

Plural versus Singular Common Names for Amphibian and Reptile Species

Although scientific names are the accepted means of referring to species in the scientific literature, common names continue to serve important functions in both scientific and popular communication. That fact is evident from the inclusion of both scientific and common names in checklists published by various taxonomically specialized scientific societies (e.g., American Ornithologists' Union 1998 [birds]; Baker et al. 2003 [mammals]; Crother et al. 2008 [amphibians and "reptiles"]; Nelson et al. 2004 ["fishes"]). In this context, a relatively minor yet somewhat radical change concerning the use and formation of common names in a recent checklist of iguana species (Iguana Taxonomy Working Group 2011) deserves explanation. The change is minor in that it involves only a single letter, "s," reflecting the plural instead of singular nature of each name, but it is radical in that it affects the names of all species in the checklist and breaks a long-standing tradition. A description of the rationale for this change was outside of the scope of the checklist, and therefore I, as the instigator, am presenting the rationale here. I hope to convince herpetologists (and biologists in general) that the traditional use of singular common names as the equivalents of the scientific names of species is inconsistent with modern species concepts and the meanings of the words from which the names are formed, and therefore, that plural common names should be used instead. Although some may consider the inconsistency to be insignificant (and thus the proposed solution to be one to a "non-problem"), it reflects a fundamental and inappropriate assumption about the basic nature of taxa.

The term "common" (in "common name") is used here to mean "ordinary" or "familiar" (as opposed to "widespread" or "general") in the sense of being composed of ordinary or familiar words; it is therefore roughly synonymous with "vernacular," meaning "of the everyday language or dialect of a group of people." The common names used by different groups of people can be distinguished by specifying a region, country, or language (e.g., "English common names"). Other properties of common names can also be conveyed by using appropriate adjectives (e.g., "standard English names" for English common names proposed in an attempt to standardize usage). I will restrict considerations in this commentary to English common names, though they likely apply to those of other languages. With one exception, I will also restrict my comments and examples to names of amphibian and reptile species, though they obviously apply to those of other taxa as well.

MODERN SPECIES CONCEPTS AND THEIR IMPLICATIONS FOR COMMON NAMES

Although debate continues concerning the precise definition of the species category (reviewed by de Queiroz 1998; Mayden 1997; Wilkins 2006), all modern species concepts equate species more generally with population level lineages—that is, with populations or metapopulations (groups of connected populations) that extend through time as the result of ancestry and descent among their component organisms (de Queiroz 1998, 1999, 2007). Implicit in this general concept of species is the view that

the species category is a level in the hierarchy of biological organization (Brown 1995; de Queiroz 2011; Mayr 1982), which includes at least cells, organisms, colonies, and populations/species, and perhaps entities at lower levels (e.g., genes) and higher levels (e.g., communities) as well. In this hierarchy of biological organization, entities at higher levels (e.g., species) are made up of those at lower levels (e.g., organisms).

In agreement with the recognition of a hierarchy of biological organization, different names are usually used for entities that occupy different hierarchical levels. For example, "Lonesome George" is the name of an organism that is part of the species named "*Chelonoidis* (formerly *Geochelone*) *abingdonii*." The common names of species, however, are often used in a way that is inconsistent with such distinctions; that is, the same common names are often used to refer both to individual organisms and to the species of which they are parts. For example, it would not be unusual for someone to say, "I saw a zebra-tailed lizard near Pisgah Crater in the Mojave Desert," using the name "zebra-tailed lizard" to refer to an individual organism. It would also not be unusual for someone to say, "The zebra-tailed lizard occurs in the Mojave Desert," using the same name, including the singular number, to refer to an entire species. This second use, however, is inconsistent with modern species concepts and the meanings of the words from which the common name is formed.

The common names of amphibian and reptile species are often formed by adding adjectives (e.g., "red-cheeked," "Sonoran"), including participles (e.g., "barking") and attributive nouns (e.g., "canyon," "rat"), or possessive nouns (e.g., "Baird's") to base names. Those base names—words such as "frog," "salamander," "turtle," "lizard," "snake," and "alligator"—are common nouns in that they refer to the members of groups of organisms. Those groups are now commonly conceptualized as the classes or sets of organisms that make up particular clades, or sometimes paraphyletic groups (e.g., "lizards"). A snake, for example, is an individual organism; it is an individual member of the set of organisms making up the clade Serpentes or Ophidia. Therefore, when we refer to a single organism in this set, we use the singular noun "snake" (e.g., "Amy anaesthetized a snake before performing surgery on it"), and when we refer to several such organisms, we use the plural noun "snakes" (e.g., "Steve has been radio-tracking 10 snakes at the same time").

When common names are formed using common nouns of the kind just described, it is inconsistent to use the singular form of those names as equivalents of the scientific names of species. The reason that this use is inconsistent is that singular common names properly refer to individual organisms, not to entire species, whereas scientific names of species properly refer to entire species, not to individual organisms. A zebra-tailed lizard, for example, is not a species; it is an organism that is a member

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or part of a species (*Callisaurus draconoides*). Conversely, *Callisaurus draconoides* is not a lizard, zebra-tailed or otherwise; it is a species the organismal parts of which are (zebra-tailed) lizards. Therefore, because species are almost always composed of more than one organism, the name "*Callisaurus draconoides*" is not equivalent to "[the] zebra-tailed lizard" but to "zebra-tailed lizards." And thus, the incorrectly stated sentence "The zebra-tailed lizard occurs in the Mojave Desert," is correctly stated using either a singular species name: "*Callisaurus draconoides* occurs in the Mojave Desert," or a plural common name: "Zebra-tailed lizards occur in the Mojave Desert."

Interestingly, the problem I am discussing is largely restricted to the common names of species. Analogous inconsistencies involving the common names of higher taxa (clades) are rare to non-existent. For example, it is not customary to equate the name "Squamata" with "[the] lizard" but with "lizards." Nor is it customary to equate "*Phrynosoma*" with "[the] horned lizard" but with "horned lizards." Nevertheless, it is customary to equate "*Phrynosoma solare*" with "[the] regal horned lizard," though consistency dictates that we ought to equate it with "regal horned lizards." All of the taxa just mentioned, whether clades or species, are composed of more than one organism.

SCIENTIFIC NAMES AND COMMON NAMES OF SPECIES

In contrast to English common names, the scientific names of amphibian and reptile species (as well as those of species in other clades) are commonly formed from Latin or Latinized words. Those words are often common nouns in their original language (e.g., "*rana*" is Latin for "frog"), but as scientific names, they are treated differently. In both popular and scientific discourse, the scientific names of species are commonly used in the singular, implying that they refer to species as wholes rather than to the organismal parts of species. In agreement with the treatment of scientific species names as singulars, several authors have argued that the scientific names of species are proper nouns (e.g., Ghiselin 1974; Hull 1976). Proper nouns, by definition, refer to individual entities (in this case, particular species) and thus are necessarily singular. Given that scientific names are singular, it is correct to say "*Plethodon petraeus* has a restricted distribution" but incorrect to say "*Plethodon petraeus* have a restricted distribution."

The use of scientific names as proper nouns is perhaps most natural in languages that are relatively distantly related to Latin (e.g., English and German more so than Spanish and Italian). Because the Latin or Latinized words from which scientific names are formed are more likely to be unfamiliar to speakers of such languages, it is natural to treat them as proper nouns, that is, as words (names) that simply refer to individual things, rather than common nouns, which refer to sets or classes of individual things and therefore often describe properties possessed by the members of those sets or classes. Just as the name "Doris Cochran" simply refers to a particular person, the name "*Apalone mutica*" simply refers to a particular species. That the name "Doris Cochran" means "of the sea" and "red" or "crimson" and the name "*Apalone mutica*" means "soft" and "unarmed" is irrelevant to their functions of referring to an individual person or species. That is to say, scientific names can be (and perhaps often are) used to refer to particular species regardless of whether the users of those names know or care about the meanings of the Latin or Latinized words from which the names are formed. Consequently, scientific names need not be descriptively accurate.

For example, just as the name "George" works perfectly well for referring to a person who is not a farmer, the name "*Coluber constrictor*" works perfectly well for referring to a species whose members do not commonly constrict their prey.

Like the scientific names of species, the common names of species are sometimes interpreted as proper nouns (e.g., Parkes 1978; Potter 1984). That interpretation, however, is inconsistent with certain practices involving common names. Rather than simply referring to species, common names often describe one or more properties of species or their component organisms. This situation is reflected in changes in common names to improve their descriptive accuracy, a practice that is expressly forbidden with scientific names. For example, the common name "poison arrow frog" was changed to "poison dart frog" (and "dart-poison frog"), and the names "Mexican hook-nosed snakes" and "plateau hooked-nosed snakes" were changed to "eastern hook-nosed snakes" and "western hook-nosed snakes" (Crother et al. 2008), in all cases to improve descriptive accuracy. In contrast, the name "*Coluber constrictor*" cannot be changed for the sake of improving descriptive accuracy. Although that rule is imposed by a formal system of zoological nomenclature, which does not apply to common names, the way that the system operates reflects the fact that the primary function of scientific names is simply for referring to taxa and not for describing the properties of their included organisms.

The interpretation of common names as proper nouns is also inconsistent with the meanings of the words from which they are formed. Because the base words from which common names are formed are common nouns (e.g., "gecko"), modifying them with descriptive adjectives (e.g., "banded") and/or possessive nouns (e.g., "Switak's") creates names that are also common nouns. Declaring them to be proper nouns or capitalizing them does not change that fact. Using them in the singular goes further toward making them function as proper nouns in that the species to which they refer are individual population level lineages; however, many uses of common names in the singular are inconsistent with their interpretation as proper names of species. For example, the statement "The Eastern Red-backed Salamander is a small species" is either incorrect or incorrectly stated. If the name "Eastern Red-backed Salamander" is the name of a species, that species (*Plethodon cinereus*) is not small: It has an extensive geographic distribution (Highton and Webster 1976), and its component organisms are extremely abundant, resulting in a high species biomass (Burton and Likens 1975). Alternatively, if the statement is about the average body size of the salamanders that make up the species and not about the species as a whole, then the proper name of the species should not be used. That is, it would be more appropriate to say "Eastern red-backed salamanders are small animals." Again, this confusion results from using a word that refers to a kind of organism as the name of a species.

USE OF SINGULAR COMMON NAMES AS A HOLDOVER

The likely explanation for the inconsistent but traditional use of singular common names for species is that it is a holdover from an earlier age. This practice originated in the pre-evolutionary era (see Daudin 1802–03 and Shaw 1802 for French and English examples), when species were conceptualized at least partly as essences or types (e.g., Hull 1965; Mayr 1976, 1982). Species were also conceptualized as self-perpetuating groups of organisms (de Queiroz 2011); however, without the principle of

evolution, the similarity and reproductive compatibility among their members was explained by their being of the same essence or type in the mind of their creator (Darwin 1859). Under essentialism, the name of a species is the name of an essence, an eternal, abstract Idea or Form of which living organisms are its concrete manifestations (Hull 1965). Under typology, a species is a type, a class or category of entities (i.e., a group defined by a set of shared characteristics) of which organisms are its instances or examples. In either case, the essence or type of a species consists of those properties that are necessary and sufficient for species membership, and traditionally, those properties took the form of organismal traits (de Queiroz 1992, 1995; Sober 1980). Thus, species were conceptualized either as eternal, ideal organisms (essentialism) or as categories of organisms (typology). Also associated with these views is the idea that any traits that vary among the members of a species are incidental or accidental, since they are not important to the essence or type of the species.

The perspective just described contrasts with modern species concepts, according to which species are viewed not as essences or types but as population level lineages. That is to say, species are viewed as entities at a level of biological organization above the level of organisms, rather than as kinds or categories of organisms (and nothing more). Thus, under modern species concepts, organisms are parts or components of species rather than examples, instances, or manifestations of them. In addition, the organisms of a species are not required to share any particular set of traits (though they often do), and traits that vary among them are not viewed as intrinsically any less important than those that happen to be fixed. Moreover, as entities at a higher level of biological organization, species possess properties unique to the population level (e.g., population structure) in addition to the properties of their component organisms (e.g., body size). These and related views have been termed “population thinking” and are in contrast with those of essentialism and typology (e.g., Mayr 1959, 1976; O’Hara 1997; Sober 1980).

The use of singular common names in situations that, under modern species concepts, call for the use of plurals can be understood as a vestige of essentialist or typological species concepts. According to those doctrines, particularly when organismal traits are treated as the essential or defining characters, the name of a species (whether scientific or common) refers to a single organism: the single eternal, ideal organism of which tangible organisms are concrete manifestations, or the single concept of an organism possessing the properties that define the class of which actual organisms are examples or instances. To the extent that the essence or type of a species is conceptualized as an organism, it is appropriate to use singular common names, such as “the wood turtle,” to refer to essentialist or typological species. Thus, the inappropriate use of singular common names based on terms that refer to organisms (e.g., “frog,” “turtle,” etc.) can be explained as a holdover from an era in which species were conceptualized as essences or types.

THE COMMON NAMES OF *HOMO SAPIENS*

Interestingly, people are less prone to using singular common names inappropriately when referring to our own species. Thus, we rarely, equate the scientific name “*Homo sapiens*” with the singular common names “[the] human” or “[the] human being;” instead, we use the plural common names “humans” and “human beings.” For example, it would be normal to say, “Humans (*Homo sapiens*) are bipedal primates,” but it would sound

archaic to say, “The human (*Homo sapiens*) is a bipedal primate.” Sometimes the singular common name “man” is used, though this practice is decreasing, presumably because it has inappropriate connotations with regard not only to number (singular versus plural) but also to gender. The singular common names “mankind” and “humankind” are also used. Those names, however, refer to the human species as a whole or the totality of human beings. Unlike the common names of amphibians and reptiles, they are never used to refer to individual people. For example, although one might say, “Henry is a tuatara who became a father at the age of 111,” one would not say, “Leonard Stejneger was a mankind who published a monograph on the herpetology of Japan.” Because we have different common names for referring to our own species as a whole and the organisms of which it is composed, inappropriate use of the singular “human” to refer to the human species as a whole is rare. In contrast, because humans have not developed separate common names for distinguishing between other species and their component organisms, inappropriate use of singular common names is not only common, it is the norm.

These patterns of use suggest that humans are less typological when referring to our own species than when referring to other species. Perhaps the reason is that we grant more importance to, or are more aware of, differences among individual humans than differences among the individual organisms of other single species. But regardless of the reason for this difference, the common names of other species, including those of amphibians and reptiles, ought to conform to the same standards that we adopt for the names of our own species. One way to achieve this would be to develop common names that clearly refer to other species as wholes rather than to their component organisms. For example, we could use names such as “the marine iguana species” or “marineiguana-kind” for *Amblyrhynchus cristatus*. Up to the present time, however, such names have not been widely used for species other than *Homo sapiens*. As long as we continue to use common names that refer to kinds of organisms (i.e., names formed from base words such as “toad,” “newt,” “tortoise,” “iguana,” “boa,” and “crocodile” without “species” or “-kind”) as equivalents of the scientific names of species, those names should be used in the plural.

CAPITALIZATION

The considerations about common names described above also bear on the issue of capitalization. Under the interpretation of the common names of species as proper names (e.g., Parkes 1978; Potter 1984), those names are commonly capitalized. However, because common names are more appropriately interpreted not as the names of species as wholes but as names of the sets of organisms of which species (as population lineages) are composed (de Queiroz 1995), common names are not, strictly speaking, the names of individual species. Therefore, they are not proper nouns and need not be capitalized (compare Atkins 1983). This conclusion is consistent with the use of common names for the organisms comprising our own and other species (“humans,” “dogs,” “cats,” etc.), which generally are not capitalized. I am not arguing however, that common names should not be capitalized. There may be other reasons for capitalizing common names, such as distinguishing the common names of species from general descriptions of organisms (e.g., “Green Frogs” versus “green frogs”) and ease of recognition while reading (Nelson et al. 2002; Parkes 1978). However, the act of capitalizing a

common name does not thereby by make it a proper noun any more than does capitalizing a word in a section heading or at the beginning of a sentence.

CONCLUSION

In summary, plural rather than singular common names should be treated as equivalent to the scientific names of species. This practice is more consistent with modern species concepts and the meanings of the words from which common names are formed; it more clearly distinguishes between different hierarchical levels of biological organization; and it eliminates a vestige of typological or essentialist thinking. Moreover, although using plural common names for species may at first seem strange because it departs from a long-standing tradition, the change is relatively minor, it now has precedents in a checklist (Iguana Taxonomy Working Group 2011) and a taxonomic revision (Torres-Carvajal et al. 2011), and it should not be particularly difficult to become accustomed to.

Acknowledgments.—I thank B. Crother, H. Greene, B. Hedges, R. McDiarmid, and members of the Iguana Taxonomy Working Group (ITWG) for discussions related to this essay. Brian Crother also provided comments on the manuscript. Although the ITWG adopted use of plural common names in its checklist of iguana species, not all members (or the other people acknowledged) necessarily favored that convention, and even those who did may not agree with all aspects of the arguments that I have presented here.

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