An illustrated and revised catalogue of Mesozoic radiolarian genera – objectives, concepts and guide for users

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ABSTRACT
This revision paper represents the final report by the InterRad Mesozoic Working Group on the taxonomy and stratigraphy of Mesozoic radiolarians at generic level. The review reports 915 genera and encompasses the type species' illustration of all described nominal genera of Mesozoic radiolarians (superorder Polycystina) from 1867, when the first Mesozoic radiolarian was described,

to 2008. This work is organized as an image catalogue of genera, where each type species is re-illustrated with a graphic scale bar indicating its magnification. Associated with each image is the most basic information that allows the reader quick location of the original publication where both genus and type species were described and/or illustrated. The review undergone here confirms the taxonomic validity of all genera according to the ICZN rules. Order and family assignment, synonymies and stratigraphic ranges are also fully analyzed. The review is divided in two parts: the Triassic and the Jurassic-Cretaceous. This division is justified by the low number of taxa crossing the Triassic-Jurassic boundary and by the significant change in morphologic patterns and faunal composition that occurred in the latest Triassic. A further reason justifying such division is the very low number of *nomina dubia* recorded in the Triassic, as opposed to the higher number in the Jurassic-Cretaceous interval. The main purpose of this catalogue is to enable radiolarian paleontologists to arrive to a satisfactory taxonomic system and establish the standards for future description of new radiolarian genera. The revision also includes a brief stratigraphic synthesis (generic range charts) which are only accessible in the electronic version of the journal.

KEY WORDS
Radiolaria,
taxonomic revision,
Mesozoic,
systematics,
type species,
biostratigraphy.

RÉSUMÉ

Un catalogue illustré et révisé de genres de radiolaires mésozoïques – objectifs, idées et guide pour les utilisateurs.

La publication du présent article est l'aboutissement d'un travail de révision entrepris par le Groupe de Travail Mésozoïque de l'association InterRad sur la taxonomie et la stratigraphie des radiolaires mésozoïques au niveau générique. Le nombre des genres mésozoiques révisés est de 915. Cette révision comprend les illustrations de toutes les espèces types des genres de radiolaires du Mésozoïque (superordre Polycystina) depuis 1867, date de la première description d'un radiolaire mésozoïque, jusque 2008. Ce travail est organisé comme un catalogue photographique des genres où chaque espèce type est illustrée avec une échelle de grossissement. Chaque image est associée à un certain nombre d'informations qui permettent au lecteur de retrouver facilement la publication originale dans laquelle le genre et l'espèce type ont été décrits et/ou illustrés. La révision entreprise dans ce travail précise la validité taxonomique de tous les genres selon les règles du *Code international de Nomenclature zoologique*. Les attributions aux familles et ordres, les synonymies et les répartitions stratigraphiques ont aussi été analysées avec grand soin. La révision est présentée en deux parties : le Trias et le Jurassique-Crétacé. Ce découpage est justifié par le petit nombre de taxons qui franchissent la limite Trias-Jurassique et donc le grand changement qui intervient à la fin du Trias, tant au point de vue des grands traits morphologiques qu'à celui de la composition faunique. Une autre raison qui justifie cette subdivision est le petit nombre de *nomina dubia* notés au Trias, à la différence du Jurassique et du Crétacé qui en comprennent un grand nombre. Dans le travail présenté ici, notre objectif principal est de permettre aux paléontologues de disposer d'un ensemble taxonomique satisfaisant permettant ainsi de disposer de standards corrects pour les descriptions futures de nouveaux genres de radiolaires. La révision inclut aussi une synthèse stratigraphique des genres ainsi que des chartes de répartition stratigraphique (uniquement accessibles dans la version électronique disponible sur le site internet de la revue).

MOTS CLÉS
Radiolaires,
révision taxonomique,
Mésozoïque,
systématique,
espèce type,
biostratigraphie.

Nomina si nescis, perit et cognitio rerum
Who knows not the names, knows not the subject
Critica Botanica, Linnaeus, 1773

INTRODUCTION
OBJECTIVES OF THIS CATALOGUE

The main goal of this catalogue is to present a complete and reviewed set of all existing Mesozoic genera with illustration of their type species. The catalogue is presented in two parts: Part 1 for the Triassic and Part 2 for the Jurassic-Cretaceous. The division is justified by the low number of genera in common to the two parts, i.e. only 30 genera cross the Rhaetian-Hettangian boundary.

We envision that this catalogue of radiolarian type species will be a useful tool in future systematic studies. In the past three decades there has been an overabundance of information, and the group experienced a vast proliferation of new generic names (up to 915). This is in part due to the fact that radiolarians displayed their maximum diversity through the Mesozoic Era. But the vastness of information is also related to the large number of radiolarian researchers and, consequently, to the many new taxa described in scattered publications, some rather obscure. In the late 1970s and early 1980s, soon after modern radiolarian research was initiated, it was relatively easy to be acquainted with all radiolarian literature. Currently, however, it has become more and more difficult, especially for beginners, to find and process the complete information and to evaluate the validity of all existing names of radiolarian taxa.

The goal of this publication is to present all the hitherto described genera, to revise their status and family assignment, and to provide their currently known stratigraphic range. Such a compilation will certainly facilitate everyday work for radiolarian researchers and will also serve to establish a taxonomic basis for a refined Mesozoic radiolarian stratigraphy.

WHY A CATALOGUE?

The origin of this project was founded on two main concepts: the high diversity of radiolarians and recurrent misclassification at generic level. The project was born in December 2005 when some of the authors were working on an article on radiolarian diversity. At that time, we were discussing the recurrent misclassification of many species by a process comparable to changes that occur in oral knowledge, that the historians call "homeostasis", i.e. the stories change imperceptibly over time to suit the needs and values of the culture. A striking case, for example, are the subsequent species assigned to the genus *Canutus*. This taxon is a good example of how new species included under the nominal genus show a gradual displacement from the original type species concept.

The reason for this is the misconception the genus inherited as a result of incorrect classification of the first species included under the genus which, in some cases, attains more significance than the type species. In other words, there is a gradual drift in the generic concept as newly described species assigned to the genus become progressively farther from the type species concept.

Obviously, changes in oral knowledge cannot be undone because there are no old copies to go back to. In our case something similar happens, however, there is still the possibility to go back to the sources, i.e. to revisit the type species. In this sense, we believed it is essential to provide a reference catalogue of all type species described for the Mesozoic genera. Preliminary information on this catalogue was presented at the 11th InterRad meeting (March 2006, Wellington, New Zealand) and a joint international project was then initiated under the framework of the Mesozoic Working Group of this association.

SOURCES

How to get a complete list of genera?
1) The first step was to produce a complete list of species described from Mesozoic material from which we derived the raw list of generic names. The species list is an objective record of all newly described taxa regardless their taxonomic status and includes valid taxa, junior objective or subjective synonyms, *nomina dubia*, etc. A catalog of holotypes

was produced by the project leader and it will be published as a "Complete index of Mesozoic Radiolarians (1876-2008)" in *Carnets de Géologie*. The list covers the period between 1876, when Karrer published the first Jurassic species, up to 2008. The number of differently named species known for the Mesozoic up to the present is 6296 recorded in 420 publications. As this represents the main source of this catalogue, an inventory with basic information is given at the end of this issue of *Geodiversitas* (O'Dogherty 2009, this volume).

This master list of Mesozoic species was made following a detailed bibliographic search of over 2300 papers dealing with Mesozoic radiolarians. Another source has been the use of the taxonomic database of the *Zoological Record* and *Nomenclator Zoologicus* provided by uBIO.

2) From the aforementioned list we have discriminated between true Mesozoic generic names and those names erroneously used for Mesozoic occurrences. Under "erroneously used" we have included all Mesozoic species that were placed incorrectly under a non-Mesozoic nominal genus by their authors. By this we mean, the use of a Recent, Cenozoic, or Paleozoic genus name but without any known representatives in the Mesozoic. Such attribution clearly constitutes an incorrect identification of the genus-group for such species. The list of these genera wrongly attributed to a Mesozoic species is given in full in Appendix 2; these genera should no longer be used for Mesozoic species. Following this action, we retained only the generic names considered as valid for the Mesozoic (see Appendix 1). This list is sorted alphabetically and can be searched by genus. Since the plates are not numbered, each genus is labeled with a figure code numbered from 1 to 396 for the Triassic and 1 to 603 for the Jurassic-Cretaceous; this follows the Japanese style of Yao (1997) or Matsuoka (2004).

DISCUSSION OF TAXA

The Mesozoic Working Group met twice for two-weeks in 2006 and 2007 in Granada, Spain, and soon after two of the participants attended two short meetings held in 2007 and 2008 in Paris, France. During these workshops we agreed upon the systematics and stratigraphy of Mesozoic genera. Throughout 2005-2006 we collected data to prepare the two databases for Mesozoic genera, one for the Triassic and the other for the Jurassic-Cretaceous. The datasets were prepared to enable fruitful discussion of each taxon and were sent to participants with detailed instructions, several months before the main meetings in Granada. These drafts were prepared as a catalogue of genera arranged by family groups or by closely related morphologies, following the systematic framework given in Dumitrica (1995) and the taxonomic classification of De Wever *et al.* (2001). The reason for this procedure was clear from the beginning since the taxonomic revision of a huge number of genera would be easier and more realistic if they were discussed by groups of closely related taxa instead of alphabetically. Pre-meeting preparation consisted of a personal revision of the stratigraphic ranges, possible synonyms and an outline agreement about family assignment. The discussions during each meeting in Granada were carried out with these annotated drafts. During the workshops the participants checked all taxa carefully in order to agree on the systematics and to achieve a taxonomic consensus of all contributors. Finally, the updated versions were prepared for the Paris meetings with the ultimate goal of completing the final version of the catalogue.

GUIDE FOR THE USER

This catalogue of genera ideally will be a quick visual tool allowing the identification of genera. For this reason, each genus is labeled with the most basic information (see Figure 1).

FIGURES

Each genus has an individual taxon code, which is a number without taxonomic significance but is required to find taxa on the plates. Since the genera follow a morphologic arrangement, this number, which is indicated in the alphabetic index, allows a quick search of the plates.

We have scanned and reproduced good images at 300 dpi resolution for each type species. These are accompanied by a scale bar made from the measurements indicated in the original publication. All

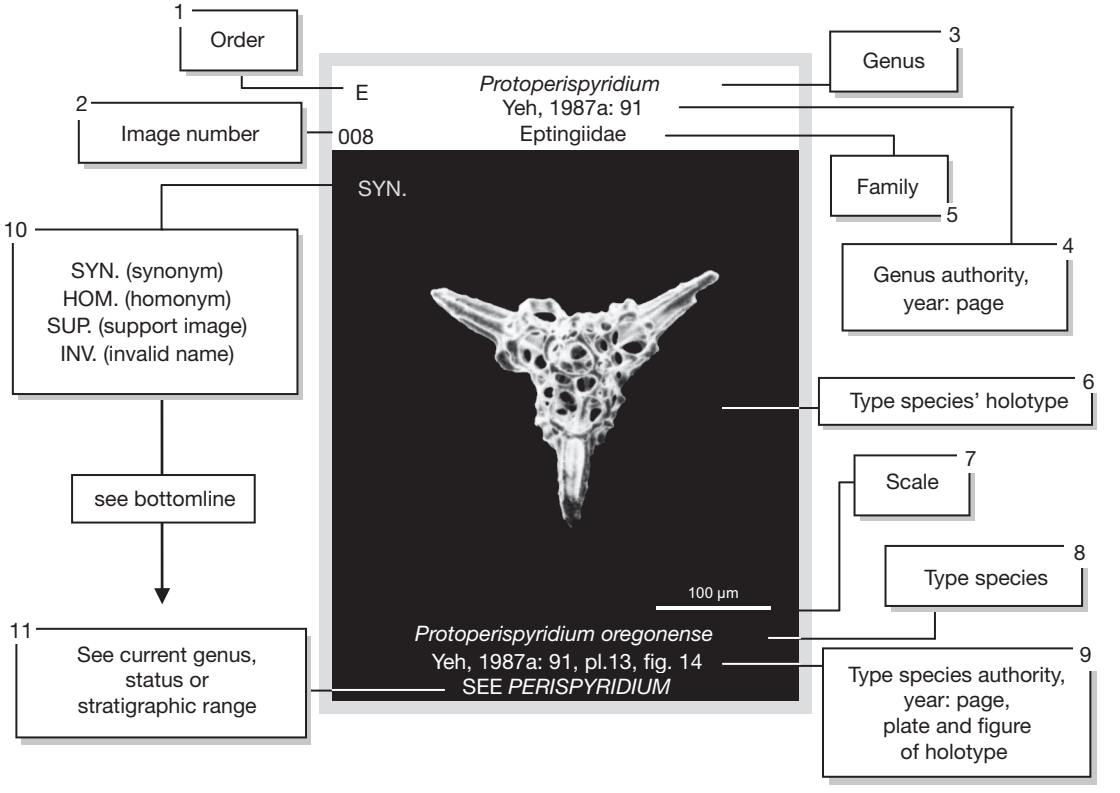

Fig. 1. — Image explanation. Example of genus record in the catalogue with indication of basic taxonomic information.

permissions granted for reproduction of the illustrations are gratefully acknowledged and are explicitly listed at the beginning of each catalogue.

Arrangement of figures

The figured genera are arranged on the plates taxonomically rather than alphabetically because, from a systematic point of view, we prefer to group taxa having morphologically significant affinities. The genera are grouped first by order (Albaillellaria, Latentifistularia, Entactinaria, Spumellaria including central capsules, and Nassellaria), then arranged by family, and finally are placed following stratigraphic occurrence and phylogenetic affinities. We have followed the systematic framework established by Dumitrica (1995), subsequently revised by the same author in De Wever *et al.* (2001), which has improved once more as a consequence of this taxonomic review. In some cases, a group of genera classified under the same family might be regarded as somewhat different at external morphology. This is due to the modern suprageneric classification followed, which is based on the internal spicule, constituting the basis of natural systematic relationships. Although the inventory of initial structures (especially in Entactinaria and Spumellaria) is still limited and their understanding fragmentary, this review fully agrees with the importance of such elements at higher systematic levels. The guiding principle in the classification of radiolarians at suprageneric level is that the structure of the initial skeletal elements is the most conservative through evolution and represents the common element characterizing a family group. With ontogeny, new skeletal elements are farther morphologically from the initial skeleton and this is the reason for

some external differences occasionally observed in a family group. The reader is referred to the general taxonomy in De Wever *et al.* (2001) for a more thorough explanation of this principle.

Homonyms and synonyms

When a case of homonymy was detected, or a taxon has been designed or suspected to be a synonym, this is indicated in the upper left part of the figure box (see Figure 1). In such cases the line underneath the figure refers to the correct genus.

In the initial stage of this study we noticed that several important genera were already preoccupied, and each author was duly informed allowing him/her a reasonable time of two years in which to publish a replacement name. Through 2006 and 2007 many new replacement names were published and they are included in this revision, but a few names still remain as homonyms (*Acastea* Yang, 1993, *Amuria* Whalen & Carter *in* Carter *et al.*, 1998, *Beatricea* Whalen & Carter *in* Carter *et al.*, 1998, *Canutus* Pessagno & Whalen, 1982, *Helena* Hull, 1997, *Maudia* Carter *in* Carter *et al.*, 1988, *Mita* Pessagno, 1977, *Thurstonia* Whalen & Carter *in* Carter *et al.,* 1998, *Triversus* Takemura, 1986). Following the code of ethics of ICZN, any future reviewer may establish a new replacement name for these genera.

The taxa were carefully reviewed and re-examined and many genera (157) were declared to be synonyms. An interesting observation derived from this study is that many of these synonymous taxa were established on very few morphological characteristics leading in most cases to a monotypic genus. Doubtful synonyms either at family or genus levels are preceded by a question mark.

In those cases where the characters displayed by the type species were not satisfactory and do not match positive identification to the type we have included an additional image (this is indicated in the upper left corner of the image, see Figure 1) as supporting evidence. These pictures are placed at the end of the catalogue.

Names of doubtful application

Those genera considered *nomina dubia* (up to 140) are indicated beneath the figure (see Figure 1) and the majority is presented at the end of the catalogue without family assignment. The only exceptions are those *nomina dubia* related or classically attached to a specific family. Such forms are allocated beside the closer representatives of the corresponding family group. Most of the genera here considered *nomina dubia* are those taxa described from thin sections by the pioneers of the study of Mesozoic and Paleozoic Radiolaria.

Nomina nuda

Since these names or nomenclatural acts are void of type species and were never illustrated they are only listed below.

Contortocircus Dumitrica & Dumitrica-Jud, 1997: 48 (type species *Acanthocircus furiosus* Jud, 1994) published in a proceeding conference (ICZN 1999: Art. 9.9.).

Excingula Kozlova, 1994 (type species *Excingula bifaria* Kozlova, 1994) is an invalid taxon. Although this nominal genus has been utilized (see Vishnevskaya & Murchey 2002) it was published in an internal report and cannot be considered valid according to ICZN 1999 Art. 9.7.

Stichomitrella Aliev, 1974, it cannot be considered valid according to the *Code* (ICZN 1999: Art. 9.5.), because it is recorded in Petrushevskaya (1981: 194) as oral communication from Aliev, neither holotype nor pictures are given in Petrushevskaya's review.

Invalid names

Names that have not been published in the meaning of Article 8 of the *Code* (ICZN 1999) have not been treated in this catalogue. An example is the genus ***Pseudolivarella*** Rose, 1994 (Rose 1994: 397), which was presented in an unpublished and not distributed thesis. However, the genus ***Foremanella*** Muzavor, 1977 (Muzavor 1977: 67) although not valid, is reillustrated because many copies of Muzavor's thesis were distributed and largely employed through the 1980s.

Authors

The general recommendations of the *Code* (ICZN 1999: Appendix B. 12) clearly state that in those cases where a name was published by more than three authors, the surname of the first author (as given in the original publication) may be cited alone in the text and followed by the term "*et al.*" However, we

TABLE 1. — List of abbreviated citations in the catalogue due to space limitations.

Authors	Modified in text as
Dumitrica, Baumgartner & Goričan, 1997	Dumitrica *et al.*, 1997
Hori, Whalen & Dumitrica *in* Goričan *et al.*, 2006	Hori, Whalen & Dumitrica, 2006
Marcucci & Salvini *in* Marcucci *et al.*, 1994	Marcucci & Salvini, 1994
O'Dogherty, Goričan & Dumitrica *in* O'Dogherty *et al.*, 2006	O'Dogherty, Goričan & Dumitrica, 2006
Pessagno & Blome *in* Pessagno *et al.*, 1984	Pessagno & Blome, 1984
Pessagno & MacLeod *in* Pessagno *et al.*, 1987	Pessagno & MacLeod, 1987
Pessagno & Yang *in* Pessagno *et al.*, 1989	Pessagno & Yang, 1989
Pessagno, Blome & Hull *in* Pessagno *et al.*, 1993	Pessagno, Blome & Hull, 1993
Tekin & Dumitrica 2007 *in* Dumitrica & Hungerbühler, 2007	Tekin & Dumitrica, 2007
Tikhomirova *in* Tikhomirova & Kazintsova, 1990	Tikhomirova, 1990
Vishnevskaya & Dumitrica *in* Vishnevskaya, 2006	Vishnevskaya & Dumitrica, 2006

have preferred to give the surnames of all authors, except in those fields (families, genera or species) where the entries are modified by limitations of field length. These changes are listed (Table 1) allowing their localization in the references list.

STRATIGRAPHIC RANGES

Although the main purpose of this catalogue is to provide precise information for the identification of type species, complementary stratigraphic ranges are presented on the bottom line of each valid genus (see Figure 1) merely to give some guidance to the age. We are aware of the limitations of our current stratigraphic knowledge, and a stratigraphic revision is far beyond the scope of this revision, especially when the zonal schemes for the Mesozoic (especially Lower Triassic and Upper Cretaceous) are not yet accurate. These ranges are meant to serve as guides offered by the contributors of this paper based on the literature and their own research (i.e. no references are cited for stratigraphic distribution of genera). As a complement of this revision, a brief stratigraphic synthesis (a set of two generic range charts) is included in the electronic version available in the *Geodiversitas* website.

LIMITATIONS (CRUCIAL THINGS TO REMEMBER)

– This is mainly an image catalogue of all Mesozoic genera rather than a stratigraphic one, as much work is still required to understand the true stratigraphic range of genera, especially for the Jurassic-Cretaceous period.

– Description of new genera is beyond the scope of this paper consequently this review reports only described Mesozoic genera. However, such assertion does not implicitly mean that it records all known genera. There are still several groups of species waiting for a new nominal genus either because they have been in use but their type species are of doubtful application, they have been reported as queried, or simply they are unknown to the science.

– Special attention must be paid to the critical boundaries of the Mesozoic Era, because the real knowledge of the fauna (at both genus and species levels) surrounding these intervals remains uncertain. This is in part due to enhanced preservation and diversity problems that are commonly associated with major extinction boundaries. A further reason may also be the sharp change in systematic style between groups of taxonomists working in distinct fields (i.e. Late Paleozoic vs. Early Mesozoic, or Late Mesozoic vs. Early Cenozoic). In this sense we strongly recommend the creation of two working groups to improve the knowledge of genera surrounding these critical boundaries. The exchanges in knowledge of the fauna would ultimately lead to improve and establish a solid and common taxonomic system. In a manner similar to this catalogue, the main effort should be paid to producing a common systematics for radiolarian genera in which a general consensus of contributors is clearly stated.

FUTURE DIRECTIONS

These concluding words represent a final recommendation in the interest of taxonomic stability:
– description of a new genus should be implemented on good illustration; ideally the type species should be photographed by both scanning electron microscopy and transmitted light;
– the type species for a new genus must be clearly determined in the original publication, with precise indication of the figured specimen and its location in a repository collection accessible to any researcher on request. The type locality, i.e. the sample from which the type species is derived, must be clearly indicated also;
– when erecting a new genus, the type species should be chosen from among sufficient pictures to illustrate the morphologic variability of such species;
– avoid erecting a new genus based on a very old publication whose holotype is not located in a clear repository site or is no longer accessible;
– the type species for a new genus should display nearly all common characters for the group of species;
– try to evade abuse of a monotypic genus by avoiding the description of a new genus based only on a few morphological characteristics. As a rule, the use of a single morphological character is not sufficient to distinguish a taxon at generic level. For this reason it would be best to use the combination of two or more characters for a new genus;
– the type species for a new genus must be selected from those taxa occupying a mid-position in the range of variability of the genus;
– when erecting a new genus, it should be mandatory to present the most complete list of included species under the new nominal genus.

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The project also benefits from important collaboration of some colleagues who helped us by contributing information relative to certain genera or publications of difficult access. In this sense we are indebted to Edward Amon, Nikita Bragin, Shyam Gupta, Yoshihito Kamata, Hui Luo, Jean-Pierre Caulet, Annika Sanfilippo and Valentina Vishnevskaya.

We especially wish to thank Jean-Pierre Caulet for allowing us to use the RadWorld relational database, an "endless work" prepared by himself, late Catherine Nigrini and Annika Sanfilippo. He constantly provided us with the latest version of this database containing original and subsequent descriptions of numerous radiolarian genera and their type species.

NOTE ADDED TO PROOFS

After this manuscript was accepted, our colleague Valentina Vishnevskaya provided us with the paper of Kazintsova & Tikhomirova (1975). This paper introduced several new taxa (three new genera and two new species; full names below) described in thin sections from chert and jaspers having very bad fossil preservation. These taxa are not illustrated in the main catalogue; nevertheless they would not influence the general meaning since they must be treated as *nomina dubia.*

Conocarposphaera Kazintsova *in* Kazintsova & Tikhomirova, 1975 (Kazintsova & Tikhomirova 1975: 37) (type species *Carposphaera circumplicata* Rüst, 1885: 290).

Conocarposphaera caucasica Kazintsova *in* Kazintsova & Tikhomirova, 1975 (Kazintsova & Tikhomirova 1975: 37).

Conocarposphaera zhamoidai Tikhomirova *in* Kazintsova & Tikhomirova, 1975 (Kazintsova & Tikhomirova 1975: 39).

Conocromyomma Kazintsova *in* Kazintsova & Tikhomirova, 1975 (Kazintsova & Tikhomirova 1975: 41) (type species *Cromyomma tuberculata* Lipman, 1949 [Lipman 1949: 117]).

Conothecosphaera Kazintsova *in* Kazintsova & Tikhomirova, 1975 (Kazintsova & Tikhomirova 1975: 41) (type species *Thecosphaera conosphaerica* Zhamoida, 1968 [Zhamoida 1968: 162]).

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APPENDIX 1

Index of Mesozoic genera sorted alphabetically. The number refers to the position in the corresponding part of this catalogue; the T before the number means that the taxon is presented in the Triassic part. Those genera crossing the Triassic-Jurassic boundary are reported twice in both parts of the Catalogue. Numbers for support figures are indicated in italics. Homonyms (**hom.**), synonyms (**syn.**), invalid taxa (**inv.**) and *nomina dubia* (**n.d.**) are indicated in brackets.

APPENDIX 2

Names of genera used erroneously for the Mesozoic, sorted alphabetically (for complete references, see the bibliography).

Acanthocorys Haeckel, 1881
Acanthosphaera Ehrenberg, 1858
Acrosphaera Haeckel, 1881
Actinomma Haeckel, 1860a
Amphicraspedum Haeckel, 1881
Amphisphaera Haeckel, 1881
Amphistylus Haeckel, 1881
Amphymenium Haeckel, 1881
Anthocyrtis Ehrenberg, 1847a
Archicircus Haeckel, 1887
Archicorys Haeckel, 1881
Artocapsa Haeckel, 1881
Artophormis Haeckel, 1881
Artostrobium Haeckel, 1887
Artostrobus Haeckel, 1887
Astractura Haeckel, 1881
Astrocyclia Haeckel, 1881
Astrophacus Haeckel, 1881
Bathropyramis (*Acropyramis*) Haeckel, 1881
Bisphaerocephalina Petrushevskaya, 1965
Botryocella Haeckel, 1887
Botryostrobus Haeckel, 1887
Calocyclas Ehrenberg, 1847b
Cannobotrys Haeckel, 1881
Carpocanistrum Haeckel, 1887
Carpocanium Ehrenberg, 1847a
Carpocanopsis Riedel & Sanfilippo, 1971
Caryosphaera Haeckel, 1881
Cenodiscus Haeckel, 1887
Cenosphaera Ehrenberg, 1854
Ceratocyrtis Bütschli, 1882
Challengeranium Haeckel, 1887
Challengeria Murray, 1876
Challengeron Murray, 1876
Chitonastrum Haeckel, 1881
Clathropyrgus Haeckel, 1881
Clistophaena Haeckel, 1887
Coccodiscus Haeckel, 1862
Conarachnium Haeckel, 1881
Conocaryomma Lipman, 1969
Conosphaera Haeckel, 1881
Cornutanna Haeckel, 1881
Corocalyptra Haeckel, 1887
Cromyechinus Haeckel, 1881
Cromyodruppa Haeckel, 1887
Cromyodrymus Haeckel, 1881
Cromyomma Haeckel, 1862
Cromyosphaera Haeckel, 1881
Cromyostylus Haeckel, 1881
Cyphanta Haeckel, 1887
Cyphinus Haeckel, 1881
Cyphonium Haeckel, 1887
Cyrtocalpis Haeckel, 1860b
Cyrtophormis Haeckel, 1887
Cyrtophormis (*Acanthocyrtis*) Haeckel, 1881
Dictyastrum Ehrenberg, 1860
Dictyocephalus Ehrenberg, 1860
Dictyoceras Haeckel, 1862
Dictyocoryne Ehrenberg, 1860
Dictyomitrella Haeckel, 1887
Dictyophimus Ehrenberg, 1847a
Dictyophimus (*Dictyophimium*) Haeckel, 1887

Dictyospyris Ehrenberg, 1847a
Discospira Haeckel, 1862
Dizonium Haeckel, 1887
Dorydictyum Hinde, 1890
Doryplegma Hinde, 1890
Dorysphaera Hinde, 1890
Druppatractus Haeckel, 1887
Druppula Haeckel, 1887
Drymyomma Jørgensen, 1900
Ellipsidium Haeckel, 1887
Ellipsostylus Haeckel, 1887
Ethmosphaera Haeckel, 1860a
Euchitonia Ehrenberg, 1860
Eucyrtidium Ehrenberg, 1847a
Eusyringium Haeckel, 1881
Flustrella Ehrenberg, 1838
Halicalyptra Ehrenberg, 1847a
Halicapsa (*Calpocapsa*) Haeckel, 1887
Halicapsa (*Echinocapsa*) Haeckel, 1881
Haliomma Ehrenberg, 1838
Heliodiscus Haeckel, 1862
Heliosoma Haeckel, 1881
Heliosphaera Haeckel, 1860a
Hexacontium Haeckel, 1881
Hexacromyum Haeckel, 1881
Hexadoras Haeckel, 1881
Hexadoridium Haeckel, 1881
Hexaloncbe Haeckel, 1881
Hexastylarium Haeckel, 1887
Hexinastrum Haeckel, 1881
Histiastrum Ehrenberg, 1847a
Hymeniastrum Ehrenberg, 1847a
Liosphaera Haeckel, 1887
Lithapium Haeckel, 1887
Lithatractus Haeckel, 1887
Lithobotrys Ehrenberg, 1844
Lithocampe Ehrenberg, 1838
Lithochytris Ehrenberg, 1847a
Lithocircus Müller, 1857
Lithocubus Haeckel, 1881
Lithocyclia Ehrenberg, 1847a
Lithomelissa Ehrenberg, 1847b
Lithomitra Bütschli, 1882
Lithomitra (*Lithomitrissa*) Haeckel, 1887
Lithopera Ehrenberg, 1847a
Lithostrobus Bütschli, 1882
Lophophaena Ehrenberg, 1847b
Lychnocanium Ehrenberg, 1847a
Medusetta Haeckel, 1887
Melittosphaera Haeckel, 1881
Micromelissa Haeckel, 1881
Mitrocalpis Haeckel, 1881
Myelastrum Haeckel, 1881
Nephrospyris Haeckel, 1887
Octodendron Haeckel, 1887
Odontosphaera Haeckel, 1887
Ommatodiscus Stöhr, 1880
Pactarentinia Furutani, 1983
Palacantholithus Deflandre, 1973
Pentinastrum Haeckel, 1881
Perichlamydium Ehrenberg, 1847a
Peromelissa Haeckel, 1881
Phacostaurus Haeckel, 1881
Phacostylus Haeckel, 1881
Phlebarachnium Haeckel, 1881
Phormocampe Haeckel, 1887
Phormocampe (*Cyrtocorys*) Haeckel, 1881
Phormocyrtis Haeckel, 1887
Phormostichoartus Campbell, 1951
Pipettella Haeckel, 1887
Plectodiscus Petrushevskaya & Kozlova, 1972
Podocampe Haeckel, 1881
Podocyrtis Ehrenberg, 1847a
Prismatium Haeckel, 1862
Protocystis Wallich, 1869
Prunocarpus Haeckel, 1887
Prunopyle Dreyer, 1889
Prunulum Haeckel, 1887
Psilomelissa Haeckel, 1881
Pterocanium Ehrenberg, 1847a
Pterocorys Haeckel, 1881
Rhodosphaera Haeckel, 1881
Rhopalastrum Ehrenberg, 1847a
Rhopalodictyum Ehrenberg, 1860
Saturnalis Haeckel, 1887
Saturnulus Haeckel, 1879
Semantis Haeckel, 1887
Sethamphora Haeckel, 1887
Sethocephalus Haeckel, 1887
Sethochytris Haeckel, 1881
Sethoconus Haeckel, 1887
Sethocorys Haeckel, 1881
Sethophormis Haeckel, 1887
Sethopilium Haeckel, 1881
Sethopyramis Haeckel, 1881
Sethosphaera Haeckel, 1881
Sphaerozoum Meyen, 1834
Spirema Haeckel, 1887
Spirocapsa Rüst, 1892
Spongaster Ehrenberg, 1860
Spongatractus Haeckel, 1887
Spongobrachium Haeckel, 1881
Spongocore Haeckel, 1887
Spongocyclia Haeckel, 1862
Spongodictyon Haeckel, 1887
Spongodiscus (*Spongodisculus*) Haeckel, 1887
Spongodruppa Haeckel, 1887
Spongolena Haeckel, 1887
Spongolonche Haeckel, 1881
Spongoprunum Haeckel, 1887
Spongosphaera Ehrenberg, 1847b
Spongostaurus Haeckel, 1881

Spongostylus Haeckel, 1881
Spongotripus Haeckel, 1881
Spongotripus (*Spongotripodiscus*) Haeckel, 1887
Spongotrochus Haeckel, 1860b
Stauracontium Haeckel, 1881
Stauralastrum Haeckel, 1887
Staurocromyum Haeckel, 1881
Staurocyclia Haeckel, 1881
Staurolonchidium Haeckel, 1887
Staurostylus Haeckel, 1881
Stauroxiphos Haeckel, 1887
Stephanastrum Ehrenberg, 1847a
Stichocampe Haeckel, 1881
Stichocorys Haeckel, 1881
Stichopilium Haeckel, 1881
Stichopilium (*Stichopilidium*) Haeckel, 1887
Stigmosphaera Haeckel, 1887
Stigmosphaerostylus Rüst, 1892
Stylartus Haeckel, 1881
Stylatractus Haeckel, 1887
Stylocapsa Principi, 1909
Stylocyclia Ehrenberg, 1847b
Stylodictya Ehrenberg, 1847a
Stylodiscus Haeckel, 1887
Stylosphaera (*Stylosphaerella*) Haeckel, 1887
Stylospongia Haeckel, 1862
Stylostaurus Haeckel, 1881
Stylotrochus Haeckel, 1862
Stylotrochus (*Stylotrochiscus*) Haeckel, 1887
Stypolarcus Haeckel, 1887
Styptosphaera Haeckel, 1881
Syringium Principi, 1909
Tessarastrum Haeckel, 1887
Tetrahedrina Haeckel, 1881
Tetraphormis Haeckel, 1881
Theocalyptra Haeckel, 1881
Theocapsomma Haeckel, 1887
Theoconus Haeckel, 1887
Theocoronium Haeckel, 1887
Theocyrtis Haeckel, 1887
Theocyrtis (*Theocorusca*) Haeckel, 1887
Theodiscus Haeckel, 1887
Theophormis Haeckel, 1881
Tlecerina Furutani, 1983
Trematodiscus Haeckel, 1860b
Triactiscus Haeckel, 1887
Triadiscus Krasheninnikov, 1960
Tricolocampe (*Tricolocampium*) Haeckel, 1887
Tricolocampe (*Tricolocamptra*) Haeckel, 1887
Tricolocapsa Haeckel, 1881
Tricolocapsa (*Tricolocapsium*) Haeckel, 1887
Trilonche Hinde, 1899
Tripocalpis Haeckel, 1881
Tripodictya Haeckel, 1881
Tripodiscium Haeckel, 1881
Triposphaera Hinde, 1890
Trochodiscus Haeckel, 1887
Tympanidium Haeckel, 1887
Zygocircus Bütschli, 1882
Zygostephanus Haeckel, 1862