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ANNOTATED CHECKLISTS OF FISHES

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Introduction to the Series
Annotated Checklists of Fishes

By

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Fishes constitute more than half of the vertebrates, with over 28,000 valid species now documented in the Catalog of Fishes database. New species continue to be described at a rate of over 250 per year, and it is expected that the final number will exceed 35,000 valid species. At the same time, there are areas of the world and certain taxonomic groups that are well known. New taxa are primarily coming from freshwaters of South America (especially Brazil), freshwaters of southeastern Asia, deep reef areas, and some deepsea areas. Commercial fishes and large-sized species are the most well known. This information is summarized in the Catalog of Fishes database, and the database continues to be updated. Revisions in searchable format are posted from time to time on the worldwide web at www.calacademy.org/research/ichthyology. The Catalog of Fishes database was first published in 1998 (Eschmeyer 1998) and the genera were first published in 1990 (Eschmeyer 1990). FishBase also supports versions supplied to them by the California Academy of Sciences at www.fishbase.org/search.cfm.

The Catalog of Fishes database contains over 10,000 genus records and 55,000 species-group records. It is recognized that many available names for fish taxa are unplaced. Are they valid or are they synonyms? At the same time, the field of ichthyology continues to change and many of the monographers of the 1950s–1990s are nearing the end of their active careers. They may have much information in files and in accumulated unpublished manuscripts that can document the status of unplaced species names. In addition, of the 55,000 species-group names, many are unavailable, such as *nomina nuda* (names with no description), names appearing in rejected works, names mentioned in passing, and names appearing in synonymy but never made available. These names are not available for use and have practically no “information content,” but they often appear in synonymies and add confusion. The fourth edition (1999) of the International Code of Zoological Nomenclature has a provision, Article 79, for creating an Official List for a discipline (useable names) and purging names that are not useable. As many as 10,000 fish names may be unuseable. The exercise of Article 79 is a lengthy process, but it begins with the creation of the proposed list of available names. There are perhaps some small problems (see Ferraris and Eschmeyer 2000), but to our knowledge ichthyology is the first large discipline to attempt to use Article 79 (International Commission on Zoological Nomenclature 1999).

The purpose of the Annotated Checklists project is to assist ichthyologists in preparing accounts for groups for which they are the experts. We are especially interested in those ichthyologists who have published on a group for years, have seen the type specimens, and are the world experts for those groups.

These checklists at this time are valuable tools to consolidate our level of knowledge and at the same time reveal taxonomic areas in need of further investigation. The California Academy of Sciences (CAS) Department of Ichthyology assists workers in preparation of the checklists by providing a draft generated from the Catalog of Fishes database and then providing literature, translation assistance, nomenclatural advice, and research on names and/or dates when requested, and, finally, providing the manuscript preparation service. Working with specialists on the annotated checklists has proved to be of great value in improving the Catalog of Fishes database; authors have been very helpful with missed names and new information.

In essence, we now have three projects that work together to increase our taxonomic knowledge of fishes: (1) the Catalog of Fishes database, (2) the annotated checklists, and (3) the preparation of the draft list of available names in ichthyology.

The Annotated Checklists

We output information to specialists directly from the Catalog of Fishes database, based on current knowledge recorded in the database. We have added database fields to accommodate additional or new information. For example, we ask the specialists to prepare a family account, to move and change the status of generic and specific names as needed, to provide pertinent remarks, and to provide the geographic distribution of valid species. We ask that they make changes in the electronic document files sent via email attachment. We then take the new information and place it directly in the appropriate fields in the Catalog of Fishes database. Then we prepare a new output version directly from the database after incorporating their improvements. Typically, manuscripts go back and forth several times between the authors and CAS; sometimes additional research is needed by the CAS staff or by the authors.

In the basic checklist presentation, we have broken the names down into the same three categories (lists 1–3) we use in the Catalog of Fishes database. This is done in anticipation of the draft list of available names. First we are interested in available names versus unavailable names. An available name is a name that can be used. It does not mean it is a valid name. In the Summary Lists for genus-group names and species-group names in the checklists, list 1 includes valid names with their synonyms. List 2 comprises available names that are of uncertain status (*incertae sedis*). List 3 contains names that are regarded as unavailable, and eventually can be deleted under Article 79. At the same time, we feel that any name that has no type specimen, a poor description, or has not been used since 1899 can be considered for purging, but if there is a type specimen and/or a reasonable description and the species still is of uncertain status then it must remain in list 2 as available. Further refinement of our category of unavailable names (in progress) will permit the suggestion for further purging of names that will essentially never be placed or used.

Most annotated checklists will treat an entire family. We anticipate that some checklists will be geographically oriented, such as North American Cyprinidae, and some may deal with smaller taxonomic groups, such as a large subfamily. The basic format of the checklists is outlined below.

Family-Group Name

The family-group name is given as the title of the checklist. These names came into priority considerations in the 1985 edition of the Code (International Commission on Zoological Nomenclature 1985), but most ichthyologists have not researched family-group names, and the Catalog of Fishes has only a preliminary database for these names. It is extremely difficult to determine the earliest family-group names, and only recently has the *Zoological Record* listed

them. Many names go far back, such as to Bonaparte in the early 1800s, to Bleeker in the mid 1800s, or to Gill in the mid to late 1800s, and the earlier names often do not have the modern –inae or –idae endings, but they are still available and are required to be modified to the –inae or –idae endings. We are assisting authors with our best knowledge of the family names in the families they treat. At the same time, the fourth edition (1999) of the Code provides for prevailing usage to be continued in some circumstances. As an example, the family Ogcocephalidae (Annotated Checklist number 17) has been in use for many years, but we know that Malthidae is an older available and previously used name; it does not matter that the genus *Malthe* is a synonym. In this case, we suggest continued use of Ogcocephalidae, and we would place that name on the draft list of available names.

Family Account

We ask that the specialists provide a family account, including morphological features (not formal diagnoses), general geographic range and habitat, and perhaps some biological information. We also desire a statement of the current state of knowledge for the group. The authors are given considerable leeway in what they wish to include for the family accounts. We view these annotated checklists as consolidating our knowledge for a family but at the same time providing information on what still needs to be done, essentially setting the stage for future ichthyological studies. We do not include family synonymies because for many groups this would be premature, but we make our best effort to find the oldest applicable name for the group.

In some cases we use subfamilies, such as in the checklist for Hexagrammidae, and for these groups short subfamily accounts are provided.

Genera

For each genus that is available (from list 1 in the Catalog of Fishes database), we give the name, author, and date, plus the literature reference number. If there are synonyms, these will occur in chronological order, except that a younger name if it is in current use will appear first in the synonymy. For each genus we provide the type species and the method of type designation. At the end of each genus synonymy there may be remarks covering various subjects related to the included synonymous genera or the status of the valid genus.

Species

Under each genus the valid species in that genus are treated in alphabetical order with their synonyms (if any) arranged chronologically (except that the name in current use is listed first in each synonymy). For species, we give the name, author, date, page, figures, and the reference number from the Catalog of Fishes database. The type locality is also provided. We list only primary types (holotype, lectotype, syntypes, neotype) in the annotated checklists. The secondary types can be found in the Catalog of Fishes database.

A DISTRIBUTION category follows. Authors have considerable latitude here. They may give general localities, such as western Atlantic (including Bermuda, the Caribbean, and Gulf of Mexico), or they may give more specific ranges. Known ranges for species in many groups continue to change with further collecting. For some well-studied groups, specific ranges are appropriate. Depths for deepsea groups or deep lakes also continue to change, but some authors have included depth ranges as we currently know them.

Each species account can have a REMARKS category to discuss any species in the synonymy. Many accounts discuss the status of the valid species, such as its possible synonymy with other species or suggestions for more investigation that needs to be done.

Summary Lists

An alphabetical list of the genus-group names in the family is given first. This is followed by incertae sedis genus-group names, and then by the unavailable genus-group names. The species-group names are also arranged alphabetically and listed in the same three categories as the genus-group names.

Literature Cited

For each checklist, references are output directly from the Catalog of Fishes database. All original sources for genera and species have a reference number, as do all other articles mentioned in the family account, distributions, and remarks.

Annotated Checklists Presentation and Timetable

We present the checklists in a CD-ROM publication, with copies going to six primary libraries: The Natural History Museum, London; Muséum National d'Histoire Naturelle, Paris; National Museum of Natural History, Smithsonian Institution, Washington, D.C.; California Academy of Sciences, San Francisco; American Museum of Natural History, New York; and the Australian Museum, Sydney. Copies may be sent to other libraries, especially depending on the primary content of the included issues. The date of publication will be recorded with the copy placed in the California Academy of Sciences main library. This establishes the *Annotated Checklists of Fishes* as a journal series and as a publication for nomenclatural (Code) purposes. We anticipate no new species being described in this series, and the only nomenclatural acts would include lectotype designations or first reviser issues such as selecting one name over another when both are in competition with the same date. We anticipate no lengthy discussions, specimen photographs, or analyses of specimens; these should be presented in separate publications. The CD-ROM copies will not be for sale. However, the individual checklists will be available free as downloadable PDF files on the CAS web site. The PDFs available from the web site are identical to those contained on the CD-ROMs. Instructions and methods of searching for specific families or authors are provided on the web site: www.calacademy.org/research/ichthyology/annotated/index.html.

At this time, we are editing about 40 more manuscripts. Several authors have begun work on additional families. We have identified at least 300 ichthyologists worldwide for consideration for authoring accounts but we have not yet approached most ichthyologists because we can only deal with a certain number of manuscripts at one time. By chance this first volume is weighted toward northern groups, but there will be no attempt to clump the checklists by taxonomic categories or by geographic areas. We will simply present them as they are completed. We have not, for example, sought workers for South American families for two reasons: we were awaiting the publication of a major checklist of all South and Central American freshwater fishes (now published, see Reis et al. 2003), and too many new species were being added from that area such that it made waiting worthwhile. Our primary name problems are for "old" groups: those well known to the early authors, such as Mediterranean and eastern Atlantic fishes. If we treat all Recent fishes, we will present more than 450 family accounts. The National Science Foundation provided a seed grant for one year (NSF 0208690), and we will seek other funding to continue the project. The NSF also recently has provided a six-month grant (NSF 0342732) to prepare a draft list of available names that is now in progress. The Alfred P. Sloan Foundation allowed us to spend some surplus funds from another project on the annotated checklist project.

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