

On the Tertiary Species of *Thracia* from Japan

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The species of *Thracia* hitherto reported from the Tertiary strata of Japan are dealt with in this article. The revision undertaken has resulted in the discovery of two new species, one from the Oligocene Asagai formation and the other from the Miocene Nakayama formation, both in the Jôban coal-field of Fukushima Prefecture. The species of *Thracia*, hitherto reported as fossil from Japan, Korea and Saghalin, with their records of occurrence are given in Table 1.

Table 1

Species of *Thracia* recorded from the Tertiary of Japan, Korea and Saghalin
with Author and Formation

Species of <i>Thracia</i>	Author and Date	Formation and Geo- logical Age
<i>pupescens</i> (PULTENEY)	YOKOYAMA, 1923	Saishu Island, Korea : (formation not stated) , Pliocene
<i>pubescens</i> (PULTENEY)	YOKOYAMA, 1925	Honya : Miocene
<i>pubescens</i> (PULTENEY)	YOKOYAMA, 1925	Shigarami : Pliocene
<i>pubescens</i> (PULTENEY)	YOKOYAMA, 1929	Kônomine : Pliocene
sp.	YOKOYAMA, 1930	Unknown (S. Saghalin)
(?) <i>genbiana</i> NOMURA	NOMURA, 1935	Narusawa : Miocene
<i>hitosaoensis</i> NOMURA	NOMURA, 1935	Hitosao : Miocene
<i>pertrapezoidea</i> NOMURA	NOMURA, 1935	Tanosawa : Miocene
<i>mgashinodonoensis</i> CINOMIKADO	CINOMIKADO, 1938	Itahana : Miocene
<i>kamayashikiensis</i> HATAI	HATAI, 1940	Suenomatsuyama : Miocene
<i>beringi</i> DALL	NOMURA and ONISHI, 1940	Murata : Miocene

Besides the Tertiary species of *Thracia* cited in Table 1, M. YOKOYAMA (20) described the three species from the Pleistocene sediments of the south Kwanto region, such as *T. papyracea* POLI from Ôtake, Inba-gun, Chiba Prefecture and *T. transmon-*

tana YOKOYAMA and *T. sematana* YOKOYAMA from Shitô, Inba-gun, in the same Prefecture. *T. papyracea* of YOKOYAMA (not POLI) is synonymous with *Cyathodonta* (*Eximiothracia*) *concinna* (GOULD) and *T. transmontana* YOKOYAMA and *T. sematana* are generically assignable to *Thraciopsis* and to *Parvithracia* respectively according to I. TAKI and K. OYAMA (18, pl. 34). Therefore, these Pleistocene species which were referred to the genus just cited are excluded from the present discussion.

Thracia pubescens (PULTENEY) described by YOKOYAMA (23) from the Pliocene Shigarami formation of Nagao Prefecture is, according to T. KURODA (7, p. 44) not identical with the type, but may be distinguished therefrom by the shape of the posterior truncation and the position of the beaks. The latter author stated that YOKOYAMA's form may represent a distinct species, though he did not give it a new name. The writer is in the opinion that YOKOYAMA's form now in question may be referred to *Thracia kakumana* (YOKOYAMA) which was originally described by YOKOYAMA (24) as *Tellina kakumana* YOKOYAMA from the Pliocene Omma formation at Kakuma in the vicinity of Kanazawa City, Ishikawa Prefecture. KURODA (8) figured a living form of this species from Saghalin, under the name of *Thracia beringi* DALL with some query. However, *Thracia beringi* and *Tellina kakumana* are considered not to be synonymous as stated elsewhere. The occurrence of the living specimens of *Thracia kakumana* (YOKOYAMA) is recorded from the neritic zone along the coast of Hokkaido.

Thracia pubescens described by YOKOYAMA from the Pliocene of Saishu Island (21) and *Thracia* sp. from South Saghalin (26) are hardly distinguishable from *Thracia kakumana* (YOKOYAMA) in every respect.

When YOKOYAMA (22) recorded the occurrence of *Thracia pubescens* from the Miocene Honya formation of Gomazawa, Taira City, Fukushima Prefecture he gave no description but merely illustrated a poorly preserved specimen. To this specimen, HATAI and NISİYAMA (6) gave the name, *Thracia yokoyamai*. Fortunately, the writer obtained a well-preserved specimen which he believes is identifiable with YOKOYAMA's *T. pubescens*, from a cliff north of the Taira railroad station, and from about the same horizon whence YOKOYAMA's specimen were collected. This specimen is considered to be identifiable with *Periploma pulchellum* HATAI and NISİYAMA (5) from the Miocene Kokozura sandstone of the Taga group, which stratigraphically occupies a higher horizon than the Honya formation in the Jôban coal-field.

Thracia pubescens described by YOKOYAMA (25) from the Pliocene Kônomine formation at Tonohama, Kôchi Prefecture, Shikoku resembles the living *T. pubescens* from southwest England described and figured by C. L. REEVE (17), but may be distinguished from the English species by its shorter shell, the middle part of the left valve being slightly concave and the posterior ridge extending from the beak to the posterior corner more prominent, and also is distinguished from the specimens of *Thracia* from the known localities in Japan. The writer thinks a new specific name should be proposed for the form from Tonohama, but there are no topotype specimens at the writer's disposal and YOKOYAMA'S original specimens now in question were destroyed by a fire during the world war II. HATAI and NISIYAMA (6) considered the specimen from Tonohama to be a variety of *Thracia kamayashikiensis* HATAI from the Suenomatsuyama formation of Tomai-mura, Iwate Prefecture.

Thracia beringi DALL was described by S. NOMURA and H. ONISHI (12) from the Miocene Murata formation of Murata-machi, Shibata-gun, Miyagi Prefecture. The writer studied some specimens which are quite identical with *Thracia beringi* of NOMURA and ONISHI. There were collected by Mr. T. KOTAKA and the writer from a very fine-grained tuffaceous sandstone exposed at Shintera and Fukuda, both in Kanagase-mura, Shibata-gun, Miyagi Prefecture near by the locality whence NOMURA and ONISHI'S specimens were collected. By comparing the fossil form under consideration with the type *Thracia beringi* DALL described by I. S. OLDROYD (14,p.85,pl.43, fig.4) from the Bering Sea and near the Aleutian Islands and Sitka, Alaska, the former seems to the writer to be easily distinguished from the latter by the size of the adult shell, general shape, convexity of the valves, and the features of the beaks. Also, it seems to the writer that the former rather resembles *Thracia trapezoides* CONRAD described by C. E. WEAVER (19,p.117,pl.104,fig.11) and OLDROYD (14,p.184,pl.43, fig.8) from Puget Sound, Washington State, although it is not identical as stated in the description of *Thracia kamayashikiensis* HATAI from the Suenomatsuyama formation of Iwate Prefecture.

Nine species of *Thracia* from Japan as cited in Table 2 are considered by the writer to be valid.

Table 2

Valid Species of *Thracia* from the Japanese Tertiary Strata

Species	Geological Horizons
<i>Thracia kakumana</i> (YOKOYAMA)	Pliocene to Recent
<i>Th.</i> sp. (Undescribed from Tonohama)	Pliocene
<i>Th.</i> (?) <i>genbiana</i> NOMURA	Miocene
<i>Th. hitosaoensis</i> NOMURA	Miocene
<i>Th. pertrapezoidea</i> NOMURA	Miocene
<i>Th. higashinodoaoensis</i> OINOMIKADO	Miocene
<i>Th. kamayashikiensis</i> HATAI	Miocene
<i>Th. hataii</i> KAMADA, n. sp.	Miocene
<i>Th. kidoensis</i> KAMADA, n. sp.	Oligocene

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Systematic Descriptions

Family Thraciidae

Genus *Thracia* BLAINVILLE, 1824

Thracia BLAINVILL, Dict. Sci. Nat., Vol. 32, p. 347. Type (by subsequent designation, GRAY, 1847), *Thracia corbuloides* BLAINVILL. Recent, Mediterranean Sea.

Thracia kakumana (YOKOYAMA)

Plate, 1 figure 11.

Thracia pubescens YOKOYAMA, 1923, Jour. Coll. Sci., Imp. Univ., Tokyo, Vol. 44, art. 7, p. 6, pl. 1, fig. 1 ; YOKOYAMA, 1925, Jour. Fac. Sci. Imp. Univ., Tokyo, Sec. 2, vol. 1, pt. 1, p. 15, pl. 3, fig. 4.

Tellina kakumana YOKOYAMA, 1927, Ibid., Vol. 2, no. 4, p. 177, pl. 47, fig. 14.

Thracia sp. YOKOYAMA, 1930, Ibid., Vol. 2, pt. 10, p. 415, pl. 80, fig. 2.

Thracia "pubescens" KURODA, 1933, in HOMMA, Geol. Cent. Shinano, p. 44.

Thracia beringi (= ?*Tellina kakumana* YOKOYAMA) KURODA, 1933, Lamell. and Gastr., Iwanami Kôza, Geol. Paleont., p. 72, text-fig. 53.

Thracia kakumana HABE, 1952, Genera Jap. Shells, Pelecypoda No. 3, p. 262, text-figs. 708, 709.

Original description : -"A left valve of a large species of *Tellina* resembling *Tellina optiva* YOK. (Foss. Moll. Izumo, pl. II, fig. 3, 4. Moll. Rem. Oil-Fields Embetsa. Etaibets, pl. XXX, fig. 2), but apparently longer in shape. The posterior portion of the specimen is broken, but that there is a falt posterior edge can be inferred from indication of it near the beak-portion. The surface has only concentric lines of growth."

Remarks : -As already noted above, most of M. YOKOYAMA'S *pubescens* are referred to this species. M. YOKOYAMA originally described this species under the generic name of *Tellina* and compared it with *Macoma optiva* (YOKOYAMA). However, based upon only a left valve lacking the posterior portion, he gave it a new name and added that full description will be postponed until the discovery of better specimens.

The following description is based on a specimen from the Omura formation exposed in the upper course of the Fushimi River in Yamashina, Togashi-mura, Ishikawa-gun, Ishikawa Prefecture, and is intened to supplement Yokoyama's remarks cited above. This specimen is now preserved in the Institute of Geology and Paleontology, Tôhoku University, Sendai (IGPS* coll. cat. no. 8132).

Shell large, valves intact, mesuring about 80 mm in length, 63 mm in height and 29 mm in thickness ; anterior margin gently rounded from beak to antero-ventral corner, ventral margin broadly arched, its posterior half nearly straight and ascending toward posterior corner of truncation, postero-dorsal margin slightly concave and passing abruptly into posterior truncation. Posterior ridge distinct but not sharp, bluntly rounded. Surface with fine concentric striae and incremental growth lines, but without perceptible granulation. Beaks cubcentral, touching each other, the right perforated.

T. kakumana (YOKOYAMA) resembles certain Recent species of the west coast of North America, such as *T. curta* CONRAD, *T. trapezoides* CONRAD, *T. challishina* DALL and *T. beringi* DALL. This species is distinguished from *T. curta* CONRAD by the larger shell which is more equilateral and by the postero-dorsal margin which slopes downward more strongly ; from *T. trapezoides* CONRAD by the larger shell, more swollen and rounded posterior margin ; from *T. challishina* DALL by not having coarse im-

* IGPS, abbreviation for Institute of Geology and Paleontology, Sendai.

ricating granulation on the surface. The present species closely resembles *T. beringi* DALL, but differs from that species by the larger shell which is more tumid at the middle part of the ventral margin.

Occurrence : -

1) Road-cut at the junction of two roads, about 100 m south of the junction of the two small rivers, Kakuma, Asakawa-mura, Kahoku-gun, Ishikawa Prefecture. (Type locality) Pliocene Omma formation (M. YOKOYAMA) .

2) Upper course of Fushimi River, Yamashina, Togashi-mura, Ishikawa-gun, Ishikawa Prefecture. Pliocene Omma formation.

Various localities within the Omma formation in the suburbs of Kanazawa City, Ishikawa Prefecture (T. ONOYAMA).

3) Western end of Seikiho, on the south coast of Saishu Island, in the Tsushima Strait (M. YOKOYAMA) .

4) To the north of Shimosoyama, Sigarami-mura, Kamiminouchi-gun, Nagano Prefecture, Pliocene Shigarami formation (M. YOKOYAMA).

Various localities within the Shigarami formation in the Kamiminouchi and Sarashina districts in Nagano Prefecture (T. KURODA).

5) Shirutor, Motodomari-gun, South Saghalin (M. YOKOYAMA).

Thracia (?) *genbiana* NOMURA

Plate 1, figure 10.

Thracia (?) *genbiana* NOMURA, 1935, Saito Ho-on Kai Mus., Res. Bull., No. 5, p. 75, pl. 4, fig. 5.

Original description : -"Shell small, transversely subquadrate in outline, rather compressed, inequilateral with the anterior part considerably longer than the posterior ; anterior end rounded, the posterior broadly truncate, ventral margin slightly arched or nearly straight, and sub-parallel with dorsal margins. Beaks small, pointed, located at about one-third of the shell-length. Test apparently thin. Surface marked by rather coarse, more or less irregular concentric lines of growth, with a feeble carina posteriorly. Length, 26 mm., height, 19 mm., depth, ca. 5 mm."

Remarks : -As already noted by S. NOMURA, the hinge-plate and pallial sinus are not exposed, thus the precise generic position of the species remains doubtful. However, the outline and observed outer features of the shell are those of the named genus. NOMURA's species resembles *Thracia papyracea* (POLI) figured by M. YOKOYAMA from the Pleistocene Narita formation at Otake in Chiba Prefecture and also *Thracia curta*

CONRAD from California and northwards. Thus from the similiarity of Nomura's species to the mentioned ones, it is suggested that the species belongs to the genus *Thracia*.

Occurrence : -Road cut between the Narusawa Hot-spring and Mizuyama, Cebbinura, Nishi-Iwai-gun, Iwate Prefecture (Type locality). Miocene Narusawa formation (S. NOMURA).

Thracia hitosaoensis NOMURA

Plate 1, figures 3, 4.

Thracia hitosaoensis NOMURA, 1935, Saito Ho-on Kai Mus., Res. Bull., No. 5, p. 107, pl. 7, fig. 7 ; HATAI, 1941, Jap. Jour. Geol. Geogr., Vol. 18, no. 3, p. 115, pl. 8, figs. 9, 10, 11, 13 ; OTUKA, 1941, Jour. Jap. Assoc. Petro. Tech., Vol. 9, no. 2, p. 153, fig. 5.

Original description : -" Shell medium in size, attaining about 55 mm. in length, transversely subovate, or more or less roundly subquadrate in form, rather compressed ; equivalve, inequilateral, anterior part considerably longer than the posterior ; dorsal margin slightly convex in front, almost straight behind ; anterior end rounded, the posterior rather broadly and distinctly truncated ; ventral margin evenly and regularly curved in most part, and rapidly ascending in the extremity of the posterior part ; a blunt ridge runs from beak to posterior corner by which the surface is divided into two unequal parts, area behind the ridge much narrower and more compressed than the remaining part. Beaks small, pointed, touching each other, not fissured, and situated considerably behind the middle part of the shell. Surface apparently sculptured by fine lines of growth and rude concentric undulation which are not oblique as in the case of *T. (Cyathodonta) undulata* CONRAD. Teeth and pallial sinus inaccessible."

Remarks : -*Thracia hitosaoensis* NOMURA is compared with *Thracia kakumana* (YOKOYAMA). S. NOMURA distinguished his *hitosaoensis* from YOKOYAMA'S *pubescens* from Saishu Island by being more compressed and more inequilateral, and from *Thracia* sp. of YOKOYAMA from the Tertiary of South Saghalin by being more inequilateral and by having more distinct posterior truncation. NOMURA (op. cit.) also mentioned that *Thracia beringi* DALL is related to *hitosaoensis* but is distinguishable therefrom by being slightly higher and more equilateral.

Occurrence : -

1) Hitosao, southeast of Ogino, along the Agano River, Yamasato-mura, Yama-gun, Fukushima Prefecture. (Type locality). Miocene Hitosao formation (S. NOMURA).

2) Road cut about 50m east of the cross-roads at Oido, Motowakuya-mura, Tôda-gun, Miyagi Prefecture. Miocen Oido formation (K. HATAI).

3) Eastern slope of the hill about 900 m northeast of Kurosawa railway station on the Okoku line, Sannai-mura, Hiraga-gun, Akita Prefecture. Miocene Kurosawa formation (Y. CTUKA).

Thracia pertrapezoidea NOMURA

Plate 1, figure 12.

Thracia pertrapezoidea NOMURA, 1935, Saito Ho-on Kai Mus., Res. Bull., No. 6, p. 50, pl. 7, fig. 4.

Original description : -" Shell rather large, transversely elongate, ovate-trapezoidal, swollen, in the central and umbonal areas, compressed in the postero-dorsal area ; more or less inequilateral, the anterior being slightly shorter than the posterior ; anterior end rounded, the posterior distinctly truncated obliquely ; ventral margin nearly convex, or sloping straight along the posterior border ; dorsal margins straight behind, gently convex in front of the beak, both being nearly equal in length. Beak prominent, but not much elevated, situated a trifle anteriorly. Surface apparently sculptured with numerous, irregular concentric lines ; granulations unknown. Posterior ridge rather obtuse. Dimensions of a right valve (type) : Length, 53.5 mm., height, 35.5 mm., depth, ca. 10 mm."

Remarks : -S. NOMURA mentioned that *Thracia pertrapezoidea* resembles *Thracia trapezoides* CONRAD, a Recent as well as fossil species of the west coast of North America, but the former is more inflated at beak with the dorsal margin more abruptly sloping.

This species is distinguishable from *T. kakumana* (YOKOYAMA) by being much narrower and proportionally longer and less higher. *T. hitosaoensis* closely resembles this species, but differs by being elongated ovate-trapezoidal in outline and more swollen.

Occurrence : -

1) Near the Tanosawa railway station, Odose-mura, Nishi-Tsugaru-gun, Aomori Prefecture. (Type locality). Miocene Tanosawa formation (S. NOMURA).

2) Kairagi, Odose-mura, Nishi-Tsugaru-gun, Aomori Prefecture. Miocene Tanosawa formation (S. NOMURA).

Thracia higashinodonoensis CINOMIKADO

Plate 1, figure 9.

Thracia higashinodonoensis CINOMIKADO, 1938, Jour. Geol. Soc. Japan, Vol. 45, no.

539, p. 674, p. 20 (7), figs. 11, 12.

Original description : -"Shell rather small, ovately transverse, swollen in the central and umbonal area, compressed in the postero-dorsal area, rounded in front, and truncated behind. Antero-dorsal margin nearly convex ; postero-dorsal margin straight and horizontal. Anterior end broad, rounded ; posterior end truncated, narrower than the anterior. Ventral margin broadly arched, rounded in front, sloping straight along the posterior border, slightly excavated near the postero-ventral corner. Surface sculptured with irregular concentric growth lines. Posterior ridge, oblique, rather distinct. Beak not prominent, located near the middle of the shell length."

Remarks : -T. OINOMIKADO mentioned that *T. higashinodoroensis* resembles *Cyathodonta concinna* (GOULD), but differs by being higher, by having much more arched ventral margin and by the posterior ridge being more depressed in the middle and postero-ventral angle more acute. He also mentioned that *T. pertrapezoidea* NOMURA is closely allied to this species, but differs by being smaller and by having less prominent beak and more oblique posterior ridge.

This species is distinguishable from the other species of the genus from Japan, by being ovately transverse in outline and having a straight and horizontal postero-dorsal margin.

Occurrence : -Bank of the small river, about 200m south of Higashinodono, Iwanoyama, Usui-gun, Gumma Prefecture. (Type locality). Miocene Itahana formation (T. OINOMIKADO).

Thracia kamayashikiensis HATAI

Plate 1, figures 7, 8.

Thracia kamayashikiensis HATAI, 1940, Bull. Biogeogr. Soc. Japan, Vol. 10, no. 9, p. 123, pl. 1, fig. 2.

Thracia beringi NOMURA and ONISHI, 1940, Jap. Jour. Geol. Geogr., Vol. 17, nos. 3-4, p. 187, pl. 19, fig. 11.

Original description : -"Shell not very large for the genus, measuring about 44 mm in length, 32 mm in height and 18 mm in depth of intact valve ; quadrate in outline, longer than high, posterior side narrowly rounded, the ventral border broadly arcuate, the anterior side squarely truncate ; postero-dorsal border gently sloping into posterior side ; antero-dorsal border straightly sloping and forming with truncate anterior side, a shape angle ; beaks small, incurved, directed anteriorly ; from umbones extends a ridge to the antero-ventr-

al corner of anterior truncation; surface provided with concentric growth lines only, very fine; other features unknown."

Remarks : In K. HATAI'S description, the anterior and posterior were reversely described. Therefore the anterior side is narrowly rounded and the posterior side squarely truncate. This species is characterized by its sharply produced umbonal region and also by its posterior ridge being more prominent than in the other species of this genus from Japan.

This species is distinguishable from *T. hitosaoensis* NOMURA and *T. pertrapezoidea* NOMURA by being trapezoidal in outline and by the strength of the posterior ridge which extends from the umbo to the postero-ventral corner of the posterior truncation.

Thracia trapezoides CONRAD, as figured by C. WEAVER (19, p. 117, pl. 104, fig. 11), is closely allied to the present species, but owing to the lack of knowledge of the range of variation of the species of *Thracia*, it is difficult to determine the true specific relation of K. HATAI and T. A. CONRAD'S species.

Occurrence : -

1) Road-cut about 300 m west of Kamayashiki, Tomai-mura, Ninohegun, Iwate Prefecture. (Type locality). Miocene Suenomatsuyama formation (K. HATAI) .

2) To the west of the Murata primary school at Murata-machi, Shibata-gun, Miyagi Prefecture. Miocene Murata formation (S. NOMURA and H. ONISHI).

3) Shintera and Fukuda, both of Kanagase-mura, Shibata-gun, Miyagi Prefecture. Miocene Murata formation. Coll. Y. KAMADA and T. KOTAKA (IGPS coll. cat. no.72962)

Thracia hataii KAMADA, n. sp.

Plate 1, figures 5, 6.

Shell rather small, largest specimen about 37mm in length, longer than high, length being about one and a half times the height, inequilateral, somewhat ventricose, posterior area slightly compressed and rostrated. Antero-dorsally short and nearly straight, anterior margin rounded, ventral margin broadly arched but posterior half nearly straight and ascending towards posterior corner of truncation. Postero-dorsally long, nearly straight and somewhat sloping, posterior margin obliquely truncated. Area behind posterior ridge narrow. Beaks small and incurved. Surface with concentric fine incremental lines. Other characters are invisible.

Length in mm	Height in mm	Thickness in mm	Valve
36.7	25.3	8.7	Both (Holotype)
28.5	17.8	4.5	Right
25.3	14.3	4.8	Left
24.1	12.8	ca. 3.0	Left
19.0	13.4	3.0	Right
18.4	9.8	ca. 3.0	Left

Remarks : -The ratio of length to height in this new species somewhat resembles that of *Cyathodonta (Eximiothracia) concinna* (GOULD) (non REEVE) figured by M. YOKOYAMA as *Thracia papyracea* POLI, but may be distinguished by being more inequilateral and having more produced and obliquely truncated posterior portion. This species be also distinguished from *T. kamayashikiensis* HATAI by the less higher and more compressed shell, and from *T. higashinodonoensis* CINOMIKADO by its more inequilateral shell and much more inclined postero- dorsal margin. *T. hitosaoensis* NOMURA is also related to the present new species, but may be distinguished by being smaller in size and lower and by having more sharply rostrated posterior portion.

The specific name of this new species is dedicated to Dr. Kotora HATAI of the Department of Geology, College of Education, Tôhoku University, for his contributions to the geological and paleontological studies in the Cenozoic field of Japan.

Localities and horizon : -IGPS loc. no. Fs-37 ; About 600 m north of Ena-machi water-reservoir, Igamesaku, Nagasaki, Ena-machi, Iwaki-gun, Fukushima Prefecture. Lat. 36° 58' 08" N., long. 140° 55' 49" E. (Type locality) Miocene Nakayama formation. IGPS coll. cat. no. 72960, Holotype.

IGPS loc. no. Fs-36 ; Kamôri-saku, Kamitakaku, Iino-mura, Iwaki-gun, Fukushima Prefecture. Lat. 37° 00' 12" N., long. 140° 55' 27" E. Miocene Nakayama formation. IGPS coll. cat.no. 72961, Paratype.

Thracia kidoensis KAMADA, n. sp.

Plate 1, figures 1, 2a-b.

Shell thin, ovately trapezoidal, longer than high, more or less ventricose, the anterior half more swollen than the posterior, inequilateral, the posterior exceeding the anterior

in length. Nearly equivalve, but right valve slightly higher than left, its beak elevated above the left. Anterior side narrowly convex, antero-dorsal and anterior margins equally rounded. Postero-dorsal margin slightly concave and passing abruptly into truncated posterior side which forms an obtuse angle with ventral margin. Ventral margin broadly arched. Ridge extending from postero-dorsal corner to beak bluntly rounded, dividing postero-dorsal region from rest of shell. Umbones not swollen or elevated; beaks small, pointed, incurved. Surface provided with fine growth lines and periodic concentric undulations. Muscular scars unequal, the anterior obliquely elongate and longer than the posterior adductor which is roughly oval in shape. Pallial sinus moderately rounded, extending anterior to about one-third shell length, nearly parallel with ventral margin.

Length in mm	Height in mm	Thickness in mm	Valve
45.0	33.5	16.0	Both (Holotype)
52.8	38.6	9.3	Left only (Paratype)

Remarks : *Thracia kakumana* (YOKOYAMA) resembles the present species but may be distinguished therefrom by the angulation of the anterior side being situated more ventrally, the large size, large umbones, and by more swollen valves. *Thracia hitosaoensis* NOMURA is distinguished from the present species by having a longer antero-dorsal border. Both *Thraciakamayashikiensis* HATAI and *T. pertrapezoidea* NOMURA are indistinguishable from the present species by the ratio of length to height, by having beaks situated nearer to the center of the dorsal margin than that of the former and by different curvatures of the anterior and posterior margins. *Thracia condoni* DALL, figured by C. E. WEAVER (19, p. 119, pl. 2, fig. 10) from the Middle Oligocene of Oregon and Washington is also distinguished from *kidoensis* by the angularity of the shell, stronger ridge extending from the umbone to the postero-ventral corner and by the higher and more swollen beaks.

Localities and horizon : IGPS loc. Fs-38; In the tunnel, west of the Iriumi mineral spring, Kobanasaku, Kido-mura, Futaba-gun, Fukushima Prefecture. Lat. 37° 15' 19" N., long. 140° 59' 01" E. (Type locality) Oligocene Asagai formation. IGPS coll. cat. no. 72958, Holotype.

IGPS loc.no. Fs-35; Tadano-saku, Shimo-kitaba, Hiroro-machi, Futaba-gun, Fukushima Prefecture. Lat. 37° 13' 11" N., long. 140° 59' 16" E. Oligocene Asagai formation. IGPS coll. cat. no. 72959, Paratype.

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Explanation of Plate

- Fig. 1-*Thracia kidoensis* Kamada, n.sp. Paratype. IGPS coll. cat. no. 72959. Loc. Tadano-saku, Shimokitaba, Hirono-machi, Futaba-gun, Fukushima Prefecture. Oligocene Asagai formation. Y. Kamada coll.
- Fig. 2a-b- *Thracia kidoensis* Kamada, n. sp. Holotype. IGPS coll. cat. no. 72958. Loc. In the tunnel west of the Iriumi mineral spring, Kobanasaku, Kido-mura, Futaba-gun, Fukushima Prefecture. Oligocene Asagai formation. Y. Kamada coll.
- Fig. 3-*Thracia hitosaoensis* Nomura. Holotype. SHM coll. cat. no. 2153. Loc. Hitosao, south-east of Ogino, along the Agano River, Yamasato-mura, Yama-gun. Fukushima Prefecture. Miocene Hitosao formation. N. Saito coll.
- Fig. 4 *Thracia hitosaoensis* Nomura. IGPS coll. cat. no. 14428. Loc. Road cut about 50 m east of the cross-roads at Oido, Moto-wakuya-mura, Tōda-gun, Miyagi Prefecture. Miocene Oido formation. K. Hatai and S. Nisiyama coll.

- Fig. 5-*Thracia hataii* Kamada n. sp. Holotype. IGPS coll. cat. no. 72960. Loc. About 600m north of Ena-machi water reservoir, Iagamesaku, Nagasaki, Ena-machi, Fukushima Prefecture. Miocene Nakayama foemation. Y. Kamada coll.
- Fig. 6-*Thracia hataii* Kamada, n. sp. Paratype. IGPS coll. cat. no. 72961. Loc. Kamôri-saku, kamitakaku, Iino-mura, Iwaki-gun, Fukushima Prefecture. Miocene Nakayama formation. Y. Kamada coll.
- Fig. 7-*Thracia kamayashikiensis* Hatai. Holotype. IGPS coll. cat. no. 61349. Loc. Road cut about 300 m west of Kamayashiki, Tomai-mura, Ninohe-gun, Iwate Prefecture. Miocene Suenomatsuyama formation. K. Hatai coll.
- Fig. 8-*Thracia kamayashikiensis* Hatai. IGPS coll. cat. no. 72962. Loc. Fukuda, Kanagase-mura, Shibata-gun, Miyagi Prefecture. Miocene Murata formation. Y. Kamada and T. Kotaka coll.
- Fig. 9-*Thracia higashinodonoensis* Oinomikado. Holotype. Reproduced from T. Oinomikado, 1938, pl. 20, fig. 11. Loc. Bank of the small river, about 200m south of Higashinodono, Iwanoya-mura, Usui-gun, Gumma Prefecture. Miocene Itahana formation. T. Oinomikado coll. (x 1.5)
- Fig. 10-*Thracia* (?) *genbiana* Nomura. Holotype. SHM coll. cat. no. 5579. Loc. A road-side cliff about 1km south of the Narusawa Hot-spring, Genbi-mura, Nishi-Iwai-gun, Iwate Prefecture. Miocene Narusawa formation. S. Nomura and S. Ito coll.
- Fig. 11-*Thracia kakumana* (Yokoyama) . IGPS coll. cat. no. 8132. Loc. Upper course of Fushimi River, Yamashina, Togashi-mura, Ishikawa Prefecture. Pliocene Omma formation. O. Aoji coll.
- Fig. 12-*Thracia pertrpaezoidea* Nomura. Holotype. SHM coll. cat. no. 6047. Loc. Near the Tanosa wa railway station, Odose-mura, Nishi-Tsugaru-gun, Aomori Prefecture. Miocene Tanosawa formation. S. Nomura coll.
- (All figures in natural size, unless otherwise stated)



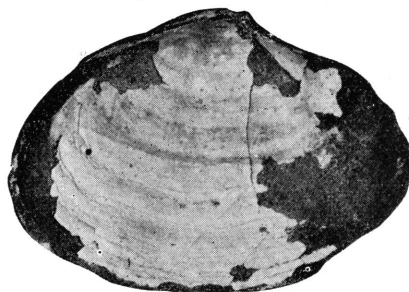
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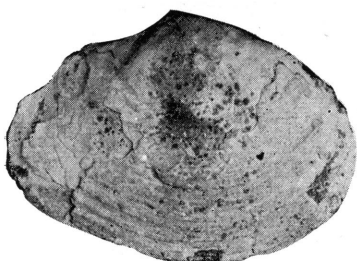
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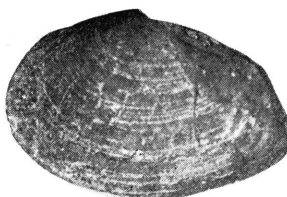
2a



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2b



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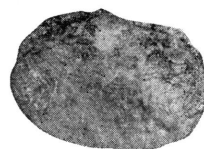
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