PLENARY TALK: Taxonomy

Facing permanent taxonomic change

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Four major taxonomic revisions published between 1982 and 2020 brought the total number of recognized mammalian species from the initial 4,629 species to the current 6,554 species, i.e. an astonishing increase of 57% in merely 38 years. Closer look at these lists shows that the estimate in each next edition is not merely the number in the previous issue with the addition of new discoveries in the interim period. Frequently, species are split through gain of new evidence which is not surprising given that taxonomic decisions are hypotheses rather than the reality itself. It comes more as a surprise that two globally used lists from 2020 reported widely different estimates: 5,899 species in the IUCN Red list versus the already quoted 6,554 species in the Checklist of the Mammals of the World. To make confusion even worse, experts involved in zoological systematics in general and species delimitation in particular take quite a variety of positions about the defining properties of a species. Over thirty species concepts are currently in circulation, each defining the species in at least slightly different ways. This may come as a surprise given that species are believed to be one of the fundamental units of biological organization underpinning every discipline of biology. Indeed, species lists have a wide range of users who have little time, interest or knowledge to interpret intelligently the results of taxonomic labour. The instability of taxonomic names is therefore perplexing to them, even more so when such changes are seemingly unnecessary.

Following de Queiroz, I argue that the source of the main problem with the species concept is in the confusion of two levels, the conceptual and operational one. Conceptually, species is a separately evolving metapopulation lineage. Such lineages are delimited by operational criteria (molecular, morphological, ecological etc.) which are currently referred to as species concepts. Two diverging lineages can be objectively ranked as distinct species only if they are sympatric. Sympatry allows an observer to safely conclude whether they are genetically (reproductively) incompatible but ecologically compatible. In other words, such lineages can co-occur because they can displace ecological niches on the one hand and maintain their genetic identity on the other hand. Disputes over taxonomic solutions invariably concern allopatric populations. Because allopatric entities do not interact in nature, uncertainties over their taxonomic status will continue in the future.

By using species lists of European mammals published since 1910, I will show that taxonomic change was far from being steady but instead showed at least one major twist in the mid-20th century. The overall effect of this change on our perception of mammalian diversity was strongly scale dependent. While it was insignificant at local scale, it heavily distorted the pattern at large scale.