A Synoptical Classification of the Bivalvia (Mollusca)

Authors: Joseph G. Carter, Cristian R. Altaba, Laurie C. Anderson, Rafael Araujo, Alexander S. Biakov, et. al.

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A SYNOPTICAL CLASSIFICATION OF THE BIVALVIA (MOLLUSCA)


PREFACE

Joseph G. Carter, Cristian R. Altaba, David C. Campbell, Peter J. Harries, and Peter Skelton

The following classification summarizes the suprageneric taxonomy of the Bivalvia for the upcoming revision of the Bivalvia volumes of the Treatise on Invertebrate Paleontology, Part N. The development of this classification began with Carter (1990a), Campbell, Hoekstra, and Carter (1995, 1998), Campbell (2000, 2003), and Carter, Campbell, and Campbell (2000, 2006), who, with assistance from the United States National Science Foundation, conducted large-scale morphological phylogenetic analyses of mostly Paleozoic bivalves, as well as molecular phylogenetic analyses of living bivalves. During the past several years, their initial phylogenetic framework has been revised and greatly expanded through collaboration with many students of bivalve biology and paleontology, many of whom are coauthors. During this process, all available sources of phylogenetic information, including molecular, anatomical, shell morphological, shell microstructural, bio- and paleobiogeographic as well as stratigraphic, have been integrated into the classification. The more recent sources of phylogenetic information include, but are not limited to, Carter (1990a), Malchus (1990), J. Schneider (1995, 1998a, 1998b, 2002), T. Waller (1998), Hautmann (1999, 2001a, 2001b), Giribet and Wheeler (2002), Giribet and Distel (2003), Dreyer, Steiner, and Harper (2003), Matsumoto (2003), Harper, Dreyer, and Steiner (2006), Kappner and Bieler (2006), Mikkelsen and others (2006), Neulinger and others (2006), Taylor and Glover (2006), Kříž (2007), B. Morton (2007), Taylor, Williams, and Glover (2007), Taylor and others (2007), Giribet (2008), and Kirkendale (2009). This work has also benefited from the nomenclator of bivalve families by Bouchet and Rocroi (2010) and its accompanying classification by Bieler, Carter, and Coan (2010).

This classification strives to indicate the most likely phylogenetic position for each taxon. Uncertainty is indicated by a question mark before the name of the taxon. Many of the higher taxa continue to undergo major taxonomic revision. This is especially true for the superfamilies Sphaerioida and Veneroidea, and the orders Pectinida and Unionida. Because of this state of flux, some parts of the classification represent a compromise between opposing points of view. Placement of the Trigonioidoidea is especially problematic. This Mesozoic superfamily has traditionally been placed in the order Unionida, as a possible derivative of the superfamily Unionoidea (see Cox, 1952; Sha, 1992, 1993; Gu, 1998; Guo, 1998; Bieler, Carter, & Coan, 2010). However, Chen Jin-hua (2009) summarized evidence that Trigonioidoidea was derived instead from the superfamily Trigonioida. Arguments for these alternatives appear equally strong, so we presently list the Trigonioidoidea, with question, under both the Trigoniida and Unionida, with the contents of the superfamily indicated under the Trigoniida.

Typified Versus Descriptive Names

The present classification gives preference to typified names over descriptive names above the family-group, following the recommendation by Stys and Kerzhner (1975) and Starobogatov (1991). Typified names are more useful than descriptive names, because their
root indicates taxonomic affiliation and their suffix can be modified to reflect taxonomic rank. Descriptive names can be advantageous for indicating a key morphological feature, but this feature may not characterize all members of the group (e.g., the Palaeotaxodonta), and descriptive names indicate nothing about the phylogenetic placement of the taxon.

We agree with Dubois (2005) that adoption of a descriptive name should be guided by the spirit of priority and adherence to original definition. The term original definition is presently interpreted in a phylogenetic sense to mean the monophyletic clade defined by the original members of the taxon, their common ancestor, and all of its descendants. We have, therefore, not formally adopted the terms Palaeoheterodonta and Heterodonta, the original definitions of which have no useful phylogenetic equivalent in the present classification. These descriptive names, as well as the phylogenetically more useful Euheterodonta and Nepiomorphia, are, however, placed in the classification in bold-face type after their synonymous, or approximately synonymous, typified name. The descriptive names Autobranchia, Protobranchia, Pteriomorphia, and Heteroconchia are presently formally adopted. Grobben’s (1894) Autolamellibranchiata is herein replaced with the shorter, more euphonic Autobranchia, following C. M. Kolesnikov (1977), T. Waller (1978), Naumov (2006), and Bieler, Carter, and Coan (2010).

Authorship and Priority of Nomina above the Family-Group

The ICZN (1999) Code does not regulate taxon names above the family-group. Previous workers have used various guidelines to determine the composition, authorship, and priority of such names. Some have based these names on the oldest valid and available included family-group name in the group, or the first publication to define the group in a modern sense, or the oldest valid and available typified name above the family-group. We have adopted the latter guideline, with separate authorship and priority for names above and within the family-group. For example, the hypoder order Antipleuroidei Krž, 2007, is presently adopted, even though it contains the superfamilies Dualinoidea Conrath, 1887, and Antipleuroidea Krž, 2007, the oldest valid and available typified name above the family-group for this clade. Similarly, Hippiuritida Newell, 1965, is adopted for an order that includes some families established as early as 1847 and 1848. In cases where a new name above the family-group is needed, but an appropriate typified root name above the family-group is not available, the earliest valid and available typified name in the family-group is used as the root, but with a new publication date. Separate priority for names above and within the family-group is preferred because it allows for the retention of a number of widely used but otherwise lesser priority names above the family-group, such as order Hippiuritida.

Typified names above the family-group, which are based on a junior generic synonym or homonym, are presently regarded as unavailable and are disregarded for purposes of priority. This is a departure from the ICZN (1999) Code rules for family-group names. For example, Anatina Lamarck, 1818, is a junior homonym of Anatina Schumacher, 1817. Consequently, the suborder Anatinacea P. Fischer, 1887, based on Anatina Lamarck, 1818, is not available and has no bearing on the priority of any other typified name above the family-group. Also, the suborder Saxicavoidea Morretes, 1949, is unavailable because it is based on Saxicava Fleuriat de Bellevue, 1802, a junior synonym of Hiatella Bosc ex Daudin MS, 1801, and the suborder Saxicavoidea has no bearing on the priority of the presently adopted order Hiattellida. However, typified names above the family-group are not presently regarded as unavailable on the basis that their nominal family-group name is a junior synonym of another family-group name. For example, the suborder Leptonidina Dall, 1889, is available despite the fact that its nominal family-group name, Leptonidae J. Gray, 1847b, is now a junior synonym of Lasaeidae J. Gray, 1842.

Priority is presently given to the higher ranking of two or more simultaneously published typified or descriptive names above the family-group. This is an extension of Article 24.1 of the ICZN (1999) Code for family-group names. For example, order Pectinacea J. Gray, 1854a, has priority over the simultaneously established (unspecified rank above family-group but below suborder) Anomiaina J. Gray, 1854a. Changes in the rank, spelling, and/or taxonomic composition of a descriptive name are not presently considered to be a valid basis for changing the author and date of the descriptive name.

Paraphyletic and polyphyletic taxa. Paraphyletic higher taxa are unavoidable in a classification that includes ancestors and descendants. This is illustrated by J. Schneider’s (1995, 1998a, 1998b, 2002) revision of the superfamily Cardioidae. Schneider reduced superfamily Tridacnoidea to subfamily Tridacninae within Cardiidae to eliminate paraply of Cardioidae with respect to Tridacnidae. However, this reduction in rank merely shifted paraply from Cardioidae to its subfamily Cerastodermatinae, the ancestral stock group for Tridacnidae. Building a taxonomy that includes living and extinct taxa presents a dilemma: choosing between explicitly recognizing paraphyletic taxa or multiplying supraspecific taxa beyond reasonable bounds (Cela-Conde & Altaba, 2002; Altaba, 2009). We favor an evolutionary classification that, being based upon cladistic analysis, does not dismiss evidence and reflects ancestor-descendant relationships. Paraphyletic taxa are indicated in the classification by an exclamation point (!) after the name.

Polyphyletic taxa are avoided in the classification, except in rare instances where the polyphly is limited to descendants of the same genus, originating at about the same time. For example, the subfamily LymnoCARDiinae is believed to contain more than one tribe derived, in the Miocene, from Cardioida of the subfamily Cerastodermatinae. In this case, LymnoCARDiinae is also paraphyletic because it does not include Cardioida, the common ancestor of all its members.

Linnean Ranks and Suffixes for Names above the Family-Group

The present classification utilizes an increased number of Linnean ranks to adequately portray phylogenetic relationships. The number of Linnean ranks reflects a substantial increase in suprageneric taxa described over the past 50 years, and the fact that morphological and molecular phylogenetics have made possible a detailed phylogenetic framework for the Bivalvia. In order to minimize the number of Linnean ranks, we have not ranked the clade EuBivalvia and certain clades in more intensively studied groups, such as the Pectinoidea, Radiolitoidea, and Cardioidae. Those preferring a simpler classification can achieve this by disregarding some of the less familiar ranks, such as subcohort, infrasubcohort, mega-order, hypoder, minorder, epifamily, and series. Such condensation of the classification will hide some phylogenetic relationships, but it might be better suited for some summary and discussion purposes. The present
Linnaean synopsis does not show ancestor-descendant relationships, but these are identified in the phylogenetic classification under preparation for the revised Bivalvia *Treatise*.

There is currently no consensus on suffixes for typified names above the family-group. The proposal by Rohdendorf (1977) for general zoology is compared in Table 1 with the classifications of the Bivalvia by Cox and others (1969, 1971), Starobogatov (1984, 1992), Waterhouse (2008), and that used herein.

The suffix -ia is commonly used for bivalve subclasses and infraclasses, e.g., Protobranchia, Autobranchia, Pteriomorphia, and Heteroconchia (T. Waller, 1978; Amler, 1999). The suffix -ata was used by Blainville (1825, 1827) and by Grobben (1894) for orders (Lamellibranchiata and Autolamellibranchiata, respectively), and by Grobben (1892), Keen (1963), and Pojeta (1978) for subclasses (Protothyraculata, Anomalodesmata, and Lucinata, respectively).

Cohort and subcohort are generally inserted between class-group and ordinal-group names, although cohort has been used below the ordinal level for dinosaurs (e.g., Benton, 2005). The ranks subcohort, megaorder, hyporder, minorder, epifamily, and series have not been used before for the Bivalvia. Megaorder, hyporder, and minorder have been used for tetrapods, although at varying ranks in the case of hyporder and minorder (cf. Novacek, 1986; Sereno, 1986, 1999; E. Gaffney & Meylan, 1988; van Valen, 1994; McKenna & Bell, 1997; Benton, 2005).

Waterhouse (2000, 2001, 2008) suggested using -idina for suborders rather than the -ina of some earlier authors, because -ina is reserved for subtribes by Article 29.2 of the ICZN (1999) *Code*. The subordinal suffix -oidina, advocated by Waller in T. Waller and Stanley (2005, p. 8), is presently rejected because -idina is more consistent with the -ida ordinal ending adopted by Scarlato and Starobogatov (1969, 1979a), Waterhouse (2008), and Bieler, Carter, and Coan (2010). The suffix -oid, as in nuculoid and pterioid, is retained for informal reference to orders, to avoid confusion with informal refer- ences to families, such as nuculids and pteriids.

The rank epifamily, with the suffix -oidae, has been used between superfamilies and family for reptiles (Bour & Dubois, 1984; de la Fuente, 2003; van der Meijden & others, 2005) and for insects (M. Engel, 2005). The term series has been used between superfamily and family for Lepidoptera.

**New Taxa**

New taxon names are formally proposed in Appendices 1 and 2 (p. 19–27 herein). This excludes rank and/or spelling changes of previously established suprageneric taxa, which will be documented in the Introduction volume to the revised *Bivalvia Treatise*.

### CLASSIFICATION FORMAT

The present classification of the Bivalvia differs from previous ones in its uniform priority basis for determining names above the family-group, more consistent use of typified rather than descriptive names above the family-group, and labelling of paraphyletic taxa. Details of the classification format are described below.

#### Taxon Order

The nominotypical family, subfamily, or tribe is listed first within each superfamily, family, or subfamily, respectively. This is followed by the remaining members of the group in alphabetical order. At higher taxonomic ranks, simpler clades are generally listed before more complex clades.

**Paraphyletic Taxa**

Paraphyletic taxa are indicated by an exclamation point after the name, e.g., Grade Euprotobranchia.

**Extinct Taxa**

Extinct taxa are indicated by the symbol • before the name, e.g., •Family Actinodontidae.

**Taxonomically Isolated Plesions and Paraphyletic Taxa**

Some plesions and some paraphyletic taxa are taxonomically isolated in the sense that they lack membership in one or more expected, immediately higher Linnaean ranks, e.g., the family Cardiididae without an intervening hyporder, minorder, or superfam- ily. Such isolated plesions and paraphyletic taxa are presently labelled plesions and paraphyletics, respectively, to emphasize their deviation from the normal Linnaean hierarchy.

**Taxon Dates and References**

Where two references are given for a taxon, e.g., Glycymerididae Dall, 1908 (Leach in J. Gray, 1847a), the second one indicates the source of date priority. See Bouche and Rocco (2010) for documentation.

**Informal Descriptive Names**

Commonly used descriptive names that are not presently formally adopted but have exact phylogenetic equivalents in the present classification are placed in bold face type after their correlative typified name, e.g., *Eupteriomorphia, Foliobranchiata, Euheterodonta, Neoheterodontei, Nepiomorphia, Palaeotaxodonta*. Commonly used descriptive names that are not presently formally adopted and have no exact phylogenetic equivalent in the present classification (as determined by their original composition) are placed in *italic* after their most compatible typified name, e.g., *Palaeoheterodonta, Heterodonta*. The taxonomically widely dispersed taxa formerly assigned to the Anomalodesmata are indicated by *underlining*.

### Table 1. Suffixes for taxonomic ranks.

<table>
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<td>-iones</td>
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<td>-ia</td>
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<td>-ioni</td>
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<td>-ia</td>
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<td>-omorphi</td>
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<td>-omorph</td>
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<td>-ia</td>
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<td>-idia</td>
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<td>-ata</td>
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<td>-ia</td>
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<td>-idia</td>
<td>-idiformi</td>
<td>-ia</td>
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<tr>
<td>Suborder</td>
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<td>-idia</td>
<td>-idina</td>
<td>-ia</td>
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<tr>
<td>Hyporder</td>
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<td>-oidei</td>
<td>-idina</td>
<td>-oidei</td>
<td>-ia</td>
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<tr>
<td>Minorder</td>
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<td>-oidei</td>
<td>-oidei</td>
<td>-ia</td>
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<tr>
<td>Superfamily*</td>
<td>-acea</td>
<td>-oidea</td>
<td>-oideia</td>
<td>-oideia</td>
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<td>Epifamily</td>
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<td>-oideia</td>
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<tr>
<td>Series</td>
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<td>-oideia</td>
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<td>-ia</td>
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<td>Family*</td>
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<td>-idae</td>
<td>-idae</td>
<td>-idae</td>
<td>-ia</td>
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<tr>
<td>Subfamily*</td>
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<td>-ina</td>
<td>-ina</td>
<td>-ina</td>
<td>-ia</td>
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<tr>
<td>Tribe*</td>
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<td>-ina</td>
<td>-ina</td>
<td>-ia</td>
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<tr>
<td>Subtribe*</td>
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<td>-ina</td>
<td>-ina</td>
<td>-ia</td>
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</tbody>
</table>

ABSTRACT OF CLASSIFICATION

To more clearly illustrate the major structure of the classification, the following abstract includes only the higher taxonomic ranks and their higher ranking paraplesions. A more detailed abstract, which includes all taxa at or above the rank of superfamily, plus all plesions and paraplesions, is provided in Appendix 3 (p. 27 herein). Symbols: • = extinct; ! = paraphyletic; underlining = former members of Anomalodesmata; ? = taxonomic placement uncertain.

Class Bivalvia Linnaeus, 1758 in 1758–1759

- Grade Euprotobranchia! Nevesskaja, 2009
  - Order Fordillida! Pojeta, 1975
  - Order Tuarangiida MacKinnon, 1982

Clade Eubivalvia Carter, nov.

Subclass Protobranchia Pelseneer, 1889 (=Palaeotaxodonta Korobkov, 1954)
  - Superorder Nuculiformii! Dall, 1889 (=Foliobranchia Ménégaux, 1889)
    - Order Nuculida! Dall, 1889
    - Order Solemyida Dall, 1889
  - Superorder Nuculaniformii Carter, Campbell, & Campbell, 2000
    - Order Nuculanida Carter, Campbell, & Campbell, 2000
  - Order Afghanodesmatida! Carter, nov.

Subclass Autobranchia Grobben, 1894

Infraclass Pteriomorphia Beurlen, 1944
  - Cohort Mytilomorphi! Férussac, 1822 in 1821–1822
    - Order Mytilida! Férussac, 1822 in 1821–1822
      - Order Colpomyida Carter, nov.
  - Cohort Ostreomorphi Férussac, 1822 in 1821–1822
    - Subcohort Arzici J. Gray, 1854a
      - Order Cyrtodontida! Scarlato & Starobogatov in Nevesskaja & others, 1971
        - Suborder Cyrtodontidina! Scarlato & Starobogatov in Nevesskaja & others, 1971
        - Suborder Praecardiidina Newell, 1965 (=Nepiomorphia Kříž, 2007)
        - Hyporder Praecardioidei Newell, 1965
        - Hyporder Antipleuroidei Kříž, 2007
    - Order Arcida J. Gray, 1854a
    - Order Afghanodesmatida! Carter, nov.
  - Subcohort Ostreioni Férussac, 1822 in 1821–1822
    - Megaorder Myalinata H. Paul, 1939
      - Order Myalinida H. Paul, 1939
    - Subcohort Ostreomorphi Férussac, 1822 in 1821–1822
      - (paraplesion) Superfamily Leiopectinoidea! Krasilova, 1959
        - Suborder Pectinidina J. Gray, 1854a
        - Suborder Anomiidina J. Gray, 1854a
          - Hyporder Anomioidei J. Gray, 1854a
            - (paraplesion) Superfamily Pseudomonotoidea! Newell, 1938
              - Minorder Anomioiotei J. Gray, 1854a
              - Minorder Dimyoiotei Ridewood, 1903
            - Hyporder Aviculopectinoidei Starobogatov, 1992
            - Hyporder Limoidei R. Moore in Moore, Lalicker, & Fischer, 2001
        - Suborder Entoliidina Hautmann, nov.
  - Subcohort Unioini J. Gray, 1854a
    - (paraplesion) Superfamily Leiopectinoidea! Krasilova, 1959
    - Suborder Pectinidina J. Gray, 1854a
    - Suborder Anomiidina J. Gray, 1854a
      - Hyporder Anomioidei J. Gray, 1854a
        - (paraplesion) Superfamily Leiopectinoidea! Krasilova, 1959
  - Subcohort Entoliidina Hautmann, nov.

Infraclass Heteroconchia Hertwig, 1895

Cohort Unionomorphi J. Gray, 1854a (=Palaeoheterodonta of authors)
  - Subcohort Unioni J. Gray, 1854a
    - Order Unioini J. Gray, 1854a
      - (paraplesion) Superfamily Lyrodesmatoidea! Fischer, 1886
    - Megacoardius J. Gray, 1854a
      - Suborder Trigonida! Dall, 1889
      - Order Unionida J. Gray, 1854a
        - Suborder Unionidina J. Gray, 1854a
        - Suborder Unioini J. Gray, 1854a
          - Suborder Aveunia J. Gray, 1854a
            - Suborder Unioini J. Gray, 1854a
              - Suborder Silesunionida! Skawina & Dzik, 2011
  - Subcohort Carditioni Dall, 1889
    - Order Actinodontida! Deschaseaux, 1952
    - Order Cardiniida Dall, 1889
  - Subcohort Cardiniida Dall, 1889
    - (paraplesion) Superfamily Leiopectinoidea! Krasilova, 1959
      - Suborder Pectinidina J. Gray, 1854a
        - Suborder Anomiidina J. Gray, 1854a
          - Hyporder Anomioidei J. Gray, 1854a
            - (paraplesion) Superfamily Pseudomonotoidea! Newell, 1938
              - Minorder Anomioiotei J. Gray, 1854a
              - Minorder Dimyoiotei Ridewood, 1903
            - Hyporder Aviculopectinoidei Starobogatov, 1992
            - Hyporder Limoidei R. Moore in Moore, Lalicker, & Fischer, 2001
        - Suborder Entoliidina Hautmann, nov.

Cohort Cardiomorphi Férussac, 1822 in 1821–1822 (=Heterodonta of authors)
  - Subcohort Cardiniida Dall, 1889
    - Order Unionida J. Gray, 1854a
      - Order Hyriidina Hoeh & others, 2009
        - Suborder Silesunionida! Skawina & Dzik, 2011
  - Subcohort Cardiniida Dall, 1889
    - Order Actinodontida! Deschaseaux, 1952
    - Order Cardiniida Dall, 1889
  - Subcohort Cardiniida Dall, 1889
    - (paraplesion) Superfamily Leiopectinoidea! Krasilova, 1959
      - Suborder Pectinidina J. Gray, 1854a
        - Suborder Anomiidina J. Gray, 1854a
          - Hyporder Anomioidei J. Gray, 1854a
            - (paraplesion) Superfamily Pseudomonotoidea! Newell, 1938
              - Minorder Anomioiotei J. Gray, 1854a
              - Minorder Dimyoiotei Ridewood, 1903
            - Hyporder Aviculopectinoidei Starobogatov, 1992
            - Hyporder Limoidei R. Moore in Moore, Lalicker, & Fischer, 2001
          - Suborder Entoliidina Hautmann, nov.

Infraclass Heteroconchia Hertwig, 1895

Cohort Unionomorphi J. Gray, 1854a (=Palaeoheterodonta of authors)
Infrasubcohort Lucinidia J. Gray, 1854a
(paraplesion) •Superfamily Babinkoidea! Horný, 1960
Order Lucinida J. Gray, 1854a
Infrasubcohort Cardiida Férussac, 1822 in 1821–1822
(paraplesion) •Superfamily Grammysioidea! S. A. Miller, 1877
Megaorder Cardiata Férussac, 1822 in 1821–1822 (Neoheterodonte) Taylor & others, 2007
Superorder Pholadiformii J. Gray, 1854a
Order Pholadida J. Gray, 1854a
Superorder Cardiiformii Férussac, 1822 in 1821–1822
•Order Modiomorphida! Newell, 1969c
•Order Megalodontida Starobogatov, 1992
•Order Hippuritida Newell, 1965
Order Cardiida Férussac, 1822 in 1821–1822 (paraplesion) •Superfamily Kalenteroidea! Marwick, 1953
Suborder Cardiida Férussac, 1822 in 1821–1822 (paraplesion) •Family Paleocardiidae! Chavan, 1969b
Hyporder Cardioidei Férussac, 1822 in 1821–1822
Hyporder Veneroidei J. Gray, 1854a
•Minorder Veneroidei J. Gray, 1854a
•Minorder Dreissenoides R. Moore in Moore, Lalicker, & Fischer, 1952
•Suborder Anthracosodiidae! Silantiev & Carter, 2011
Suborder Leptonidina Dall, 1889
Megaorder Poromyaria! Ridewood, 1903
•Order Poromyida! Ridewood, 1903
•Order Pandorida R. Stewart, 1930
•Order Pholadomyida! Newell, 1965
•Order Thraciida Carter, nov.
Megaorder Solenata Dall, 1889
•Order Solenida Dall, 1889
•Order Hiattellida Carter, nov.

DETAILED CLASSIFICATION

Class Bivalvia Linnaeus, 1758 in 1758–1759
•Grade Euprotobranchia! Nevesskaja, 2009
  •Order Fordillida! Pojeta, 1975
    •Superfamily Fordillioidea! Pojeta, 1975
      •Family Fordillidae! Pojeta, 1975
      •Family Camyidae! Hinz-Schallreuter, 2000
    •Order Tuarangiida! MacKinnon, 1982
      •Subfamily Tuarangiidae MacKinnon, 1982
      •Subfamily Concavodontidae Sánchez, 1999
Superfamily Pristiglomoidea Sanders & Allen, 1973
  •Family Pristiglomidae Sanders & Allen, 1973
  •Order Solemyida Dall, 1889 (Foliobranchia Ménégaux, 1889)
    •Order Nuculida! Pojeta, 1975
      •Superfamily Nuculioidea! J. Gray, 1824
        •Family Nuculidae! J. Gray, 1824
          •Subfamily Nuculinae J. Gray, 1824
          •Subfamily Nuculominae! Maxwell, 1988
          •Subfamily Palaconculinae! Carter, 2001
          •Family Praenuculidae! McAlester, 1969
          •Subfamily Praenuculinae! McAlester, 1969
          •Subfamily Concavodontidae Sánchez, 1999
      •Superfamily Solemyioidea Sanders & Allen, 1973
        •Family Solemyidae Sanders & Allen, 1973
        •Order Solemyida Dall, 1889
        •Superfamily Solemyoidea! J. Gray, 1840b
          •Family Solemyidae! J. Gray, 1840b
          •Subfamily Solemyinae J. Gray, 1840b
          •Subfamily Janacekiinae! Růžička & Rehoř in Hajkr & others, 1978
          •Family Clinopisthidae! Pojeta, 1988
          •Family Ctenodontidae! Wöhrmann, 1893
          •Family Ovatoconchidae! Carter, nov.
      Superfamily Manzanellioidea Chronic, 1952
        •Family Manzanellidae Chronic, 1952
        •Superorder Nuculaniformii Carter, Campbell, & Campbell, 2000
• Order Afghanodesmatida! Carter, nov.
  • Superfamily Tironuculoidea Babin in Babin & others, 1982
    • Family Tironuculidae Babin in Babin & others, 1982
  • Subfamily Tironuculinae! Babin in Babin & others, 1982
  • Subfamily Natasiniae Sánchez, 1997
  • Family Nucularcidae Pojeta & Stott, 2007
    • Family Similodontidae! Carter & Pojeta, nov.
  • Superfamily Afghanodesmatoidea! Scarlato & Starobogatov, 1979a
    • Family Afghanodesmatidae Scarlato & Starobogatov, 1979a
    • Family Eritropidae! Cope, 2000

Order Nuculanaida Carter, Campbell, & Campbell, 2000
Superfamily Malletioidea! H. Adams & A. Adams, 1858 (d'Orbigny, 1846)
  Family Malletiidae! H. Adams & A. Adams, 1858 (d'Orbigny, 1846)
    • Family Cucullellidae! P. Fischer, 1886
      • Subfamily Cucullellinae P. Fischer, 1886
      • Subfamily Palaconeillinae! Babin, 1966
      • Family Pseudocyrtodontidae Maillieux, 1939
      • Family Strabidae Prantl & Růžička, 1954
      Family Tindariidae Verrill & Bush, 1897
        • Subfamily Tindariniae! Verrill & Bush, 1897
        • Subfamily Neilonellinae Schileyko, 1989
Superfamily Nuculanoidea H. Adams & A. Adams, 1858 (J. Gray, 1854a)
  Family Nuculanidae! H. Adams & A. Adams, 1858 (J. Gray, 1854a)
    • Family Isoarcidae Keen, 1969b
    • Family Phaseolinae Scarlato & Starobogatov in Nevesskaja & others, 1971
      • Subfamily Phaseolinae Scarlato & Starobogatov in Nevesskaja & others, 1971
      • Subfamily Siliculinae! J. A. Allen & Sanders, 1973
      • Family Polidecciidae! Kumpera, Prantl, & Růžička, 1960
      Family Sareptidae Stoliczka, 1870 in 1870–1871
        • Subfamily Sareptinae Stoliczka, 1870 in 1870–1871
        • Subfamily Yoldiellinae J. A. Allen & Hannah, 1986
        • Subfamily Yoldiinae Dall, 1908
      Family Zealedinae Scarlato & Starobogatov, 1979a
        • Subfamily Zealedinae Scarlato & Starobogatov, 1979a
        • Subfamily Parayoldiellinae Filatova & Schileyko, 1984

Subclass Autobranchia Grobben, 1894
Infraclass Pteriomorphia Beurlen, 1944
Cohort Mytilomorph! Féruссac, 1822 in 1821–1822
  Order Mytilida! Féruссac, 1822 in 1821–1822
    • Superfamily Modiolopsioidea! P. Fischer, 1886
      • Family Modioloopsidae! P. Fischer, 1886
      • Family Goniophorinidae Sánchez, 2006
Superfamily Mytiloidea Rafinesque, 1815
  Family Mytilidae! Rafinesque, 1815
    • Subfamily Mytilinae! Rafinesque, 1815
      • Tribe Mytilini! Rafinesque, 1815
      • Tribe Adulini Scarlato & Starobogatov, 1979b
      • Tribe Aulacomyini Carter, nov.
        • Subfamily Arcuatulinae Scarlato & Starobogatov, 1979b
        • Subfamily Bathymodiolinae Kenk & Wilson, 1985
        • Subfamily Lithophaginiae H. Adams & A. Adams, 1857 (J. Gray, 1854a)
          • Tribe Lithophagini H. Adams & A. Adams, 1857 (J. Gray, 1854a)
          • Tribe Botulini Scarlato & Starobogatov, 1979b
        • Subfamily Modiolinae! G. Termier & H. Termier, 1950
          • Subfamily Xenomytilinae Squires & Saul, 2006
          • Subfamily Crenellinae J. Gray, 1840b
            • Subfamily Crenellinae J. Gray, 1840b
              • Tribe Crenellini! J. Gray, 1840b
              • Tribe Dacrydiini Ockelmann, 1983
            • Subfamily Musculinae Iredale, 1939
            • Tribe Septiferiniae Scarlato & Starobogatov, 1979b
              • Subfamily Septiferiniae Scarlato & Starobogatov, 1979b
              • Subfamily Limnoperniniae Scarlato & Starobogatov, 1979b
• Order Colpomyida Carter, nov.
  • Superfamily Colpomyoidea Pojeta & Gilbert- Tomlinson, 1977
  • Family Colpomyidae! Pojeta & Gilbert- Tomlinson, 1977
  • Family Evyanidae Carter, Campbell, & Campbell, 2000
Cohort Ostreomorphi Férussac, 1822 in 1821–1822
(plesion) • Family Matheriidae Scarlato & Starobogatov, 1979a
(plesion) • Family Ischyrodonitidae Scarlato & Starobogatov, 1979a
Subcohort Arcini J. Gray, 1854a
  • Order Cyrtodontidae Scarlato & Starobogatov in Nevesskaja & others, 1971
    • Suborder Cyrtodontodinae Scarlato & Starobogatov in Nevesskaja & others, 1971
      • Superfamily Cyrtodontontoidea Ulrich in Ulrich & Scofield, 1894
        • Family Cyrtodontidae Ulrich in Ulrich & Scofield, 1894
      • Subfamily Psychodesmatinae Scarlato & Starobogatov, 1984
      • Superfamily Falcatorontoidea Cope, 1996
        • Family Falcatorontidae Cope, 1996
      • Superfamily Pichleriidea Scarlato & Starobogatov, 1979a
        • Family Pichleriidae Scarlato & Starobogatov, 1979a
  • Suborder Praecardiidina Newell, 1965 (=Nepiomorphia Kříž, 2007)
    • Hyporder Praecardioidei Newell, 1965
      • Superfamily Praecardioidea R. Hoernes, 1884
        • Family Praecardiidae R. Hoernes, 1884
        • Family Buchiolidae Grimm, 1998
      • Superfamily Cardioloidea R. Hoernes, 1884
        • Family Cardiolidae R. Hoernes, 1884
        • Family Slavidae Kříž, 1982
    • Hyporder Antipleuroidei Kříž, 2007
      • Superfamily Dualinoidea Conrath, 1887
        • Family Dualinidae Conrath, 1887
        • Subfamily Dualininae Conrath, 1887
        • Subfamily Loisopteriinae Nagel-Myers, Amler, & Becker, 2009
      • Family Praelucinidae Conrath, 1887
      • Family Stolidotidae Starobogatov, 1977
      • Family Spanilidae Kříž, 2007
Order Arcidae J. Gray, 1854a
  • Superfamily Glyptarcoidea Cope, 1996
    • Family Glyptarcidae Cope, 1996
Superfamily Arcoidea Lamarck, 1809
  Family Arcidae Lamarck, 1809
  • Subfamily Arcinæ! Lamarck, 1809
  • Subfamily Anadarinae Reinhart, 1935
  • Subfamily Noetiinae R. Stewart, 1930
    • Tribe Noettini R. Stewart, 1930
    • Tribe Striarcini MacNeil, 1937
  • Tribe Trinacriini MacNeil, 1937
  • Family Catamarcaiidae Cope, 2000
  • Family Cucullaeidae R. Stewart, 1930
  • Family Frejidae! Ratter & Cope, 1998
Family Glycymerididae Dall, 1908 (Leach in J. Gray, 1847a)
  • Subfamily Glycymeridinae Dall, 1908 (Leach in J. Gray, 1847a)
  • Subfamily Arcellinae! Newell, 1969a
  • Family Paralleloodontidae! Dall, 1898
    • Subfamily Paralleloodontinae Dall, 1898
    • Subfamily Grammatodontinae! L. Stephenson, 1941
      • Tribe Grammatodontini! L. Stephenson, 1941
      • Tribe Catellini Scarlato & Starobogatov, 1979b
      • Tribe Nemodontini L. Stephenson et MacNeil MS, 1941
  • Superfamily Limopsoidea Dall, 1895a
Family Limopsidae Dall, 1895a
  • Superfamily Philobryoidea Félix Bernard, 1897
  • Family Philobryidae Félix Bernard, 1897
  • Subcohort Ostreioni Férussac, 1822 in 1821–1822
    • Megacoher Myalinata H. Paul, 1939
    • Order Myalinida H. Paul, 1939
      • Superfamily Alatoconchoidea H. Termier, Termier, & Lapparent, 1974
      • Family Alatoconchidae H. Termier, Termier, & Lapparent, 1974
      • Family Saikraconchidae Yancey & Ozaki, 1986
      • Superfamily Ambonychioidae S. A. Miller, 1877
      • Family Ambonychiidae S. A. Miller, 1877
      • Family Lunulacardiidae P. Fischer, 1887
• Subfamily Lunulacardiinae P. Fischer, 1887
• Subfamily Pterochaeniinae Fang & Ding, 1993
• Family Monopteriidae Newell, 1969b
• Family Mysidiellidae Cox, 1964
• Family Myalinidae Frech, 1891
• Family Ramonalinidae Yancey, Wilcox, & Mione, 2009
• Superfamily Inoceramoidea C. Giebel, 1852
  • Family Inoceramidae C. Giebel, 1852
  • Subfamily Inoceraminae C. Giebel, 1852
  • Subfamily Coloniceraminae Pochialaynen, 1985
  • Subfamily Sachalinoceraminae Zonova, 1984
• Family Atomodesmatidae Waterhouse, 1976
• Subfamily Atomodesmatinae Waterhouse, 1976
• Subfamily Malimanininae Waterhouse, 2001
• Subfamily Permoceraminae Waterhouse, 2008
• Family Kolymiidae V. Kuznetsov, 1973
• Family Retroceramidae Koshelkina, 1980
• Superfamily Prokopievskioidea H. Vokes, 1967
• Family Prokopievskioidea H. Vokes, 1967
  • Subfamily Prokopievskioidea H. Vokes, 1967
  • Subfamily Abiellinae Starobogatov, 1970
  • Subfamily Concinellinae Silantiev, nov.
  • Subfamily Kinerkaellinae Scarlato & Starobogatov, 1979a
• Family Anadontellidae Silantiev, nov.
  • Subfamily Atomodesmatinae Waterhouse, 1976
  • Subfamily Malimanininae Waterhouse, 2001
• Superfamily Ostreoidea Rafinesque, 1815
  • Family Ostreidae Rafinesque, 1815
  • Subfamily Ostreinae Rafinesque, 1815
    • Tribe Ostreini Rafinesque, 1815
    • Tribe Pustulostreini Harry, 1985
    • Tribe Undulostreini Harry, 1985
  • Subfamily Lophinae Vialov, 1936
    • Tribe Lophini Vialov, 1936
    • Tribe Myrakeenini Harry, 1985
• Family Arctostreidae Vialov, 1983
  • Subfamily Arctostreinae Vialov, 1983
  • Subfamily Palaeolophinae Malchus, 1990
• Family Gryphaeidae Vialov, 1936
  • Subfamily Gryphaeinae Vialov, 1936
  • Subfamily Exogyrinae Vialov, 1936
    • Tribe Exogyrinini Vialov, 1936
    • Tribe Amphidonteini Vialov, 1983
  • Subfamily Gryphaeostreinae Stenzel, 1971
    • Tribe Gryphaeostreini Stenzel, 1971
    • Tribe Ambigosteini Malchus, 1990
    • Tribe Curvosteini Malchus, 1990
• Family Gryphaeidae Vialov, 1936
  • Subfamily Gryphaeinae Vialov, 1936
  • Subfamily Exogyrinae Vialov, 1936
    • Tribe Exogyrinini Vialov, 1936
    • Tribe Amphidonteini Vialov, 1983
  • Subfamily Gryphaeostreinae Stenzel, 1971
    • Tribe Gryphaeostreini Stenzel, 1971
    • Tribe Ambigosteini Malchus, 1990
    • Tribe Curvosteini Malchus, 1990
  • Subfamily Liostreinae Vialov, 1983
• Family Pinnidae Leach, 1819
  • Subfamily Pinninae Leach, 1819
  • Tribe Pinnini Leach, 1819

Megaorder Ostreata Férussac, 1822 in 1821–1822
(plesion) • Family Myodakryotidae Tunnicliff, 1987
Superorder Ostreiformii Férussac, 1822 in 1821–1822 (= Eupteriomorpha Boss, 1982)
Order Ostreida Férussac, 1822 in 1821–1822
Suborder Ostreidae Férussac, 1822 in 1821–1822
  • Family Ostreidae Rafinesque, 1815
    • Subfamily Ostreinae Rafinesque, 1815
      • Tribe Ostreini Rafinesque, 1815
      • Tribe Pustulostreini Harry, 1985
      • Tribe Undulostreini Harry, 1985
    • Subfamily Lophinae Vialov, 1936
      • Tribe Lophini Vialov, 1936
      • Tribe Myrakeenini Harry, 1985
  • Family Arctostreidae Vialov, 1983
    • Subfamily Arctostreinae Vialov, 1983
    • Subfamily Palaeolophinae Malchus, 1990
  • Family Gryphaeidae Vialov, 1936
    • Subfamily Gryphaeinae Vialov, 1936
    • Subfamily Exogyrinae Vialov, 1936
      • Tribe Exogyrinini Vialov, 1936
      • Tribe Amphidonteini Vialov, 1983
    • Subfamily Gryphaeostreinae Stenzel, 1971
      • Tribe Gryphaeostreini Stenzel, 1971
      • Tribe Ambigosteini Malchus, 1990
      • Tribe Curvosteini Malchus, 1990
• Family Gryphaeidae Vialov, 1936
  • Subfamily Gryphaeinae Vialov, 1936
  • Subfamily Exogyrinae Vialov, 1936
    • Tribe Exogyrinini Vialov, 1936
    • Tribe Amphidonteini Vialov, 1983
  • Subfamily Gryphaeostreinae Stenzel, 1971
    • Tribe Gryphaeostreini Stenzel, 1971
    • Tribe Ambigosteini Malchus, 1990
Superfamily Posidonioidea Neumayr, 1891
• Family Posidoniidae Neumayr, 1891
• Family Aulacomyellidae! Ichikawa, 1958
  • Subfamily Aulacomyellinae Ichikawa, 1958
• Subfamily Bositrinae! Waterhouse, 2008
• Family Daonellidae Neumayr, 1891
• Family Halobiidae Kirtl, 1912

Superfamily Pterioidea! J. Gray, 1847b (Goldfuss, 1820)
Family Pteriidae J. Gray, 1847b (Goldfuss, 1820)
  • Subfamily Pteriinae J. Gray, 1847b (Goldfuss, 1820)
  • Subfamily Dattinae M. Healey, 1908
• Family Bakevelliidae! W. King, 1850
• Family Cassianellidae Ichikawa, 1958
• Family Kochiidae Frech, 1891
Family Malleidae Lamarck, 1818
  • Subfamily Malleinae Lamarck, 1818
  • Subfamily Isognomoninae! Woodring, 1925 (J. Fleming, 1828)
  • Subfamily Pulvinitinae L. Stephenson, 1941
• Family Permamidiidae Cox, 1964
  • Subfamily Permamidiinae Cox, 1964
  • Subfamily Oretiinae Waterhouse, 2008
• Family Plicatostylidae Luper & Packard, 1929
• Family Vlastidae! Neumayr, 1891
  • Subfamily Vlastinae Neumayr, 1891
  • Subfamily Praeostreinae! Kříž, 1966

Superfamily Rhombopterioidea! Korobkov in Eberzin, 1960
• Family Rhombopteriidae! Korobkov in Eberzin, 1960
• Family Umburridae! Neumayr, 1891

Order Pectinida J. Gray, 1854a
(paraplesion) • Superfamily Leiopectinoidea! Krasilova, 1959
  • Family Leiopectinidae! Krasilova, 1959
Suborder Pectinidina J. Gray, 1854a
Superfamily Pectinoidea Rafinesque, 1815
Epifamily Pectinoidea Rafinesque, 1815
Family Pectinidae! Rafinesque, 1815
  • Subfamily Pectininae Rafinesque, 1815
    • Tribe Pectini Rafinesque, 1815
    • Tribe Archaepectinati! Nordsieck, 1969
    • Tribe Amussini Ridewood, 1903
    • Tribe Austrochlamydini Jonkers, 2003
    • Tribe Decatopectinati T. Weller, 1986
  • Subfamily Camptonectinae Habe, 1977
  • Subfamily Palliolinae Korobkov in Eberzin, 1960
    • Tribe Palliolini Korobkov in Eberzin, 1960
    • Tribe Adamussini Habe, 1977
      • Tribe Eburneopectinati T. Weller, 2006
      • Tribe Mesopelplini T. Weller, 2006
      • Tribe Pseudotoliini T. Weller, 2006
      • Tribe Serripectinati T. Weller, 2006
  • Subfamily Pedinae! Bronn, 1862
    • Tribe Pedini Bronn, 1862
    • Tribe Chlamydi! Teppner, 1922
    • Tribe Crassadomini T. Weller, 1993
    • Tribe Fortipectinati K. Masuda, 1963
      • Subtribe Fortipectinina K. Masuda, 1963
      • Subtribe Patinopectinina Habe, 1977
    • Tribe Mimachlamydi! T. Weller, 1993
      • Subfamily Pseudopectininae! Kasum-Zade, 2003
      • Subfamily Weyliinae Kasum-Zade, 2003
  • Family Pleuronectitidae! Hautmann, nov.
    • Tribe Spondylidae J. Gray, 1826
      • Subfamily Spondylinae J. Gray, 1826
        • Subfamily Pseudopectininae! Kasum-Zade & Romanov, 1987
        • Epifamily Neitheoidae Sobetski, 1960
          • Family Neitheidae Sobetski, 1960
          • Family Tosaspectinidae! Trushichelev, 1984
  • Subfamily Pectinidae! Rafinesque, 1815
    • Tribe Pedini Bronn, 1862
    • Tribe Chlamydi! Teppner, 1922
    • Tribe Crassadomini T. Weller, 1993
    • Tribe Fortipectinati K. Masuda, 1963
      • Subtribe Fortipectinina K. Masuda, 1963
      • Subtribe Patinopectinina Habe, 1977
    • Tribe Mimachlamydi! T. Weller, 1993
      • Subfamily Pseudopectininae! Kasum-Zade, 2003
      • Subfamily Weyliinae Kasum-Zade, 2003
    • Family Pleuronectitidae! Hautmann, nov.
      • Tribe Spondylidae J. Gray, 1826
        • Subfamily Spondylinae J. Gray, 1826
          • Subfamily Pseudopectininae! Kasum-Zade & Romanov, 1987
          • Epifamily Neitheoidae Sobetski, 1960
            • Family Neitheidae Sobetski, 1960
            • Family Tosaspectinidae! Trushichelev, 1984
Suborder Anomiidina J. Gray, 1854a
Hyporder Anomioidei J. Gray, 1854a
* (plesion) Family Saharopteriidae G. Termier & H. Termier in Pareyn, Termier, & Termier, 1972
* (paraplesion) Superfamily Pseudomonotoidea! Newell, 1938
  • Family Pseudomonotidae! Newell, 1938

Minorder Anomioidei J. Gray, 1854a
Superfamily Anomioidea Rafinesque, 1815
Family Anomidae! Rafinesque, 1815
  • Subfamily Anomiinae! Rafinesque, 1815
  • Subfamily Heteranomiinae Scarlato & Starobogatov, 1979a
    • Family Permanomiidae Carter, 1990a
    • Family Placunidae Rafinesque, 1815

Minorder Dimyoidei Ridewood, 1903
Superfamily Dimyoida P. Fischer, 1886
Family Dimyidae P. Fischer, 1886
Superfamily Plicatuloidea J. Gray, 1854b
Family Plicatulidae! J. Gray, 1854b
  • Family Chondrodonciidae Freneix, 1960
  • Superfamily Prospodyloidea! Pchelintseva, 1960
    • Family Prospodyliidae! Pchelintseva, 1960
    • Subfamily Prospodylinae! Pchelintseva, 1960
    • Subfamily Pegnaivalvulinae Waterhouse, 2008

• Hyporder Aviculopectinoidei Starobogatov, 1992
  • Superfamily Aviculopectinoidea! E. Meek & Hayden, 1865
    • Family Aviculopectinidae! E. Meek & Hayden, 1865
      • Subfamily Aviculopectininae! E. Meek & Hayden, 1865
      • Subfamily Echiniferpectininae Waterhouse, 2008
      • Subfamily Hayasakpectininae! Boyd & Newell, 2000
      • Subfamily Spiridopectininae Waterhouse, 2008
    • Family Deltopectinidae Dickins, 1957
      • Subfamily Deltopectininae! Dickins, 1957
      • Subfamily Cyrtorostrinae Newell & Boyd, 1995
      • Subfamily Squamuliferpectininae Waterhouse, 2008
    • Family Limatulinidae! Waterhouse, 2001
  • Superfamily Chaenocardioidea S. A. Miller, 1889
    • Family Chaenocardidae! S. A. Miller, 1889
    • Family Streblochondriidae Newell, 1938
      • Subfamily Strebrochondriinae Newell, 1938
      • Subfamily Guizhoupectininae M. Astafieva, 1994
      • Subfamily Orbiculopectininae Waterhouse, 2001
        • Tribe Orbiculopectinini Waterhouse, 2001
        • Tribe Eocampectinini Waterhouse, 2001
      • Subfamily Saturnopectininae D. Campbell, nov.
      • Subfamily Streblopectininae Waterhouse, 2008
  • Superfamily Heteropectinoidea! Beurlen, 1954
    • Family Heteropectinidae! Beurlen, 1954
      • Subfamily Heteropectininae! Beurlen, 1954
      • Subfamily Cassianoidinae Newell & Boyd, 1995
      • Subfamily Etheripectininae! Waterhouse, 1982
      • Subfamily Girtypectininae Waterhouse, 2008
    • Family Annuliconchidae Astafieva, 1995
    • Family Antijaniridae Hautmann, nov.
    • Family Hunanopectinidae! Yin Hong-fu, 1985
      • Subfamily Hunanostrocestininae Yin Hong-fu, 1985
        • Tribe Hunanostrocestinini Yin Hong-fu, 1985
        • Tribe Furcatiiini Waterhouse, 2001
      • Subfamily Asoellinae! Begg & Campbell, 1986
    • Family Limipectinidae Newell & Boyd, 1990
      • Subfamily Limipectininae Newell & Boyd, 1990
      • Subfamily Acanthopectininae Newell & Boyd, 1995
      • Tribe Acanthopectinini Newell & Boyd, 1995
      • Tribe Costatoplicatinini Waterhouse, 2008
      • Tribe Lamnipectinini Waterhouse, 2008
    • Family Ornithopectinidae Hautmann, nov.
  • Superfamily Pterinopectinoidea! Newell, 1938
    • Family Pterinopectinidae! Newell, 1938
      • Subfamily Pterinopectininae! Newell, 1938
      • Subfamily Pterinopectinellinae Waterhouse, 2008
Subfamily Tesseratiinae Waterhouse, 2008
Family Claraiidae Gavrilova, 1996
Subfamily Claraiinae! Gavrilova, 1996
Subfamily Chuluariinae Waterhouse, 2008
Family Natalissimidae! Waterhouse, 2008
Subfamily Natalissiminiae! Waterhouse, 2008
Subfamily Pseudaviculopectininae! Waterhouse, 2008
Hyporder Limoidei R. Moore in Moore, Lalicker, & Fischer, 1952
Superfamily Limoidea Rafinesque, 1815
Family Limidae! Rafinesque, 1815
Subfamily Liminae Rafinesque, 1815
Subfamily Ctenostreoninae Kasum-Zade, 2003
Subfamily Limatulinae! Kasum-Zade, 2003
Tribe Limatuliniae! Kasum-Zade, 2003
Tribe Calciciansulariini Waterhouse, 2008
Subfamily Plagiostominiae Kasum-Zade, 2003
Family Isolimeidae Kasum-Zade, 2003
Subfamily Pseudaviculopectininae! Waterhouse, 2008
Hyporder Monotoidei Waterhouse, 2001
Superfamily Buchioidae! Cox, 1953 (P. Fischer, 1886)
Family Buchiidae! Cox, 1953 (P. Fischer, 1886)
Family Dolponellidae Waterhouse, 2001
Family Monotidae! P. Fischer, 1886
Subfamily Monotinae P. Fischer, 1886
Subfamily Otariinae! Waterhouse, 1982
Superfamily Eurymesmatidae! Reed, 1932
Family Eurymesmatidae! Reed, 1932
Family Manticulidae Waterhouse, 2008
Superfamily Oxytomoidea Ichikawa, 1958
Family Oxytomoidea Ichikawa, 1958
Subfamily Oxytominae Ichikawa, 1958
Subfamily Maccyeillinae Waterhouse, 2008
Suborder Entoliida! Hautmann, nov.
Superfamily Entolioidae! Teppner, 1922
Family Entoliidae Teppner, 1922
Subfamily Entoliinae Teppner, 1922
Subfamily Palaeoentoliinae! Romanov, 1985
Subfamily Syncyclonematinae! T. Waller, 1978
Family Entolioidesidae Kasum-Zade, 2003
Subfamily Entolioidesinae! Kasum-Zade, 2003
Subfamily Calvaentoliinae Kasum-Zade, 2003
Family Pernopectinidae! Newell, 1938
Family Propeamussiidae Abbott, 1954
Superfamily Euchondrioidae! Newell, 1938
Family Euchondriidae! Newell, 1938
Infraclass Heterocochlia Hertwig, 1895
Cohort Uniomorphi J. Gray, 1854a (=Palaeoheterodonta of authors)
(paraplesion) •Family Thoraliidae N. Morris, 1980
Subcohort Unioni J. Gray, 1854a
(plesion) •Family Lyrodesmatidae! P. Fischer, 1886
Family Lyrodesmatidae! P. Fischer, 1886
•Family Pseudarcidae Scarlato & Starobogatov, 1979a
Megaorder Uniononta J. Gray, 1854a
Order Trigoniida! Dall, 1889
Superfamily Trigonioidae! Lamarck, 1819
Family Trigoniidae! Lamarck, 1819
Subfamily Trigoniinae Lamarck, 1819
Subfamily Minetrigoniinae T. Kobayashi, 1954
Subfamily Nototrigoniinae Skwarko, 1963
Subfamily Pleurotrigoniinae van Hoeven, 1929
Subfamily Nequenitrignioniinae H. Leanza, 1993
Subfamily Psilotrigoniinae C. Fleming, 1987
Family Eoschizodidae Newell & Boyd, 1975
Family Groeberellidae Pérez, Reyes, & Damborenea, 1995
Family Myophoriidae! Brönn, 1849 in 1848–1849
Family Prosogyrotrigoniidae T. Kobayashi, 1954
Subfamily Prosogyrotrigoniinae T. Kobayashi, 1954
Subfamily Praeentoniinae C. Fleming, 1962
• Family Scaphellinidae Newell & Giriacks, 1962
• Family Schizodidae Newell & Boyd, 1975
  • Subfamily Schizodinae Newell & Boyd, 1975
  • Subfamily Eoastartinae Newell & Boyd, 1975
  • Subfamily Sinodorinae Pojeta & Zhang, 1984
• Superfamily Myophorelloidea T. Kobayashi, 1954
  • Epifamily Myophorelloidae T. Kobayashi, 1954
  • Family Myophorellidae T. Kobayashi, 1954
  • Subfamily Myophorellinae T. Kobayashi, 1954
  • Tribe Myophorellini T. Kobayashi, 1954
  • Tribe Steinmannellinae M. Cooper, 1991
  • Subfamily Vaugoniinae T. Kobayashi, 1954
  • Tribe Vaugonini T. Kobayashi, 1954
  • Tribe Quadratotrigoniini Saveliev, 1958
• Family Buchotrignoidea H. Leanza, 1993
  • Subfamily Buchotrignoidea H. Leanza, 1993
• Subfamily Syrotrigoniinae Pérez & Reyes, 1997
• Family Laevitrigoniidae Saveliev, 1958
  • Subfamily Laevitrigoniinae Saveliev, 1958
• Epifamily Megatrigonioidae van Hoepen, 1929
  • Series Megatrigoniitae van Hoepen, 1929
• Family Megatrigoniidae van Hoepen, 1929
  • Subfamily Megatrigoniinae van Hoepen, 1929
  • Tribe Megatrigoniini van Hoepen, 1929
  • Tribe Apiotrigoniini Tashiro, 1979
  • Subtribe Apiotrigoniina Tashiro, 1979
  • Subtribe Heterotrigoniina M. Cooper, 1991
  • Subfamily Pterotrigoniinae van Hoepen, 1929
  • Tribe Pterotrigoniini van Hoepen, 1929
  • Tribe Scabrotrigoniini M. Cooper, 1989
• Family Iotrigoniidae Saveliev, 1958
  • Series Rutotrigoniitae van Hoepen, 1929
• Family Rutotrigoniidae van Hoepen, 1929
• Superfamily Pseudocardinioidae Martinson, 1961
  • Family Pseudocardiniidae Martinson, 1961
  • Family Utschamiellidae C. M. Kolesnikov, 1977
• Superfamily Trigonioioidae Cox, 1952 (or in Unionida?)
  • Family Trigonioioidae Cox, 1952
  • Subfamily Trigonioioidinae Cox, 1952
  • Subfamily Peregrinoconchinae! Gu Zhi-wei & others in Ma & others, 1976
• Family Nakamuraunaiidae Guo, 1981
• Family Nippononaiidae Chen Jin-hua, 1987
  • Subfamily Nippononaiinae! Chen Jin-hua, 1987
  • Subfamily Sinonaiinae Chen Jin-hua, 1987
• Family Plicatouniidae Chen Jin-hua, 1987
• Family Rectidentinae Modell, 1942
  • Subfamily Qiyangiinae Chen Jin-hua, 1983
  • Subfamily Rectidentinae Modell, 1942

Order Unionida J. Gray, 1854a
Suborder Unionidina J. Gray, 1854a
Superfamily Unioninoidea Rafinesque, 1820
  Family Unionaceae Rafinesque, 1820
  Subfamily Unioninae Rafinesque, 1820
    • Tribe Unionini Rafinesque, 1820
    • Tribe Anodontini Rafinesque, 1820
  Subfamily Ambleminae Rafinesque, 1820
    • Tribe Amblemini Rafinesque, 1820
    • Tribe Lampsilini Ihering, 1901
    • Tribe Pleurobemini Hannibal, 1912
    • Tribe Quadrulini Ihering, 1901
  Subfamily Gonideinae Ortmann, 1916
  Superfamily Modellinae Modell, 1974
  Subfamily Parreysiinae Henderson, 1935
  Subfamily Qiyangiinae Chen Jin-hua, 1983
  Subfamily Rectidentinae Modell, 1942
Carter & others—Synoptical Classification of the Bivalvia (Mollusca)

Family Margaritiferidae Henderson, 1929
•Family Sancticarolitidae Simone & Mezzalira, 1997
Superfamily Mulleroidea Deshayes, 1832a
Family Mulleriidae Deshayes, 1832a
Subfamily Mulleriinae Deshayes, 1832a
Subfamily Leelinae Morretes, 1949
Subfamily Monocondylaeinae Modell, 1942
Subfamily Mycetopodinae J. Gray, 1840b
Family Etheriidae Deshayes, 1832a
Family Iridinidae Swainson, 1840
Subfamily Iridininae Swainson, 1840
Subfamily Aspathariinae Modell, 1942
•Superfamily Trigonioidea Cox, 1952 (or in Trigoniida, which see)

Suborder Hyriidina Hoch & others, 2009
Superfamily Hyrioidea Swainson, 1840
Family Hyriidae Swainson, 1840
Subfamily Hyriinae Swainson, 1840
Tribe Hyriini Swainson, 1849
Tribe Castalini Morretes, 1949
?Tribe Cucumerunionini Iredale, 1934
Tribe Diplodontini Ihering, 1901
Tribe Hyridellini McMichael & Hiscock, 1958 (Iredale, 1934)
Subfamily Velesunioninae Iredale, 1934
•Suborder Silesunionidina! Skawina & Dzik, 2011
•Superfamily Silesunionoidea! Skawina & Dzik, 2011
•Family Silesunionidae! Skawina & Dzik, 2011
•Family Unionellidae Skawina & Dzik, 2011

Cohort Cardiomorphi Férussac, 1822 in 1821–1822 (=Heterodonta of authors)
(plesion) •Family Lipanellidae Sánchez, 2005
Subcohort Carditioni Dall, 1889
•Order Actinodontida! Deschaseaux, 1952
•Superfamily Anodontopsoidae! S. A. Miller, 1889
•Family Anodontopsidae S. A. Miller, 1889
•Family Actinodontidae! Davies, 1933
•Family Baidiostracidae Fang & Cope, 2008
•Family Cycloconchidae! Ulrich in Ulrich & Scofield, 1894
•Subfamily Cycloconchinae! Ulrich in Ulrich & Scofield, 1894
•Subfamily Taselasmodinae Fang & Cope, 2008
•Family Inithuarellidae! Sánchez in Sánchez & Vaccari, 2003
•Family Redonidae! Babin, 1966
•Superfamily Nyassoidae! S. A. Miller, 1877
•Family Nyassidae! S. A. Miller, 1877
•Superfamily Palaeomuteloidae Lahusen, 1897
•Family Palaeomutelidae Lahusen, 1897
•Superfamily Ammigenioidea Khalifin, 1948
•Family Ammigenidae Khalifin, 1948
•Family Montanariidae! Scarlato & Starobogar, 1979a
•Family Zadimerodiidae! Guo, 1988
•Superfamily Oriocrasselloidea Boyd & Newell, 1968
•Family Oriocrasselloidea Boyd & Newell, 1968
•Family Crassellipsidea! Carter, 2008

Order Cardiida Dall, 1889
(plesion) •Family Archaeocardidae Khalifin, 1940
(paraplesion) •Family Eodontidae! Carter, Campbell, & Campbell, 2000
Superfamily Crasselloidea Féruussac, 1822 in 1821–1822
Family Crassellidae Féruussac, 1822 in 1821–1822
Subfamily Crassellinae! Féruussac, 1822 in 1821–1822
•Subfamily Psychomyinae Keen, 1969b
Subfamily Scambulinae Chavan, 1952a
•Family Aenigmoconchidae Betekhtina in Betekhtina & Soukhov, 1968
Family Astaridae! d’Orbigny, 1844 in 1844–1848 (J. Gray, 1840b)
Subfamily Astarinae! d’Orbigny, 1844 in 1844–1848 (J. Gray, 1840b)
•Subfamily Astartellinae! Boyd & Newell, 1968
•Subfamily Eriphylinae Chavan, 1952b
•Subfamily Opinae! Chavan, 1952b
•Subfamily Pinzonellinae Beurlen, 1954
•Subfamily Terrainae Scarlato & Starobogatov, 1979a

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• Subfamily Trigonopinae R. N. Gardner & Campbell, 2002
• Family Cardiniidae Zittel, 1881

Family Carditidae! Férussac, 1822 in 1821–1822
• Subfamily Cardininae Férussac, 1822 in 1821–1822
• Subfamily Carditamerinae! Chavan, 1969b
• Subfamily Carditesinae! Chavan, 1969b
• Subfamily Thecaliinae Dall, 1903
• Subfamily Venericardiinae Chavan, 1969b

Family Condylocardiidae Félix Bernard, 1896
• Subfamily Condylocardiinae Félix Bernard, 1896

Subcohort Cardioni Férussac, 1822 in 1821–1822 (=Euheterodonta Giribet & Distel, 2003)

Infrasubcohort Lucinidia J. Gray, 1854a (paraplesion) • Superfamily Babinkoidea! Horný, 1960
• Family Babinkidae! Horný, 1960
• Family Coxiconchiidae Babin, 1977

Order Lucinida J. Gray, 1854a

Superfamily Lucinoidea! J. Fleming, 1828
• Family Lucinidae J. Fleming, 1828
• Subfamily Lucininae J. Fleming, 1828
• Subfamily Fimbriinae Nicol, 1950 (Stoliczka, 1870 in 1870–1871)
• Subfamily Ilioniinae! Scarlato & Starobogatov, 1979a
• Subfamily Milthinae! Chavan, 1969a
• Subfamily Myrteinae Chavan, 1969a
• Family Mactromyidae Cox, 1929 (P. Fischer, 1887)
• Family Paracyclidae! P. A. Johnston, 1993

Superfamily Thyasiroidea Dall, 1900 (Dall, 1895a)
• Family Thyasiridae Dall, 1900 (Dall, 1895a)
• Subfamily Thyasirinae! Dall, 1900 (Dall, 1895a)

Infrasubcohort Cardidiida Férussac, 1822 in 1821–1822 (paraplesion) • Superfamily Grammysioidea! S. A. Miller, 1877
• Family Grammysiidae! S. A. Miller, 1877
• Subfamily Grammysinæ S. A. Miller, 1877
• Subfamily Cuncamrinæ! N. Morris, Dickins, & Astafieva-Urbajtis, 1991
• Family Sanguinolitidae! S. A. Miller, 1877
• Subfamily Sanguinolinitæ S. A. Miller, 1877
• Subfamily Alulinae N. Morris, Dickins, & Astafieva-Urbajtis, 1991
• Subfamily Paleodorinae Carter, nov.
• Subfamily Pholadellinae S. A. Miller, 1877

Superorder Cardiformii Férussac, 1822 in 1821–1822

• Order Modiomorphida! Newell, 1969c
• Subfamily Modiomorphinae! S. A. Miller, 1877
• Family Modiomorphidae S. A. Miller, 1877
• Subfamily Modiomorphinae S. A. Miller, 1877
• Subfamily Butovicellinae! Krž, 1965
• Subfamily Healevinæ! Hautmann, 2008
• Subfamily Joanninæ Carter, nov.
• Family Cypricardiniidae Ulrich in Ulrich & Scofield, 1894
• Family Hippopodumiidae! Cox in Cox & LaRocque, 1969
• Family Palaeophilidae! Marwick, 1953
• Family Tusayanidae! Scarlato & Starobogatov, 1979a

Order Megalodontida! Starobogatov, 1992

• Family Mecynodontidae! Haffer, 1959
• Family Mecynodontidæ Haffer, 1959
• Family Beichuanidæ Liu Xie-zhang & Gu in Hou Hong-fei, Wan, & Xian, 1988
• Family Congeriomorphidae Saul, 1976
• Family Phlethocardiidae Scarlato & Starobogatov, 1979a
• Family Prosocoelidae! Karczewski, 1992

• Superfamily Megalodontoida! J. Morris & Lycett, 1853
• Family Megalodontidae! J. Morris & Lycett, 1853
• Family Ceratomyopsidae Cox, 1964
• Family Dicerocardiæ! Kurassy, 1934

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• Family Pachyrismatidae, Scarlato & Starobogatov, 1979a
• Family Wallowaconchidae Yancey & Stanley, 1999
• Order Hippuritida Newell, 1965
  • Superfamily Requienioidea Kutassy, 1934
    • Subfamily Requieniinae Kutassy, 1934
    • Subfamily Matheroninidae R. Scott & others, 2010
  • Family Epidiceratidae Rengarten, 1950
• Superfamily Radiolitoidea d’Orbigny, 1847b
  • Family Radiolitidae d’Orbigny, 1847b
• ?Family Antillocaprinidae Mac Gillavry, 1937
• Family Caprotinidae J. Gray, 1848
  • Subfamily Caprininae d’Orbigny, 1847b
  • Subfamily Caprinuloideinae Damestoy, 1971
• Family Caprinulidae Yanin, 1990
• Family Caproinidae J. Gray, 1848
• Family Diceratidae Dall, 1895a
• Family Hippuritidae J. Gray, 1848
• Family Ichthyosarcolitidae Douvillé, 1887 (T. Gill, 1871)
• Family Monopleuridae Munier-Chalmas, 1873
• Family Plagioptychidae Douvillé, 1888
• Family Polyconitidae Mac Gillavry, 1937
• ?Family Trechmannellidae Cox, 1934

Order Cardiida Férussac, 1822 in 1821–1822
(paraplesion) • Superfamily Kalenteroidea Marwick, 1953
• Family Kalenteridae Marwick, 1953
  • Subfamily Kalenterinae Marwick, 1953
  • Subfamily Myoconchinae Newell, 1957
Suborder Cardiidina Férussac, 1822 in 1821–1822
(paraplesion) • Family Palaecarditidae Chavan, 1969b

Hyposer Cardiodei Férussac, 1822 in 1821–1822
Superfamily Cardioidea Lamarck, 1809
  • Family Pterocarditidae Scarlato & Starobogatov, 1979a
    • Subfamily Pterocardininae Scarlato & Starobogatov, 1979a
    • Subfamily Tuongocardiinae J. Schneider, 1995
Family Cardiidae Lamarck, 1809
  • Subfamily Lahilliinae Finlay & Marwick, 1937
  • Subfamily Protocardiinae Reuss, 1846 in 1845–1846
  • Subfamily Laevicardiinae Keen, 1951
  • Subfamily Pleuropardiinae J. Schneider, 1995
Clade Neocardiids J. Carter, Hylleberg, & Popov, nov.
  • Subfamily Clinocardiinae Kafanov, 1975
Clade Eucardiids J. Schneider, 1995
  • Subfamily Cerastodermatinae Nordsieck, 1969
    • Tribe Cerastodermatini Nordsieck, 1969
    • Tribe Chokrakini S. V. Popov in Neveskaja, Paramonova, & Popov, 2001
    • Tribe Parvicardiini Kafanov & Starobogatov in Kafanov & S. V. Popov, 1977
  • Subfamily Clinocardiinae Kafanov, 1975
  • Subfamily Fraginae R. Stewart, 1930
    • Tribe Fragini R. Stewart, 1930
    • Tribe Goniocardini Scarlato & Starobogatov, 1979a
    • Subfamily Lymnocardiinae Stoliczka, 1870 in 1870–1871
      • Tribe Lymnocardiini Stoliczka, 1870 in 1870–1871
      • Tribe Acobaecardiini Paramonova in Nevesskaja, Paramonova, & Popov, 1986
      • Tribe Adacnini T. Gill, 1871
      • Tribe Arcicardiini Neveskaja in Neveskaja & others, 1986
      • Tribe Avicardiini S. V. Popov in Kafanov, 1977
      • Tribe Aviculocardiini Paramonova in Neveskaja, Paramonova, & Popov, 2001
      • Tribe Limnopappini Schlickum, 1962
      • Tribe Merklinardiini S. V. Popov in Neveskaja, Paramonova, & Popov, 2001
      • Tribe Obsoletiformini Paramonova in Neveskaja, Paramonova, & Popov, 2001
      • Tribe Pachydacnini Andreescu, 1975
      • Tribe Paradacnini Eberzin, 1967
      • Tribe Phyllocardiini Neveskaja in Neveskaja & others, 1986
      • Tribe Planacardiini Paramonova in Neveskaja, Paramonova, & Popov, 2001

• Tribe Plicatiformini! Paramonova in Nevesskaja, Paramonova, & Popov, 2001
• Tribe Pontalmyrini! Taktakishvili, 1987
• Tribe Prosodacnini Keen, 1937
• Tribe Pseudocarditini Keen, 1969b
Subfamily Orthocardiinae J. Schneider, 2002
• Subfamily Profraginae Badve, 1977
• Subfamily Trapenocarditinae Kanjilal & Srinivasan, 2002
Subfamily Tridacninae Lamarck, 1819

Superfamily Tellinoidea Blainville, 1814
Family Tellinidae Blainville, 1814
• Family Donacidae J. Fleming, 1828
• Family Icanotiidae R. Casey, 1961
• Family Psammobiidae J. Fleming, 1828
• Family Quenstedtiidae Cox, 1929
Family Semelidae Stoliczka, 1870 in 1870–1871 (Latreille, 1825)
• Subfamily Semelinae! Stoliczka, 1870 in 1870–1871 (Latreille, 1825)
• Subfamily Erviliinae Dall, 1895b
• Subfamily Scrobiculariinae H. Adams & A. Adams, 1856

Family Solecurtidae d’Orbigny, 1846
• Family Sowerbyidae Cox, 1929
• Family Tancrediiidae F. Meek, 1864a
• Family Unicardiopsidae Chavan, 1969c

Hyporder Veneroidei J. Gray, 1854a
Minorder Veneroidei J. Gray, 1854a

Superfamily Arcticoidea! R. Newton, 1891 (d’Orbigny, 1844 in 1844–1848)
Family Arcticidae! R. Newton, 1891 (d’Orbigny, 1844 in 1844–1848)
Family Euloxidae J. A. Gardner, 1944
• Family Pollicidae L. Stephenson, 1953
• Family Trapeziidae Lamy, 1920 (Dall, 1895a)
• Family Veniellidae Dall, 1895a

Superfamily Chamoidea Lamarck, 1809
Family Chamidae Lamarck, 1809

Superfamily Cyrenoidea J. Gray, 1840b
Family Cyrenidae! J. Gray, 1840b
Family Cyrenoididae H. Adams & A. Adams, 1857 (J. Gray, 1853)
Family Glaucosomatidae J. Gray, 1853

Superfamily Gaimardioidae Hedley, 1916
Family Gaimardiidae Hedley, 1916

Superfamily Glossoidae J. Gray, 1847b (J. Gray, 1840b)
Family Glossidae J. Gray, 1847b (J. Gray, 1840b)
Family Kelliellidae P. Fischer, 1887
Family Vesicomyidae Dall & Simpson, 1901

Superfamily Hemidonaocoidea Scarlato & Starobogatov in Nevesskaja & others, 1971
Family Hemidonaocoidea Scarlato & Starobogatov in Nevesskaja & others, 1971

Superfamily Mactroidea Lamarck, 1809
Family Mactidae! Lamarck, 1809

Subfamily Mactrinae! Lamarck, 1809
Subfamily Darininae Signorelli, nov.
Subfamily Kymatoxinae Stenzel & Krause in Stenzel, Krause, & Twining, 1957
Subfamily Lutrariinae J. Gray, 1853
Subfamily Tanysiphoninae Scarlato & Starobogatov in Nevesskaja & others, 1971
Family Anatinellidae Deshayes in J. Gray, 1853
Family Cardilliidae P. Fischer, 1887
Family Mesodesmatidae J. Gray, 1840b
Subfamily Mesodesmatinae! J. Gray, 1840b
Subfamily Davilinae Dall, 1895b

Superfamily Ungulinoidea J. Gray, 1854b

Family Unguliniidae J. Gray, 1854b

Superfamily Veneroideae Rafinesque, 1815

• Family Isocyprinidae! R. N. Gardner, 2005

Family Veneridae! Rafinesque, 1815

Subfamily Venerininae Rafinesque, 1815
Tribe Venerini Rafinesque, 1815
Subtribe Venerina Rafinesque, 1815
Subtribe Chionina Frizzell, 1936
Tribe Dosiniini Deshayes, 1853
Tribe Tapetini! J. Gray, 1851

Subfamily Meretricinae J. Gray, 1847b (J. Gray, 1838)
Tribes Meretricini J. Gray, 1847b (J. Gray, 1838)
Subtribe Meretricina! J. Gray, 1847b (J. Gray, 1838)
Subtribe Callocardiina! Dall, 1895a
Subtribe Clementiina Frizzell, 1936
Subtribe Cyclinina Frizzell, 1936
Subtribe Gemmina Dall, 1895a
Subtribe Petricolina d’Orbigny, 1840
Subtribe Samarangiina Keen, 1969c
Subtribe Sunettina Stoliczka, 1870 in 1870–1871
Subtribe Turtoniina W. Clark, 1855
Subtribe Gouldiini R. Stewart, 1930
Subtribe Gouldiina! R. Stewart, 1930
Subtribe Lioconchina Habe, 1977

Minorder Dreissenoitei R. Moore in Moore, Lalicker, & Fischer, 1952
Superfamily Dreissenioidea J. Gray, 1840a
Family Dreissenidae J. Gray, 1840a
Subfamily Dreisseninae J. Gray, 1840a
•Subfamily Dreissenomyinae Babak, 1983
Superfamily Sphaerioidea! Deshayes, 1855b (Rafinesque, 1820)
Family Sphaeriidae! Deshayes, 1855b (Rafinesque, 1820)
Subfamily Sphaeriinae! Deshayes, 1855b (Rafinesque, 1820)
Subfamily Euperinae Heard, 1965
Subfamily Pisidiinae J. Gray, 1857
•Family Neomiodontidae R. Casey, 1955
•Subfamily Neomiodontinae R. Casey, 1955
•Subfamily Eomiodontinae Hayami, 1965

Suborder Gastrochaenidina Morretes, 1949
Superfamily Gastrochaenoidea J. Gray, 1840b
Family Gastrochaenidae J. Gray, 1840b
Subfamily Gastrochaeninae J. Gray, 1840b
Subfamily Eufistulaninae Carter, nov.
Subfamily Spengleriinae! Carter, nov.
•Suborder Anthracosidina Silantiev & Carter, 2011
•Superfamily Anthracosioidea Amalitzky, 1892
•Family Anthracosioidea Amalitzky, 1892
•Family Ferganokonchidae Martinson, 1961
•Family Shaanxikonchidae Liu Ben-pei in Liu Ben-pei & Li, 1980
Superfamily Palaeanodontoidae Modell, 1964
•Family Palaeanodontidae Modell, 1964
Superfamily Prilkieelloidea Starobogatov, 1970
•Family Prilkieillidae Starobogatov, 1970
•Family Senderzoniellidae Betekhtina, Starobogatov, & Jatsuk, 1987

Suborder Leptonidina Dall, 1889
Superfamily Cyamioidea! G. O. Sars, 1878
Family Cyamiidae G. O. Sars, 1878
Family Basterotiidae Cossmann in Cossmann & Peyrot, 1909
Family Galatheavalvidae Knudsen, 1970
Family Sportellidae! Dall, 1899
Superfamily Galeommatoidae J. Gray, 1840b
Family Galeommatidae J. Gray, 1840b
Family Lasaediae J. Gray, 1842
Superorder Pholadiformii J. Gray, 1854a
Order Pholadida J. Gray, 1854a
Superfamily Pholadoidea Lamarck, 1809
Family Pholadidae! Lamarck, 1809
Subfamily Pholadinae Lamarck, 1809
Tribe Pholadini! Lamarck, 1809
•Tribe Euxinibarneini Zhgenti, 1991
Subfamily Jouannetiinae Tryon, 1862b
Subfamily Martesiinae U. Grant & Gale, 1931
Subfamily Xylophaginiae! Purchon, 1941
Family Teredinidae Rafinesque, 1815
Subfamily Teredininae Rafinesque, 1815
Tribe Teredinini Rafinesque, 1815
Tribe Bankiini Turner, 1966
Subfamily Kuphinae Tryon, 1862b
•Superfamily Pleuromyoidae! Zittel, 1895
•Family Pleuromyidae! Zittel, 1895
• Family Ceratomyidae! Arkell, 1934
  • Subfamily Ceratomyinae! Arkell, 1934
  • Subfamily Myopholadinae! Cox, 1964
• Family Vacumellidae! Astafeva-Urbajtis, 1973

Superfamily Myoidea Lamarck, 1809
  Family Myidae Lamarck, 1809
    Subfamily Myinae Lamarck, 1809
    Subfamily Cryptomyinae Habe, 1977
    Subfamily Spheniinae! Frank Bernard, 1983
  Family Corbulidae! Lamarck, 1818
    Subfamily Corbulinae! Lamarck, 1818
    • Subfamily Caestocorbulinae H. Vokes, 1945
    • Subfamily Caryocorbulinae H. Vokes, 1945
    • Subfamily Erodoninae Winckworth, 1932
    • Subfamily Pachydontinae H. Vokes, 1945
  • Family Pleurodesmatidae Cossmann in Cossmann & Peyrot, 1909
  • Family Raetomyidae R. Newton, 1919

Megaorder Poromyata Ridewood, 1903
  Order Poromyida Ridewood, 1903
    Superfamily Poromyoidea! Dall, 1886
      Family Poromyidae! Dall, 1886
      Family Cetoconchidae Ridewood, 1903
    Superfamily Cuspidarioidea! Dall, 1886
      Family Cuspidariidae! Dall, 1886
      Family Halonymphidae Scarlato & Starobogatov, 1983
      Family Protocuspidariidae! Scarlato & Starobogatov, 1983
      ? Family Spheniopsidae! J. A. Gardner, 1928
    Superfamily Parilimyoidea! B. Morton, 1981
      Family Parilimyidae! B. Morton, 1981
    Superfamily Verticordioidea! Stoliczka, 1870 in 1870–1871
      Family Verticordiidae Stoliczka, 1870 in 1870–1871
      Family Euciroidae! Dall, 1895a
    Family Lyonsiellidae! P. Fischer, 1887
  Order Pholadomyida! Newell, 1965
    Superfamily Pholadomyoidea! W. King, 1844
      Family Pholadomyidae! W. King, 1844
        Subfamily Pholadomyinae! W. King, 1844
        • Subfamily Charenomyinae! Waterhouse, 1966
      Family Arenigomyidae! Carter, nov.
      Family Margaritariidae! H. Vokes, 1964
      Family Ucumaridae! Sánchez in Sánchez & Vaccari, 2003

Order Pandorida! R. Stewart, 1930
  Superfamily Pandoroidae! Rafinesque, 1815
    Family Pandoridae Rafinesque, 1815
    Family Laterulidae! Hedley, 1918 (J. Gray, 1840b)
    Family Lyonsiidae! P. Fischer, 1887
  Superfamily Clavagelloidea! d’Orbigny, 1844 in 1844–1848
    Family Clavagellidae! d’Orbigny, 1844 in 1844–1848
    Family Penicillidae! J. Gray, 1858
  Order Thraciida! Carter, nov.
    Superfamily Thracioida! Stoliczka, 1870 in 1870–1871 (Couthouy, 1839)
      Family Thraciidae! Stoliczka, 1870 in 1870–1871 (Couthouy, 1839)
      • Family Burmesiidae! M. Healey, 1908
      Family Cleidothaeridae! Hedley, 1918 (Stoliczka, 1870 in 1870–1871)
      Family Myochamidae! P. P. Carpenter, 1861
      Family Periplomatidae! Dall, 1895a

Megaorder Solenata Dall, 1889
  Order Solenida Dall, 1889
    Superfamily Orthonotoidea! S. A. Miller, 1877
      • Family Orthonoridae! S. A. Miller, 1877
      • Family Konduridae! Sánchez in Sánchez & Benedetto, 2007
      • Family Prothyrididae! S. A. Miller, 1889
      • Family Solenomorphidae! Cockerell, 1915
        • Subfamily Solenomorphinae! Cockerell, 1915
        • Subfamily Promacrinae! Scarlato & Starobogatov, 1979a
    Superfamily Solenoidea Lamarck, 1809
      Family Solenidae Lamarck, 1809
      Family Pharidae! H. Adams & A. Adams, 1856
Subfamily Pharinae! H. Adams & A. Adams, 1856
Subfamily Cufellinae A. Davies, 1935
Subfamily Novaculinae Ghosh, 1920
Subfamily Pharellinae Stoliczka, 1870 in 1870–1871
•Subfamily Rzehakiinae Korobkov, 1954
•Subfamily Siliquinidae! Bronn, 1862
Order Hiatellida Carter, 1924
Superfamily Hiatelloidea J. Gray, 1824
Family Hiatellidae J. Gray, 1824
Subfamily Panopeinae! Bronn, 1862
Family Saxicavellidae P. H. Scott, 1994
•Superfamily Edmondioidea! W. King, 1850
  •Family Edmondidiidae! W. King, 1850
  •Family Pachydomidae! P. Fischer, 1887
  •Subfamily Pachydomininae! P. Fischer, 1887
  •Tribe Pachydomini P. Fischer, 1887
  •Tribe Astartilini Waterhouse, 1960
  •Tribe Holthausellini Beurlen, 1954
  •Tribe Pleiocyprinellini Simões & others, 1997
•Subfamily Myroniinae Scarlato & Starobogatov, 1979a

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APPENDIX 1. NEW SUPRAGENERIC TAXA AND UNRANKED CLADE NAMES

Abbreviations: CL, simple crossed lamellar; CCL, complex crossed lamellar; ISP, irregular simple prismatic; RSP, regular simple prismatic.


Anadontellidae Silantiev, herein, fam. nov. Type genus, Anadon-
tella Betekhtina in Betekhtina, Starobogatov, & Jatsuk, 1987, p. 41. Family diagnosis: members of the superfamily Prokopievskioidea with relatively thin, elongate, subtriangular (Ambraconatha-like) or subrectangular, equivale or slightly inequivalve shells, with an edentulous hinge, distinctly multilayered shells with fine, commarginal growth lines, and no radial microsculpture. Some forms (e.g., Synjaella) are strongly tapered posteroventrally and have a sinus-like concavity on the posterior and ventral margins. Ligament opisthodetic, possibly submerged, with single, narrow ligament groove appearing on internal molds, possibly representing secondarily simplified duplivincular ligament. Outer shell layer calcitic irregular simple prismatic or fibrous prismatic, middle and inner shell layers nacreous, except immediately internal to ISP pallial myostracum, where irregular CCL is developed. Nonmarine. Anadontellidae resembles Naiaditidae but differs from Prokopievskioidea in lacking radial microsculpture. At least Anadontella differs from some Prokopievskioidea and Naiaditidae in having a distinct sublayer of irregular CCL between the pallial myostracum and the nacreous inner part of the inner shell layer. Anadontellidae differs from Naiaditidae in having a single, narrow, opisthodetic ligament groove opposite an amphibetic, duplivincular ligament. This family also contains Soanellina Betekhtina, 1990, and Synjaella Kaney, 1993.

Antijaniridae Hautmann, herein, fam. nov. Type genus, Antijanira Bittner, 1901, p. 49. Family diagnosis: small shells with well-developed radial ribs occasionally bearing spines; ribs either equal in strength or intercalated in two or more ranks; discs circular to slightly retrocrescent, biconvex or with right disc flatter; dorsal margin straight and relatively short; beaks located close to midpoint of dorsal margin; byssal notch well developed; ctenodium not observed; ligament alivincular-areate, with centrally or slightly posteriorly located resilifer; shell with calcitic outer shell layer, regular simple prismatic in right valve and predominantly homogeneous in left valve, plus aragonitic crossed lamellar middle and inner shell layers. Comparisons: the ligament system indicates affinity with taxa presently classified with Aviculopectinoidea or Heteropectinoidea, contrary to Hertlein’s (1969, p. 355) placement of the “Antijanira group” in Pectinidae. The style of ornamentation in Antijaniridae is not observed in other Triassic Aviculopectinoidea or Heteropectinoidea, except for Ornithopecten (Ornithopectinae), which differs in having a broad right posterior wing and a delicate right anterior auricle. This family also contains Amphijanira Bittner, 1901, and Oxypteria Waagen, 1907. The affinity of Oxypteria to this group was first recognized by Allasinaz (1972, p. 266).

Arenigomyidae Carter, herein, fam. nov. Type genus, Arenigo-
mya Cope, 1996, p. 1017. Cope (1996, p. 1017) gave the following diagnosis for Arenigomya, which is also the present family diagnosis: “Equivalve, edentulous, trapezoidal bivalve with length one-and-a-half times greater than height. Surface with fine concentric undulose ornament, radial striae and anteriorly prominent commarginal rugae. Surface detail of finely granulose ornament. Strong carina runs from posterior side of umbo to postero-ventral margin of valves. Each valve with subumbonal articulation device.” This family is monogenic.

Aulacomyini Carter, herein, tribe nov. Type genus, Aulacomy-
a Mörch, 1853 in 1852–1853, p. 53. This new tribe is proposed because Perninae Scarlato & Starobogatov, 1979b, p. 24, is invalid;
its type genus was given without author or date but is inferred from the context to be *Perna* Philippiou in Retzius, 1788. This Perninae is a junior homonym of Pernaeae J. Fleming, 1828 (spelling corrected by Zittel, 1895, to Pernaeae, the latter based on *Perna* Bruguière, 1789, in Bruguière, Lamarck, & Deshayes, 1789–1832, a junior synonym of *Isognomon* Lightfoot, 1786). Tribe Aulacomyini diagnosis: smooth or radially ribbed, mytiliform members of Mytilinae in which the anterior adductor muscle is present only in the juvenile stage. Other than the type genus, this tribe contains *Ischadium* Jukes-Browne, 1905, *Perna* Philippiou in Retzius, 1788, and *Choromytilus* T. Soot-Ryen, 1952.


**Concinellinae Silantiev, herein, subfam. nov.** Type genus, *Concinella* Betekhtina, 1966, p. 108, 198. Subfamily diagnosis: members of family Prokopiaksidae with thin, subcircular to subtriangular, inequivalent or equivalent, edentulous shells, probably an opisthodetic, possibly submerged ligament with a single, narrow ligament groove appearing on internal molds, possibly representing a secondarily simplified, duplivincular ligament. Ornamentation of regularly imbricated growth lines and fine radial striae. Outer shell layer calcitic irregular simple prismatic; middle and inner shell layers nacreous. Nonmarine. This subfamily is monogenic.

**Crassatellopsidae Carter, herein, fam. nov.** Type genus, *Crassatellopsis* Beuhsaunen, 1895, p. 146. The following family diagnosis is modified from the description of *Crassatellopsis* by P. A. Johnston (1993): two cardinal teeth in right valve, one anterior and one central, the latter bordered posteriorly by a narrow shell; two cardinal teeth in left valve, left cardinal tooth immediately posterior to left pentalval cardinal is slender and directed posterolaterally; right cardinal tooth anterior to right pentalval cardinal tooth is slender and directed anterolaterally; no anterior teeth and no shell marginal teeth. Shell shape similar to *Astarte*, trigonally suboval or subcircular; umbos pointed, prosograte; shell margin broadly concave immediately anterior to umbos, convex elsewhere; lunule and escutcheon absent; exterior ornament of commarginal ribs, rugae, and growth lines; ribs generally prominent and regularly spaced in early growth stages, in some cases diminishing gradually throughout ontogeny. Hinge plate narrow or broad. Anterior adductor muscle scar reniform or moderately elongate; posterior adductor muscle scar larger. Anterior pedal retractor scar positioned above and separate from anterior adductor scar; above this scar 2 to possibly 4 subumbonal muscle scars are positioned at the junction of hinge plate and the shell interior, with the dorsalmost of these scars most prominent and usually positioned directly below the left or right principal cardinal tooth or its socket in the opposite valve. Posterior internal radial ridge present immediately anterior to posterior adductor muscle scar. Pallial line continuous, nonsinuate, relatively close to shell margin ventrally. Lamellar sublayer of ligament inserting into opisthodetic, narrow, submarginal fossette, but fibrous sublayer of ligament inserting within a strongly oblique, short resilifer; ligament sublayers separated by indistinct ridge on posterior margin of resilifer. This family is monogenic.

**Darininae Signorelli, herein, subfam. nov.** Type genus, *Darina* J. Gray, 1853, p. 42. Subfamily diagnosis: members of Mactridae with thin, fragile, oval to subcircular, elongate, anteriorly and posteriory gaping shells, nearly median umbo, a rudimentary, external ligament, a large resilium on a ventrally to posterolaterally strongly projecting chondrophore, a subbed posterior umbonal ridge, and hinge dentition that is concentrated on the central part of the hinge. This subfamily also contains *Darcinia* B. Clark & Durham, 1946. Darininae differs from Mactridinae in having a more elongate shell shape, thinner, more pellucid valves, and more medially concentrated hinge dentition. It differs from Kymatoxinae in having a more elongate, more nearly equilateral shell shape, anterior as well as posterior gaps, less prominent sculpture, and stronger anterior lateral teeth. It differs from Lutrariinae in having a more projecting chondrophore and more median umbos.

**Entoliidina Hautmann, herein, subord. nov., nom. transl. et correct.** M. Hautmann, herein, *ex* Entoliidae Teppner, 1922, p. 89. A suborder proposed for the superfamilies Euchondrioidea and Entolioida, as indicated above.

**Eubivalvina Carter, herein, unranked clade nov.** A descriptive clade name proposed for the subclasses Protobranchia and Autobranchia.

**Eufistulinae Carter, herein, subfam. nov.** Type genus, *Eufistula* Eames, 1951, p. 445. Subfamily diagnosis: obligate tube-dwelling Gastrochaenidae with long, straight-sided tubes; long, largely fused siphons *sensu stricto*, sparse, minute siphonal papillae on incumbent but not excurrent siphonal aperture; anterior pedal retractor muscles passing around visceral mass as they approach the foot; the ventral surface of the foot elongate-ovate in the lateral direction. This subfamily differs from Spengleriinae and Gastrochaeninae in having obligate tube-dwelling life habits in which the tube is very elongate and straight sided, in lacking papillae on the excurrent siphon, and in having a laterally expanded instead of round to anteroposteriorly elongate ventral pedal surface. This family also contains *Kummelia* L. Stephenson, 1937.

**Hiattellida Carter, herein, ord. nov., nom. transl. et correct.** Carter, herein, *ex* Hyatellidae J. Gray, 1824, based on *Hyatella*, an incorrect subsequent spelling of *Hiattella* Bosc *ex* Daudin MS, 1801; =suborder Saxicavoidea Morretes, 1949, p. 47, invalid, based on the junior synonym *Saxicava* Fleuriue de Bellevue, 1802 (=Hiattella *ex* Daudin MS, 1801). Taxonomic content indicated above.

**Joannininae Carter, herein, subfam. nov.** Type genus, *Joannina* Waagen, 1907, p. 94. Subfamily diagnosis: edentulous members of Modiomorphidae differing from sister subfamilies Modiomorphinae and Healeyinae in having more dorsally projecting umbos, better defined anterior auricles, a narrower hinge plate, and, with the exception of *Leidapoconcha*, a shorter, more external ligament nymph and growth lines not continuing from a lunule onto the subumbomal hinge plate. This subfamily also contains *Protopis* Kitti, 1904, *Waijiaoella* Stiller & Chen, 2006, *Qingyaniola* Stiller & Chen, 2006, and *Leidapoconcha* Stiller & Chen, 2006.


**Ornithopectininae Hautmann, herein, fam. nov.** Type genus, *Ornithopecten* Cox, 1962, p. 596. Family diagnosis: discs inequilateral, retrocrescent, posteriorly slightly expanded; beaks located well in front of midpoint of dorsal margin; right anterior auricle delicate, with narrow subauricular byssal notch; right posterior wing broad, poorly differentiated but distally pointed; left anterior auricle poorly
differentiated, with indistinct auricular sinus; ornament with radial ribs usually intercalated in different ranks, superimposed by regularly spaced commarginal ridlets. Comparisons: Ornithopectinidae differs from the closely related Antijanidae chiefly in the anteriorly positioned beaks, retroventrally oriented, and broad posterior wing. This family is monogenic.

Ovatoconchiidae Carter, herein, fam. nov. Type genus, Ovatoconcha Cope, 1896, p. 988. Family diagnosis: members of superfamily Solyemoidea with anteriorly produced shell, as in Ctenodontidae and Solyemidae, but lacking parvicular nymphs and possibly lacking palaeotaxodont hinge teeth in adult shell. This family is monogenic.

Paleodorinae Carter, herein, subfam. nov. Type genus, Paleodora C. Fleming, 1957, p. 943. Subfamily diagnosis: members of family Sanguinolitidae with elongate, subrectangular, slightly sickle-shaped shell with anterior end short and rounded, posterior end longer; posteroventrally rounded and dorsoposteriorly truncate; ornament of low, commarginal ribs, replaced by fine growth lines on the relatively flat, dorsoposterior area; hinge unknown, possibly lacking distinct teeth; sharply elevated, internal shell lamellae radiating from area below beaks anteroventrally and toward the posterior. This subfamily is monogenic.

Pleuronectidae Hautmann, herein, fam. nov. Type genus, Pleuronectites Schlotheim, 1820, p. 217. Family diagnosis: discs procrescent, height of valves greater than length, left valve more convex than right; shell exterior smooth or with radial ribs; right anterior auricle with auricular scroll and deep byssal notch; ctenolium present; right posterior auricle obtuse but well delimited, not projecting above hinge margin; auricles of left valve lacking auricular sinuses and dorsally levelling with hinge margin; ligament alivincular-ate, small boursrelets may be present; hinge lacking resilient teeth; shell interior without buttresses; shell with thin, calcitic outer shell layer, divided into radial sectors with irregular foliated to radially irregular spherulitic prismatic to radially fibrous prismatic structure; aragonitic middle and inner shell layers with evidence of line of siphonal aperture. Anterior pedal retractor muscles pass around visceral mass as they approach the sole of the foot; ventral surface of foot nearly circular to elongate-ovate in anteroposterior direction. This subfamily differs from Gastrochaeninae in having siphons sensu stricto that are entirely separated, and by having little or no extension of the ctenidia and mantle cavity posterior to the shell margins. It differs from Eufistulaninae in having entirely separated siphons sensu stricto, and in having obligate endolithic instead of obligate tube dwelling habits. This family also contains Gastrochaenopsis Chavan, 1952, and Spenglichaena Carter, gen. nov.


APPENDIX 2. NEW GENERA AND SPECIES

Superfamily Gastrochaenoidea J. Gray, 1840b
Family Gastrochaenidae J. Gray, 1840b
Subfamily Gastrochaeninae J. Gray, 1840b

Stenoachaena Carter, herein, gen. nov.

Figure 1

Type species.—Gastrochaena lacera Belokryks, 1991, p. 10.

Discussion.—The genus Stenoachaena is presently proposed for Middle Eocene Gastrochaena lacera Belokryks, 1991 (p. 10, pl. 1, fig. 1a, 2), from the Dnepropetrovsk region of Ukraine. The name Stenoachaena derives from the Greek stenos for narrow, and from a variation of chenos for the upturned prow of a boat, as in Gastrochaena. The new genus name is feminine. The name Stenoachaena reflects the extremely small pedal gape and boatlike shape of the united valves. In addition to Stenoachaena lacera, this genus includes Upper Jurassic Gastrochaena zitteli Boehm, 1883, from Stramberk, Czech Republic, and Jurassic Gastrochaena valfinensis de Lorolj, 1888, in de Lorolj & Bourgeat, 1886–1888, from Valfin, eastern France (possibly a juvenile of Stenoachaena zitteli).

Generic diagnosis and description.—Members of Gastrochaeninae with a greatly posteriorly elongated, small- to medium-sized shell (9.5–38 mm long), with far anterior but not terminal beaks, a very small, anteriorly restricted peda gape (comprising less than 12% of shell length), and pedal gape margins oriented at a high angle (over 60°) relative to the hinge axis. The shell’s posterior is narrowly ovate
and ornamented with regularly spaced, erect, commarginal lamellae (Stenochaena zitteli) or irregularly spaced growth lines (Stenochaena lacera). There are no mineralized periostracal spikes or spines cemented to the shell. The boring’s shell chamber is subcylindrical, tapering far anteriorly and far posteriorly to conform with the shell’s shape. The anterior half of the siphonal boring appears like a slightly narrower extension of the shell chamber, without a strong constriction in boring width at the base of the siphons. The posterior half of the siphonal boring is divided into incurrent and excurrent areas that diverge at an angle of 20°–25°. The hinge is thin, edentulous, and lacks myophores. Posterior to the beaks, the hinge is slightly convex and nearly parallel with the ventral shell margin; anterior to the beaks, it is very short, dorsally slightly deflected, and laterally strongly deflected (about 60°) from the subumbonal hinge axis. This lateral deflection frames a distinct, triangular opening between the dorsoanterior shell margins. The ligament is opisthodetic and parivincular, with very thin, not strongly dorsally projecting nymphs. The anterior adductor muscle scar is positioned immediately adjacent to the deflected dorsoanterior shell margin. Other muscle scars are not visible, despite excellent preservation of the aragonitic shells.

Comparisons.—No other member of Gastrochaenidae approaches Stenochaena in its combination of a very anteriorly restricted, high-angle pedal gape and greatly posteriorly extended, nearly cylindrical shell shape.

Distribution.—Stenochaena is known only from the Upper Jurassic and Middle Eocene of Europe.

Ecology.—Specimens of Stenochaena lacera from Belokrys (1991) came from borings in the dome-shaped coral Astraeopora sphaeroidalis (Mich.). Belokrys speculated that juveniles of this species bored through living coral tissue. Although this cannot be certain, the borings are sometimes partially overgrown by coral, indicating close proximity to living coral tissue at the time of settlement. Calcareous laminae are sometimes present in the anterior of the boring’s shell chamber, indicating that the bivalves sometimes bored in a posterior direction to keep pace with coral growth.

Boehm’s (1883) specimen of Stenochaena zitteli came from an Upper Jurassic limestone at Stramberk, Czech Republic (Boehm, 1883, p. 495, pl. 53,6–7). Boehm indicated that his specimen occupied a calcareous tube that is anteriorly thin walled and posteriorly rather thick walled. This putative tube is probably the calcareous lining of
a boring, thickened posteriorly to conform with the shell’s shape, as in modern endolithic gastrochaenids. The British Museum has in its collections an upper Tithonian, Upper Jurassic specimen of *S. zitteli*, also from Stramberk (British Museum Geology Department L23855), with impressions of a coral substratum on the exterior of its boring cast.

**Superfamily Gastrochaenoidea J. Gray, 1840b**

**Family Gastrochaenidae J. Gray, 1840b**

**Subfamily Spengleriinae Carter, herein, subfam. nov.**

**Spenglerichaena** Carter, herein, gen. nov.

*Type species.* — *Gastrochaena apertissima* Deshayes, 1855a, p. 326.

**Discussion.** — The genus *Spenglerichaena* is presently proposed for Recent, Indo-Pacific *Gastrochaena* *apertissima* Deshayes, 1855a, the type species. The name derives from *Spengleria* and *Gastrochaena*, in recognition of anatomical similarities with *Spengleria* and shell similarities, especially the lack of a raised posterior triangular area, with *Gastrochaena*. The new genus name is feminine.

**Generic diagnosis and description.** — Members of *Spengleriinae* with anteriorly strongly laterally inflated shells, moderately anterior umbo, completely divided, relatively long siphons *sensu stricto*, little or no extension of the ctenidia and posterior mantle cavity posterior to the shell margins, no raised, posterior triangular area, and no distinct umbalonal-posteroventral sulcus. The shell posterior has irregular, commarginal growth lamellae and a thin, nonmineralized periostracum. The ctenidia are nonplicate, the pedal probing organ is spatulate, and the calcareous boring linings lack an annular septum and spiny baffles at the base of the siphonal boring.

**Comparisons.** — *Spenglerichaena* resembles *Spengleria* in its completely separated siphons *sensu stricto* and anterior pedal retractor muscles that pass around the visceral mass as they approach the foot. However, *Spenglerichaena* lacks the raised posterior triangular area, aragonitic periostracal spikes, distinct umbalonal-posteroventral sulcus, pointed calcareous baffles in the boring lining at the base of the siphons, plicate ctenidia, and more medially positioned umbo of *Spengleria*. Its nonplicate ctenidia, spatulate pedal probing organ, lack of a raised, posterior triangular area, and lack of mineralized periostracal spikes are more typical of *Gastrochaena* and *Rocellaria*, but in those genera, the siphons *sensu stricto* and *sensu lato* are largely fused, and the ctenidia and mantle cavity are extended at least slightly into the siphonal part of the boring, posterior to the shell margins. *Spenglerichaena* differs from *Gastrochaenopsis* in having a wider, longer pedal gape, no raised posterior triangular area, and greater lateral inflation of the shell.

**Distribution.** — Borings similar to those made by *Spenglerichaena* are known from the Lutetian, Middle Eocene near Verona, Italy, but the associated shells are unknown (Savazzi, 1980). *Spenglerichaena* is therefore definitely known only from the Recent tropical Indo-West Pacific Region.
Ecology.—Spenglerichaena bores primarily into thicker coral substrata that are less subject to breakage.

Superfamily Modiomorphoidea S. A. Miller, 1877
Family Modiomorphidae S. A. Miller, 1877
Subfamily Modiomorphinae S. A. Miller, 1877

Goniomorpha Carter, herein, gen. nov.

Type species.—Goniophora hamiltonensis J. Hall & Whitfield, 1869, p. 36.

Discussion.—The genus Goniomorpha is presently proposed for sharply carinate, posteriorly obliquely truncate, subumbonally irregularly dentate modiomorphids formerly classified as Megalodon J. de C. Sowerby, 1827, in James Sowerby, 1812–1845, or Goniophora J. Phillips, 1848. The type species is presently designated as Middle Devonian Goniomorpha hamiltonensis J. Hall & Whitfield, 1869. The name Goniomorpha derives from Goni- (from Goniophora Phillips, 1848) and morpha (from Modiomorpha J. Hall & Whitfield, 1869). Johnston (1993, p. 76) was aware that “Goniomorpha” hamiltonensis is “almost certainly not congeneric” with Goniophora J. Phillips, 1848, and he pointed out that it differs from true Goniomorpha in having a depressed, striated lunule, the growth lines of which continue onto the subumbonal hinge plate, as in Modiomorpha concentrica (Conrad, 1838) (see J. Hall, 1884 in 1883–1884, pl. 43, fig. 18–19; Bailey, 1983, fig. 47; Carter, 1990a, fig. 50A). Carter (1990a, p. 266) indicated that “Goniomorpha” hamiltonensis belongs in Modiomorphidae, noting that it is microstructurally similar to M. concentrica, and Johnston (1993) also assigned “Goniomorpha” hamiltonensis to Modiomorphidae.

True Goniophora is a mecyonodontid based on upper Silurian Goniophora cymbaeformis Sowerby in Murchison, 1839. This mecyonodontid resembles Goniomorpha in having an equivale, strongly inequilateral, posteriorly elongate shell with simple, commarginal ornament, and a sharp, angular carina extending from the beak to the posteroventral shell margin. However, it differs from Goniomorpha in having prominent anterior and posterior internal ridges (Johnston, 1993, p. 74–76; Liljedahl, 1994, p. 74, fig. 52I). The hinge and ligament of Goniophora cymbaeformis are unknown, but other species of this genus differ from Goniomorpha in having a narrower hinge plate, largely restricted to the subumbonal area, with finer, more regularly shaped cardinal teeth, an opisthodetic, parivincular ligament with shorter, more external nymphs, no strong growth lines on the subumbonal hinge plate, and no deeply impressed lunule (Liljedahl, 1994, p. 74).

Goniomorpha hamiltonensis was described and illustrated by J. Hall (1885, p. 296, pl. 43, figs. 17–21), Carter and Tevesz (1978), Carter (1990a, p. 266–268, fig. 50), Carter, Lutz, and Tevesz (1990, p. 391), and Johnston (1993, p. 76). Other species presently included in Goniomorpha lack posterior lateral teeth, and they all have at least one, weakly to strongly developed, irregular but more or less triangular cardinal tooth in the left valve. A second, weaker cardinal tooth may be present posterior to the principal cardinal tooth in the left valve, e.g., in Lower Devonian Goniomorpha sturti (Beuhausen, 1895) (see Maillieux, 1937, p. 136), or a large, rounded cardinal tooth may be present in the right valve, anterior to the right, principal cardinal socket, as in Lower Devonian Goniomorpha cognata (Drevermann, 1902) (see Drevermann, 1902, p. 88, pl. 10, fig. 15–16).

Carter (1990a, p. 266) incorrectly indicated that “Goniophora” hamiltonensis has a very weak left posterior lateral tooth overlapping a weak right posterior lateral tooth. This was based on a misinterpretation of a shallow flexure near the base of the posterior hinge plate in an isolated left valve. Subsequent sections through united valves from the Hamilton Group near Morrisville, New York, along with the observations by C. F. Römer (1844) and Maillieux (1937), indicate a lack of lateral hinge teeth in this genus.

Generic diagnosis and description.—Goniomorpha encompasses members of subfamily Modiomorphinae with a sharply defined, umbonal-posteroventral carina, an angular, rostrate posterior, and no posterior lateral hinge teeth. Like other Modiomorphinae, the shell is equivaled, posteriorly elongate, and strongly inequilateral, with low umbos, a deeply impressed, growth-lined lunule with growth lines extending from the lunule onto a wide, subumbonal hinge plate, a weakly or more strongly developed, irregular, more or less triangular, left cardinal tooth, a flat, wide, posterior hinge plate, and slightly submerged, elongate, parivincular ligament nymphs. In some species, a second, smaller, more posterior, left cardinal tooth is also present, or a rounded cardinal tooth is present in front of the principal cardinal socket in the right valve. The adductors are heteromyarian, the anterior one deeply impressed and positioned just below the hinge, and bounded posteriorly by a low, umbonal ridge or buttress. The posterior adductor muscle scar is more shallowly impressed. The anterior pedal retractor scar is separated from...
the anterior adductor scar, but the posterior pedal retractor scar is partially confluent with the posterior adductor scar. The pallial line is unknown for the type species, but it was probably integripliulate, judging from other members of Modiomorphinae. The shell mineralogy and microstructure resemble *Modiomorpha concentrica*, except that mineralized periostracal spikes are fused to the shell’s exterior anteriorly (see Carter, 1990a, p. 268).

**Comparisons.**—*Goniomorpha* resembles *Modiomorpha* in having a crudely shaped cardinal tooth in the left valve, but *Goniomorpha* has a more sharply defined posterior carina, a more sharply truncate posterior, a more variable subumbonal dentition, and no posterior lateral teeth. A posterior lateral tooth is variably developed in *Modiomorpha* (see Carter, 1990a, p. 266).


**Paleoecology.**—*Goniomorpha hamiltonensis* occurs in the Middle Devonian Hamilton Group of central New York State in clay-rich sandstones also containing a high diversity of other marine invertebrates, especially the bivalves *Pychopteria* (Pterineidae), rare pectinoids, and the gastropods *Palaeeozygopleura* and *Bermexia*. *Goniomorpha hamiltonensis* is not usually found in large concentrations. The strongly and sharply truncate, elongate posterior and lateral teeth are variably developed in *Goniomorpha* species. A posterior lateral tooth is variably developed in *Goniomorpha* species. The shell margins are strongly reflected outward. The adductor myostracum of nearly vertical irregular simple prisms (ISP) is visible, but this could be covered by an attached brachiopod and adherent sediment. The posterior adductor muscle scar (1.4 × 0.8 mm) is ovate, higher than wide, and much larger than the anterior adductor muscle scar (1.4 × 0.8 mm); both scars are positioned near their respective shell margins, and both are elevated by a shelly buttress, that supporting the anterior adductor being more prominent by virtue of its position on a more steeply inclined shell surface. The posterior pedal retractor scar measures 1.2 × 1.0 mm, and its center is 40% from the ventral shell margin toward the dorsal end of the shell. The ligament insertion area is acutely triangular and alvicultivarcuate, with the fibrous attachment area distinctly impressed below narrow, distinct, anterior and posterior bourrelets. The “incipient” crater that Carter (1990a, p. 219) described for this specimen are actually the flanks of the alvicultivarcuate ligament (Hautmann, 2004, 2006). The ligament insertion area is covered by a very thin aragonitic ligostracum of nearly vertical irregular simple prisms (ISP) and steeply dipping fibrous prisms. The underlying hinge is nacreous. The outer shell layer is very thin and varies from ISP to regular simple prismatic to homogeneous mosaic, with prisms 6–10 μm wide. The middle shell layer is nacreous and closely approaches the shell margins. Where marginal radial folds are present, the nacreous laminae are strongly reflected outward. The adductor myostracum is finely ISP. The inner shell layer is aragonitic and mostly coarsely textured ISP, with minor nacreous lensatic sublayers.

**Comparisons.**—*Nacrolopha carolae* differs from all other presently known members of Palaeolophinae in having nacre, an anterior adductor muscle scar, and a posterior pedal retractor scar. Because these features are internal, the composition of the genus is poorly known. *Palaeolophopsis montiscaprilis* (Klipstein, 1843) (Klipstein, 1843, p. 247, pl. 16, 5) appears externally similar to *N. carolae* (see also Wöhrmann, 1889, p. 200, pl. 6, f. 1–3), but illustrations of that species do not show an anterior adductor or posterior pedal retractor muscle scar. Possible congeners of *Nacrolopha* include certain other species assigned by Malchus (1990) to *Palaeolopha*, such as Carnian, Upper Triassic *Palaeolopha mediocostata* (Wöhrmann, 1889), and *Palaeolopha calcoformis* (Broili, 1904). However, these species are unknown both microstructurally and in the details of their muscle scars.

**Superfamily Ostreoidea Rafinesque, 1815**

**Family Arctostreidae Vialov, 1983**

**Subfamily Palaeolophinae Malchus, 1990**

**Nacrolopha Carter & Malchus, herein, gen. nov.**

Fig. 4

**Type species.**—*Nacrolopha carolae* Carter & Malchus, herein, gen. et sp. nov.

The new genus *Nacrolopha* is presently proposed for the new species, Carnian, Upper Triassic *Nacrolopha carolae* Carter & Malchus (Fig. 4), with the holotype of the latter being a well-preserved left valve from Alpe di Specie, Cassiano Formation (alt. 1900–2000 m), Italy (UNC 13497b). The holotype was described and illustrated as an unknown genus and species by Carter (1990a, p. 217–220, fig. 32). The genus name derives from the nacreous microstructure and *Lophia*-like shape of the type species. The species is dedicated to Carol Elizabeth Via Carter. The holotype, which has been sectioned for microstructural analysis, is deposited in the paleontological collection of the Yale University Peabody Museum of Natural History, New Haven, Connecticut.

**Generic and species diagnosis.**—*Nacrolopha* is characterized by a posteriorly instead of postero-dorsally positioned posterior adductor scar, a posterior pedal retractor scar that is partially confluent with the posterior adductor scar, a minute, anterior adductor scar, and a nacreomprismatic left valve that lacks foliated structure, structural chambering, and chalky deposits. This diagnosis applies to the genus and to its type species.

**Generic and species description.**—The following description of *N. carolae* is based on left valve UNC 13497b. The beak is progonostegate in the juvenile stage and orthognathate in the adult stage. The hinge is slightly arched and smooth except for 9 shallow pits (possible preparation artifacts) posterior and ventral to the cardinal area. There are no chomata. The ventral and internal shell margins vary from nearly smooth to slightly radially costate. The exterior has about 25 coarse, radial costae immediately adjacent to the attachment area; these increase to about 30 at the shell margins through intercalation and branching, but mostly through intercalation. A pallial line is not visible, but this could be covered by an attached brachiopod and adherent sediment. The posterior adductor muscle scar (5.1 × 3.5 mm) is ovate, higher than wide, and much larger than the anterior adductor muscle scar (1.4 × 0.8 mm); both scars are positioned near their respective shell margins, and both are elevated by a shelly buttress, that supporting the anterior adductor being more prominent by virtue of its position on a more steeply inclined shell surface. The posterior pedal retractor scar measures 1.2 × 1.0 mm, and its center is 40% from the ventral shell margin toward the dorsal end of the shell. The ligament insertion area is acutely triangular and alvicultivarcuate, with the fibrous attachment area distinctly impressed below narrow, distinct, anterior and posterior bourrelets. The “incipient” crater that Carter (1990a, p. 219) described for this specimen is actually the flanks of the alvicultivarcuate ligament (Hautmann, 2004, 2006). The ligament insertion area is covered by a very thin aragonitic ligostracum of nearly vertical irregular simple prisms (ISP) and steeply dipping fibrous prisms. The underlying hinge is nacreous. The outer shell layer is very thin and varies from ISP to regular simple prismatic to homogeneous mosaic, with prisms 6–10 μm wide. The middle shell layer is nacreous and closely approaches the shell margins. Where marginal radial folds are present, the nacreous laminae are strongly reflected outward. The adductor myostracum is finely ISP. The inner shell layer is aragonitic and mostly coarsely textured ISP, with minor nacreous lensatic sublayers.

**Comparisons.**—*Nacrolopha carolae* differs from all other presently known members of Palaeolophinae in having nacre, an anterior adductor muscle scar, and a posterior pedal retractor scar. Because these features are internal, the composition of the genus is poorly known. *Palaeolophopsis montiscaprilis* (Klipstein, 1843) (Klipstein, 1843, p. 247, pl. 16, 5) appears externally similar to *N. carolae* (see also Wöhrmann, 1889, p. 200, pl. 6, f. 1–3), but illustrations of that species do not show an anterior adductor or posterior pedal retractor muscle scar. Possible congeners of *Nacrolopha* include certain other species assigned by Malchus (1990) to *Palaeolopha*, such as Carnian, Upper Triassic *Palaeolopha mediocostata* (Wöhrmann, 1889), and *Palaeolopha calcoformis* (Broili, 1904). However, these species are unknown both microstructurally and in the details of their muscle scars.
Figure 4. *Nacrolopha carolae* Carter & Malchus, *gen. et sp. nov.*, holotype, left valve, University of North Carolina 13497b; Carnian, Upper Triassic, Cassiano Formation, Alpe di Specie, altitude 1900–2000 m, Dolomitic Alps, northeast of Cortina d’Ampezzo, Italy; 1. interior of left valve, showing alivincular-arcuate ligament insertion area, muscle scars for posterior adductor (PA), anterior adductor (AA, supported by a slight buttress), and posterior (Continued on facing page.)
The presence of ISP and homogeneous mosaic structure in the outer shell layer of the left valve of *N. carolae* resembles some Triassic bakevelliids and gryphaeids, e.g., the Middle Triassic bakevelliid *Hoernia socialis* (Schlotheim, 1823 in 1822–1823) (Carter, 1990b, p. 337) and the Upper Triassic gryphaeid *Gryphaea nevadensis* McRoberts, 1992 (McRoberts & Carter, 1994). Some Jurassic gryphaeids retained homogeneous mosaic structure in their outer shell layer, typically between an RSP outermost sublayer and the foliated middle shell layer, e.g., in Jurassic *Gryphaea arcuata* (Lamarck, 1801) and in *Praceogyna hebridica* (Forbes, 1851) (Carter, 1990c, p. 356–359).

The dorsally rounded posterior adductor muscle scar in *N. carolae* resembles Gyrphaeidae and differs from the dorsally flattened or concave posterior adductor scar in Ostracidae (Harry, 1985).

*Nacrolopha carolae* resembles Norian–Rhaetian, Upper Triassic *Umbrostrea emamii* Hautmann, 2001b, from the Nayband Formation of Iran, in having some calcitic RSP in its outer shell layer and nacre in its inner shell layers. However, *U. emamii* differs in having a regularly to irregularly foliated instead of nacreous middle shell layer. In *U. emamii*, the outer layer of the right valve is RSP to slightly ISP, whereas that of the left valve is coarsely ISP (Hautmann, 2001b, pl. 7; 2006). Structural chambers are lacking in the foliated layer. *Umbrostrea* lacks an adult anterior adductor muscle scar and adult posterior pedal retractor muscle scars (Hautmann, 2001b).

**Distribution.** *Nacrolopha carolae* is presently known only from the Carnian, Upper Triassic, Cassiano Formation at Alpe di Specie, Italy.

### APPENDIX 3. CLASSIFICATION ABOVE FAMILY RANK

The following abstract includes all taxa at or above the rank of superfamily (superfamilies are listed in alphabetical order), plus all pleios and paraplesions. Taxa above the rank of order are highlighted with bold face type. Symbols: • = extinct; ! = paraphyletic.

**Class Bivalvia Linnaeus, 1758 in 1758–1759**

- **Grade Euprotobranchia! Neveskaja, 2009**
  - •Order Fordillida! Pojeta, 1975: •Superfamily Fordilloioidea! Pojeta, 1975
  - •Order Tuaranigiida MacKinnon, 1982

- **Clade Eubivalvia Carter, nov.**
  - **Subclass Protobranchia Pelseneer, 1889 (=Palaeotaxodonta Korobkov, 1954)**
    - **Superorder Nuculiformii! Dall, 1889 (=Foliobranchia Ménégaux, 1889)**
      - Order Nuculida! Dall, 1889: Superfamily Nuculoidea! J. Gray, 1824; Superfamily Pristiglomoidea Sanders & Allen, 1973
      - Order Solemyida Dall, 1889: Superfamily Manzanelloidea Chronic, 1952; Superfamily Solemyoidea! J. Gray, 1840b
    - **Superorder Nuculaniformii Carter, Campbell, & Campbell, 2000**
      - •Order Afghanodesmatida! Carter, nov.: •Superfamily Afghanodesmatoidea! Scarlato & Starobogatov, 1979a; •Superfamily Tironuculoidea Babin in Babin & others, 1982
  - **Superorder Nuculanoidea Carter, 1990a**
    - •Order Tuarangiida! MacKinnon, 1982
  - **Superorder Nuculiformii! Dall, 1889 (=Foliobranchia Ménégaux, 1889)**
    - **Subclass Autobranchia Grobben, 1894**
      - **Infraclass Pteriomorphia Beurlen, 1944**
        - **Cohort Mytilomorphi! Férussac, 1822 in 1821–1822**
          - Order Mytilida! Férussac, 1822 in 1821–1822: •Superfamily Modiolopoidea! P. Fischer, 1886; Superfamily Mytiloidea Rafinesque, 1815
          - •Order Colpomyida Carter, nov.: •Superfamily Colpomyoidea Pojeta & Gilbert-Tomlinson, 1977
        - **Cohort Ostreomorphi! Férussac, 1822 in 1821–1822**
          - (plesion) •Family Matheriidae Scarlato & Starobogatov, 1979a
          - (plesion) •Family Ischyrodontidae Scarlato & Starobogatov, 1979a
        - **Subcohort Arccioni! J. Gray, 1854a**
          - •Order Cyrtodontida! Scarlato & Starobogatov in Neveskaja & others, 1971
          - •Suborder Cyrtodontidina! Scarlato & Starobogatov in Neveskaja & others, 1971: •Superfamily Cyrtodontoidea! Ulrich in Ulrich & Scofield, 1894; •Superfamily Falcadontoidea Cope, 1896; •Superfamily Pichlerioidea Scarlato & Starobogatov, 1979a
          - •Suborder Praecardiidina Newell, 1965 (=Nepiomorphia Krž, 2007)
          - •Hyperor Praecardioidae Newell, 1965: •Superfamily Cardioloidea R. Hoernes, 1884; •Superfamily Praecardioida R. Hoernes, 1884

  - **Order Afghanodesmata! Carter, 1990b, p. 337**
    - a brachiopod (*P. r. PPR*) (Pratt); a brachiopod (*B. r. Brach*); a brachiopod (*P. r. Brach*); a brachiopod (*B. r. Brach*); a brachiopod (*P. r. Brach*)
Hypoder Antipleuroidei Kříž, 2007: Superfamily Dualinoidea Conrath, 1887
Order Arcida J. Gray, 1854a: Superfamily Arcoidea Lamarck, 1809; Superfamily Glyptarcoidea Cope, 1996; Superfamily Limopsoidea Dall, 1895a; Superfamily Philobyroidea Félix Bernard, 1897

Subcohort Ostreioni Férussac, 1822 in 1821–1822
•Megaorder Myalina H. Paul, 1939
  •Order Myalina H. Paul, 1939: Superfamily Alatoconchoidea H. Termier, Termier, & Lapparent, 1974; Superfamily Ambonychioidae! S. A. Miller, 1877; Superfamily Inoceramoidea C. Giebel, 1852; Superfamily Prokopievskioidea H. Vokes, 1967
Megaorder Ostreata Férussac, 1822 in 1821–1822 (plesion) •Family Myodakryotidae Tunnicliff, 1987
Superorder Ostreiformii Férussac, 1822 in 1821–1822 (=Eupteriomorphia Boss, 1982)
Order Ostreida Férussac, 1822 in 1821–1822
  •Family Myodakryotidae Tunnicliff, 1987
Superorder Ostreiformii Férussac, 1822 in 1821–1822 ❄️
Order Ostreida Férussac, 1822 in 1821–1822
Suborder Ostreidina Férussac, 1822 in 1821–1822: Superfamily Ostreoidea Rafinesque, 1815
Suborder Malleidina J. Gray, 1854a
(paraplesion) •Family Pterineidae F. Meek, 1864b
Superfamily Pinnoidea Leach, 1819; Superfamily Posidonioidea Neumayr, 1891; Superfamily Pterioidea J. Gray, 1847b (Goldfuss, 1820); Superfamily Rhombopterioidea J. Gray in Eberzin, 1960
Order Pectinida J. Gray, 1854a
(paraplesion) •Superfamily Leiopectinoidea Krasilova, 1959
Suborder Pectinidina J. Gray, 1854a: Superfamily Pectinoidea Rafinesque, 1815
Suborder Anomiidina J. Gray, 1854a
Hypoder Anomioidae J. Gray, 1854a
•(plesion) ?Family Saharopteriidae G. Termier & H. Termier in Pareyn, Termier, & Termier, 1972
•(paraplesion) Superfamily Pseudomonoitidae! Newell, 1938
Minorder Anomioidae J. Gray, 1854a: Superfamily Anomioidae Rafinesque, 1815
Minorder Dimyoidae Ridewood, 1903: Superfamily Dimyoidae P. Fischer, 1886; Superfamily Plicatuloidea J. Gray, 1854b; Superfamily Prospindylotoidea! Pechlinsava, 1960
•Hypoder Aviculopectinoidea! Starobogatov, 1992; Superfamily Aviculopectinoidea! F. Meek & Hayden, 1865;
•Superfamily Chaenocardioidea S. A. Miller, 1889; Superfamily Heteropectinoidea! Beurlen, 1954; Superfamily Pterinopectinoidea! Newell, 1938
Hypoder Limoidei R. Moore in Moore, Lalicker, & Fischer, 1952: Superfamily Limoidea Rafinesque, 1815
•Hypoder Monotoidea Waterhouse, 2001: Superfamily Buchioidae! Cox, 1953 (P. Fischer, 1886); Superfamily Eurydesmatoloidea! Reed, 1932; Superfamily Oxytomoidea Ichikawa, 1958
Suborder Entoliidina! Hautmann, nov.: Superfamily Entolioidae! Teppner, 1922; Superfamily Euchondrioidea! Newell, 1938

Infraclass Heteroconchia Hertwig, 1895
Cohort Uniomorphi J. Gray, 1854a (=Palaeoborderonta of authors)
(plesion) •Family Thoraliidae N. Morris, 1980
Subcohort Unio J. Gray, 1854a
(paraplesion) •Superfamily Lyrodesmatoidea! P. Fischer, 1886
Megaorder Unioctana J. Gray, 1854a
Order Trigonida! Dall, 1889: Superfamily Myophorelloidea T. Kobayashi, 1954; Superfamily Pseudocardinioidea Martinson, 1961; Superfamily Trigonioidae! Lamarck, 1819; Superfamily Trigonioidae! Cox, 1952 (or in Unionida?); Superfamily Trigonioidae! Modell, 1942
Order Unioctana J. Gray, 1854a
Suborder Unionindina J. Gray, 1854a: Superfamily Mullerioidea Deshayes, 1832a; Superfamily Trigonioidae! Cox, 1952 (or in Trigonida?); Superfamily Unionoidea Rafinesque, 1820
Suborder Hyrididae Hoch & others, 2009: Superfamily Hyrioidea Swainson, 1840
•Suborder Sicilunionidina! Skawina & Drzik, 2011; Superfamily Sicilunionoidae! Skawina & Drzik, 2011

Cohort Cardiomorphi Férussac, 1822 in 1821–1822 (=Heterodonta of authors)
(plesion) •Family Lipanellidae Sánchez, 2005
Subcohort Carditioni Dall, 1889
•Order Actinodontida! Deschaseaux, 1952; Superfamily Amnigenioidea Khalfin, 1948; Superfamily Anodontopoidea! S. A. Miller, 1889; Superfamily Nyassoidea! S. A. Miller, 1877; Superfamily Oriocrassatelloidea Boyd & Newell, 1968; Superfamily Palaeomuteloidea Lahusen, 1897
Order Cardidida Dall, 1889
(plesion) •Family Archaeocardiidae Khalfin, 1940
(paraplesion) •Family Eodonidae! Carter, Campbell, & Campbell, 2000
Superfamily Crassatelloidea Férussac, 1822 in 1821–1822

Supercohort Cardioni Férussac, 1822 in 1821–1822 (=Euheterodonta Giribet & Distel, 2003)

Infrasubcohort Lucinidia J. Gray, 1854a  
(paraplesion) •Superfamily Babinkioidea! Horný, 1960  
Order Lucinida J. Gray, 1854a: Superfamily Lucinoidea! J. Fleming, 1828; Superfamily Thyasiroidea Dall, 1900 (Dall, 1895a)

Infrasubcohort Cardidiida Férussac, 1822 in 1821–1822  
(paraplesion) •Superfamily Grammysioidea! S. A. Miller, 1877

Megaorder Cardiata Férussac, 1822 in 1821–1822  

Superorder Cardiiformii Férussac, 1822 in 1821–1822  

•Order Modiomorphida! Newell, 1969c: •Superfamily Modiomorphoidea! S. A. Miller, 1877
•Order Megalodontida! Starobogatov, 1992: •Superfamily Mecynodontoidea! Haffer, 1959; •Superfamily Megalodontoidea! J. Morris & Lyckett, 1853
•Order Hippuritida Newell, 1965; •Superfamily Radiolitoidea d’Orbigny, 1847b; •Superfamily Requienioidea Kutasy, 1934

Order Cardiida Férussac, 1822 in 1821–1822  

(paraplesion) •Superfamily Kalenteroidea! Marwick, 1953  

Infrasubcohort Cardiidia Férussac, 1822 in 1821–1822  

•Superfamily Kalenteroidea! Marwick, 1953  

Superorder Cardioidei Férussac, 1822 in 1821–1822: Superfamily Cardioidea Lamarck, 1809; Superfamily Tellinoidea Blainville, 1814

Hydropod Veneroidei J. Gray, 1854a  

Minorder Veneroitei J. Gray, 1854a: Superfamily Arcticoidea! R. Newton, 1891 (d’Orbigny, 1844 in 1844–1848); Superfamily Chamoidea Lamarck, 1809; Superfamily Cyrenoidea J. Gray, 1840b; Superfamily Gaimardioidea Hedley, 1916; Superfamily Glossoidea J. Gray, 1847b (J. Gray, 1840b); Superfamily Ungulinoidea J. Gray, 1854b; Superfamily Veneroidea Rafinesque, 1815

Minorder Dreissenoides The Moore in Moore, Lalicker, & Fischer, 1952; Superfamily Dreissenoides J. Gray, 1840a; Superfamily Sphaeroides! Deshayes, 1855b (Rafinesque, 1820)

Suborder Gastrochaenidina Morretes, 1949: Superfamily Gastrochaenoides J. Gray, 1840b


Suborder Leptonidina Dall, 1889: Superfamily Cyamoides! G. O. Sars, 1878; Superfamily Galeommatoides J. Gray, 1840b

Superorder Pholadiformii J. Gray, 1854a  

Order Pholadida J. Gray, 1854a: Superfamily Myoidea Lamarck, 1809; Superfamily Pholadoidea Lamarck, 1809; •Superfamily Pleuromyoidea! Zittel, 1895

Megaorder Poromyata Ridewood, 1903

Order Poromyida Ridewood, 1903: Superfamily Cuspidarioidea Dall, 1886; Superfamily Parilimoidea! B. Morton, 1981; Superfamily Poromyoida Dall, 1886; Superfamily Verticordioidea! Stoliczka, 1870 in 1870–1871  

Order Pholadomyida! Newell, 1965: Superfamily Pholadomoidea! W. King, 1844

Order Pandorida R. Stewart, 1930: Superfamily Clavagelloidea d’Orbigny, 1844 in 1844–1847; Superfamily Pandoroidea! Rafinesque, 1815

Order Thraciida Carter, nov.: Superfamily Thracioides! Stoliczka, 1870 in 1870–1871 (Couthouy, 1839)

Megaorder Solenata Dall, 1889.

Order Solenida Dall, 1889: •Superfamily Orthonotoidea! S. A. Miller, 1877; Superfamily Solenoides Lamarck, 1809  

Order Hiattellida Carter, nov.: •Superfamily Edmondioidea! W. King, 1850; Superfamily Hiattelloidea J. Gray, 1824

APPENDIX 4. AUTHOR ADDRESSES

Cristian R. Altaba, Laboratori de Sistemàtica Humana, Universitat de les Illes Balears, 07122 Palma, Balearic Islands, Spain, cristian.altaba@uib.cat  

Laurie C. Anderson, South Dakota School of Mines and Technology, 501 East Saint Joseph Street, Rapid City, South Dakota 57701-3901, USA, Laurie.Anderson@sdsmt.edu

Rafael Araujo, Museo Nacional de Ciencias Naturales, José Gutiérrez Abascal 2, 28006, Madrid, Spain, mcnra2f@mncn.csic.es

Alexander S. Biakov, Chief of Laboratory of Stratigraphy and Tectonics, North-East Interdisciplinary Scientific Research Institute (NEISRI), Far East Branch, Russian Academy of Sciences, Portovaya Street, 16, 685000, Magadan, Russia, abakov@mail.ru

Arthur E. Bogan, Research Laboratory, North Carolina State Museum of Natural Sciences, Mail Service Center 1626, Raleigh, North Carolina 27699-1626, USA, arthur.bogan@ncdenn.gov

David C. Campbell, Paleontological Research Institution, 1259 Trumansburg Road, Ithaca, New York 14850, USA, pleuropedia@gmail.com

Matthew Campbell, Department of Biology, Charleston Southern University, 9200 University Boulevard, Charleston, South Carolina 29406, USA, mrcampbell2008@gmail.com


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