 0.7)	5.0–6.7 (6.0 ± 0.5)	4.8–6.2 (5.7 ± 0.5)	3.4–4.6 (3.8 ± 0.3)
Longitudinal rib number of penultimate whorl (RN)	11–22 (17.2 ± 2.6)	12–14 (13.0 ± 0.7)	12–16 (14.0 ± 2.8)	13–18 (16.0 ± 2.4)	18–20 (19.0 ± 1.4)	15–22 (17.4 ± 2.1)	13–16 (14.3 ± 1.5)
Spire angle (SA) (degrees)	11.7–18.6 (14.1 ± 2.0)	13.3–17.3 (14.9 ± 1.6)	17.4–23.5 (20.7 ± 3.1)	12.3–22.7 (18.3 ± 2.3)	24.8–40.3 (30.0 ± 3.8)	16.7–22.9 (20.4 ± 1.8)	16.8–34.1 (27.1 ± 5.3)
Spiral cord number of penultimate whorl (SCN)	7–9 (7.7 ± 0.9)	7	9	8–13 (9.3 ± 1.4)	8–11 (9.5 ± 1.1)	9–11 (9.5 ± 0.7)	8–9 (8.3 ± 0.6)
Shell height (SH) (mm)	23.7–30.1 (26.3 ± 1.8)	25.0–31.7 (27.5 ± 2.5)	23.7–25.3 (24.5 ± 0.8)	20.4–28.6 (24.4 ± 1.8)	20.9–25.4 (22.5 ± 1.2)	21.4–27.2 (24.0 ± 1.6)	11.8–16.6 (13.5 ± 1.3)
Shell width (SW) (mm)	7.9–9.2 (8.4 ± 0.4)	8.5–10.1 (9.2 ± 0.7)	8.8–10.3 (9.4 ± 0.8)	8.0–11.1 (9.6 ± 0.9)	11.3–12.9 (12.4 ± 0.5)	8.8–10.2 (9.5 ± 0.4)	6.0–7.7 (6.9 ± 0.5)
Third whorl length (TWL) (mm)	3.9–4.8 (4.3 ± 0.3)	4.2–5.2 (4.6 ± 0.4)	3.8–4.7 (4.1 ± 0.5)	3.6–5.3 (4.4 ± 0.5)	3.3–4.6 (3.7 ± 0.4)	3.5–4.7 (4.1 ± 0.4)	1.8–3.5 (2.7 ± 0.7)
Whorl elongation ratio (WER)	2.00–2.75 (2.3 ± 0.2)	2.37–2.81 (2.6 ± 0.2)	2.60–3.05 (2.9 ± 0.2)	2.69–3.39 (3.0 ± 0.2)	5.27–8.05 (6.5 ± 1.0)	2.67–3.86 (3.2 ± 0.4)	4.68

Whorl number (WN)	4.00–8.25 (5.1 ± 1.3)	4.25–6.00 (5.0 ± 0.7)	3.25–5.75 (4.6 ± 1.3)	3.25–4.75 (3.9 ± 0.4)	3.00–3.50 (3.1 ± 0.2)	3.50–4.50 (4.0 ± 0.4)	1.75–3.00 (2.1 ± 0.4)
Sculpture Type (node; granulated rib; smooth rib; spiral cord; smooth) (%)	0; 71; 14; 14; 0	40; 60; 0; 0; 0	0; 0; 33; 67; 0	5; 53; 5; 21; 16	0; 8; 0; 92; 0	17; 33; 0; 42; 8	0; 14; 14; 36; 36
Morphological characters of mature male teleoconchs							
Aperture height (AH) (mm)	6.9–7.2 (7.1 ± 0.2)	7.1–8.6 (7.5 ± 0.7)	7.0–8.0 (7.4 ± 0.54)	8.0–11.1 (9.3 ± 1.2)	8.5–11.4 (9.6 ± 0.9)	7.5–8.5 (7.8 ± 0.5)	4.9–6.4 (6.0 ± 0.6)
Aperture length (AL) (mm)	6.6–7.5 (7.1 ± 0.5)	7.0–8.9 (7.7 ± 0.8)	7.2–7.8 (7.5 ± 0.3)	8.0–11.5 (9.4 ± 1.2)	9.6–11.6 (10.3 ± 0.7)	7.5–8.7 (8.1 ± 0.5)	5.3–6.4 (6.0 ± 0.4)
Aperture slenderness ratio (ASR)	1.58–1.64 (1.6 ± 0.1)	1.52–1.83 (1.7 ± 0.2)	1.37–1.62 (1.5 ± 0.1)	1.58–1.77 (1.7 ± 0.1)	1.40–1.67 (1.5 ± 0.1)	1.58–1.64 (1.6 ± 0.1)	1.54–1.73 (1.7 ± 0.1)
Aperture width (AW) (mm)	4.2–4.6 (4.4 ± 0.2)	4.2–5.0 (4.6 ± 0.4)	4.5–5.7 (4.9 ± 0.6)	4.8–6.5 (5.6 ± 0.7)	5.7–7.7 (6.7 ± 0.7)	4.6–5.5 (5.0 ± 0.4)	3.4–4.0 (3.7 ± 0.2)
Basal cord number (BCN)	2–3 (2.3 ± 0.6)	2–3 (2.5 ± 0.6)	2–3 (2.7 ± 0.6)	3–4 (3.4 ± 0.5)	4–8 (5.9 ± 1.4)	4	2–4 (3.0 ± 1.0)
Body whorl length (BWL) (mm)	11.9–12.5 (12.3 ± 0.3)	12.0–14.2 (12.8 ± 0.9)	12.1–13.9 (12.8 ± 1.0)	13.6–18.1 (15.7 ± 1.9)	13.6–18.9 (15.9 ± 1.7)	12.7–14.2 (13.2 ± 0.7)	8.7–10.7 (10.0 ± 0.8)
Fourth whorl length (FWL) (mm)	3.3	3.0–3.3 (3.2 ± 0.1)	2.8–3.3 (3.1 ± 0.3)	1.7–3.3 (2.7 ± 0.7)	1.3–1.5 (1.4 ± 0.1)	2.0–2.7 (2.4 ± 0.3)	
Penultimate whorl length (PWL) (mm)	4.8–5.1 (5.0 ± 0.2)	4.4–5.1 (4.9 ± 0.3)	4.6–5.6 (5.0 ± 0.5)	4.6–7.2 (5.9 ± 0.9)	4.0–6.7 (5.3 ± 1.1)	4.8–5.1 (4.9 ± 0.1)	3.2–4.0 (3.6 ± 0.4)
Longitudinal rib number of penultimate whorl (RN)	13–20 (15.3 ± 4.0)	10–15 (12.3 ± 2.2)	12–18 (14.7 ± 3.06)	11–18 (15.2 ± 2.8)	15–17 (16.0 ± 1.0)	16	11
Spire angle (SA) (degrees)	10.6–15.7 (12.5 ± 2.8)	15.5–17.9 (16.3 ± 1.1)	14.1–19.0 (16.9 ± 2.5)	14.4–28.7 (18.9 ± 5.0)	23.9–46.3 (36.5 ± 7.2)	13.8–20.9 (18.2 ± 3.1)	14.9–33.5 (22.3 ± 8.4)
Spiral cord number of penultimate whorl (SCN)	6	5–7 (6.0 ± 0.8)	7–9 (7.7 ± 1.2)	7–11 (8.5 ± 1.7)	9–11 (10.0 ± 0.9)	8	10
Shell height (SH) (mm)	21.4–24.9 (23.7 ± 2.0)	23.5–26.9 (24.5 ± 1.6)	19–24 (21.7 ± 2.5)	19.8–25.9 (23.1 ± 2.7)	17.0–22.1 (19.5 ± 1.7)	19.8–21.2 (20.5 ± 0.7)	10.6–14.2 (12.6 ± 1.5)
Shell width (SW) (mm)	7.4–7.9 (7.7 ± 0.2)	7.4–9.1 (8.0 ± 0.8)	7.7–9.0 (8.3 ± 0.7)	8.1–10.9 (9.6 ± 1.1)	10.6–13.1 (11.5 ± 0.9)	7.5–8.8 (8.3 ± 0.6)	5.9–6.8 (6.4 ± 0.4)
Third whorl length (TWL) (mm)	4	3.8–4.2 (4.0 ± 0.2)	3.7–4.2 (3.9 ± 0.3)	3.6–5.0 (4.4 ± 0.5)	2.4–3.5 (2.9 ± 0.4)	3.2–3.9 (3.7 ± 0.3)	1.8–3.2 (2.4 ± 0.6)
Whorl elongation ratio (WER)	2.12–2.19 (2.2 ± 0.1)	2.27–2.62 (2.4 ± 0.2)	2.43–2.49 (2.5 ± 0.1)	2.95–4.90 (3.9 ± 0.8)	6.11–7.33 (6.6 ± 0.6)	2.76–3.95 (3.4 ± 0.5)	
Whorl number (WN)	4.00–5.25 (4.8 ± 0.7)	5.00–6.00 (5.6 ± 0.5)	3.25–4.50 (4.1 ± 0.7)	3.00–3.50 (3.3 ± 0.2)	3.00–3.50 (3.3 ± 0.3)	3.50–4.75 (4.3 ± 0.6)	2.00–2.50 (2.3 ± 0.3)

Sculpture Type (node; granulated rib; smooth rib; spiral cord; smooth) (%)	0; 33; 67; 0; 0	50; 50; 0; 0; 0	0; 100; 0; 0; 0	0; 71; 14; 14; 0	0; 83; 17; 0; 0	0; 75; 25; 0; 0	0; 20; 20; 0; 60
Morphological characters of protoconchs							
Number of protoconchs (PN)	8–17 (12.0 ± 3.5)	11–29 (22.0 ± 8.1)	4–12 (7.7 ± 4.0)	8–29 (17.4 ± 5.7)	15–50 (24.4 ± 10.4)	7–31 (17.9 ± 8.2)	1–6 (2.4 ± 1.8)
Longitudinal rib number on body whorl of the largest protoconch (RNP)	9–13 (10.7 ± 1.6)	9–11 (10.0 ± 0.8)	9–13 (10.7 ± 2.1)	9–12 (10.3 ± 0.9)	10–14 (12.8 ± 1.6)	10–14 (11.2 ± 1.6)	
Shell height of the largest protoconch (SHP) (mm)	1.8–3.4 (2.7 ± 0.4)	2.5–2.9 (2.7 ± 0.2)	2.4–3.4 (3.1 ± 0.5)	2.2–3.6 (3.0 ± 0.4)	2.4–3.2 (2.8 ± 0.3)	2.3–3.6 (3.1 ± 0.4)	1.6–2.9 (2.1 ± 0.5)
Shell width of the largest protoconch (SWP) (mm)	1.3–1.9 (1.7 ± 0.2)	1.6–1.9 (1.8 ± 0.1)	1.8–2.3 (2.1 ± 0.3)	1.9–2.5 (2.2 ± 0.2)	2.2–3 (2.5 ± 0.3)	1.8–2.9 (2.4 ± 0.3)	1.4–2.2 (1.8 ± 0.3)
Whorl number of the largest protoconch (WNP)	3.00–4.00 (3.5 ± 0.3)	3.25–3.75 (3.5 ± 0.3)	3.25–3.75 (3.6 ± 0.3)	2.75–3.75 (3.3 ± 0.3)	2.50–3.00 (3.0 ± 0.2)	3.00–3.75 (3.3 ± 0.3)	2.25–3.00 (2.8 ± 0.3)
Number of nodes on body whorl of the largest protoconch (Node Number) (3; 2; 1; 0) (%)	0; 10; 40; 50	0; 0; 50; 50	0; 0; 0; 100	0; 0; 15; 85	0; 0; 0; 100	0; 0; 20; 80	0; 0; 0; 100
Spiral cord type on body whorl of the largest protoconch (Spiral Cord Type) (prominent; weak; absent) (%)	40; 60; 0	50; 50; 0	0; 100; 0	0; 77; 23	30; 40; 30	10; 90; 0	0; 29; 71
Morphological characters of radulae							
cusp number of rachidian	5–7	5–6	5–7	5–7	5–6	5–6	5–6
cusp number of lateral teeth	5–7	4–6	3–5	3–6	4–6	3–6	3–5
cusp number of interior marginal teeth	4–7	4–7	4–5	4–6	4–6	4–6	3–5
cusp number of exterior marginal teeth	4–7	4–7	4–5	4–6	4–6	4–6	3–5
Shape of the largest cusp of rachidian (pointed; rounded; flat) (%)	100; 0; 0	100; 0; 0	100; 0; 0	100; 0; 0	33; 67; 0	100; 0; 0	33; 67; 0
Shape of the largest cusp of lateral teeth (pointed; rounded; flat) (%)	33; 67; 0	0; 100; 0	0; 50; 50	0; 80; 20	0; 100; 0	0; 67; 33	0; 67; 33
Species	<i>Semisulcospira nakasekoe</i>		<i>Semisulcospira ourensis</i>			<i>Semisulcospira elongata</i> sp. nov.	
Locality	Yawata	Neyagawa	Oura	Okude	Sugaura	Chikubu-shi ma Island	Kitafunaki
Substrate	Sand and concrete block	Rock and sand	Piled rock	Mud	Piled rock	Rock	Sand
Water depth	0–0.5 m	0–0.5 m	0–0.5 m	3–6 m	0–0.5 m	2–5 m	3–5 m
specimen number of shells (mature male teleoconch; mature female teleoconch; protoconch)	3; 12; 10	4; 13; 10	5; 14; 13	2; 1; 1	4; 13; 10	0; 3; 2	0; 8; 8
specimen number of radulae	3	3	3	3	3	2	3

specimen number of reproductive organs (male; female)	3; 7	4; 7	9; 15	2; 1	4; 7	0; 2	1; 6
Morphological characters of mature female teleoconchs							
Aperture height (AH) (mm)	8.1–9.2 (8.7 ± 0.4)	8.5–9.8 (9.3 ± 0.4)	7.3–9.0 (8.1 ± 0.5)	9.3	7.8–9.1 (8.3 ± 0.3)	9.4–10.0 (9.7 ± 0.3)	9.4–11.2 (10.4 ± 0.8)
Aperture length (AL) (mm)	7.9–9.3 (8.7 ± 0.5)	8.4–9.9 (9.2 ± 0.4)	7.2–9.3 (8.1 ± 0.6)	8.8	7.7–8.8 (8.3 ± 0.3)	9.8–10.4 (10.0 ± 0.3)	9.1–11.0 (10.0 ± 0.7)
Aperture slenderness ratio (ASR)	1.58–1.79 (1.7 ± 0.1)	1.56–1.75 (1.7 ± 0.1)	1.52–1.75 (1.6 ± 0.1)	1.49	1.55–1.76 (1.7 ± 0.1)	1.60–1.92 (1.7 ± 0.2)	1.39–1.67 (1.6 ± 0.1)
Aperture width (AW) (mm)	4.8–5.8 (5.2 ± 0.3)	5.2–6.2 (5.6 ± 0.2)	4.5–5.5 (5.0 ± 0.3)	5.9	4.7–5.4 (5.0 ± 0.2)	5.4–6.1 (5.8 ± 0.4)	5.9–6.9 (6.3 ± 0.4)
Basal cord number (BCN)	2–5 (3.3 ± 0.9)	3–6 (3.8 ± 0.9)	2–3 (2.2 ± 0.4)	2	2–4 (2.8 ± 0.7)	3–4 (3.7 ± 0.6)	2–4 (3.0 ± 0.9)
Body whorl length (BWL) (mm)	13.1–15.7 (14.4 ± 0.8)	15–17 (15.8 ± 0.6)	12.7–15.5 (14.1 ± 0.9)	16	13.5–15.1 (14.1 ± 0.4)	16.1–18.0 (17.1 ± 1.0)	16.6–19.0 (17.8 ± 1.0)
Fourth whorl length (FWL) (mm)	2.5–3.3 (2.9 ± 0.3)	2.9–3.3 (3.1 ± 0.2)	3.2–4.1 (3.5 ± 0.3)	4.6	3.0–4.1 (3.4 ± 0.3)	4.4–4.9 (4.6 ± 0.2)	4.2–5.3 (4.5 ± 0.4)
Penultimate whorl length (PWL) (mm)	4.1–5.9 (5.2 ± 0.5)	5.5–7.0 (6.1 ± 0.4)	5–6 (5.5 ± 0.3)	6.5	4.9–5.9 (5.5 ± 0.3)	5.9–7.5 (6.9 ± 0.9)	6.6–7.4 (6.9 ± 0.3)
Longitudinal rib number of penultimate whorl (RN)	15–20 (18.4 ± 1.8)	16–26 (21.3 ± 3.4)	11–20 (14.2 ± 2.9)	18	11–15 (13.0 ± 1.4)	12–14 (13.0 ± 1.0)	15–25 (20.4 ± 3.4)
Spire angle (SA) (degrees)	13.5–21.8 (19.1 ± 2.6)	14.5–22.6 (18.3 ± 2.1)	12.2–16.3 (14.3 ± 1.3)	12.8	10.0–16.8 (12.4 ± 1.9)	12.6–14.8 (13.5 ± 1.1)	10.4–14.2 (12.0 ± 1.4)
Spiral cord number of penultimate whorl (SCN)	7–13 (9.0 ± 1.4)	8–11 (9.1 ± 0.9)	6–8 (7.0 ± 0.8)	7	6–8 (6.8 ± 0.8)		8–9 (8.5 ± 0.7)
Shell height (SH) (mm)	18.6–24.8 (21.4 ± 1.7)	21.9–25.1 (23.3 ± 1.0)	25.3–28.1 (26.4 ± 0.9)	26.9	20.9–26.7 (23.3 ± 1.4)	28.2–37.3 (32.9 ± 4.5)	29.6–43.2 (36.6 ± 4.1)
Shell width (SW) (mm)	8.3–9.5 (8.8 ± 0.4)	8.9–10.3 (9.5 ± 0.4)	7.6–9.9 (8.8 ± 0.6)	11.0	8.8–9.6 (9.1 ± 0.3)	10.3–11.1 (10.7 ± 0.4)	10.0–11.9 (10.9 ± 0.7)
Third whorl length (TWL) (mm)	3.5–4.4 (4.0 ± 0.3)	3.9–4.9 (4.4 ± 0.3)	3.7–4.8 (4.4 ± 0.3)	5.7	3.6–4.8 (4.4 ± 0.4)	5.3–5.8 (5.6 ± 0.3)	5.1–7.1 (5.9 ± 0.6)
Whorl elongation ratio (WER)	2.50–3.57 (3.1 ± 0.4)	2.74–3.14 (3.0 ± 0.2)	2.20–2.59 (2.4 ± 0.1)	2.02	2.06–2.70 (2.5 ± 0.2)	2.05–2.18 (2.1 ± 0.1)	2.12–2.56 (2.3 ± 0.2)
Whorl number (WN)	2.50–4.50 (3.6 ± 0.6)	3.00–3.50 (3.3 ± 0.2)	3.75–5.50 (4.6 ± 0.6)	3.25	3.00–4.50 (3.7 ± 0.4)	3.50–4.75 (4.3 ± 0.7)	3.75–7.75 (5.8 ± 1.1)
Sculpture Type (node; granulated rib; smooth rib; spiral cord; smooth) (%)	42; 33; 0; 25; 0	54; 31; 0; 15; 0	0; 64; 36; 0; 0	0; 0; 0; 100; 0	0; 15; 85; 0; 0	0; 0; 100; 0; 0	0; 13; 88; 0; 0
Morphological characters of mature male teleoconchs							

Aperture height (AH) (mm)	7.0–8.1 (7.7 ± 0.6)	6.8–7.3 (7.0 ± 0.3)	7.1–7.7 (7.4 ± 0.3)	9.4–9.7 (9.5 ± 0.2)	7.0–8.0 (7.5 ± 0.4)		
Aperture length (AL) (mm)	6.9–8.2 (7.7 ± 0.7)	7.0–7.5 (7.2 ± 0.2)	7.0–8.0 (7.5 ± 0.4)	9.5–9.7 (9.6 ± 0.2)	7.1–8.4 (7.7 ± 0.6)		
Aperture slenderness ratio (ASR)	1.57–1.68 (1.6 ± 0.1)	1.60–1.64 (1.6 ± 0.1)	1.61–1.79 (1.7 ± 0.1)	1.61–1.81 (1.7 ± 0.1)	1.60–1.78 (1.7 ± 0.1)		
Aperture width (AW) (mm)	4.1–5.3 (4.8 ± 0.6)	4.3–4.6 (4.4 ± 0.2)	4.3–4.6 (4.5 ± 0.1)	5.4–5.9 (5.7 ± 0.4)	4.2–4.9 (4.5 ± 0.3)		
Basal cord number (BCN)	3–4 (3.7 ± 0.6)	3–4 (3.5 ± 0.6)	2–4 (2.6 ± 0.9)	2–3 (2.5 ± 0.7)	2–3 (2.5 ± 0.6)		
Body whorl length (BWL) (mm)	11.2–13.7 (12.8 ± 1.4)	11.4–12.4 (11.9 ± 0.4)	11.6–13.6 (12.6 ± 0.8)	15.9–16.2 (16.0 ± 0.2)	12.1–13.7 (12.7 ± 0.7)		
Fourth whorl length (FWL) (mm)	2.3	1.9–2.1 (2.0 ± 0.1)	2.6–3.4 (2.9 ± 0.3)	4.1–4.5 (4.3 ± 0.3)	2.6–3.5 (3.1 ± 0.4)		
Penultimate whorl length (PWL) (mm)	3.9–5.6 (4.8 ± 0.9)	4.1–4.6 (4.4 ± 0.2)	4.3–5.7 (4.9 ± 0.6)	5.9–6.5 (6.2 ± 0.4)	4.5–5.4 (4.9 ± 0.4)		
Longitudinal rib number of penultimate whorl (RN)	20	13–23 (18.8 ± 4.4)	10–12 (11.0 ± 0.7)	15	10–12 (10.8 ± 1.0)		
Spire angle (SA) (degrees)	15.2–19.2 (17.2 ± 2.0)	18.2–25.3 (20.6 ± 3.3)	11.3–16.2 (13.9 ± 1.8)	12.6–13.3 (12.9 ± 0.5)	11.4–19.1 (14.7 ± 3.4)		
Spiral cord number of penultimate whorl (SCN)	7–9 (8.0 ± 1.0)	7–8 (7.7 ± 0.6)	6–7 (6.5 ± 0.7)	7	6–7 (6.3 ± 0.5)		
Shell height (SH) (mm)	18.0–20.5 (18.9 ± 1.4)	16.1–19 (17.8 ± 1.2)	20.2–24.5 (22.6 ± 1.6)	29.4–34.8 (32.1 ± 3.8)	20.7–23.2 (21.5 ± 1.2)		
Shell width (SW) (mm)	6.8–8.6 (8.0 ± 1.0)	7.2–7.3 (7.3 ± 0.1)	7.1–8.1 (7.6 ± 0.4)	10.2	7.8–8.6 (8.2 ± 0.4)		
Third whorl length (TWL) (mm)	3.2–4.2 (3.9 ± 0.5)	2.9–3.1 (3.0 ± 0.1)	3.4–4.4 (3.9 ± 0.5)	5.0–5.4 (5.2 ± 0.3)	3.7–4.3 (4.0 ± 0.3)		
Whorl elongation ratio (WER)	3.08	3.40–3.62 (3.5 ± 0.1)	2.24–2.83 (2.6 ± 0.2)	2.09–2.36 (2.2 ± 0.2)	2.28–2.91 (2.4 ± 0.3)		
Whorl number (WN)	2.50–4.50 (3.4 ± 1.0)	3.25–4.25 (3.8 ± 0.5)	4.00–5.25 (4.5 ± 0.5)	4.00–6.50 (5.3 ± 1.8)	3.50–4.50 (3.9 ± 0.5)		
Sculpture Type (node; granulated rib; smooth rib; spiral cord; smooth) (%)	0; 100; 0; 0; 0	0; 100; 0; 0; 0	0; 60; 40; 0; 0	0; 100; 0; 0; 0	0; 100; 0; 0; 0		
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Morphological characters of protoconchs							
Number of protoconchs (PN)	1–15 (8.6 ± 4.1)	6–22 (13.6 ± 4.7)	4–35 (14.2 ± 8.7)	42	1–31 (17.6 ± 11.6)	23–24 (23.5 ± 0.7)	12–59 (35.1 ± 12.9)

Longitudinal rib number on body whorl of the largest protoconch (RNP)	10–17 (12.1 ± 2.3)	10–14 (11.4 ± 1.1)	8–12 (9.5 ± 1.4)	11	9–14 (10.8 ± 1.7)	9–10 (9.5 ± 0.7)	10–12 (10.9 ± 0.8)
Shell height of the largest protoconch (SHP) (mm)	2.4–3.7 (3.0 ± 0.4)	2.7–4.0 (3.4 ± 0.4)	1.1–2.8 (2.1 ± 0.5)	3.1	1.4–3.4 (2.5 ± 0.6)	2.6–2.8 (2.7 ± 0.1)	2.3–3.4 (2.8 ± 0.3)
Shell width of the largest protoconch (SWP) (mm)	1.8–2.6 (2.2 ± 0.2)	2.0–2.6 (2.4 ± 0.2)	1.0–1.9 (1.5 ± 0.3)	1.9	1.2–2.0 (1.7 ± 0.3)	1.8–1.9 (1.8 ± 0.1)	1.6–2.0 (1.7 ± 0.1)
Whorl number of the largest protoconch (WNP)	3.00–4.00 (3.4 ± 0.4)	3.00–4.00 (3.6 ± 0.3)	2.25–3.50 (3.0 ± 0.4)	3.50	2.5–3.75 (3.4 ± 0.5)	3.50–3.75 (3.6 ± 0.2)	3.00–3.75 (3.4 ± 0.3)
Number of nodes on body whorl of the largest protoconch (Node Number) (3; 2; 1; 0) (%)	0; 0; 20; 80	0; 0; 0; 100	0; 0; 77; 23	0; 0; 0; 100	0; 10; 50; 40	0; 0; 100; 0	0; 0; 13; 88
Spiral cord type on body whorl of the largest protoconch (Spiral Cord Type) (prominent; weak; absent) (%)	30; 60; 10	30; 60; 10	38; 38; 23	100; 0; 0	60; 40; 0	0; 100; 0	75; 25; 0
Morphological characters of radulae							
cusp number of rachidian	5–7	5–9	5–6	5–7	5–6	5–7	5–6
cusp number of lateral teeth	3–5	3–5	4–5	5–6	3–7	4–6	5–6
cusp number of interior marginal teeth	4–7	4–5	4–6	4–6	4–5	4–5	4–6
cusp number of exterior marginal teeth	4–7	4–5	4–6	4–6	4–5	4–5	4–6
Shape of the largest cusp of rachidian (pointed; rounded; flat) (%)	100; 0; 0	100; 0; 0	100; 0; 0	100; 0; 0	33; 33; 33	50; 50; 0	100; 0; 0
Shape of the largest cusp of lateral teeth (pointed; rounded; flat) (%)	0; 100; 0	0; 67; 33	0; 100; 0	0; 33; 67	0; 0; 100	0; 100; 0	67; 33; 0
Species	<i>Semisulcospira elongata</i> sp. nov.			<i>Semisulcospira cryptica</i> sp. nov.		Putative hybrid	
Locality	Okude	Imazu Beach	Mano	Chikubu-shi ma Island	Okude	Araizeki	Nango
Substrate	Mud	Sand	Mud	Rock	Mud	Sand and concrete block	Sand and concrete block
Water depth	3–6 m	3–5 m	6–12 m	2–5 m	3–6 m	0–0.5 m	0–0.5 m
specimen number of shells (mature male teleoconch; mature female teleoconch; protoconch)	0; 3; 2	3; 7; 7	1; 11; 7	1; 17; 9	6; 13; 12	5; 3; 3	0; 2; 1
specimen number of radulae	2	3	3	3	3	3	1
specimen number of reproductive organs (male; female)	0; 3	0; 7	1; 9	4; 8	5; 7	3; 3	0; 2
Morphological characters of mature female teleoconchs							
Aperture height (AH) (mm)	10.0–11.6 (10.6 ± 0.9)	9.3–10.3 (9.9 ± 0.4)	7.8–9.4 (8.5 ± 0.6)	9.1–11.9 (10.3 ± 0.7)	9.2–10.9 (10.0 ± 0.5)	7.2–9.2 (8.4 ± 1.0)	8.3–8.6 (8.4 ± 0.2)
Aperture length (AL) (mm)	9.9–11.6	9.0–10.4	7.5–8.9 (8.2)	9.3–12.2	9.0–11.2	7.3–9.7 (8.6)	8.3–8.7 (8.5 ± 0.2)

Aperture slenderness ratio (ASR)	(10.8 ± 0.8) 1.39–1.58 (1.5 ± 0.1)	(9.7 ± 0.5) 1.55–1.76 (1.6 ± 0.1)	± 0.5) 1.34–1.59 (1.5 ± 0.1)	(10.6 ± 0.8) 1.47–1.86 (1.7 ± 0.1)	(10.0 ± 0.6) 1.43–1.62 (1.5 ± 0.1)	± 1.2) 1.49–1.97 (1.7 ± 0.2)	0.3) 1.70–1.80 (1.7 ± 0.1)
Aperture width (AW) (mm)	6.9–7.4 (7.1 ± 0.3)	5.3–6.3 (5.9 ± 0.3)	5.0–6.3 (5.4 ± 0.4)	5.8–7.0 (6.2 ± 0.3)	5.9–7.1 (6.5 ± 0.4)	4.9–5.3 (5.1 ± 0.3)	4.8–4.9 (4.8 ± 0.1)
Basal cord number (BCN)	2–4 (3.0 ± 1.0)	2–4 (2.9 ± 0.7)	2–3 (2.5 ± 0.5)	2–5 (3.0 ± 0.9)	1–4 (2.7 ± 0.9)	3–4 (3.3 ± 0.6)	3
Body whorl length (BWL) (mm)	17.9–20.2 (18.7 ± 1.3)	15.7–17.6 (16.8 ± 0.6)	13.5–16.2 (14.7 ± 1.0)	16.5–20.2 (17.6 ± 1.0)	16.1–19.7 (17.8 ± 0.9)	13.2–15.2 (14.2 ± 1.0)	14.0–14.4 (14.2 ± 0.2)
Fourth whorl length (FWL) (mm)	3.9–4.9 (4.6 ± 0.5)	3.8–4.5 (4.0 ± 0.2)	3.1–3.9 (3.7 ± 0.3)	4.0–5.1 (4.5 ± 0.3)	4.0–5.5 (4.7 ± 0.4)	2.8–3.1 (3.0 ± 0.1)	3.1–3.3 (3.2 ± 0.2)
Penultimate whorl length (PWL) (mm)	6.9–7.9 (7.6 ± 0.6)	5.9–7.2 (6.5 ± 0.4)	4.9–6.3 (5.8 ± 0.4)	6.2–7.7 (6.8 ± 0.4)	6.3–8.1 (7.3 ± 0.6)	5.0–5.4 (5.2 ± 0.2)	5.4–5.5 (5.4 ± 0.1)
Longitudinal rib number of penultimate whorl (RN)		13–20 (15.3 ± 3.3)	18–29 (21.5 ± 3.0)	9–15 (11.8 ± 1.6)	17–28 (21.7 ± 3.9)	13–19 (15.7 ± 3.1)	
Spire angle (SA) (degrees)	12.4–16.8 (14.1 ± 2.4)	10.0–17.8 (14.9 ± 2.8)	7.7–18.3 (13.8 ± 3.1)	11.1–17.3 (14.3 ± 1.7)	8.1–16.0 (13.5 ± 2.3)	18.4–21.7 (19.8 ± 1.7)	13.6–14.7 (14.2 ± 0.8)
Spiral cord number of penultimate whorl (SCN)	8–10 (9.0 ± 1.4)	5–8 (7.3 ± 1.5)	7–10 (7.7 ± 1.1)	7–8 (7.6 ± 0.5)	7–8 (7.4 ± 0.5)	6–8 (7.0 ± 1.4)	9
Shell height (SH) (mm)	31.4–36.5 (33.7 ± 2.6)	28.8–34.8 (32.8 ± 1.9)	25.4–32.5 (28.6 ± 2.4)	31.1–40.5 (35.9 ± 2.3)	28.7–34.0 (30.8 ± 1.8)	22.7–24.6 (23.9 ± 1)	23.0–24.6 (23.8 ± 1.1)
Shell width (SW) (mm)	12.1–13.6 (12.7 ± 0.8)	9.6–10.9 (10.2 ± 0.5)	9.2–11.1 (9.7 ± 0.5)	10.8–12.6 (11.4 ± 0.5)	10.6–12.8 (11.9 ± 0.6)	8.3–9.0 (8.6 ± 0.4)	8.5–8.6 (8.5 ± 0.1)
Third whorl length (TWL) (mm)	5.5–6.5 (6.0 ± 0.5)	4.4–6.1 (5.0 ± 0.6)	4.1–5.3 (4.8 ± 0.3)	5.1–6.5 (5.6 ± 0.4)	5.1–6.4 (5.8 ± 0.4)	3.5–3.9 (3.7 ± 0.2)	4.3–4.7 (4.5 ± 0.3)
Whorl elongation ratio (WER)	2.02–2.61 (2.4 ± 0.3)	2.28–2.68 (2.5 ± 0.1)	2.03–2.74 (2.3 ± 0.2)	1.99–2.57 (2.3 ± 0.2)	1.82–2.34 (2.1 ± 0.2)	2.34–3.25 (2.8 ± 0.5)	2.60–2.71 (2.7 ± 0.1)
Whorl number (WN)	3.25–4.50 (3.7 ± 0.7)	4.50–6.25 (5.7 ± 0.7)	3.25–8.00 (5.2 ± 1.6)	4.00–7.00 (5.6 ± 0.9)	3.50–4.50 (3.8 ± 0.4)	4.25–4.50 (4.4 ± 0.1)	4.00
Sculpture Type (node; granulated rib; smooth rib; spiral cord; smooth) (%)	0; 0; 0; 100; 0	0; 29; 29; 14; 28	0; 100; 0; 0; 0	0; 47; 53; 0; 0	0; 62; 8; 15; 15	0; 67; 33; 0; 0	0; 50; 0; 50; 0
Morphological characters of mature male teleoconchs							
Aperture height (AH) (mm)		9.9–10.5 (10.2 ± 0.3)	7.5	9.9	8.8–9.9 (9.2 ± 0.4)	9.2	
Aperture length (AL) (mm)		9.6–10.4 (10.1 ± 0.4)	7.7	10.2	8.5–10.0 (9.3 ± 0.5)	9.7	
Aperture slenderness ratio (ASR)		1.45–1.62	1.55	1.73	1.42–1.69	1.97	

Aperture width (AW) (mm)		(1.6 ± 0.1) 6.4–6.7 (6.6 ± 0.1)	5.0	5.9	(1.6 ± 0.1) 5.9–6.5 (6.0 ± 0.2)	5	
Basal cord number (BCN)		2–3 (2.3 ± 0.6)	3	3	1–3 (2.5 ± 0.8)	2–4 (3.2 ± 0.8)	
Body whorl length (BWL) (mm)		18.0–18.7 (18.3 ± 0.4)	12.9	17.4	15.2–16.7 (15.9 ± 0.6)	15.2	
Fourth whorl length (FWL) (mm)		4.0–4.6 (4.3 ± 0.3)	2.8	3.9	3.8–5.0 (4.3 ± 0.5)	2.8	
Penultimate whorl length (PWL) (mm)		7.4–7.8 (7.6 ± 0.2)	5.0	7.0	5.9–7.1 (6.2 ± 0.5)	5.3	
Longitudinal rib number of penultimate whorl (RN)		21–23 (22.0 ± 1.4)	18	10	19–24 (21.6 ± 2.3)	11–15 (13.5 ± 1.9)	
Spire angle (SA) (degrees)		13.0–14.6 (13.6 ± 0.9)	14.7	13.5	11.5–17.9 (15.0 ± 2.5)	14.6–17.2 (15.8 ± 1.1)	
Spiral cord number of penultimate whorl (SCN)		6–8 (7.0 ± 1.4)		9	7–9 (7.4 ± 0.9)	5–8 (7.4 ± 1.3)	
Shell height (SH) (mm)		32.6–33.4 (33.1 ± 0.4)	24.9	31.8	26.6–33.0 (29.6 ± 2.6)	24.6	
Shell width (SW) (mm)		10.9–11.1 (11.0 ± 0.1)	8.7	10.6	10.0–11.2 (10.6 ± 0.5)	8.6	
Third whorl length (TWL) (mm)		5.8–6.4 (6.1 ± 0.3)	4.2	4.8	4.4–5.6 (5.0 ± 0.4)	3.7	
Whorl elongation ratio (WER)		2.13–2.61 (2.4 ± 0.2)	2.64	2.51	1.84–2.44 (2.2 ± 0.2)	3.25	
Whorl number (WN)		4.25–4.75 (4.4 ± 0.3)	4.50	4.50	3.50–5.25 (4.4 ± 0.7)	3.50–5.50 (4.9 ± 0.8)	
Sculpture Type (node; granulated rib; smooth rib; spiral cord; smooth) (%)		0; 67; 33; 0; 0	0; 0; 100; 0; 0	0; 100; 0; 0; 0	0; 83; 17; 0; 0	0; 100; 0; 0; 0	
<hr/>							
Morphological characters of protoconchs							
Number of protoconchs (PN)	40–43 (41.5 ± 2.1)	23–63 (42.7 ± 12.2)	6–19 (11.7 ± 4.5)	13–75 (31.3 ± 20.8)	9–82 (40.8 ± 19.4)	4–11 (7.0 ± 3.6)	11
Longitudinal rib number on body whorl of the largest protoconch (RNP)	10–14 (12.0 ± 2.8)	12–14 (12.8 ± 0.8)	11–15 (13.2 ± 1.6)	10–12 (10.9 ± 0.6)	11–16 (13.3 ± 1.4)	10–11 (10.3 ± 0.6)	10
Shell height of the largest protoconch (SHP) (mm)	1.2–3.0 (2.1 ± 1.2)	2.0–2.8 (2.6 ± 0.3)	2.2–3.1 (2.8 ± 0.3)	2.2–3.2 (2.7 ± 0.4)	1.9–3.6 (2.9 ± 0.5)	2.7–3.8 (3.3 ± 0.6)	2.1
Shell width of the largest protoconch (SWP) (mm)	1.8–1.9 (1.9)	1.4–1.8 (1.7)	1.5–2.0 (1.8)	1.5–2.0 (1.7)	1.4–2.1 (1.8)	1.8–2.4 (2.1)	1.6

Whorl number of the largest protoconch (WNP)	$\pm 0.1)$ 3.75	$\pm 0.1)$ 3.00–4.00 (3.5 \pm 0.4)	$\pm 0.2)$ 3.00–4.00 (3.5 \pm 0.4)	$\pm 0.2)$ 2.75–3.75 (3.4 \pm 0.4)	$\pm 0.2)$ 2.75–4.00 (3.5 \pm 0.4)	$\pm 0.3)$ 3.50–4.00 (3.8 \pm 0.3)	3.00
Number of nodes on body whorl of the largest protoconch (Node Number) (3; 2; 1; 0) (%)	0; 0; 50; 50	0; 0; 86; 14	0; 0; 50; 50	0; 0; 89; 11	0; 0; 33; 67	0; 0; 33; 67	0; 0; 44; 56
Spiral cord type on body whorl of the largest protoconch (Spiral Cord Type) (prominent; weak; absent) (%)	0; 100; 0	71; 29; 0	33; 67; 0	89; 11; 0	92; 8; 0	33; 67; 0	33; 67; 0
Morphological characters of radulae							
cusp number of rachidian	5–6	5–7	5–7	5–7	5–7	5–7	6–7
cusp number of lateral teeth	6–7	3–6	4–6	5–6	5–7	5–7	5–6
cusp number of interior marginal teeth	4–7	4–5	4–6	4–5	4–6	4–6	4–5
cusp number of exterior marginal teeth	4–7	4–5	4–6	4–5	4–6	4–6	4–5
Shape of the largest cusp of rachidian (pointed; rounded; flat) (%)	100; 0; 0	100; 0; 0	100; 0; 0	100; 0; 0	100; 0; 0	100; 0; 0	100; 0; 0
Shape of the largest cusp of lateral teeth (pointed; rounded; flat) (%)	100; 0; 0	100; 0; 0	100; 0; 0	0; 100; 0	0; 100; 0	0; 100; 0	0; 100; 0

Measurements and counts: minimum–maximum value (mean \pm s.d.).

Table S3. Result of the ADMIXTURE analysis for the four *Semisulcospira niponica*-group species showing averages, standard deviations, and minimums of the cross-validation (CV) error value in 1–10 genetic populations (*K*).

<i>K</i>	Average of the CV error value	Standard deviation of the CV error value	Minimum of the CV error value
1	0.4462	0.0037	0.4377
2	0.4394	0.0066	0.4283
3	0.4539	0.0054	0.4388
4	0.4819	0.0099	0.4549
5	0.5066	0.0072	0.4894
6	0.5371	0.0085	0.5193
7	0.5652	0.0105	0.5390
8	0.5936	0.0130	0.5638
9	0.6184	0.0218	0.5503
10	0.6416	0.0257	0.5697

Table S4. Result of the ADMIXTURE analysis for the two *Semisulcospira niponica*-group species showing averages, standard deviations, and minimums of the cross-validation (CV) error value in 1–10 genetic populations (*K*).

<i>K</i>	Average of the CV error value	Standard deviation of the CV error value	Minimum of the CV error value
1	0.4752	0.0039	0.4655
2	0.4641	0.0042	0.4544
3	0.4929	0.0056	0.4815
4	0.5350	0.0071	0.5167
5	0.5839	0.0091	0.5552
6	0.6363	0.0120	0.6092
7	0.6894	0.0121	0.6618
8	0.7440	0.0142	0.7172
9	0.8016	0.0165	0.7736
10	0.8558	0.0186	0.8007

Table S5. Result of the ADMIXTURE analysis for the five *Semisulcospira nakasekoe*-group species showing averages, standard deviations, and minimums of the cross-validation (CV) error value in 1–10 genetic populations (*K*).

<i>K</i>	Average of the CV error value	Standard deviation of the CV error value	Minimum of the CV error value
1	0.2881	0.0016	0.2838
2	0.2718	0.0018	0.2675
3	0.2681	0.0015	0.2648
4	0.2711	0.0036	0.2648
5	0.2769	0.0036	0.2716
6	0.2853	0.0025	0.2808
7	0.2942	0.0027	0.2876
8	0.3030	0.0035	0.2956
9	0.3113	0.0038	0.3011
10	0.3217	0.0043	0.3103

Table S6. Result of the ADMIXTURE analysis for the three *Semisulcospira nakasekoe*-group species showing averages, standard deviations, and minimums of the cross-validation (CV) error value in 1–10 genetic populations (*K*).

<i>K</i>	Average of the CV error value	Standard deviation of the CV error value	Minimum of the CV error value
1	0.3625	0.0023	0.3579
2	0.3665	0.0026	0.3582
3	0.3818	0.0039	0.3725
4	0.4024	0.0041	0.3921
5	0.4206	0.0047	0.4103
6	0.4433	0.0056	0.4342
7	0.4692	0.0059	0.4547
8	0.4967	0.0072	0.4813
9	0.5240	0.0083	0.5023
10	0.5527	0.0082	0.5347

Table S7. Results of the Random Forest analyses for *Semisulcospira decipiens* with specimen numbers and the contribution of each character and the mean Gini coefficients to each species.

Substrate	Rock	Sand	Mud	Mean Gini coefficient
Specimen number	72	19	26	
Aperture slenderness ratio (ASR)	0.0014	0.0083	0.0037	3.3382
Basal cord number (BCN)	0.0075	-0.0042	0.0217	1.7270
Body whorl length (BWL)	0.0371	0.0295	0.1001	7.8647
Longitudinal rib number of penultimate whorl (RN)	0.0065	-0.0002	0.0019	2.7697
Spire angle (SA)	0.0182	0.0270	0.0109	5.8259
Spiral cord number of penultimate whorl (SCN)	0.0179	0.0067	0.0430	3.6740
Whorl elongation ratio (WER)	0.0024	0.0098	-0.0017	3.6619
Whorl number (WN)	0.0036	0.0079	-0.0036	2.9361
Sculpture type	0.0186	0.0077	0.0439	3.0747
Number of protoconchs (PN)	0.0280	0.0092	0.0278	4.9874
Longitudinal rib number on body whorl of the largest protoconch (RNP)	0.0362	0.0954	0.0768	9.3997
Shell height of the largest protoconch (SHP)	0.0106	0.0479	0.0069	4.0862
Whorl number of the largest protoconch (WNP)	0.0411	0.0315	0.1401	8.6069
Number of nodes on body whorl of the largest protoconch	0.0024	0.0010	0.0012	0.5444
Spiral cord type on body whorl of the largest protoconch	0.0027	0.0041	0.0037	0.7637

Table S8. Results of the Random Forest analyses for *Semisulcospira arenicola* with specimen numbers and the contribution of each character and the mean Gini coefficients to each species.

Substrate	Rock	Sand	Mud	Mean Gini coefficient
Specimen number	17	64	14	
Aperture slenderness ratio (ASR)	-0.0082	0.0131	0.0428	4.6597
Basal cord number (BCN)	0.0036	-0.0003	0.0024	0.9004
Body whorl length (BWL)	0.0021	0.0084	0.0180	2.7940
Longitudinal rib number of penultimate whorl (RN)	0.3576	0.0726	0.0254	12.4996
Spire angle (SA)	-0.0009	0.0031	0.0017	2.3301
Spiral cord number of penultimate whorl (SCN)	0.0029	0.0040	0.0053	1.7590
Whorl elongation ratio (WER)	0.0057	0.0014	-0.0061	2.4967
Whorl number (WN)	0.0036	0.0010	-0.0009	1.8634
Sculpture type	0.0177	0.0046	0.0064	1.3461
Number of protoconchs (PN)	0.0224	0.0074	0.0680	3.7363
Longitudinal rib number on body whorl of the largest protoconch (RNP)	0.0130	0.0110	0.0121	2.8902
Shell height of the largest protoconch (SHP)	0.0094	0.0137	0.0524	3.4262
Whorl number of the largest protoconch (WNP)	0.0149	0.0048	0.0236	2.0427
Number of nodes on body whorl of the largest protoconch	0.0114	0.0106	0.0036	1.6379
Spiral cord type on body whorl of the largest protoconch	0.0385	0.0117	0.0171	1.9048

Table S9. Results of the Random Forest analyses for *Semisulcospira cryptica* sp. nov. with specimen numbers and the contribution of each character and the mean Gini coefficients to each species.

Substrate	Rock	Mud	Mean Gini coefficient
Specimen number	17	13	
Aperture slenderness ratio (ASR)	0.0214	0.0410	1.6815
Basal cord number (BCN)	-0.0004	-0.0011	0.0536
Body whorl length (BWL)	0.0004	-0.0006	0.2708
Longitudinal rib number of penultimate whorl (RN)	0.1322	0.1801	3.8799
Spire angle (SA)	-0.0014	-0.0016	0.2235
Spiral cord number of penultimate whorl (SCN)	-0.0004	0.0011	0.1316
Whorl elongation ratio (WER)	0.0014	0.0102	0.6020
Whorl number (WN)	0.0555	0.0778	2.3658
Sculpture type	0.0031	0.0002	0.2331
Number of protoconchs (PN)	0.0121	0.0091	0.8904
Longitudinal rib number on body whorl of the largest protoconch (RNP)	0.0585	0.0568	2.1114
Shell height of the largest protoconch (SHP)	0.0020	0.0004	0.3812
Whorl number of the largest protoconch (WNP)	0.0001	-0.0004	0.1966
Number of nodes on body whorl of the largest protoconch	0.0266	0.0193	0.9121
Spiral cord type on body whorl of the largest protoconch	0.0036	0.0054	0.3130