

Suggested Generic Allocations for some Japanese Molluscan Species

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Abstract

The Cardiidae, Vermetidae and Marginellidae species with a type locality in Japan or Sakhalin and Kamchatka are listed and generic allocations suggested.

Some 40 years ago the late Professor Hubert G. Schenck began a project at Stanford University of setting up card files on the species in certain families. These files are now too bulky to publish in their entirety, but extracts on a regional basis, citing the named species in terms of modern classifications, may be useful. The present paper covers, for the Japanese area, the Cardiidae (my speciality during much of this time); the Vermetidae, on which I have also published; and the Marginellidae, the speciality of two students, Dr. Eugene V. Coan and Mr. Barry Roth, who have made this part of the paper available.

These are not complete check lists, for forms with a type locality in the Indo-Pacific province, ranging north only into southern Japan, are not included. Rather, the emphasis is on species with a type locality in Japan or in the area immediately to the north (Sakhalin and Kamchatka). The card files were accumulated by canvassing the annual volumes of the Zoological Record; by scanning the periodical literature received by the Geology Department library at Stanford; and by study of reprints that Japanese colleagues have generously supplied. Even though an attempt was made to be thorough, doubtless many names were overlooked. The present lists are offered only as a kind of progress report. Probably many of the named species will prove to be synonyms as Japanese workers review the fossil and Recent literature and have opportunity to study additional collections. Obviously this summary is not the place for such revisions. However, synonymies that are cited in recent Japanese literature are indicated.

The classification for the Cardiidae is in general that which has been published in the "Treatise on Invertebrate Paleontology" (Keen *in* Moore, 1969), with slight modifications. The classifications for the Vermetidae and Marginellidae are those that will be used in the forth-coming gastropod volume of the "Treatise." Preliminary revisions on these groups have appeared: (Keen, 1961; Coan & Roth, 1966; Roth & Coan, 1968).

Format in the lists is as follows:

Arrangement of genera and species is alphabetical under family and subfamily headings. For generic and subgeneric taxa, name of the author and date are given. For each specific entry the order is: generic taxon here suggested as appropriate; author of specific name; date; the original generic name in square brackets if this differs from present allocation; notes on spelling errors or synonymy; age (especially for fossil forms). A question mark before an entry indicates uncertainty because the available figures do not show all features needed for positive decision.

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Class PELECYPODA [BIVALVIA]
 Family CARDIIDAE
 Subfamily CARDIINAE

Genus **Plagiocardium** Cossmann, 1886

P. ishigakense (MacNeil, 1964) [*Cardium*]. Eocene.

Genus **Schedocardia** Stewart, 1930

?*S. miikensis* (Nagao, 1928) [*Cardium*]. Eocene.

Genus **Vepricardium** Iredale, 1929

V. kyushuense (Shuto, 1960). Miocene.

V. ogurai (Otuka, 1938) [*Cardium*]. Miocene.

Subfamily TRACHYCARDIINAE

Genus **Vasticardium** Iredale, 1927

V. burchardti (Dunker, 1877) [*Cardium*]. [Emended by authors to *burchardi*].

V. hyuganum Shuto, 1960. Middle Miocene.

V. kantoense Kanno, 1958. Lower Miocene.

V. kinsimarae (Makiyama, 1934) [*Cardium*].

V. narusawaense (Nomura, 1935) [*Cardium*]. [= *narisawaense*, spelling error].

V. otukai Oyama, Mizuno, & Sakamoto, 1960, *ex* Hatai & Nisiyama, MS. Upper Oligocene.

V. tochiense Hirayama, 1954. Miocene.

V. tokyoense (Tokunaga, 1906) [*Cardium*]. Pleistocene.

Subfamily FRAGINAE

Genus **Fragum** Röding, 1798

F. bonnoi (Otuka, 1937) [*Corculum*]. Recent.

Genus **Ctenocardia** H. & A. Adams, 1857

Subgenus **Afrocardium** Tomlin, 1931

C. (A.) edarana (Yokoyama, 1927) [*Cardium*]. Pleistocene.

Subfamily PROTOCARDIINAE

Genus **Protocardia** Von Beyrich, 1845

Subgenus **Protocardia**, *s. s.*

P. (P.) koshikijimensis Amano, 1957 [*Protocardium*]. Upper Cretaceous.

P. (P.) kurumensis Hayami, 1958. Jurassic.

P. (P.) tosenis Kimura, 1956. Jurassic.

Subgenus **Brevicardium** Stephenson, 1941

P. (B.) hiraigensis Hayami, 1965. Lower Cretaceous.

P. (B.) morii Hayami, 1959. Lower Cretaceous.

Subgenus **Globocardium** Hayami, 1965

P. (G.) sphaeroidea (Forbes, 1845) [*Cardium*]. Lower Cretaceous in Japan; type locality in Europe.

Subgenus **Pachycardium** Conrad, 1869

?*P. (P.) ibukii* Nakazawa & Murata, 1966. Lower Cretaceous.

Subgenus **Tendagurium** Dietrich, 1933

?*P. (T.) seikaiana* (Amano, Ogata, & Nire, 1958) [*Tendagurium*]. Cretaceous.

Genus **Nemocardium**, Meek, 1876

Subgenus **Nemocardium** *s. s.*

N. (N.) bechei (Reeve, 1847) [*Cardium*] [= "*beckei*", spelling error]. Recent.

- N. (N.) ezoense* Takeda, 1953. Oligocene.
N. (N.) iwakiense (Makiyama, 1934) [*Cardium*]. Oligocene?
N. (N.) toriii (Nomura, 1933) [*Cardium*]. Mio-Pliocene.
N. (N.) yatsushiroense Hayami, 1965. Lower Cretaceous.
N. (N.) yokoyamai Takeda, 1953. Oligocene.
 Subgenus **Frigidocardium** Habe, 1951 [= *Erigidocardium*, spelling error].
N. (F.) eos (Kuroda, 1929) [*Cardium*]. Recent.
N. (F.) kiranum (Sakurai & Habe, 1966) [*Frigidocardium*]. Recent.
 Subgenus **Keenaea** Habe, 1951
N. (K.) samarangae Makiyama, 1934. Recent.
 Subgenus **Pratulium** Iredale, 1924
N. (P.) ishidoense (Yabe, Nagao, & Shimizu, 1926) [*Cardium*]. Lower Cretaceous.
N. (P.) tristiculum (Yokoyama, 1924) [*Cardium*]. Upper Oligocene.
 Subgenus **Trifaricardium** Habe, 1951
N. (T.) nomurai Kuroda & Habe, 1951 [*Trifaricardium*]. [New name for *Cardium cancellatum* Nomura, 1933, preoccupied].

Subfamily LAEVICARDIINAE

Genus **Laevicardium** Swainson, 1940

- L. angustum* (Yokoyama, 1925) [*Cardium*]. Mio-Pliocene.
L. pigmae Shuto, 1960. Middle Miocene.
L. pulcherrimum Sakurai & Habe, 1966. Recent.
L. shiobareense (Yokoyama, 1926) [*Cardium*]. Pliocene.
L. taracaicum (Yokoyama, 1930) [*Cardium*]. Upper Oligocene-Miocene.
L. yoshidense Kanno, 1958. Upper Oligocene.

Genus **Clinocardium** Kenn, 1936

- C. ainuanum* (Yokoyama, 1927) [*Cardium*]. Neogene.
C. arenicoloides (Akutsu, 1964) [*Vasticardium*]. Miocene.
C. asagaiense (Makiyama, 1934) [*Cardium*]. Upper Oligocene
C. braunsi (Tokunaga, 1906) [*Cardium*]. Pleistocene.
C. buelowi (Rolle, 1896) [*Cardium*]. Recent.
C. chikagawaense Kotaka, 1950. Pliocene.
C. etheringtoni (Slodkewitsch, 1938) [*Laevicardium*]. Miocene, Sakhalin Is.
C. fastosum (Yokoyama, 1927) [*Cardium*]. Pliocene.
C. hanperizanense (Nomura, 1933) [*Cardium*]. Pleistocene.
C. hanzawai (Nomura, 1933) [*Cardium*]. Neogene.
C. hizenense (Nagao, 1928) [*Cardium*]. Neogene.
C. iwasiroense (Nomura, 1935) [*Cardium*]. Tertiary.
C. jobanicum (Yokoyama, 1924) [*Cardium*]. Miocene.
C. matchgareense (Makiyama, 1934) [*Cardium*]. Upper Oligocene-Miocene.
C. mutuense (Nomura & Hatai, 1936) [*Cardium*]. ?Neogene.
C. pseudofastosum (Nomura, 1937) [*Cardium*]. Lower Pliocene.
C. rhomboideum (Khomenko, 1934) [*Cardium*]. Miocene, Sakhalin Is.
C. shimotokuraense (Akutsu, 1964) [*Vasticardium*]. Miocene.
C. shinjiense (Yokoyama, 1923) [*Cardium*]. Neogene.
C. subdecussatum Shuto, 1960. Upper Miocene.
C. tokunagai (Yokoyama, 1920) [*Cardium*]. Pleistocene?
C. uchidai Kira, 1954, ex Habe, MS. Recent.
C. uyemurai (Kanehara, 1937) [*Cardium*]. Pliocene, Sakhalin Is.
C. yamasakii (Makiyama, 1934) [*Cardium*]. ?Miocene.

- Genus **Fulvia** Gray, 1853 [*Papyridea* of some authors, not of Swainson, 1840]
F. angulata (Slodkewitsch, 1938) [*Papyridea*]. Miocene, Sakhalin Is.
F. hariimani (Dall, 1904) [*Papyridea*]. [= *P. nipponica* Yokoyama, 1924, *fide* Oyama, Mizuno, & Sakamoto, 1960]. Miocene, Alaska to Japan.
F. kipenensis (Slodkewitsch, 1938) [*Papyridea*]. Miocene, Kamchatka.
F. kishimaense (Nagao, 1928) [*Cardium*]. Lower Oligocene.
F. matschigarica (Khomeenko, 1938) [*Papyridea*]. Oligocene, Sakhalin Is.
F. mutica (Reeve, 1844) [*Cardium*]. Recent.
F. noyamiana (Slodkewitsch, 1938) [*Papyridea*]. Miocene, Sakhalin Is.
F. sakhalinensis (Slodkewitsch, 1938) [*Papyridea*]. Miocene, Sakhalin Is.
F. securiformis (Slodkewitsch, 1938) [*Papyridea*]. Pliocene, Kamchatka.
F. sertunayana (Slodkewitsch, 1938) [*Papyridea*]. Miocene, Kamchatka.
F. utchokensis (Slodkewitsch, 1938) [*Papyridea*]. Miocene, Kamchatka.
- Genus **Serripes** Gould, 1841
S. annae (Pilsbry, 1904) [*Cardium*]. Recent.
S. expansus Hirayama, 1954. Miocene.
S. groenlandicus (Bruguière, 1789) [*Cardium*]. [= *C. pauperculum* Yokoyama, 1923, not Meek, 1872, *fide* Noda, 1962]. Lower Miocene to Upper Pliocene in Japan; type locality, North Atlantic, Recent.
S. hataii Noda, 1962. Middle Miocene.
S. japonica Noda, 1962. Miocene.
S. laperousii (Deshayes, 1839) [*Cardium*]. [= *Maetra fujinensis* Yokoyama, 1923, *fide* Noda, 1962]. Middle Miocene to Lower Pliocene in Japan; type locality, North Pacific, Recent.
S. kamtschaticus Ilyina, 1963. Middle Pliocene, Kamchatka.
S. makiyamai (Yokoyama, 1928) [*Maetra*]. Middle Miocene to Lower Pliocene.
S. makiyamai nigamiensis Noda, 1962. Upper Miocene
S. notabilis (Sowerby, 1915) [*Cardium*]. [= *S. notabilis nomurai* Otuka, 1943, *fide* Noda, 1962, from the Neogene]. Miocene to Recent.
? *S. ochotensis* Ilyina, 1963. Middle Pliocene, Kamchatka.
S. shiobaraensis Noda, 1962. Middle Miocene.
S. squalidus (Yokoyama, 1924) [*Cardium*]. Upper Oligocene.
S. triangularis Noda, 1962. Upper Miocene.
? *S. wutschensis* Ilyina, 1963. Upper Miocene, Kamchatka.
S. yokoyamai Otuka, 1935. Middle Miocene to Lower Pliocene.

Incertae sedis

- Cardium corpulentum* Amano, 1957. Lower Cretaceous. [? *Nemocardium* (*Pratulium*)].
Cardium naganoensis Hayami, 1959. Lower Liassic.
Protocardia inaii Hayami, 1959. Jurassic.
Protocardia onoi Hayami, 1959. Lower Liassic.

Class GASTROPODA
 Family VERMETIDAE

- Genus **Dendropoma** Mörch, 1861 [= *Spiroglyphus* Daudin of authors]
D. luchuannum (Kuroda, 1928) [*Vermitoma*]. Recent.
D. phanorbis (Dunker, 1860) [*Vermetus*]. Recent.
D. planorbis (Dunker, 1860) [*Vermetus*]. Recent.
- Genus **Petalocochus** Lea, 1843
 Subgenus **Macrophragma** Carpenter, 1857

P. (M.) tokyoensis (Pilsbry, 1895) [*Vermetus*]. Recent.

?*P. (M.) vitreus* (Kuroda & Habe, in Kuroda, Habe, & Oyama, 1971) [*Vermetus*].
Recent.

Genus **Serupulorbis** Sassi, 1827

Subgenus **Serpulorbis**, s. s.

S. (S.) medusae (Pilsbry, 1891) [*Thylacodes*]. Recent.

S. (S.) muroenoensis (Otuka, 1938) [*Lemintina*]. Lower Pliocene.

?*S. (S.) shinanoensis* (Yokoyama, 1925) [*Vermetus*]. Lower Pliocene.

S. (S.) validus Kuroda & Habe, 1952. Recent.

S. (S.) xenophora Habe, 1961. [= *xenophorus*, spelling error]. Recent.

Subgenus **Cladopoda** Gray, 1850

S. (C.) imbricatus (Dunker, 1860) [*Vermetus*]. [= *Serpulus adamsi* A. Adams, 1864,
ex Mörch MS (unneeded new name)]. Recent.

Incertae sedis

Vermetus ebaranus Yokoyama, 1926. [Probably an annelid worm]. Pleistocene.

V. nodosorugosus Lischke, 1869. Recent.

V. perplanorbis Yokoyama, 1926. [Probably an annelid worm]. Pleistocene.

Family MARGINELLIDAE

[Allocations supplied by Dr. Eugene V. Coan and Mr. Barry Roth]

Subfamily MARGINELLINAE, s. l.

Genus **Dentimargo** Cossmann, 1899 [= *Volvarinella* Habe, 1951]

D. flaccida (Yokoyama, 1928) [*Mitra*]. [= *Marginella (Stazzania) totomiensis* Makiyama, 1931]. Lower Pliocene.

D. kawamurai (Habe, 1951) [*Volvarinella*]. Recent.

D. makiyamai (Habe, 1951) [*Volvarinella*]. Recent.

D. neglecta (Sowerby, 1846) [*Marginella*]. Recent.

D. teramachii (Habe, 1951) [*Volvarinella*]. Recent.

Genus **Volvarina** Hinds, 1844

V. hirasei (Bavay, 1917) [*Marginella*]. Recent.

Subfamily CYSTISCINAE

Genus **Cystiscus** Stimpson, 1865

?*C. sagamiensis* (Kuroda & Habe in Kuroda, Habe, & Oyama, 1971) [*Hyalina*].
Recent.

Genus **Crithe** Gould, 1860 [= *Microvulina* Habe, 1951]

C. atomaria Gould, 1860. Recent.

C. nanaoensis (Habe, 1951) [*Microvulina*]. Recent.

C. nipponica (Habe, 1951) [*Microvulina*]. [May = *C. atomaria*]. Recent.

Genus **Granula** Jousseaume, 1875 [= *Kogomea* Habe, 1951]

G. falsijaponica (Habe, 1961) [*Kogomea*]. Recent.

G. japonica (Nomura & Hatai, 1940) [*Hyalina*]. Recent.

G. novemprovincialis (Yokoyama, 1928) [*Erato*]. [May = *G. tokaiensis*]. Lower
Pliocene.

G. ovata (Habe, 1951) [*Kogomea*]. Recent.

G. tokaiensis (Makiyama, 1927) [*Marginella*]. Lower Pliocene.

Genus **Granulina** Jousseaume, 1888 [= *Cypraeolina* Cerulli-Irelli, 1911; *Gibberulina* of

- authors, not Monterosato, 1884]
G. solida (Makiyama, 1927) [*Cypraeolina*]. Pliocene.
G. tantilla (Gould, 1860) [*Persicula*]. [= *Marginella cotamago* and *M. perovulum* Yokoyama, 1922, and *Cypraeolina horikosii* Habe, 1951, *vide* Habe & Kuroda in Habe, Kuroda, & Oyama, 1971]. Lower Pliocene to Recent.
G. pisum yokoyamai (Shuto, 1962) [*Gibberulina*]. Lower Pliocene.

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