Appendix 2: Examples of intraspecific diagnosability based on genetic data

Here we provide some examples of diagnosability in the genetic variation in some African mammals far below what would be reasonable to treat as species. These examples show how genetic diagnosability as per dPSC leads to unreasonable species definitions.

*African buffalo*: Seven genetic clusters, identifiable by their microsatellite allele frequencies, were defined among ten populations in Uganda and Kenya alone (Heller et al. 2010).

*Common warthog*: Muwanika et al. (2003) found that the western African samples all grouped monophyletically in a phylogenetic tree of the mitochondrial d-loop. According to the dPSC, the warthog could be split into two species, a western and an eastern/southern one. G&G seem to have overlooked the work of Muwanika et al. (2003) and have kept the common warthog as a single species, which we agree with.

*Chimpanzee*: Hvilsom et al. (2013) studied the population structure of three of the four subspecies of the chimpanzee with 25 microsatellites (*Pan troglodytes troglodytes*, *P. t. verus* and *P. t. schweinfurthii*). A principal component analysis revealed that the western subspecies (*P. t. verus*) was quite distinct and the two other fell into distinct, but adjoining clusters (Figure 4 of Hvilsom et al. 2013). This study has been extended with about 80,000 SNPs. Here it turned out that the western subspecies was fixed for a different allele than the other two subspecies at about 800 SNPs. The two other subspecies had four fixed SNP differences each (Hvilsom et al. unpublished). Since SNPs are valid characters in the framework of the dPSC, we could on the basis of this evidence split the chimpanzee into at least three species. On the other hand, Hvilsom et al (2013) showed that there is admixture between *P. t. troglodytes* and *P. t. schweinfurthii*. In addition, when brought together in zoos, the different subspecies (including the western) hybridize readily without any sign of reproductive isolation. Since nothing suggests that these subspecies are evolutionary individuated we consider them to belong to one species, *Pan troglodytes.*

references

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