Guidelines for the description of new species in ornithology

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Received 5 June 1992

Introduction

This paper has been written because of our disappointment with many descriptions of new species of birds which we felt were not up to the high standards we should expect in modern avian systematic work. In an attempt to remedy this problem, we present in this paper a set of suggested guidelines, the use of which, we believe, would improve the current situation significantly. A preliminary version of this paper was presented in poster form at the XXth International Ornithological Congress in Christchurch, New Zealand (LeCroy & Vuilleumier 1990).

After presenting the background and the data on the rate of new species descriptions in ornithology, we discuss the kinds of problems that exist, with descriptive examples, followed by a series of concrete and, we hope constructive, suggestions for future workers.

Background

About 35 years ago the catalogue of birds of the world at the species level appeared to be so nearly complete that Mayr (1957: 35) wrote: "I doubt that more than 20 new species will be discovered in the next ten years". Later, however, in view of the steady flow of descriptions of new species in the ornithological literature, Mayr (1971: 315) concluded that "the number of undescribed new species of birds is by no means nearly exhausted, contrary to my earlier predictions".

Asking "Why have all these [avian] species been overlooked so long?" Mayr & Vuilleumier (1983: 229) wrote "One reason is that some of them are sibling species . . .. Another, and more important reason, is that some of these [new] species have exceedingly small ranges . . ., or are restricted to virtually inaccessible places visited only recently by ornithologists . . .". Continued exploration of remote, and hitherto nearly inaccessible places, has indeed resulted in the description of unexpectedly interesting species mostly from tropical areas (see also Diamond 1985).

During the past 52 years ornithologists at the American Museum of Natural History (AMNH) in New York have published 6 reviews of new species of birds (Zimmer & Mayr 1943, Mayr 1957, Mayr 1971, Mayr & Vuilleumier 1983, Vuilleumier & Mayr 1987, Vuilleumier *et al.* this volume). These reviews can be undertaken because the AMNH houses the most complete bird collection in the world (about 830,000 skins and approximately 99% of the known 9000+ species) and offers the needed comparative material. Also, the rich library resources at AMNH permit us to have access to the vast majority of ornithological journals, even the most obscure and localized ones. The work done to prepare these

reviews has given us the opportunity to examine critically all new species descriptions published in the last 5 decades.

Rate of new species descriptions

In the 52 years from 1938 to 1990, 291 new binomina have been proposed in the literature, of which c. 55% are probably valid full species (including allospecies *sensu* Amadon 1966), 18% are subspecies, 13% are synonyms, 1% are nomenclaturally invalid, 1% are hybrids and about 12% are *species inquirendae*. Over this period valid new species have thus been published at the rate of c. 3 species per year. This rate represents an annual increase of only 0.033% in the world's avifauna, an incredibly low figure. Probably in no other class of vertebrates are there so few as yet undescribed new species.

Given such a small number of new species being described annually, it is all the more essential that ornithologists should publish descriptions that are uniform, precise and scientifically of the highest calibre, thus leading the way for equally high calibre descriptions of new species in other disciplines. Unfortunately, too many descriptions of new species in ornithology, even in the 1980s and the present day, remain substandard. Clearly this state of affairs needs urgently to be changed.

The problem

While writing a chapter on the species concept in ornithology, one of us (Vuilleumier 1976) reviewed 107 new species descriptions for the period 1955 to 1974, and was struck by the relatively large number of poor descriptions of putative new species of birds. Later on, while preparing the last 3 reviews of new avian species (Mayr & Vuilleumier 1983, Vuilleumier & Mayr 1987, Vuilleumier *et al.* this volume) there was continued dismay at the mediocre quality of the work of some fellow ornithologists.

Thus, Vuilleumier & Mayr (1987: 146) wrote: "The authors deplore the practice of some ornithologists to describe allegedly new species of birds without reference to a type specimen. Far too often, the description of new species of birds is published in very obscure journals, at times even in privately printed journals. New species of birds should be all described in widely read, easily accessible, and preferably refereed ornithological journals. This would certainly eliminate the necessity of spending much time tracking down names that eventually turn out to be nomina nuda or synonyms . . ." A few examples will illustrate what these authors meant and what we mean in the present paper.

1. On 2 occasions, swallows (Hirundinidae) from Africa have been described as new on the basis of a single specimen obtained from flocks of migrants (Williams 1966, Fry & Smith 1985). Thus nothing is known of the breeding locality of these birds and in a group as difficult and widespread as the swallows, one cannot be sure that the proper comparisons have been made.

2. In other cases, putative new species have been described, again with inadequate documentation, and in obscure publications that we have had

much difficulty in finding, even in the comprehensive natural history libraries of the AMNH and the Museum of Comparative Zoology (MCZ). Thus *Crax estudilloi* was described in the *Game Bird Breeders, Aviculturists, Zoologists and Conservationists' Gazette* (see Vuilleumier & Mayr 1987: 140), which is not a professional ornithological journal, and *Asthenes luizae* was published in Volume 1, number 1, of *Ararajuba* (see Vuilleumier *et al.*, this volume). *Ararajuba* is the journal of the Brazilian Society of Ornithology, and although there is no question of its scientific calibre, it is unfortunately not yet widely circulated outside Brazil, and an important new record could thus have been easily overlooked.

3. In yet other instances, reading the description has proved almost impossible because of the language in which it was originally described (e.g. Vietnamese: *Lophura hatinhensis*—see Vuilleumier *et al.*, this volume).

4. We have reviewed cases where the 'types' were live (cage birds) at the time of description or publication (e.g. *Hypochera lorenzi* and *H. incognita*—see Mayr & Vuilleumier 1983: 222). These birds belong to a notoriously difficult group where species limits are very difficult to draw, and the absence of designated type specimens means that the new species are impossible to evaluate. Frequently also, such captive birds fail to be preserved when they die (see *Crax estudilloi*—Vuilleumier *et al.*, this volume).

5. A few years ago, the late Augusto Ruschi published no fewer than 4 poorly crafted descriptions of alleged new hummingbird species from Brazil, leaving such a confusing trail of problems that the correct identity of these birds is only now beginning to be understood (Hinkelmann 1988).

6. Perhaps the most striking example of inadequate presentation of a new species is illustrated by the recent description of *Laniarius liberatus* (Laniidae) from Somalia based chiefly on an analysis of DNA from blood samples and feather quills. The only known individual was caught in Africa, transported to Europe, and later transported back to, and released, in Africa, but, incredibly, not where it had been originally captured (Smith *et al.* 1991). Furthermore, this case is interesting because it received extensive coverage, including notes in *Trends in Ecology and Evolution* (Hughes 1992a,b, Peterson & Lanyon 1992), a piece in *BBC Wildlife* (Scott 1991), 2 letters in *Oryx* (Ansell 1992, Bourne 1992) and even a long article in the *New York Times* by Carol Kaesuk Yoon in the Science Section of 28 April 1992.

This specimen was doubly wasted. Its survival in a strange area after a year in captivity is highly unlikely and its ability to find a mate and reproduce is even more unlikely. Thus it was returned to the wild to die. Nor is there now any voucher specimen for the sample of DNA or a type specimen to serve as a standard of reference for the application of the new name. Believing in the good faith of the authors is not sufficient; it is a basic tenet of the scientific method that the availability of documentation and specimens is essential to permit others to assess the quality and accuracy of a scientist's work. That only one individual was seen in no way implies that the 'new' species is on the verge of extinction, or even rare. We highly recommend a recent article on the importance of collections

and collecting, which was in fact published before the appearance of the description of the shrike (Winkler *et al.* 1991).

We feel that the standards of species description in ornithology, instead of improving, may be declining. Even professionally trained ornithologists are publishing bad descriptions of putative new species, while too many untrained ornithologists publish 'new' species in very local journals.

We wish to emphasize here that there are, and have been, excellent descriptions of new species in the literature. As models for good descriptions of new species of birds (without implying a judgment on the validity of the new taxon) we can cite those of *Stachyris latistriata* (Gonzales & Kennedy 1990) from the Philippines, *Meliphaga hindwoodi* (Longmore & Boles 1983) from Australia, *Pyrrhura orcesi* (Ridgely & Robbins 1988) from Ecuador, and *Cercomacra manu* (Fitzpatrick & Willard 1990) from Peru. We congratulate the authors of these and other similarly good descriptions, and suggest that these descriptions ought to serve as models for other workers.

In many countries where amateur ornithologists are numerous (Europe, USA), committees of specialists examine critically each sight record of a bird species allegedly identified as rare or new for that country. On the basis of the merit of each case, some of these records are accepted but others are simply rejected. We do not advocate the establishment of an international committee of reputable avian systematists who would similarly review critically each new species description, but we feel that high standards must be adhered to. Instead we present below deliberately explicit guidelines in order to help raise standards in the future. However, the clear distinction between species descriptions and discussions of species concepts first needs emphasising.

One of us (Vuilleumier 1976: 50) remarked earlier that new species of birds had very often been described by authors according to a morphological or typological species concept. At the time, Mayr's (1963b) biological species concept (and see Mayr 1982) was probably accepted by these authors, as opposed to some today (e.g. Cracraft 1983, McKitrick & Zink 1988) who prefer a phylogenetic one. All these concepts, and their relevance to systematics, classification, and speciation analysis, have been admirably covered by Haffer (1986, 1990) and need not be discussed further.

In the earlier instalments on new avian species, although judgment was passed on the validity of the new species of birds we reviewed, judgment was *not* passed on the species concept represented by each of those new species. Nor is this so in the present article, our goal being only to express our concerns about the standards of description of new species, without reference to species concepts.

The International Code of Zoological Nomenclature

The starting point for professional practice is clearly the *International Code of Zoological Nomenclature* (ICZN). J. Chester Bradley in the Preface to the first edition of the ICZN (1961) wrote the following:

"Like all language, zoological nomenclature reflects the history of those who have produced it, and is the result of varying and conflicting

practices . . .. Ordinary languages grow spontaneously in innumerable directions; but biological nomenclature has to be an exact tool that will convey a precise meaning for persons in all generations."

The rules, recommendations and code of ethics of the ICZN (3rd ed, 1985, or subsequent editions) should be followed in the description of all new species of birds. It is important to point out in particular that:

(a) The Code does *not* infringe upon taxonomic judgement, or determine the rank to be given a population, but that

(b) The Code *does* promote stability and universality in the scientific names of animals, including birds, and provides, in the words of the Code, "a Name-Bearing Type" which is the specimen that provides an "objective standard of reference whereby the application of the name of a taxon can be determined". In the original description of a new species-level taxon this may be either:

(i) a *holotype*: a single specimen (or *the* single specimen) designated to bear the proposed name, or

(ii) a *syntype*: each specimen in the series mentioned in the description, when no holotype is designated.

Guidelines on what to publish

We list below the minimal number of items that we feel are absolutely necessary for inclusion to create a good description of a new species of bird.

1. Holotype or syntypes should be designated. To facilitate future comparisons and permit measurements to be made, we feel strongly that it is imperative that the type(s) be specimen material and not illustration, bits of feathers, or blood or tissue samples. The latter can be useful in many ways, but are no substitute for a type specimen, only additional evidence (see below). Additional specimens in a type series are highly desirable because they illustrate population variability.

2. Minimal information should include the catalogue number and the name of the institution where the type is deposited, the sex and age of the type specimen(s), the collecting locality in as much detail as possible, including coordinates and altitude, the date of collection, name(s) of collector(s), measurements and a detailed word description of the type(s).

3. Desirable additional information that may be the necessary basis upon which to judge the validity of the new species includes voice recordings, blood samples, tissue samples, anatomical specimens, notes on behaviour, ecology, etc.

4. The etymology and gender of the name proposed must be given.

5. Explanation should be given as to why the new species is included in a given existing genus, or why it is placed in a new genus. Comparisons should be detailed, and substantiated with adequate material such as figures or tables, and maps.

6. Comparisons made should be the appropriate ones; similar and/or related sympatric and allopatric forms should be compared in detail with the new species, maps should be included to illustrate the geographical relationships with precision.

7. Discussion of the biogeography of the genus in which the new taxon is placed is highly desirable, thus identifying the eco-geographic context of the new species within or among previously known species. Whether the new species is geographically disjunct, or is an allospecies (*sensu* Amadon 1966) or is an isolated species, should be discussed.

8. Why the new taxon, if allopatric, is a new species and not a new subspecies and what species concept is being followed in this instance should be explained.

Publishing a proposed name

New species of birds should be described in refereed journals whose editors are thoroughly familiar with the proper format for the description of a new taxon and with the ICZN. This will ensure that the necessary information for correct description is included and also will bring the proposed new taxon readily to the attention of the scientific community. It would be the responsibility of the editor to verify that the new species description submitted for publication conforms to the format advocated here, and which we hope can be accepted universally.

Although it is perfectly understandable that authors of new species should wish to publish such descriptions in their native language, today the *lingua franca* of science is English. Nearly all ornithologists can read English, even if they do not speak it. Hence a publication in the English language, or at least a thorough summary in English, would ensure, and to the author's benefit, that the description of a newly proposed taxon can be made available to as wide an international audience as possible. We strongly condemn the practice of some ornithologists of publishing new descriptions in books or catalogues, where they may be easily overlooked.

Deposition of type(s)

Because types are so important in basic systematic work, several rules must be followed for their true designation. They include:

1. The type(s) should be deposited in a recognized museum with good facilities for proper permanent storage of specimens and with an interest taken in care and preservation of type specimens on the part of professionally trained curators. It is of little use to anyone to keep the type in a private collection.

2. The type(s) should be labelled in a way that makes the special status of a type specimen immediately apparent; the type(s) should preferably be kept separate from the general collection.

3. Bibliographic reference to the published description and the proposed name should be clearly written on the label.

4. Since types are such crucial and essential repositories of systematic and biological information, yet are probably not loaned safely because of the vagaries of modern mails, they should be housed in institutions that can be visited relatively easily by ornithologists.

Discussion

We agree with Peterson & Lanyon (1992) that the best kind of new species description is a detailed one which includes a variety of types of information, backed up by type specimens. Interestingly, included in the *New York Times* article mentioned above is a list of the minimal items of information needed for an adequate description, from sources provided by Richard C. Banks of the U.S. Fish and Wildlife Service, Washington, D.C. It is most gratifying to see that Banks' list conforms in all ways with our own views, as expressed in this paper.

Conservation cannot proceed without detailed knowledge of avian diversity, and this can only be acquired by judicious sampling of populations and careful systematic analysis of collections. Given the current rate of habitat destruction, we wish to note here that conservationists who are against such sampling are jeopardizing their own efforts by hampering the acquisition of vital knowledge before it is too late.

As Mayr pointed out 30 years ago, avian biologists, including amateurs, have been leaders in several fields of biology in the past; in systematics this leadership could be accomplished because of the "completeness of the knowledge of birds" and especially because "most bird species are not merely known but also abundantly sampled from throughout their range" (Mayr 1963a: 30). However, it is becoming increasingly apparent as habitats are being destroyed at an alarming rate, that very many bird species are still insufficiently sampled and incompletely known and that the availability of discerningly collected specimens is more critical now than ever before. If we are to retain this status of leadership in the specialised branch of systematics which consists of describing new species-taxa, ornithologists must practice self-discipline and must follow a minimum number of rules. We hope that ornithologists who intend to describe new species of birds in the future will find our guidelines in this paper useful. If we want to avoid ridicule, we must avoid the kind of work that we still see too often published, even by colleagues who should know better.

Acknowledgements

We are grateful to James Monk for his constructive criticisms of a draft of this paper and we thank Elizabeth De Jesus for typing the manuscript.

References:

Amadon, D. 1966. The superspecies concept. *Syst. Zool.* 15: 245–249.

Ansell, W. F. H. 1992. To collect or not to collect—a conservation issue? *Oryx* 26: 119.

Bourne, W. R. P. 1992. Of shrikes, shrews and storm-petrels. *Oryx* 26: 119–121.

Cracraft, J. 1983. Species concepts and speciation analysis. Pp. 159–187 *in* R. F. Johnston (ed.), *Current Ornithology*. Vol. 1. Plenum Press, New York.

Diamond, J. M. 1985. How many unknown species are yet to be discovered? *Nature* 315: 538–539.

Fitzpatrick, J. W. & Willard, D. E. 1990. *Cercomacra manu*, a new species of antbird from southwestern Amazonia. *Auk* 107: 239–245.

Fry, C. H. & Smith, D. A. 1985. A new swallow from the Red Sea. *Ibis* 127: 1–6.

Gonzales, P. C. & Kennedy, R. S. 1990. A new species of *Stachyris* babbler (Aves: Timaliidae) from the Island of Panay, Philippines. *Wilson Bull.* 102: 367–379.

Haffer, J. 1986. Superspecies and species limits in vertebrates. *Zeitschr. Zool. Syst. Evolutionsforsch.* 24: 169–190.

— 1990. Ornithologists and species concepts. *Proc Int. 100 DO-G Meeting, Current Topics Avian Biol.*, Bonn 1988: 57–60.

Hinkelmann, C. 1988. Comments on recently described new species of hermit hummingbirds. *Bull. Brit. Orn. Cl.* 108: 159–169.
Hughes, A. L. 1992a. Avian species described on the basis of DNA only. *Trends Ecol. Evol.* 7: 2–3.
— 1992b. Reply from Austin Hughes. *Trends Ecol. Evol.* 7: 168.
International Code of Zoological Nomenclature. 1961. 1st ed. International Trust for Zoological Nomenclature, London.
International Code of Zoological Nomenclature, 1985. 3rd ed. International Trust for Zoological Nomenclature, Univ. California Press, Berkeley.
LeCroy, M. & Vuilleumier, F. 1990. Guidelines for the description of new species in ornithology. [Abstract.] *Acta XX Congr. Internat. Ornithol.* (*Suppl.*): 378.
Longmore, N. W. & Boles, W. E. 1983. Description and systematics of the Eungella Honeyeater *Meliphaga hindwoodi*, a new species of honeyeater from central eastern Queensland, Australia. *Emu* 83: 59–65.
McKitrick, M. C. & Zink, R. M. 1988. Species concepts in ornithology. *Condor* 90: 1–14.
Mayr, E. 1957. New species of birds described from 1941 to 1955. *J. Orn.* 98: 22–35.
— 1963a. The role of ornitholgical research in biology. *Proc. XIIIth Internat. Ornithol. Congr.*: 27–38.
— 1963b. *Animal Species and Evolution.* Cambridge, Massachusetts, Harvard Univ. Press.
— 1971. New species of birds described from 1956 to 1965. *J. Orn.* 112: 302–316.
— 1982. Processes of speciation in animals. Pp. 1–19 *in* C. Barigozzi (ed.), *Mechanisms of Speciation.* Alan R. Liss, New York.
Mayr, E. & Vuilleumier, F. 1983. New species of birds described from 1966 to 1975. *J. Orn.* 124: 217–232.
Peterson, A. T. & Lanyon, S. M. 1992. New bird species, DNA studies and type specimens. *Trends Ecol. Evol.* 7: 167–168.
Ridgely, R. S & Robbins, M. B. 1988. *Pyrrhura orcesi*, a new parakeet from southwestern Ecuador, with systematic notes on the *P. melanura* complex. *Wilson Bull.* 100: 173–182.
Scott, K. 1991. World first: bird survives baptism. *BBC Wildlife* 9 (8): 534.
Smith, E. F. G., Arctander, P., Fjeldså, J. & Amir, O. G. 1991. A new species of shrike (Laniidae: *Laniarius*) from Somalia, verified by DNA sequence data from the only known individual. *Ibis* 133: 227–235.
Vuilleumier, F. 1976. La notion d'espèce en ornithologie. Pp. 29–65 *in* C. Bocquet, J. Génermont & M. Lamotte (eds.), *Les Problèmes de l'Espèce dans le Règne Animal.* Tome I. Soc. Zool. France, Mém. no. 38. Paris.
Vuilleumier, F. & Mayr, E. 1987. New species of birds described from 1976 to 1980. *J. Orn.* 128: 137–150.
Williams, J. G. 1966. A new species of swallow from Kenya. *Bull. Brit. Orn. Cl.* 86: 40.
Winkler, K. W., Fall, B. A., Klicka, J. T., Parmelee, D. F. & Tordoff, H. B. 1991. The importance of avian collections and the need for continued collecting. *Loon* 63: 238–246.
Zimmer, J. T. & Mayr, E. 1943. New species of birds described from 1938 to 1941. *Auk* 60: 249–262.

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