

## Taxonomic Resources on the Internet

The following internet sites emphasize sources of nomenclature and taxonomy.

**NCBI Taxonomy Browser:** <http://www.ncbi.nlm.nih.gov/Taxonomy/tax.html/>

“Searchable access to information on the organisms with molecular and genetic information included in the Entrez system, including PubMed, Nucleotide and Protein Sequences, Protein Structures and Complete Genomes.”

**MorphoBank:** <http://www.morphobank.org/>

“MorphoBank's most important innovation is that it is a web application for conducting phylogenetics or cladistics research on morphology. It enables teams of scientists who use anatomy to study the Tree of Life (phylogeny) to work over the web - in real time - and to do research they could not easily do using desktop programs alone. MorphoBank displays - over the web - dynamic phylogenetic matrices of morphological characters with labeled images demonstrating homology statements, and implements the data editing functions of widely used desktop programs (e.g., Mesquite, Nexus Data Editor) over the web in a password protected environment. It is an environment for virtual collaboration by teams of researchers building phylogenetic matrices with affiliated image data. MorphoBank can also draw on images in existing 2D and 3D digital libraries.”

“If a scientist has images that are not deposited in other digital libraries, MorphoBank uses its database to store images (including films and CT scans) submitted by scientists, and allows contributors to label anatomical structures on the images. MorphoBank records information on the author of the submission, related publications, critical commentary and species names.”

**Encyclopedia of Life (EOL):** <http://www.eol.org/>

“The Encyclopedia of Life is an unprecedented global partnership between the scientific community and the general public. Their goal is to make freely available to anyone knowledge about all the world's organisms. Anybody can register as an EOL member and add text, images, videos, comments or tags to EOL pages. Expert curators ensure quality of the core collection by authenticating materials submitted by diverse projects and individual contributors.” EOL's mission is “To increase awareness and understanding of living nature through an Encyclopedia of Life that gathers, generates, and shares knowledge in an open, freely accessible and trusted digital resource.” The ultimate goal will be to build a web page for every species. The site is structured much like a wiki where those with taxonomic knowledge are encouraged to (collectively) contribute to the authorship of species pages.

**Catalogue of Life:** <http://www.catalogueoflife.org/>

“The aim is to collate the names of all species set in the context of a taxonomic hierarchy and of their distribution. It is estimated that less than a fifth of the world's biota has been identified, and a single checklist is an important step in effectively coordinating efforts to document biodiversity.”

“Degradation and loss of global biodiversity is a key issue for our time. The Catalogue of Life supports the major biodiversity and conservation information services such as GBIF (the Global Biodiversity Information Facility), the Encyclopedia of Life and the IUCN Red List of threatened species. The Catalogue is recognised by the Convention on Biological Diversity as a significant component of the Global Taxonomy Initiative and as a contributor to Target 1 of the Global Strategy for Plant Conservation. The Catalogue of Life does not

directly contribute to the conservation of global biodiversity, but it is becoming a key enabler of the programmes that do.”

“Major bioscience programmes depend upon the integration of complex data if they are to progress effectively. Cross-mapping species that provide the substance of that research is fundamental to data integration. The Catalogue of Life provides an essential taxonomic backbone to support the escalating pace of scientific endeavour worldwide.”

This site incorporates several other databases (as seen above) in attempts to make a one stop catalog.

**Species 2000:** <http://www.sp2000.org/index.php>

“Species 2000 is a "federation" of database organizations working closely with users, taxonomists and sponsoring agencies. The goal of the Species 2000 project is to create a validated checklist of all the world's species (plants, animals, fungi and microbes). This is being achieved by bringing together an array of global species databases covering each of the major groups of organisms.”

“Each database covers all known species in the group, using a consistent taxonomic system. The existing global species databases presently account for some 60% of the total known (1,368,009) species.”

“The programme in partnership with the Integrated Taxonomic Information system (ITIS) of North America currently produces the Catalogue of Life. This is used by the Global Biodiversity Information Facility (GBIF) and Encyclopedia of Life (EOL) as the taxonomic backbone to their web portals. Species 2000 receives funding from GBIF.”

**TreeBASE** - <http://treebase.org/treebase-web/home.html>

“TreeBASE is a relational database of phylogenetic information. TreeBASE stores phylogenetic trees and the data matrices used to generate them from published research papers. We encourage biologists to submit phylogenetic data that are either published or in press, especially if these data were not fully presented in the publication due to space limitations. TreeBASE accepts all types of phylogenetic data (e.g., trees of species, trees of populations, trees of genes) representing all biotic taxa.”

**Integrated Taxonomic Information System:** <http://itis.gov/>

“Here you will find authoritative taxonomic information on plants, animals, fungi, and microbes of North America and the world. We are a partnership of U.S., Canadian, and Mexican agencies (ITIS-North America); other organizations; and taxonomic specialists.”

**Biosis Systematics, Taxonomy and Nomenclature:**

[http://thomsonreuters.com/products\\_services/science/science\\_products/a-z/biosis/](http://thomsonreuters.com/products_services/science/science_products/a-z/biosis/)

Nice collection of resources from Biosis and Zoological Record (e.g. statistics on new and changed animal names reported in the Zoological Record), and valuable external links.

See the **Index to Organism Names**: <http://www.organismnames.com/>

“ION contains all the animal, plant, and virus names data found within the Thomson BIOSIS literature databases - Zoological Record®, BIOSIS Previews® and Biological Abstracts®. Bacteria names will be added soon.”

**Tree of Life**: <http://www.tolweb.org/tree/>

“The Tree of Life Web Project (ToL) is a collaborative effort of biologists from around the world. On more than 10,000 World Wide Web pages, the project provides information about biodiversity of organisms on Earth, the characteristics of different groups of organisms, and their evolutionary history (phylogeny).”

“Each page contains information about a particular group. e.g., [segmented worms](#), [phlox flowers](#), [tyrannosaurs](#), [euglenids](#), [Heliconius butterflies](#), [club fungi](#), or the [vampire squid](#). ToL pages are linked one to another hierarchically, in the form of the evolutionary tree of life. Starting with the root of all Life on Earth and moving out along diverging branches to individual species, the structure of the ToL project thus illustrates the genetic connections between all living things.”

Read more about the Tree of Life project by visiting [http://www.tolweb.org/tree/home\\_pages/abouttol.html](http://www.tolweb.org/tree/home_pages/abouttol.html)

**Fauna Europea**: <http://www.faunaeur.org/>

“The Fauna Europaea project (EVR1-1999-20001) has been funded by the European Commission for a period of four years (1 March 2000 - 1 March 2004) within the Fifth Framework Programme (5FP). Fauna Europaea has assembled a database of the scientific names and distribution of all living multicellular European land and fresh-water animals.”

“Experts in taxonomy have provided data of all species currently known in Europe. Together these data have formed a huge database, which will be accessible to everyone. The University of Amsterdam has coordinated the project, assisted by the University of Copenhagen and the National Museum of Natural History in Paris. The Fauna Europaea database will provide a unique reference for many groups such as scientists, governments, industries, conservation communities and educational programs.”

**Global Biodiversity Information Facility**: <http://data.gbif.org/welcome.htm>

“The Global Biodiversity Information Facility (GBIF) was established by governments in 2001 to encourage free and open access to biodiversity data, via the Internet. Through a global network of countries and organizations, GBIF promotes and facilitates the mobilization, access, discovery and use of information about the occurrence of organisms over time and across the planet.”

Has over 400 million indexed records, great distribution data and other meta data.

**Uniprot**: <http://www.uniprot.org/taxonomy/>

Not really a true systematics site, but it does have a taxonomy section with over 1 millions entries, so it may be useful for looking at hierarchy.

**BioNames:** <http://bionames.org/>

“BioNames is a database of taxa, texts, and trees. It includes taxonomic names for animals (and other organisms covered by the ICZN), full-text literature from BioStor and BHL, links to digital literature (via CrossRef, CiNii, Gallica, JSTOR, and other archives), taxonomic classifications (GBIF and NCBI, cross-linked using EOL, which also provides the images), and phylogenetic trees from PhyLoTA.”

Lots of trees from publications and also taxonomic information, but not yet extensive.

## **BOTANY**

**The International Plant Names Index:** <http://www.ipni.org/index.html>

“IPNI is the product of a collaboration between The Royal Botanic Gardens, Kew, The Harvard University Herbaria, and the Australian National Herbarium.”

“The International Plant Names Index (IPNI) is a database of the names and associated basic bibliographical details of all seed plants, ferns and fern allies. Its goal is to eliminate the need for repeated reference to primary sources for basic bibliographic information about plant names. The data are freely available and are gradually being standardized and checked. IPNI will be a dynamic resource, depending on direct contributions by all members of the botanical community.”

Note: This database incorporates the Gray Index in part.

**Missouri Botanical Garden TROPICOS3 database:** <http://www.tropicos.org/> “This site provides access to the Missouri Botanical Garden's VAST (VAScular Tropicos) nomenclatural database and associated authority files.”

This database is an excellent place for finding taxonomic information on plants (original publication reference, type and synonym information, etc.) and is very easy to use.

**GRIN Taxonomy for Plants:** <http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl>

GRIN taxonomic data provide the structure and nomenclature for accessions of the National Plant Germplasm System (NPGS), part of the National Genetic Resources Program (NGRP) of the United States Department of Agriculture's (USDA's) Agricultural Research Service (ARS). In GRIN Taxonomy for Plants all families and genera of vascular plants and 51,628 species from throughout the world are represented, especially economic plants and their relatives. Information on scientific and common names, classification, distribution, references, and economic impacts are provided.

NOTE: only for vascular plants.

## **ZOOLOGY**

**World Register of Marine Species (WoRMS):** <http://www.marinespecies.org/>

“The aim of a World Register of Marine Species (WoRMS) is to provide an authoritative and comprehensive list of names of marine organisms, including information on synonymy. While highest priority goes to valid

names, other names in use are included so that this register can serve as a guide to interpret taxonomic literature.”

“The content of WoRMS is controlled by taxonomic experts, not by database managers. WoRMS has an editorial management system where each taxonomic group is represented by an expert who has the authority over the content, and is responsible for controlling the quality of the information. Each of these main taxonomic editors can invite several specialists of smaller groups within their area of responsibility to join them.”

### **Nomenclatural Glossary for Zoology**

<http://www.biologybrowser.org/nomglos> (current version from Thompson ISI)

[http://entnemdept.ufl.edu/choate/insectclass/zoolnomen\\_sysgloss.pdf](http://entnemdept.ufl.edu/choate/insectclass/zoolnomen_sysgloss.pdf) (earlier 2000 version from Biosis)

Terminology used in Zoological Record for systematics and nomenclature in indexing the world literature for zoology.

### **Nomenclator Zoologicus, Vol 1-10** <http://www.ubio.org/NomenclatorZoologicus/>

A digitized version of “A List of the Names of the Genera and Subgenera in Zoology from the Tenth Edition of Linnaeus 1758 to the end of 2004.” This is a continuous record of the bibliographical origins of the names of every genus and subgenus in zoology published since the 10th ed. of Linnaeus' *Systema Naturae* in 1758 up to 1994 in nine volumes, published by the Zoological Society of London. [The Zoological Record can be search for generic names proposed after 2004.]

### **Name Bank and Classification Bank**

<http://www.ubio.org/index.php?pagename=namebank>

[http://www.ubio.org/index.php?pagename=classificationbank\\_home](http://www.ubio.org/index.php?pagename=classificationbank_home)

Name Bank pulls together all the names for an organism and provides a persistent identifier for that organism. Includes a comprehensive listing of common names, including those in other languages. Classification Bank stores alternate classifications. These products, which work together, are from the UBio Project of the Woods Hole Oceanographic Institute. Currently the majority of organisms included are animals.

### **Nomina Insecta Nearctica:** <http://www.nearctica.com/nomina/main.htm>

“*Nomina Insecta Nearctica* is a complete synonymical checklist of the approximately 90,000 species of insects of North America north of Mexico published by Entomological Information Services in 1996 and 1997 in four volumes and a CD-ROM. An abbreviated version of this checklist is now available on Nearctica. The list contains all of the species of insects of North America with the synonyms removed. Lists of names are never particularly thrilling, but you might want to browse through it just to get a feel for the incredible size and diversity of the insects.”

This is a great resource for entomologists, with one caveat that this is not a searchable database and you have to know the higher classification to be able to use it.

## BIOLOGICAL NOMENCLATURE

**ZooBank:** <http://www.zoobank.org>

“ZooBank is intended as the official registry of Zoological Nomenclature, according to the International Commission on Zoological Nomenclature (ICZN). The scientific names of animal species are crucial to effective global communication about biodiversity, and hence its use and conservation. Without broad agreement on the name of a disease-bearing microbe, vital food species, or threatened animal, we can't even begin to combat, exploit or conserve them. So, in scientific language, humans are *Homo sapiens* and honeybees are *Apis mellifera*; and this is true all over the world.”

All new scientific taxa published after 2011 in electronic format (only) should be registered in ZooBank. “The requirements for electronic publications are that the work be registered in ZooBank before it is published, that the work itself state the date of publication and contain evidence that registration has occurred, and that the ZooBank registration state both the name of an electronic archive intended to preserve the work and the ISSN or ISBN associated with the work.” **International Code of Botanical Nomenclature: (St. Louis Code):** <http://www.bgbm.fuberlin.de/iapt/nomenclature/code/SaintLouis/0000St.Luistitle.htm>

A complete on-line version of the Code. The printed and only official version of the Code has been published as *International Code of Botanical Nomenclature (St Louis Code)*. Regnum Vegetabile 138. Koeltz Scientific Books, Königstein. ISBN 3-904144-22

**International Code of Zoological Nomenclature 4th ed.** <http://www.iczn.org/iczn/index.jsp>

The complete on-line version of the Zoological Code.

**Phylocode:** <http://www.ohiou.edu/phylocode/>

The PhyloCode - designed to name the parts of the tree of life by explicit reference to phylogeny. The PhyloCode will go into operation in a few years, but the exact date has not yet been determined. It is designed so that it may be used concurrently with the existing codes based on rank-based nomenclature (ICBN, ICZN, etc.).

**Table of nomenclatural equivalences:** <http://darwin.eeb.uconn.edu/systsem/table.html>

This table equates terms **between the botanical and zoological codes**, which might be worth your time to print out.

**Curiosities of Biological Nomenclature** <http://www.curiooustaxonomy.net/>

Be sure to read the **Curiosities of Biological Nomenclature**, which includes many of the most interesting Latin names yet published.

**ETI Bioinformatics Taxonomy and Database List:** <http://www.eti.uva.nl/tools/links/taxonomy.php>

Has a large list of databases, most which are taxon specific, try this for specialty searches.