Appendix 1: Unsupported splits in G&G

List of species groups where the presented data in G&G do not support species diagnosability, or where morphological and genetic data are inconsistent.

**Impala**: *Aepycerus melampus, A. petersi*

The black-faced impala (*A. petersi*) can be distinguished from the common impala (*A. melampus*) by its black facial markings.

G&G: “The phylogeny by Nersting and Arctander (2001), using the mitochondrial control region, separated most samples of the two species; … One haplotype from  *A. petersi*, however, was nested very deeply within the *A. melampus clade*, presumablya result of recent interbreeding.” p151.

Therefore, the two species cannot be diagnosed 100%.

 G&G: “*Aepycerus* *petersi* (Bocage, 1879) … a study of eight microsatellite markers found no evidence for introgression (Lorenzen and Siegismund, 2004), so any interbreeding, as inferred from the finding of Nersting and Arctander (2001—see above), must be very infrequent. The differentiation between *A. petersi* and *A. melampus*, in both mtDNA and microsatellites, is very high.” p151.

Note the use of the biological species concept here. G&G do not mention that Nersting and Arctander (2001) and Lorenzen and Siegismund (2004) treat the black-faced and the common impala as one species. The differentiation between the two subspecies is not extreme; the level is within what can be observed for genetic differentiation among populations within species. For an overview, see Table 2 in Lorenzen et al. (2008).

**Wildebeest**: *Connochaetes taurinus, C. albojubatus*, *C. johnstoni*, *C. mearnsi*

(Morphological data are presented in Table 59)

G&G: “The smallest species in skull length is *C. mearnsi*, but the skull length is hardly narrower than in the other species of *Connochaetes*.” p217

Males: The variable Gt l in *C. mearnsi* is on average smaller than the values for the other species, but the distribution overlaps with the distributions for the species *C. taurinus* and *C. albojubatus*. The variable Gt br in *C. mearnsi* is on average smaller than the values for the other species, but the distribution overlaps with the distributions for the other three species.

Females: The variable Gt l in *C. mearnsi*, is smaller than the values for the three other species (but two of these are only represented with single data points. In *C. mearnsi*, the variable Gt br is on average smaller than the values for the three other species, but the distribution overlaps with the distributions for *C. taurinus* and *C. albojubatus*.

G&G: “The longest nasals are in *C. johnstoni*; the other species are all about the same.” p217

Males: The variable Nas l in *C. johnstoni* is on average larger than the values for the other species, but there is an overlap in the distribution between *C. johnstoni* and all other species.

Females: The variable Nas l in *C. johnstoni* (one data point) is larger than the average values for the other species, but it falls within the distributions for *C. taurinus*.

G&G:“…*C. mearnsi* has an extremely narrow span, although the distance between the tips is not much different…” p217

Males: The variable Span in *C. mearnsi* is on average smaller than the values for the other species, but the distribution overlaps with the distributions for the species *C. taurinus* and *C. albojubatus*. The variable Tip-tip is on average smaller than the values for the other species, but the distribution overlaps with the distributions for the other three species.

Females: The variable Span in *C. mearnsi* is in fact on average **larger** than for *C. johnstoni,* yet smaller than the average values for the other two species, but the Span distribution in *C. mearnsi* overlaps with the distributions for all the three other species. The variable Tip-tip in *C. mearnsi* is on average smaller than the values for *C. taurinus* and *C. albojubatus*, but the distribution overlaps with the distributions for *C. taurinus*.

**Topi: N subgroup,** *Damaliscus korrigum* and *D. tiang*

G&G: “… it is possible that further material may show that *D. tiang* is just an extreme clinal variant of *D. korrigum.”* p213.

**Topi: E African subgroup**, *Damaliscus eurus*, *D. jimala*, *D. ugandae, D. topi*

(Morphological data are presented in Table 57 and 58)

G&G: *“D. eurus* differs from D*. jimala* and *D. ugandae*, particularly in its very long, broad nasals.”p213

The variables Nas l and Nas b are on average larger for *D. eurus* than for the other two species, but the ranges overlap (both sexes).

G&G: “*D. ugandae* is wider across the zygomatic branches, and has longer more spreading horns than *D. jimala.”*p213.

The variable Zyg br is on average larger for *D. ugandae* than for *D. jimala* but the ranges overlap (both sexes). The variable Horn l str is on average larger for *D. ugandae* than for *D. jimala* but the ranges overlap (both sexes). The variables Span and Tip-tip are on average larger for *D. ugandae* than for *D. jimala* but the ranges overlap (both sexes)*.*

G&G: “The coastal species, *D. topi*, is much smaller than the others and shorter horned, with a narrower span than the others.”p213

Size

Males: The variables Cb l, Gt l, Preorb, Pal l, Zyb br and Nas l in *D. topi* are on average smaller than all other species but overlap with *D. jimala.*

Females: The variables Cb l, Gt l, Preorb, Zyb br in *D. topi* are on average smaller than all other species but the range overlaps with *D. ugandae*.

Horn length

The variable Horn l str in *D. topi* is in fact on average **larger** than the three other species, but the range overlaps with the range for *D. ugandae* (both sexes).

Span

Males: The variable Span for  *D. topi*  is on average smaller than for the other species, but the range overlaps with the range for *D. jimala*

Females: The variable Span is on average smaller for *D. topi* than for the other species but the range overlaps with *D. eurus*.

**Dik-dik**: *Madoqua guentheri, M. smithii*

G&G: “*Madoqua guentheri* (Thomas, 1894) … Greatest skull length 98—109 mm.” p179

“*Madoqua smithii* (Thomas, 1901) … Closely related to *M. guentherii … ,* but much larger; greatest skull length 109—120 mm.” p179.

Again, with an overlap in the length distribution of the skull, it is not possible to distinguish the two species although one may be larger than the other, on average.

**Klipspringer**: *Oreotragus oreotragus, O. aceratos, O. aureus, O. centralis, O. porteousi, O. saltatrixoides, O. schillingsi, O. somalicus, O. stevensoni, O. transvaalensis, O. tyleri*

(Morphological data are presented in Table 69)

G:G: “*Oreotragus oreotragus* (Zimmermann, 1783) … Horns particularly short. Males the largest among the klipspringers” p275

Variable Horn l in *O. oreotragus* is in fact on average **larger** than for *O. tyleri* but on average smaller than the other species; overlaps with the distributions of most of the other species, including *O. transvaalensis,* see below. Variable Skull l (taken as proxy for size) on average larger than the other species; overlaps with the distribution of the species *O. aureus, O. centralis, O. tyleri* and *O. transvaalensi.*

G&G: “*Oreotragus transvaalensis* (Roberts, 1917) … Horns particularly long.” p275

Variable Horn l on average larger than the other species; overlaps with the distribution of most of the other species, including *O. oreotragus,* see above.

G&G: “*Oreotragus stevensoni* (Roberts, 1946) … Horns particularly long.” p276

Variable Horn l is actually **smaller** than for *O. transvaalensis*, but on average larger than the other species and overlaps with most of the other species.

G&G: “*Oreotragus aceratos* (Noack, 1899) … *O. aceratus* is very similar to *O. centralis*, from which it differs in the smaller size of females, and the (on average) slightly larger teeth.” p276

Females: Skull l (taken as proxy for size) is on average smaller for *O aceratus*; but overlaps with *O. centralis*. Variable Teeth is in fact on average **smaller** for *O. aceratus* than for *O. centralis*. However, the distributions overlap.

Males: Variable Teeth is larger for *O. aceratus* (a single sample) than for *O. centralis*. However, the value for that single sample falls within the distributions of *O. centralis*.

G&G: “*Oreotragus saltatrixoides* (Temminck, 1853) … Teeth very small” p278

Males: The variable Teeth is on average smaller than for all other species. Yet the distribution overlaps with most other species

Females: The variable Teeth in *O. saltatrixoides*  is actually on average **larger** compared to *O. somalicus*, *O. stevensoni*,  *O. aceratus* and *O. oreotragus.* Although, still on average smaller compared to the other species, but the distribution overlaps with most other species.

G:G: “*Oreotragus porteousi* (Lydekker, 1911) … Closely resembling *O.saltatrixoides* and *O. schillingsi*  in pelage; variation within each of these species greater within than between them. … Distinguished by the particularly long horns.” pp278-279

Variable Horn l is on average actually **shorter** than for *O. stevensoni* and *O. transvaalensis* but on average longer than the remaining species. However, the distribution overlaps with most of the other klipspringer species

**Oribi**: *Ourebia ourebi*,  *O. hastata, O. montana, O. quadriscopa*

(Morphological data are presented in Table 43)

G&G: *“Ourebia montana* (Cretzschmar, 1826) … considerably larger than *O. quadriscopa,* but the horns not longer.” p179

Variable Gt l is on average larger for *O montana* than for *O. quadriscopa,* but the distributions overlap. Furthermore, *O. montana* has on average **longer** horns than *O. quadriscopa*; yet, still there is an overlap in the range of variable Horn l

G&G: “O*urebia hastata* (Peters, 1852) … Size the same as in *O. montana*, but the horns considerably longer.” p179.

On the contrary, variable Horn l for *O. hastata* is on average **shorter** than for *O. montana*, but the distributions overlap.

G&G: “O*urebia ourebi* (Zimmermann, 1783) … Remarkable as the only *Ourebia* species with the males larger than the females, instead of females being larger.” p179

Variable Gt l is on average larger for males, but the distributions for males and females overlap; as do the distributions for the sexes of all other species

**Sable antelope**: *Hippotragis niger*, *H. roosevelti*

(Morphological data are presented in Table 55)

G&G: “*H. roosevelti* (Heller, 1910)… Noticable smaller than other sable, with shorter horns...” p203

Males: Gt l (Greatest skull length) is overlapping with the others that have larger averages. Cb l (Condylobasal length) is reported with a single sample point, which is smaller than all others. Horn l is overlapping with the other species that have longer horns on average.

Females: no data for Gt l or Cb l. Horn l is reported with a single data point that falls within the range of *Hippotragis niger kirkii*.

**Waterbuck**: *Kobus ellipsiprymnus, K. defassa*

G&G: “*Kobus ellipsiprymnus* (Ogilby, 1833) … White ring around the rump.” p195, p196

G&G: *“Kobus defassa* (Ogilby, 1833) … Very similar to *K. ellipsiprymnus*, but the entire back of the rump white, instead of having a white ring.” p196

On page 196 G&G refer to Lorenzen et al. (2006), but they do not mention that the paper treats the two taxa as conspecific. Lorenzen et al. (2006) studied the population structure of the common and defassa waterbuck. As for the impala, the level of differentiation is comparable to what can be observed among populations within species, see above under impala. Furthermore, in the contact zone (sampled at Nairobi National Park) phenotypically intermediate phenotypes were observed and genetic admixture between the two forms was documented. The two forms were considered belonging to the same species.

**Kob**: *Kobus thomasi*, *K. leucotis* (*K. loderi* and *K. kob* are not considered here.)

G&G: “*Kobus leucotis* (Lichtenstein & Peters 1854) white eared kob … Adult males deep black. … Large white patch around the eyes and the ears…” p192

G&G: “Lorenzen et al. (2007) compared mtDNA control region sequences and seven microsatellites in three of the four taxa considered here … The microsatellites gave some differentiation between the three species, except that *K. thomasi* from Murchison Falls fell into the *K. leucotis* grouping …” p193

G&G do not mention that Lorenzen et al. (2007) consider the taxa as belonging to the same species. The regional differentiation for the microsatellites is well within the range of what is found for populations within species, see Table 2 of Lorenzen et al. (2008). It is noteworthy, that the Murchison Falls population fell within the *K. leucotis* group. Based on genetic evidence, this population should have been placed in the white eared kob species. G&G give no information as to how one should handle this conflicting evidence. G&G chose to use morphology exclusively in this case. Lorenzen et al. (2007) considered the different populations to belong to the same species. The results from Murchison Falls were considered as substantial introgression among two subspecies in this area, resulting in a white eared kob with Uganda kob morphological phenotype (also acknowledged by G&G on p193).

**Lechwe**: *Kobus kafuensis, K. smithemani, K. robertsi*

(Morphological data are presented in Table 48)

G&G: “*Kobus kafuensis* (Halthenorth, 1963) Kafue Flats lechwe …horns extremely large.” p190

Variable Horn l distribution overlaps with three other species, including *K. smithemani*.

G&G: “*Kobus smithemani* (Lydekker, 1900) black lechwe … Horns relatively short;” p190

Variable Horn l distribution overlaps with four other species, also *K. kafuensis*.

G&G: “*Kobus robertsi* (Rothschild, 1907) Robert’s lechwe … horns very short.” p191

Variable Horn l reported with a single sample point for this species falls within the distribution of two other species

**Forest duikers**: *Cephalophus fosteri, C. hooki*

“*Cephalophus fosteri* St. Leger 1934 Mt Elgon forest duiker ... Very small in size; skull length 153-166 mm” p275

*“Cephalophus hooki*  St. Leger 1934Mt. Kenya forest duiker … Very small, though slightly larger than *C. fosteri*; skull length 163 mm (*N* = 1).” p275

The single data point for *C. hookeri* (163) is within the distribution range of C*. fosteri* (153-166).