

TAXONOMY AND THE AVICULTURIST

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Taxonomy is an often confusing topic, especially to those not directly or actively associated with its use. It is a scientific discipline largely established and regulated by academicians, whose primary interest is the classification of living forms. Their efforts have created a framework that illustrates the genetic and evolutionary relationships these forms have to one another. It is this same framework that serves as a basis for both the professional and amateur zoologist in his study or inquiry into the animal kingdom. However, in order for the zoologist to pursue these investigations, it is essential that he have an adequate working knowledge of the principles of taxonomy and its associated nomenclature. It is the intent of this paper, therefore, to present the basic fundamentals of this subject in a manner that hopefully can be clearly interpreted by those not directly involved in this specialty.

Since taxonomy concerns itself with the orderliness of things, it is only fitting that we begin with its historical aspects. Carolus Linnaeus (1707-1778), a Swedish naturalist, is recognized as the father of modern taxonomy and the originator of binomial nomenclature. He realized that there was confusion in the use of vernacular or common names, especially since they were not governed by strict rules of procedure, and that they differed depending on language and local custom. Consequently, he adopted the use of Latin, a universal language, and published his system in the 1758 edition of *Systema Naturae Regnum Animale*. Linnaeus utilized two Latin words in his binomial arrangement, the first to indicate the general kind of animal (genus), and the second to designate the particular kind (species).

Since that time, the classification of animals has developed into a well structured science. A taxonomic hierarchy composed of categories or taxa (phylum, class, order, etc.) now exists that not only makes it easier to identify animals through natural groupings, but also presents the evolutionary relationships these categories, and more importantly the species, exhibit toward each other. If we were to list these taxonomic categories in their order of descent, we would have the following: phylum, class, order, fam-

ily, genus, and species. There are also groupings prefixed by "sub" or "super" that are often used for further division. These appear between the previously mentioned categories. In the case of ducks, geese, and swans, tribes are used to subdivide the family.

Let us take an example, the mallard *Anas platyrhynchos*, and trace it through its taxonomical sequence.

Phylum – Chordata
Class – Aves
Order – Anseriformes
Family – Anatidae
Tribe – Anatini
Genus – Anas
Species – platyrhynchos

(I choose to use "tribe" but omitted the "sub" and "super" categories here for the sake of simplicity.)

The hierarchy or sequence in which the categories appear is referred to as their phylogenetic order. Phylogeny pertains to the lines of descent for any taxon, based upon origin and evolutionary relationships. In general, it is a comparison of primitive structures versus complex, and appears at all levels of taxonomy from phylum to species. For instance, there are 19 phyla beginning with Protozoa, the primitive unicellular organisms, and ending with Chordata, those advanced animal forms possessing a spinal column. Each subsequent phylum in the sequence is considered to be more advanced than the previous one. There are 27 currently recognized orders of birds, beginning with (depending upon the authority) the ostrich (Struthioniformes). This bird exhibits a number of primitive characteristics, such as a keelless sternum. The sequence of avian orders ends with the perching birds (Passeriformes), which exhibit a number of characteristics such as an advanced perching foot and the prevalence of song for species recognition. The same rule of sequence applies to the genera within the family, and so on.

As stated previously, taxonomy is a well structured science, particularly with regard to nomenclature, the describing and naming of species. The first important step in this process is the evaluation of the specimen in question. Does it

actually qualify for specific status; that is, does it originate from a population of similar organisms which actively or potentially interbreed and are reproductively isolated from all other such groups? Once this has been decided and before the species received its Latin name, it must be described. It then becomes a holotype, the specimen which theoretically exhibits all those characteristics typical of the new species.

When a taxonomist describes a new species, there are numerous criteria that must be taken into consideration. Besides descriptions of the traditional morphological characters (size, shape, color, etc.), physiology (serology, cytology, chemical analysis, etc.); ethology (behavior); ecology and geography must also be examined. Basically, the taxonomist must clarify what differences are supposed to exist between the specimen in question and other similar species. It should be stated here that there are essentially two types of taxonomists, the lumpers and the splitters. Splitters classify according to minute differences; lumpers differentiate on the basis of larger detail.

Since the time of Linnaeus, we have learned much about animals, especially their evolution, behavior, etc. Linnaeus assumed that all species had been created simultaneously, that they were unchanging, and that all individuals of a species had descended from an original pair. Darwin's work corrected this theory by illustrating that speciation is a continuous evolutionary process. Some Latin names, therefore, have now become literally meaningless or misleading, although many still remain as convenient designations. Even though Latin names were at one time meant to be descriptive of the animal's appearance, over the years this has broadened to cover its habitat or distribution, to honor a friend or colleague or perhaps to honor the person who collected it. The application of Latin names is not a simple matter, as they must follow the strict guidelines of the International Commission on Zoological Nomenclature established in 1901. It is within the auspices of the Commission, which obtains its authority from the International Congress of Zoology, to regulate and act upon the International Rules of Zoological Nomenclature (The International Code).

It is also the Commission's responsibility to publish the *Bulletin of Zoological Nomenclature* which announces the latest decisions on new species, name changes, changes in the code, etc. The current principal provisions of The International Code (updated in 1964) are as follows:



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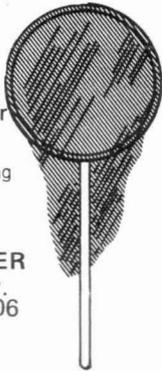
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1. It separates zoological nomenclature from botanical nomenclature.
2. It establishes policies for the use of suffixes (iformes, idae, etc.).
3. It maintains the rule that all names must be Latin or a form thereof, underlined in manuscripts and italicized in publications.
4. It adheres to the law of priority: The genetic and specific names of a particular animal shall be the names proposed by Linnaeus in 1758, or the names first proposed after that date.
5. It defines the author of a name as the one who first publishes it and accompanies it with a suitable description of the animal.

A generic name may not be used more than once in the animal kingdom, but a specific name may be used frequently and often is, as it is applied to other species. The first letter of a generic name is always capitalized, but the specific name is always lower case. One may notice that a person's name (the author) may follow a scientific name, such as *Agapornis personata* Reichenow. This is usually done for clarification, especially when the historical background of the name is complicated. Over a period of several years, the generic name of a species may have been changed several times by as many authors. If the author's name is not enclosed in brackets, then he originally described the species in the genus in which it is now placed; however, if his name appears in brackets, such as *Agapornis roseicollis* [Vieillot], then the author originally placed it in a genus other than that in which it now appears.

Names are updated or changed as a result of a better understanding of an animal's characteristics. All that is necessary to change a name is for the taxonomist to justify the alteration to the Commission; and if the change is granted, then the new name is published in the *Bulletin of Zoological Nomenclature*. Thereafter the new name is applied to the species until another change is warranted, if ever. It is scientifically and ethically improper for any Latin name to be applied to a species unless these procedures have been followed. The fact that name changes should only be initiated by qualified individuals who have a thorough understanding of an animal's profile cannot be over-emphasized.

More recently, with the addition of subspecies, taxonomists have found it necessary to go to a trinomial system of nomenclature. A subspecies is a geographically limited population whose members commonly possess certain taxonomic characters that distinguish them from all other populations of the same

species. When a species is divided into subspecies, the holotype for the species also serves as the type-specimen for one of the subspecies. In addition, it is assigned the same Latin name as the species, as illustrated by the lesser snow goose *Anser caerulescens caerulescens*. From then on this subspecies is known as the nominate form. The creation of this subdivision has, of course, resulted in numerous disagreements pertaining to the differentiation between species and subspecies. Mention should also be made of the existence of "color phase". This term is not synonymous with subspecies, as it designates nothing more than a color variant of a species. This is true, for example, of the blue goose which is a color variant of the lesser snow goose; and it also applies to the gray and reddish color variations of the common screech owl *Otus asio*.

There are many other facts and special problems associated with taxonomy. To have discussed or presented examples of each would have no doubt confused the reader more than he already is. However, as stated in the opening paragraph, this is a complicated subject, and a full command of its elements is a difficult goal to achieve. For those who are interested in pursuing this further, a list of references appears at the end of this article.

DISCUSSION

Over the years numerous comments extremely critical of taxonomy and its application to the aviculturist have appeared in various avicultural journals. Most of these remarks have been generated by those who are confused as to the correct status of a particular scientific name. In order for a person to keep informed of taxonomic change, it is necessary to maintain a large authoritative ornithological library, partially comprised of ornithological journals and current issues of the *Bulletin of Zoological Nomenclature*. The expense involved is usually quite prohibitive to the average aviculturist; consequently, the readily available publications must serve as reference material, whether or not they are authoritative. This, perhaps, is where the problem lies. There are numerous books, monographs and journals on the market that are written or compiled by persons who are knowledgeable in the taxonomic statuses of the species described therein. They have approached their subject matter in an academic fashion, and their results can and should be considered valid sources of taxonomic information. However, there is a greater number of available publications that have not taken the same direction. These are usually author-

ed by lay persons knowledgeable in behavior and natural history, but less knowledgeable in taxonomy. They usually have not researched this aspect because the publication is generally directed toward the non-scientific enthusiast.

Certainly it is difficult to decide which author or work is authoritative. Even the old standards such as Peters' *Checklist of Birds of the World* and Ridgway's *Birds of North and Middle America* contain many antiquated generic and specific names. The most logical way to choose an authority is to examine the publication and note the author(s). The content of the publication will most often reflect the qualifications of the writer. If the subject matter is presented in an objective, organized and well documented fashion, and if the author is someone who can be identified with academic ornithology or is an accredited avian taxonomic authority as a result of previous contributions, then chances are the publication can be considered authoritative. Also, the more recent the publication, the more current the scientific nomenclature is likely to be. Popular publications that are largely composed of photographs or that are related to the author's personal experiences with birds should be completely avoided as sources of scientific value. They are meant to be nothing more than pleasurable reading.

able reading.

Ideally, if this differentiation can be made and if the aviculturist can maintain a working knowledge of the available authoritative reference material accompanied by a basic understanding of taxonomy, then many of the associated frustrations should be eliminated.

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