

Cambodian Journal of Natural History

Identifying bats from echolocation calls

The real price of sustainable bamboo

Farming butterflies in Siem Reap

A survey of freshwater fishes

Describing new species

Deciduous forests



August 2013



Vol 2013 No. 1

Cambodian Journal of Natural History

ISSN 2226–969X

Editors

Email: Editor.CJNH@gmail.com

- Dr Jenny C. Daltry, *Senior Conservation Biologist, Fauna & Flora International.*
- Dr Neil M. Furey, *Research Adviser, Fauna & Flora International: Cambodia Programme.*
- Hang Chanthon, *Former Vice-Rector, Royal University of Phnom Penh.*

International Editorial Board

- Dr Stephen J. Browne, *Fauna & Flora International, Singapore.*
- Dr Martin Fisher, *Editor of Oryx – The International Journal of Conservation, Cambridge, United Kingdom.*
- Dr L. Lee Grismer, *La Sierra University, California, USA.*
- Dr Knud E. Heller, *Nykøbing Falster Zoo, Denmark.*
- Dr Sovanmoly Hul, *Muséum National d’Histoire Naturelle, Paris, France.*
- Dr Andy L. Maxwell, *World Wide Fund for Nature, Cambodia.*
- Dr Jörg Menzel, *University of Bonn, Germany.*
- Dr Brad Pettitt, *Murdoch University, Australia.*
- Dr Campbell O. Webb, *Harvard University Herbaria, USA.*

Other peer reviewers for this volume

- Dr Arjan Boonman, *Queen Mary University of London, United Kingdom, and Indonesian Institute of Sciences (LIPI), Bogor, Indonesia.*
- Dr Stuart Davies, *Smithsonian Institution, Washington DC, USA.*
- Dr James Guest, *University of New South Wales, Sydney, Australia.*
- Dr Alice Hughes, *University of Bristol, United Kingdom.*
- Dr Eriko Ito, *Hokkaido Research Center, Forestry and Forest Products Research Institute (FFPRI), Hokkaido, Japan.*
- Durai Jayaraman, *Fauna & Flora International, Phnom Penh, Cambodia.*
- Prof. Maurice Kottelat, *Cornol, Switzerland, and Raffles Museum of Biodiversity Research, National University of Singapore.*
- Alexander Monastyrski, *Vietnam-Russia Tropical Centre, Hanoi, Vietnam.*
- Berry Mulligan, *Fauna & Flora International, Phnom Penh, Cambodia.*
- Prof. Walter Rainboth, *University of Wisconsin Oshkosh, USA.*
- Dr Nicholas J. Souter, *Centre for Biodiversity Conservation and Fauna & Flora International, Phnom Penh, Cambodia.*
- Tim Wood, *Phnom Penh, Cambodia.*

The *Cambodian Journal of Natural History* (ISSN 2226–969X) is a free journal published by the Centre for Biodiversity Conservation, Royal University of Phnom Penh. The Centre for Biodiversity Conservation is a non-profit making unit dedicated to training Cambodian biologists and to the study and conservation of Cambodian biodiversity.

Cover photo: The Cambodian tailorbird *Orthotomus chaktomuk* made international headlines when it was named in 2013, after being discovered at a construction site on the outskirts of Phnom Penh (© Ashish John, Wildlife Conservation Society). In the Guest Editorial, one of the authors of the new bird, Jonathan Eames OBE, gives a personal perspective on where and how to describe new species of animals.

Guest Editorial—Describing new species

Jonathan C. EAMES

BirdLife International Cambodia Programme, #9, Street 29 Tonle Basac, Chamkarmon, P.O. Box 2686, Phnom Penh, Cambodia.

Email Jonathan.Eames@birdlife.org

In the previous issue of the *Cambodian Journal of Natural History* (Volume 2012, No. 2), the editors provided guidance on how to draft a good scientific paper (Daltry *et al.*, 2012). Following the recent publication of the type description of a new species of bird from Cambodia in June 2013 (Mahood *et al.*, 2013), I thought it would be helpful to continue this theme by providing guidance to authors on what to include in a type description for a new animal. This editorial is focused on bird and, to a lesser extent, mammal type descriptions because this is a field where I have some experience. The *International Code of Zoological Nomenclature* is a system of internationally accepted rules and recommendations for naming animals. The *International Code of Nomenclature for algae, fungi, and plants* (McNeill *et al.*, 2012), previously the *International Code for Botanical Nomenclature*, contains some differences and those wishing to describe taxa from these groups of organisms should refer to it instead.

It could be said that all humans are taxonomists. As a species we devote considerable time in our lives to sorting and classifying objects without perhaps even thinking much about what we are doing. This would include such mundane tasks such as sorting ripe from unripe fruit, deciding which Premier League club is worthy of our support, or even choosing a lipstick in a department store.

The urge to discover is one of the strongest motivations a human can experience. Discovery in all its forms enriches our lives endlessly. Scientific discovery can be a revelation upon which the future of civilizations turns. For example, the discovery of the healing properties of penicillin in 1928 has since saved millions of human lives. Species discovery is thrilling too, but for many scientists it may come only once in a career. Once we have discovered a new species we must describe it. It is therefore important to try and get it right.

Published guidance exists on what to publish in a species description, for example Winston (1999). One of the most useful papers on the subject was

written partly in response to the disappointment of the authors with the quality of many of the descriptions of new species of bird then appearing (LeCroy & Vuilleumier, 1992). I commend both this paper and a retort (Collar, 1999) to all, and unashamedly draw heavily from the former in what now follows. I also include recent examples of bad and good practice as revealed in the type descriptions of mammals and birds recently published from Asia and elsewhere.

When describing a new species the starting point is to designate a “holotype” or two or more “syntypes”. The holotype is a single voucher specimen used by an author to define and represent the species, and this may be the only one found or one of several individuals found. When people talk about “the type” they are referring to this specimen (Winston, 1999). The syntypes are two or more specimens selected from the available material to represent the species when no single specimen has been identified as the holotype (Winston, 1999). To facilitate future comparisons, the holotype or syntypes should be complete specimens and not unsupported illustrations, body parts, and blood or tissue samples. A “type series”, comprising the holotype or syntypes and additional specimens (called “paratypes”) is desirable because this helps to demonstrate variability within the new species.

While it is highly desirable to have the type specimen(s) permanently deposited in a museum or other publicly available collection, very occasionally it may be impractical to kill an individual, for example a highly endangered mammal (International Commission on Zoological Nomenclature, 2000). Authors and editors that deviate from the convention of collecting type specimens risk confusing the scientific record and the ire of their peers, as the following recent examples clearly show.

In 2005 a new monkey was described from a photograph of an individual animal (Jones *et al.*, 2005). The description of a new primate is a major event and resulted in the type description being published in the journal *Science*. However, the authors, working for a

leading conservation organisation, chose to describe their new species from photographs instead of killing and preserving a specimen, perhaps because of the rarity of the animal or because it was a monkey. Thus the “holotype” in this case was the animal depicted in the photograph, but the *International Code on Zoological Nomenclature* (International Commission on Zoological Nomenclature, 2000) does not permit photographs to be designated as types. In the absence of a voucher specimen, and therefore being obliged to describe the taxon from images only, the monkey was placed in the genus *Lophocebus*, which contains many species (Jones *et al.*, 2005). Later research by a leading museum, which chose to collect a specimen, placed the monkey in the entirely new monotypic genus *Rungwecebus* (Davenport *et al.*, 2006) on the basis of molecular and morphological data. Had the type description been based on a voucher specimen, a far more thorough piece of science could have been published, establishing a new genus and new species in a single paper and giving greater kudos to the authors.

Another example serves to show how confusion can arise when a complete specimen is not obtained and described. In 2006 a new species of babbler was described from India (Athreya, 2006). Whilst the author’s reasons for not collecting a voucher specimen were given in the paper, and whilst the type description may meet the provisions of the *International Code on Zoological Nomenclature*, the absence of a complete type specimen and the designation of the image of the bird in photographs as type material renders it flawed and of limited utility to others. Athreya (2006) wrote: “The holotype is the bird from which a few feathers were obtained and which is the subject in a series of photographs presented in this paper. The holotype was captured, photographed, measured and released”. Since the holotype was released alive, do the feathers, the photographs or the released bird or all three represent the holotype? The absence of any complete voucher specimens renders it almost impossible for future researchers to make comparisons with congeners.

In another, now infamous example, the Bulu Burti boubou *Laniarius liberatus*, an African bushshrike, was described from blood samples only and lacked a specimen (Smith *et al.*, 1991). New species can be described on the basis of DNA sequences, but, while not mandatory, it is strongly recommended that the type specimen(s) from which the DNA was sequenced is preserved and deposited in a museum with a type label and data linking it to the sequence (International Commission on Zoological Nomenclature, 2000).

The provenance of type material is also critically important. In most recent cases involving vertebrates, it is typical for the collector to be one of the authors of the type description. Thus the provenance of the type material is usually accurately known. Recently, however, from this very region, there was an alarming example where this was not the case. In 1994 the type description of the khiting vhor *Pseudonovibos spiralis* was based on preserved material purchased in a shop (Peter & Feiler, 1994). Whilst the authors acted in good faith, they were rash in rushing to publish a description based on material that was fraudulently crafted from cow horn.

The information that should accompany a type specimen includes a collection catalogue number, the name of the institution where the type is deposited, its age and sex, collecting locality (including coordinates and altitude), date of collection, the name of the collector(s), biometrics and a detailed word description of the type. The inclusion of additional information to help us to judge the validity of the species is also advisable. This may include sonograms of voice recordings (in the case of birds or frogs, for example), tissue and blood samples and notes on behaviour and ecology (LeCroy & Vuilleumier, 1992). Two comprehensive examples of bird type descriptions containing such comprehensive information include Alstrom *et al.* (2010) and Mahood *et al.* (2013).

As the new species will bear a scientific name derived from Latin or Ancient Greek, the etymology and gender of the proposed name must be given. For most of us this means we must seek guidance from a scholar in these obscure languages. The authors must explain why the new species is included within a particular genus, including any new genus they may propose. Importantly, comparisons must be made with closely related congeners, including sympatric and allopatric forms, and maps showing geographical relationships included. This may render lengthy and costly overseas trips to museums in Europe or the United States necessary to examine specimens of previously described species. The biogeography of the new species should be discussed and an explanation given as to why if the new taxon is allopatric, it is a new species and not a new subspecies (LeCroy & Vuilleumier, 1992).

In the case of Athreya’s (2006) babbler, the comparison of this new taxon with its close congeners was limited to comparing photographs only. This is not reliable because photographs do not capture colour precisely, and no direct comparison was made with the two most closely related species. The comparison

should have been undertaken with the holotype specimens of the most closely related taxa under museum conditions. In addition the type description appeared in an obscure journal (although it was at least published in the English language).

With a draft type description finished, one must consider to which journal it will be submitted for publication. It is important to pick a peer-reviewed journal that is appropriate for the animal species being described, and one that is familiar with publishing type descriptions according to the *International Code of Zoological Nomenclature*—the set of rules for naming animals and the resolution of nomenclatural problems (International Commission on Zoological Nomenclature, 2000). The International Commission on Zoological Nomenclature acts as adviser and arbiter for the zoological community by generating and disseminating information on the correct use of the scientific names of animals.

The journal should ideally have an International Standard Serial Number (ISSN) and be published in the English language. However proud we may be of our own languages, publication in any language other than English will reduce the impact of the work within the scientific community at large. The publication of type descriptions in books, where the description will be more easily overlooked, should also be avoided. Following these steps will help to ensure the widest possible readership for your work (LeCroy & Vuilleumier 1992).

The description of the Vietnamese pheasant *Lophura hatinhensis* type specimen in a book in Vietnamese did not help to clarify its existence. Only recently was its invalidity as a taxon finally established (Hennache *et al.*, 2012).

Where the holotype, syntypes and other type material will be deposited is also a crucial consideration. Type specimens should always be deposited in a recognised museum collection that has good collection management facilities and that also welcomes visiting scientists. This is necessary to ensure the permanent and safe storage of the priceless type material and to ensure other scientists may have access to it for future study (few museums will consider sending type material on loan by post). To best serve the needs of science, it may be appropriate to split the type series so that some type material is stored in a collection in the country of origin, thereby helping to promote science locally, as well as in an internationally recognised collection. In doing so, the risk of loss or damage to the entire type series is spread and reduced. It is

also important that type specimens are labelled and preferably stored separately from the main collection. Bibliographic reference to the published description and the proposed name should be written on the label (LeCroy & Vuilleumier, 1992).

Probably everyone reading this will be familiar with the saola *Pseudoryx nghetinhensis*, which was described in a letter in the prestigious journal *Nature* (Dung *et al.*, 1993). The discovery of a new large mammal genus and the use of DNA analysis were certainly factors that the editors of *Nature* considered when deciding to publish this type description. The holotype was, however, deposited in the collection of the Forest Inventory and Planning Institute in Hanoi, Vietnam. This could hardly be described as a recognised museum collection with good collection management facilities or allowing easy access by visiting scientists. It would have been better for science had the holotype been deposited in a museum with a collection of bovid type material.

Although the golden age of vertebrate species discovery has past, new species are described regularly. In 2010, at least 208 species of higher plants and vertebrate animals were apparently described from the Greater Mekong region, of which at least seven were described from Cambodia (Thompson, 2011). Thus the opportunity to discover a new species in Cambodia is a very real one and I hope that many of you will have in the future.

The *Cambodian Journal of Natural History* does not normally accept formal descriptions of new species, new subspecies or other new taxa. If you wish to submit original taxonomic descriptions, please contact the editors in advance. The journal editors have two reasons for not accepting type descriptions. First, is the need for expert peer reviewers. While the editors have a good range of expert taxonomist contacts for some taxa (e.g. reptiles, bats, amphibians, birds and orchids), they may not be able to secure high calibre reviews for some of the lesser taxa that may be submitted. The last thing any of us would want to do is publish a taxon that turned out to be false or inadequately described and substantiated. That would be a disservice to science— all of us are familiar with the problems caused by poor descriptions.

Second, there are already many excellent places to publish new species. As an author, I would be looking for a robust, well established journal that has a strong track record in publishing taxa and can reach the global audience that need access to the descriptions, both now and in the future (type descriptions stay