

AmphibiaChina: an online database of Chinese Amphibians

Jing CHE^{1,*}, Kai WANG²

¹ State Key Laboratory of Genetic Resources and Evolution, Kunming Institute of Zoology, Chinese Academy of Sciences, Kunming, Yunnan 650223, China

² Sam Noble Oklahoma Museum of Natural History and Department of Biology, University of Oklahoma, Norman OK 73072-7029, U.S.A.

ABSTRACT

AmphibiaChina, an open-access, web-based database, is designed to provide comprehensive and up-to-date information on Chinese amphibians. It offers an integrated module with six major sections. Compared to other known databases including AmphibiaWeb and Amphibian Species of the World, AmphibiaChina has the following new functions: (1) online species identification based on DNA barcode sequences; (2) comparisons and discussions of different major taxonomic systems; and (3) phylogenetic progress on Chinese amphibians. This database offers a window for the world to access available information of Chinese amphibians. AmphibiaChina with its Chinese version can be accessed at <http://www.amphibiachina.org>.

Keywords: Amphibia; Taxonomy; Species identification; DNA barcoding; Tree of life

Being the third largest country in the world, China possesses multiple biodiversity hotspots, which harbor a rich diversity of amphibians. Because of the rapid accumulation of many kinds of data for Chinese amphibians, it is desirable to have a versatile platform to integrate all new advances and promote their accessibility to scientists, governmental agencies, and the inquisitive public.

Currently, two online databases deal exclusively with amphibians: "AmphibiaWeb" (2015) and "Amphibian Species of the world" (Frost, 2015). The latter provides detailed taxonomic history and the former provides information on natural history, conservation, as well as its own taxonomic system for amphibians. Both databases host information on Chinese amphibians, yet they sometimes conflict with regard to the taxonomic validity of some species. This owes to multiple causes, such as being unaware of Chinese literature or not having access to it, the language barrier, the lack of

communications between scholars, and philosophical differences regarding assignments of species to genera and the recognition of other higher taxonomic categories. Such controversies create significant confusion, even for the professional herpetologists. For the public and most governmental agencies, it may be much worse. Various textbooks and popular presses use outdated nomenclature, invalid species names, and sometimes even convey the wrong information about species and the incorrect identification of species. Among a cornucopia of concerns, this situation causes serious problems and creates obstacles in further research, of biology, public education, effective conservation activity, wildlife management and law enforcement in China.

Here, we announce that the Kunming Institute of Zoology (KIZ), Chinese Academy of Sciences (CAS), has established the open-access, web-based platform "AmphibiaChina" (www.amphibiachina.org). It seeks to integrate available information on all known species of amphibians in China. Scientists, non-experts, and even the public can freely search the database and obtain relevant information, according to their interests.

AmphibiaChina aims to: (1) promote multidisciplinary studies on Chinese amphibians, (2) correct some errors, spread accurate knowledge and promote scientific outreach, (3) involve citizen scientists and herpetoculturists in documenting amphibian diversity and contributing to research in China, (4) encourage communication among herpetological researchers, law enforcement agencies, governmental departments, and the curious public, and advocate effective biodiversity conservation in

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*Corresponding author, E-mail: chej@mail.kiz.ac.cn

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China, and (5) provide a window for researchers outside of China to understand and access information on Chinese species.

Presently, AmphibiaChina is available in Chinese only, although

an English version is planned. It contains six major sections: Systematics; Species Identifications; Information retrieval; Chinese Amphibian Tree of Life; News; and a Photo Gallery (Figure 1).

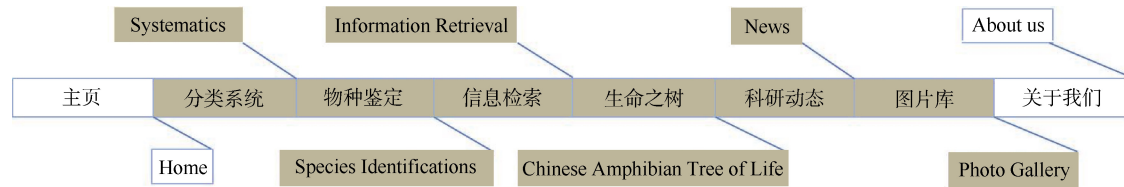


Figure 1 Six major sections of AmphibiaChina

Systematics

Users can navigate this section using the hierarchical system of formal taxonomy, or by geographic region (province).

This section provides the Chinese species list by three orders. Clicking on the Order name displays the families in that Order. Clicking on the Family name displays its genera. Clicking on the Genus will display its species. At the species-level, the most comprehensive and up-to-date information is available, including the valid scientific name, subjective synonym(s), local common name, level of protection, diagnosis, brief morphological description, available biological information, photos, distribution range and the distribution maps, type specimen(s) and type locality, and a discussion. In groups with taxonomic controversy, even chaos, this section gives alternative taxonomies on the right column of the screen based on the preference of AmphibiaChina (AmphibiaChina, 2015), AmphibiaWeb (AmphibiaWeb, 2015), Amphibian Species of the World (Frost, 2015), and the Colored Atlas of Chinese Amphibians and their Distributions (Fei et al, 2012). AmphibiaChina offers comments on taxonomic controversies.

Users can explore the amphibian diversity of a province by clicking on its name on the map of China, which generates a provincial amphibian species list. These will be extremely useful for conservation agencies and the public.

Species Identifications

This section designed multiple kinds of online identification tools including diagnostic keys, photos uploaded, and DNA barcoding. Presently, online identification from uploaded gene sequences (copy/paste sequences to the text box, or choose files) of samples of interest is available. At the moment of writing, the DNA sequence database contains 2048 sequences of the COI gene of 302 species of Chinese amphibians, covering more than 70% of the known diversity of this country. This system will increase its taxonomic coverage up to most extant amphibian species by 2018 (two years), and other genes (16S rRNA, and *CYTB*) will become available in the very near future.

The online species identification section will not only be useful for researchers, but also in fields such as biodiversity surveys, invasion species monitoring, forestry conservation management, pet trading, food safety, biological medicine, pest

control, and customs, etc..

Information Retrieval

This section will allow anyone to search this site by species, photos, and sequences.

Chinese Amphibian Tree of Life

This section gives the up-to-date phylogeny of Chinese amphibian according to the published data. Chinese amphibians are not a monophyletic group, of course. Users can move from higher to lower taxonomic ranks for each group. A detailed discussion of its phylogenetic position appears along with figures of the tree.

News

This section presents news on current amphibian research progress, meetings, etc. It will emphasize Chinese species. Researchers can use this platform to communicate their initiatives.

Photo Gallery

This section contains photographs of living Chinese amphibians and their habitat. Anyone can navigate the gallery by taxonomic groups, geographic area (province), or individual photographer. People are encouraged to register as photographers of this system and upload photos under their accounts. While allowing for the maximum involvement of photographers, the gallery is reviewed by experts on a weekly basis, correcting the taxonomic information associated with the photos. Users are the builders of this section.

NOTE: Currently, only the Chinese version of AmphibiaChina is available. We are considering an English version of the site. We encourage professional herpetologists, students, and amphibian enthusiasts to contribute to the site by uploading photos to the database and provide comments and suggestions through email: amphibiachina@mail.kiz.ac.cn.

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