

Taxon Concept Schema (TCS)

Appendix: Taxonomy Background

Taxa (taxon concepts) are units of biodiversity designating groups of organisms such as gorillas or roses which are placed in ordered taxonomic hierarchies. Taxa are described and named by taxonomists when they classify groups of organisms using characteristics which differentiate them from other organisms. Characteristics that determine a common ancestry and therefore the evolution of the group are considered the most objective criteria for use in taxonomy. However, the characteristics used in classification are based on taxonomists' opinions or hypotheses and are therefore likely to change in the light of new evidence. For example, change maybe necessary when new individuals are discovered or when new examination techniques are developed. As a result, there is often a range of alternative taxonomic hierarchies rather than a single definitive one.

Taxa are placed at specific ranks in the taxonomic hierarchies. For example, mammals are at the rank **Class** called *Mammalia* (Linnaeus 1758). Below mammals we have an **Order** *Primates* (monkeys and apes) below which is the **Family** *Hominidae* (man-like primates) within which we have the **Genus** *Homo* (humans), *Pan* (chimpanzees) or *Gorilla* describing all gorillas. The names given to taxa, such as *Gorilla*, are governed by rules defined in the Biological Codes of Nomenclature. All taxa at rank Genus and above have a single name such as *Gorilla* while below genus they have binomial names such as *Gorilla gorilla*.

Figure 1 provides a graphic example using gorillas to appreciate taxa (taxon concepts) and taxon names. Gorillas were first described and classified by Reverend Savage in 1847 based on a population found in West-Central Africa. He considered gorillas similar to chimpanzees (named *Troglodytes niger* in 1812 by E. Geoffroy St. Hilaire) and grouped them into the same Genus calling them *Troglodytes gorilla*. In 1816, Oken realized that the generic name *Troglodytes* had already been used in 1806 by Vieillot to name the birds called wrens. The generic name for chimpanzees was therefore changed to *Pan*, (strictly speaking Savage should've named gorillas *Pan gorilla* in 1847). In 1852 I. Geoffroy St. Hilaire re-classified the gorillas, separating them from chimpanzees and renaming them *Gorilla gorilla*, the first use of the name for gorillas commonly used today. In 1902, gorillas were found in East-Central Africa and in 1903 Matschie reclassified them and defined a new species of gorilla called *G. berengei*. Matschie continued his splitting of gorillas, resulting in several species including *G. graueri* from the Congo in 1914 and many others (*G. diehli*, *G. jacobi*, *G. schwarzi*, *G. hansmeyeri* and *G. zenkeri*).

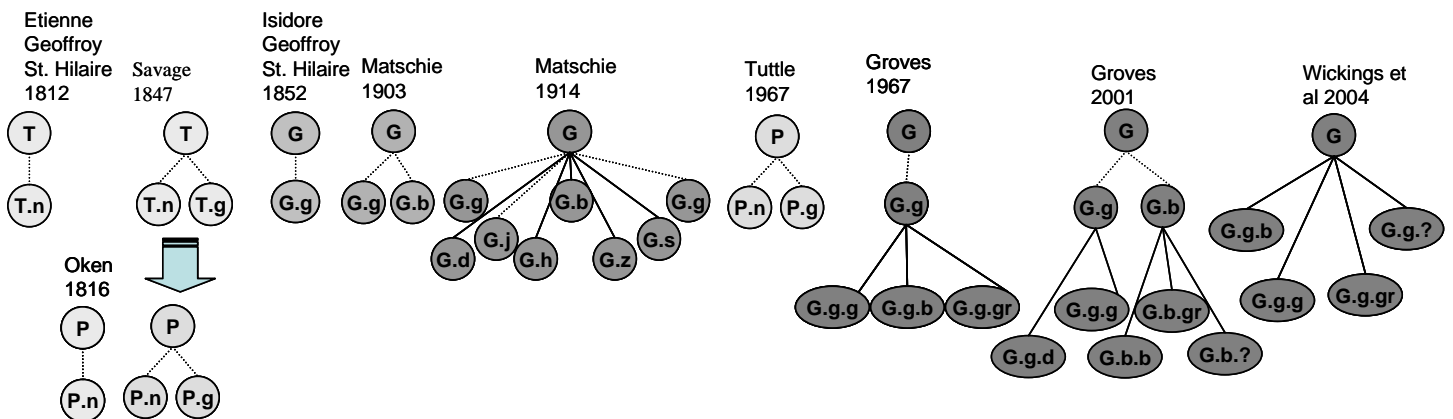


Figure 1 Summary Gorilla Classifications showing genus, species and sub-species as classified by some of the primate taxonomists since gorillas were first discovered in 1847 through to 2004.

In 1967 Tuttle claimed that gorillas were related to chimps and put them back in the genus *Pan* while Groves claimed that there was only one species of gorilla, *G. gorilla* of which there were 3 sub-species: *G. g. gorilla*, *G. g. graueri* and *G.g.beringei*. By 2001, Groves had reclassified Gorilla into two species (currently agreed by most experts in the field) and 5 sub-species: *G. gorilla*, *G. g. gorilla*, *G. g. diehli* and *G. beringei*, *G, b. beringei*, *G. b. graueri* and an un-named subspecies of *G. b*. Recent DNA analysis is

suggesting in 2007 that four distinct evolutionary specific units of gorilla exist although it is not clear if these are species or sub-species. If we consider the popular field guides such as Mammal Species of the World (1993), it presented gorillas as one species *G. gorilla* with 3 subspecies similar to Groves 1967. In the 2005 edition, they adopt the Groves 2001 classification with 2 species and 4 subspecies. 'Apes of the World' adopt's Tuttle's definition of gorilla and recognizes 1 species *P. gorilla*.

When we use the taxonomic name *G. gorilla*, there may be many different definitions of this name; a taxon concept where the taxon name is defined by a particular taxonomist in a particular classification. In the gorilla example above (considering only taxa at the species rank) we have 10 different taxon names that are used with varying meanings across 8 different classifications. This corresponds to 18 different taxon concepts described by the authors. Biologists undertaking analysis of data collected according to different field guides could end up with misleading results unless they were aware of the different taxon concepts. Was I dealing with *G. gorilla* Groves 1967, or *G gorilla* Groves 2001 or *P. gorilla*?

In databases and in the literature authors are frequently vague about what taxon concept they are referring to. Authors may cite a name such as *G. gorilla* assuming readers will understand their intent. For a group as well known as gorillas who wouldn't think this? This mistake may have serious repercussions. For example, if the IUCN's red list of endangered species cites *G. gorilla* according to Groves 1967 but without explicitly specifying it, then a poacher might be able to legally argue that trading in *G. berengei* (according to Matschie or Groves 2001) is legal - as it is a different species.

Taxon names are important in their own right and the Biological codes of nomenclature specify how these should be cited. The codes do not specify how taxon concepts should be cited except that the concept citation includes a taxon name.

These issues do not address the complexity of misspelling of taxon names or the mis-identification of organisms to taxon concepts.

Jessie Kennedy,
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Further Reading

TCS document repository: <http://www.tdwg.org/activities/tnc/tnc-document-repository/>

References

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