



THE CONE COLLECTOR

Filmer 2011.

Nomenclature and Taxonomy in Living Conidae

Introduction

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Version 2.0 October 2012.

INTRODUCTION

This material was first published in 2001 as a book by Backhuys Publishers Leiden, The Netherlands. It is up-dated and photographs of the types are added to the earlier text herein.

The author has done his best to ensure that no Copyright Laws are broken and has made every effort to obtain permission to publish where necessary. Should there be any cases where he has failed to obtain permission he apologizes and will correct the entry if so advised.

It is not the intention of this author to take any actions in this work which have an effect on nomenclature or taxonomy (Disclaimer). The rules for the nomenclature and taxonomy in Zoology are set out in the International Code of Zoological Nomenclature (hereinafter "the Code"). Therefore there are no new names, designations of lectotypes, type localities or other such actions herein.

In this publication this author includes all the species group names in the Family Conidae genus *Conus*, (Class Gastropoda, Subclass Prosobranchia, Order Neogastropoda and Super Family Conoidea), It excludes:

- 1) All names which precede the establishment of the Binominal System by Carolus Linnaeus (Karl von Linné) in the 10th edition of the "Systema Naturae per Regna Tria Naturae, published in 1758.
- 2) All names of fossils except those subsequently proved to be living or closely related to living species.
- 3) All names introduced in works which, are on The Official Index of Rejected and Invalid Works in Zoological Nomenclature of the International Commission on Zoological Nomenclature (ICZN hereafter), see Appendix 1 A.

J.R. le B. Tomlin published the first such general catalogue in 1937 (The Proceedings of The Malacological Society, volume 22, parts 4 & 5, pages 205 - 330, March & July 1937). This work was updated by A.J. Kohn & A.C. Riggs in 1979 (The Journal of Molluscan Studies, 45, pages 131 - 147) and again later by A.J. Kohn, P.E. Pointer, A.C. Riggs & H.T. Dang, and by A.J. Kohn, S.S. Kim, P.E. Pointer, A.C. Riggs and H.T. Dang in 1992 and in 1995. The list also appears on the Internet (<http://fly.hiwaay.net/dwills/shellnet.html>) updated by A.J. Kohn, S.S. Kim, P.E. Pointer, A.C. Riggs, H.T. Dang, A.K. Swarthout and T.A. Bode. All of these publications/lists covered both living and fossil shells in the genus *Conus*.

Details of Appendices are, in the main contained, in the various sections hereunder. Appendix 4 is a Glossary and Appendix 8 lists all

names, included in the main listing, arranged alphabetically under the first author's name.

The process of evolution means that the status of a species is only transitory, in that, it has evolved from another and may evolve to a third hence the science of zoological taxonomy cannot be fixed. The common definition of a species is concerned with its ability to breed. A separation between two similar animals into separate species is generally only justified if they cannot produce fertile offspring. In the case of shells it is, at present, nearly always impossible to determine whether they can produce fertile offspring or not. Consequently it is almost impossible to distinguish between distinct species. Now various experts are study the DNA of Mollusca, this may lead to a better clarification of species differentiation. Because of this those concerned with taxonomy in the Mollusca have tended to fall into two groups, commonly called "splitters" and "lumpers". "Splitters" are those who tend to see relatively small differences in texture, shape or colour as justifying separate species status. "Lumpers" are those who tend to assume that minor differences do not justify separate species status. This author is generally in the camp of the "lumpers", as will be seen in the main list under the heading "Taxonomic status".

This author is also concerned about the lack of detail appearing in many new descriptions, especially in comparisons (discussion). In many cases very few specimens are examined. Often the apparent differences between the new and existing named taxon are trivial and indeed much less than exists between specimens of known very variable species such as *C. magus* Linnaeus, 1758. In these cases it is difficult to be reasonably sure that new species status is justified. However difficult a task it might be, this author would like to see the ICZN lay down rules for the conditions under which a new species or subspecies can be named. Such an action would considerably reduce the proliferation of dubious new taxa.

This author deplores the continued introduction of unofficial unavailable names for various forms or varieties (infrasubspecific names). It leads to confusion not to clarity and it also defeats the binominal system and the purpose of the rules, to govern the naming of zoological specimens, established by the scientific community

ACKNOWLEDGEMENTS

The author is especially indebted to the following for considerable help and guidance: The late Dr. Henry Coomans and Mr Robert MoolenbEEK of the Zoological Museum, University of Amsterdam: Dr. Dieter Röckel of Eberbach, Germany: Dr. Emilio Rolán of Vigo, Spain: Mr. Jon Singleton of Geraldton, Western Australia: The late Mr. Walter Sage of the American Museum of Natural History New York: Dr. Antonio Monteiro of Lisbon, Portugal and particularly to Ms. Kathie Way and Mrs. Joan

Pickering of the Natural History Museum, London, both of whom gave me a great deal of help and advice, the latter was also kind enough to comment on the manuscript: Dr. P.K. Tubbs, secretary to the ICZN, also gave valued advice. Many other museum staff have granted me access to the type collections, to study and photograph the types. Many other individuals have assisted me in various ways these are listed in Appendix 2 and all are due my sincere thanks.

Four major general reference books have also been of great value to the author in the research for this publication. They are: Cone Shells of the World by J.A. Marsh and O.H. Rippingale, 1968; Cone Shells by J.G. Walls, 1979; A Chronological Taxonomy of *Conus*, 1758 - 1840 by A.J. Kohn, 1992 and Manual of the Living Conidae by D. Röckel, W. Korn & A.J. Kohn, 1995.

Finally my special thanks are due to Mr. Bill Fenzan of Virginia USA who over some years has given me considerable help and advice and provided many images. Most of all, without the huge amount of time Mr. Gavin Malcolm of Hampshire England has spent checking, providing images from old books and converting the book form to the website form this project would have been impossible. I am most grateful to him. I would also like to thank Mr. Andre Poremski, the website manager for his excellent work.

GENERA AND SUBGENERA

Much has been written on the subject of genera and subgenera in the Family Conidae. This work is not intended to further the arguments on this subject. It therefore follows the majority of significant authors (e.g. Linnaeus, Gmelin, Hwass, Reeve, the Sowerbys', Tomlin, Kohn and Röckel) who have preferred to maintain the single genus *Conus*, except as indicated below. Röding's use of *Cucullus* is assumed to be synonymous with *Conus*.

Where authors, in original publications of new names, have used different genera and/or subgenera these are included as follows: Genus is shown un-bracketed, e.g. *Darioconus bengalensis* Okatuni, 1968: Subgenus is shown bracketed, e.g. *Leptoconus (Thoraconus) biraghii* G. Raybaudi (Massilia), 1992. Genera and subgenera, other than *Conus*, which appear in this catalogue, are listed in Appendix 6 with the original authors' names and dates of publication.

The suggested re-classification of the genus *Conus* by J.K. Tucker & M. J. Tenorio in their recent book "Systematic Classification of Recent and Fossil Conoidean Gastropods" is not applied herein, except where one of these genera is designated by the original author of a new name.

There is one area of uncertainty and that relates to the genus *Conorbis* first introduced by Swainson in 1840. Only one species in the

Family Conidae was placed, originally, in this genus, namely *Conorbis adamii* Bozzetti, 1994, however a few other species names may well belong in this genus, e.g. *C. coromandelicus* E.A. Smith, 1894, *C. eucoronatus* Sowerby, 1903, *C. helgae* Blöcher, 1992 and *C. lenhilli* Cargile, 1998. Recent studies of radula suggest these species might belong in the Family Turridae. For purposes of consistency and until more work is done these names are included herein in the genus *Conus*.

THE CODE OF THE INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE

Appendix 1 A lists the suppressed works listed on the OFFICIAL INDEX OF REJECTED AND INVALID WORKS IN ZOOLOGICAL NOMENCLATURE

Appendix 1 B lists the names, which are suppressed and are on the OFFICIAL INDEX OF REJECTED AND INVALID SPECIFIC NAMES IN ZOOLOGY.

Appendix 1 C Concerns the principle of priority. Article 23 in the Code describes the Principle of Priority and its purpose (Appendix 1 C). In recent years much confusion and discussion has arisen when either new names have been introduced or old names have been rediscovered which create a conflict between priority and stability. In Appendix 1 C are detailed a number of cases, known to this author, which need to be clarified.

USING THIS CATALOGUE

A. Species names and authors

- 1) Names are listed alphabetically under the name introduced, where the name was introduced as a subspecies, variety or form, this is included in brackets () after the name, (this is not in accordance with the Code but is done to enable the alphabetical listing and to facilitate finding a name), e.g. *C. abboti* (subspecies regius Gmelin) Clench, 1942.
- 2) Names are listed as published and not altered to conform with gender rules, e.g. *Cleobula albonerosa* Garrard, 1966 is retained as *Conus albonerosa* Garrard, 1966 and not altered to *albonerosus*, (this is not in accordance with the Code but is done to recognize and preserve the original name).
- 3) Inverted commas " " surround names published where it is apparent that it was not the intention of the author to introduce a new name. e.g. "*albinistique*" Prigent, 1983.
- 4) Brackets and inverted commas (" ") are used when a publication only became available the year or years after its official date. eg. *C. anceps* A. Adams, 1854 ("1853").

5) Inverted commas " " are used when an author has indicated, in the original description, another author's manuscript or publication, valid or otherwise. eg. *C. achates* "Meuschen" Dillwyn, 1817.

6) There were four members of the Sowerby family who were involved in the Conidae in one way or another. One, James (1757 - 1822). And three with the same Christian name, George Brettingham. As it is probable that both G.B. Sowerby 1st (I) (1788 - 1854) and his son G.B. Sowerby 2nd (1812 - 1884) were involved in the preparation of The Conchological Illustrations published between the years 1833 and 1841, this author has used the terminology Sowerby I & II, e.g. *C. albomaculatus* Sowerby I & II, 1841 and lastly G.B. Sowerby 3rd (III) (1843 - 1921).

7) Broderip and Sowerby I & II worked together in 1833 introducing new names, in some cases Broderip's names appeared first, in others Sowerby's did, but Broderip also published the same names just after Sowerby, in these cases Broderip's names are also included (as homonyms and synonyms), e.g. *C. luteus* Broderip, 1833.

8) Although Dr. A.J. Kohn (1993) rightly credits the names introduced in the Portland Catalogue, 1786 to Lightfoot, this author has retained the "S" Lightfoot where this was included in the Catalogue. eg. *C. arenatus* "S" Lightfoot, 1786. This "S" refers to the unpublished manuscript of Dr. Solander (the source of most names introduced by Lightfoot).

9) Species names from the German language possessing an Umlaut have been altered to conform with the ICZN rules. eg. *C. gruneri* Reeve is changed to *C. grueneri* Reeve, 1843.

B. Publications

- 1) Abbreviations used, are explained in the following Appendices:
 - a) For major works, relevant to the genus *Conus*, in Appendix 3 A.
 - b) For serials, journals and magazines, relevant to the genus *Conus*, in Appendix 3 B. These abbreviations conform in the main to The List of Publications in the library of the Natural History Museum, London.
 - c) For generally used words in this work, in Appendix 3 C. Names of minor works are either given in full or are covered by the general abbreviations.
- 2) All Roman numerals are converted to Arabic numerals.
- 3) Issues of the Proceedings of the Zoological Society (London) were numbered in two different ways, up to 1858 each year was a part number

followed by a number, e.g. in 1843, "pt. 11, no. 130". The last part number was 26. Since 1859 the year was not numbered but within each year parts were issued, these are shown as "unnumbered (year number following on from no. 26), pt. no."

4) After Reeve the abbreviation "C. I." refers to the *Conchologia Iconica* and after Sowerby and/or Broderip the same abbreviation refers to the *Conchological Illustrations*.

5) In Reeve's *Supplement to Conchologia Iconica* the numbers were incorrectly printed repeating numbers already used in the main work, the numbers in brackets correct the error in the numbering on plates 4 (iv) to 9 (ix).

6) The *Atlante Malacologico Molluschi Marini Viventi Nel Mediterraneo* by F. Settepassi published by Museo Civico di Zoologia del Comune di Roma Italy is dated 1972 but volume 3 with the *Conidae* was only published on 10th July 1985. The *Conidae* section was authored by A. Gaglini and introduced many new names which are non binominal, it should probably be declared an invalid work by ICZN and placed on The Official Index of Rejected and Invalid Works in Zoological Nomenclature. However, as it has not yet been so declared, the new names in the genus *Conus* introduced in the main body of this work are included herein but the numerous names introduced in the plates without descriptions are not included.

7) The assumed publication dates of L. C. Kiener's major work *Spécies Général et Iconographie des Coquilles Vivantes 2, Descriptions, Paris, France*. Abbreviated to **Coq. Viv. 2** has been 1845 for the plates and from 1845 to 1850 for the descriptions (text). Recently M.J. Faber discovered a set of the Kiener series with different and possibly correct dates. These were published in *Miscellanea Malacolgia* 5 (3) 2011 in an article entitled "The Holy Grail of Louis Charles Kiener's *Spécies Général des Coquilles Vivantes*" These new dates are shown in brackets () after the original dates for both the plates and the descriptions (text) e.g. *C. africanus* plate 1845 (1848) page (1849) (1850)

C. Type Species

1) Abbreviations for museums with *Conus* type collections are listed in Appendix 3 D.

2) "representation" is used where a holotype or a lectotype from a figure only has been designated to represent either the holotype or the lectotype. In the case of Sowerby the abbreviation "C. I." refers to the *Conchological Illustrations* and the abbreviation "T. C." to the *Thesaurus Conchyliorum*. In the case of Reeve the abbreviation "C. I." refers to the *Conchologia Iconica*. In the case of Kiener the

abbreviation "C. V." refers to *Spécies Général et Iconographie des Coquilles Vivant 2*.

3) Designators of lectotypes, neotypes or representations of types are given in brackets "()", in the case of types designated by Coomans, Moolenbeek & Wils and published in *Basteria* between 1979 and 1986 "(C, M & W)" is used, in the interests of space.

4) Clench in 1942 used the terminology "designated type" not specifying either holotype or lectotype, this terminology is retained herein.

5) Nowell-Usticke in 1968 did not designate holotypes, in 1971 he introduced holotypes, which is not permitted under the Code, in these cases the designated specimens are described as lectotypes herein.

6) Kohn, in his earlier reviews of *Conus* Taxonomy published in the *Zoological Journal of the Linnean Society*, London, between 1976 and 1988, sometimes incorrectly designated holotypes, these designations were altered to lectotypes where necessary by Kohn in 1992.

7) In a few cases two authors have designated the same or different types, in these cases the earlier designation is retained, if both are designated at the same time both names are included.

8) Dimensions of types are shown in millimetres in brackets "()", Dimensions are precise where so stated in the original description or designation but rounded to the nearest 0.5 mm. in other cases. "fig" is used where figures are the basis for representations of types or cited figures. "(? mm)" is used where the dimensions are not known. "figured" is used when a syntype, which is present in a collection, was figured in the original description.

9) Dimensions of all figures are the actual sizes and are not altered to reflect the shell size as follows:

a) Figures in Martini, 1773 and Chemnitz, 1788 & 1795 are not reduced by 8% as applied by Kohn (*Chronological Taxonomy of Conus*, 1758 - 1840 (page 117 - 118)).

b) Figures in Rumphius, 1705 are actual dimensions, although the figures do display the spire in an unusual way and the actual specimens would have been 10% to 15% smaller.

c) Figures in Sowerby ii, 1858 - 1885 in *Thesaurus Conchyliorum* vary in size and do not seem to relate to actual shell size, dimensions given are those of the figures.

10) "cited" is used where no types exist and no representations of types exist but where the original author has referred to figures in the works of others, valid or otherwise.

11) "type series" is used when it is unclear as to whether the

original author studied one or more specimens and where no subsequent designation exists.

12) In cases where an author refers to one specimen and the whereabouts of this specimen is known. But the author does not say whether only one specimen was studied some taxonomists consider the one specimen to be a syntype. This author considers the one specimen to be the holotype.

13) Where holotypes or type material is lost and the original author named the collection or collections in which the original material was deposited, then this information is included herein. This may help in later efforts to discover lost material, e.g. type material in the collection of H. Cuming which should mostly be in BMNH but is not all traceable at present.

14) Where holotypes or lectotypes are lost but paratypes or paralectotypes are available relevant locations and dimensions are given.

15) Where syntypes are available one or more of these are included, provided no holotype exists and no designation of a lectotype or a neotype has been published.

16) Where names have been introduced which are unavailable names (nomen nudum) under the Code the originally described or named specimen or specimens are referred to as "specimen(s) named" or as "specimen(s) described".

17) Where no type(s) has (have) been designated by the original author then the term "no type designated" is used.

18) The whereabouts of a number of type collections is unknown. Also those of a number of synonyms of *C. ventricosus* Gmelin, 1791 introduced by authors such as Nardo in 1847. Nardo mentions figures in most of his descriptions, however no figures were included in the original work. It is probable that Nardo is referring to figures in the manuscript of S. Chiereghini, unfortunately this author has not been able to locate a copy of Chiereghini's manuscript.

20) It has not been possible to obtain details on a number of type species in Italian museums. Authors whose material is in Italian museums include: de Gregorio in MPUP, (due to damage in World War 2 this material is now untraceable): Monterosato in MCR, (this material is currently being studied, although most material is no longer traceable): Coen in various Italian museums (material is destroyed or untraceable): Gaglini, in MCR (material is untraceable). As all the names introduced by these authors are forms of *C. ventricosus* Gmelin, 1791 the details of the type species are not that important.

21) Recently some of the types of J.H. Chemnitz have been discovered in the Zoological Institute of the Russian Academy of Sciences St. Petersburg. These types were apparently purchased by the Academy at a public auction in Copenhagen on the 7th December 1802. So far only one *Conus* type has been found namely *C. arachnoideus* Gmelin, 1791.

22) Images of all actual Types and designated representative types have no captions. Images of original figures; cited figures; paratypes; or types of species which have been renamed do carry captions.

D. Type Localities

- 1) "not known" is used where it appears that the original author did not know the locality of the type.
- 2) "not mentioned" is used where the original author does not mention the locality and may or may not have known it.
- 3) Where names have been introduced which are unavailable names (nomen nudum) under the Code. The original locality where the specimen or specimens were found, if known, is given as "Locality".
- 4) People's names in brackets (), after the locality, are either those accredited by the original author or those who corrected, altered, designated or restricted the locality. "(erroneous)" is included when a type locality has been altered by a subsequent author and "[erroneous]" is included when, in this author's opinion, the original or subsequently designated type locality is incorrect. "[dubious]" is included when, in this author's opinion the original or subsequent alteration is suspect.
- 5) Where the original type locality designation is limited or where the name of a type locality has changed, additional or clarifying information is added in brackets "()". In the case of some localities from the Central American countries, (East coast) or (West coast) is included to indicate either the Gulf of Mexico - Caribbean Sea or the Pacific Ocean.
- 8) Habitats, where they are included in the original description, are given in brackets "()" after the locality data.

E. Nomenclatural Status

The purpose of this entry in the lists is to establish whether or not the name itself meets the requirements of the Code, (4th Edition). It does not indicate the relationship between the name and a taxon.

- 1) **available names** are:

- a) Valid names, which may be applied to a taxon.
 - b) Invalid names, which are objectively invalid and are either primary junior homonyms or totally or partially suppressed names.
 - c) Emendations, which are, either justified corrections of incorrect spelling and take the name of the original author, or unjustified emendations (without reason) and take the name of the emending author, and become junior homonyms of the original name.
- 3) **unavailable names (nomen nuda)** are:
- a) Anonymous names (no author):
 - b) Names cited as synonyms:
 - c) Names cited as varieties or forms published after 1960, (infrasubspecific names), Before 1961 such names are automatically elevated to subspecies status, except if the original author clearly states that infrasubspecific rank is intended.
 - d) Names named but not described or figured before 1930.
 - e) Names named but not described or indicated ("indicated" requires some comparison with other taxon) or figured after 1931.
 - g) Names published in invalid publications, e.g. the Disclaimer in The Hawaiian Shell News.
 - h) Names published which were not intended to introduce new names.

F. Taxonomic Status

The purpose of this entry in the lists is to establish, whether or not, a name can be linked to a specific taxon.

- 1) All conclusions and/or comments under Taxonomic status are purely the opinion of this author (subjective) and have no authority as to correctness and are therefore subject to the differing opinions of any other person.
- 2) **available names** are:
- a) Valid species (taxon).
 - b) Valid subspecies (taxon).
 - c) Synonyms of other names, (senior or junior, objective or subjective).
 - d) Doubtful (nomen dubium), where status is uncertain and no type material exists.
 - e) Uncertain (incertae cedis), where status is uncertain but type material exists.
- 3) **unavailable names** are:
- a) None. Meaning they have no taxonomic status under the Code and are excluded from zoological nomenclature. In these cases after "none" the identity of the specimen is given when known and the information is presented in "()" brackets under the title "specimen".
 - b) Homonyms (invalid names). The taxonomic status is given when known.

4) Names introduced in the genus *Conorbis*, e.g. *Conorbis adamii* Bozzetti, 1994 are provisionally included (see above under genera). Other species originally described in the genus *Conus*, which may belong in genus *Conorbis* are so indicated under Taxonomic status, e.g. *C. coromandelicus* Smith, 1894

5) Brackets "()" are used to indicate a form or a colour form, terms which have no validity in zoological nomenclature, but which indicate a difference of some note within synonymy.

6) In some cases where, in this author's opinion, there is doubt whether an available name is a valid species, subspecies or synonym, both possibilities are given, the more likely first and the less likely second.

7) The *Conus* species from the Cape Verde Islands are complex. It is possible that many of the new species named in recent years are forms or subspecies of *C. cuneolus* Reeve, 1843. However, it is also possible that most are distinct species, which have evolved as such from one or two species, (Duda & Rolán, 2005). This author accepts the views of those Spanish and Portuguese authors (E. Rolán, M. Tenorio, A. Monteiro, C. Fernandes and H. Trovão) who have undertaken detailed research on the Cape Verde *Conus*, taking into account such aspects as radula and egg capsules. Thus, in this work, they are mostly recorded as "valid species".

8) The *Conus* species from Angola are now reasonably well studied. The distribution and ranges of the Angolan cones are less clearly separated than are those of The Cape Verde Islands. Nevertheless, in this work, this author accepts the conclusions of E. Rolán, D. Röckel & F. Fernandes (1981, 1982, 2000 & 2001) and A. Monteiro, M.J. Tenorio & G.T. Poppe (2004). Thus most names are recorded herein as valid species, although some may prove to be synonyms (forms) of *C. bulbosus* Reeve, 1843 or of *C. africanus* Kiener, 1845.

There are similar variations in the species groups *C. anemone* Lamarck, 1810 from southern Australia and *C. tinianus* Hwass, 1792 from southeast Africa. In these cases it is generally accepted that there is only one species with much variation in shape and colour, possibly Cape Verde and Angolan cones are similarly varied forms of fewer species.

9) The *Conus* species from the western Atlantic and Caribbean are also complex. This author generally accepts the conclusions of D. Vink, expressed in his series, published in *La Conchiglia* between 1984 and 1991.

10) The Cones of the Eastern Pacific have recently been reviewed in considerable detail by Tenorio, Tucker & Chaney in "A Conchological

Iconography - The Families Conolithidae and Conidae - The Cones of the Eastern Pacific. Conchbooks 2012. This review is the basis of this author's conclusions now included in Update 2.