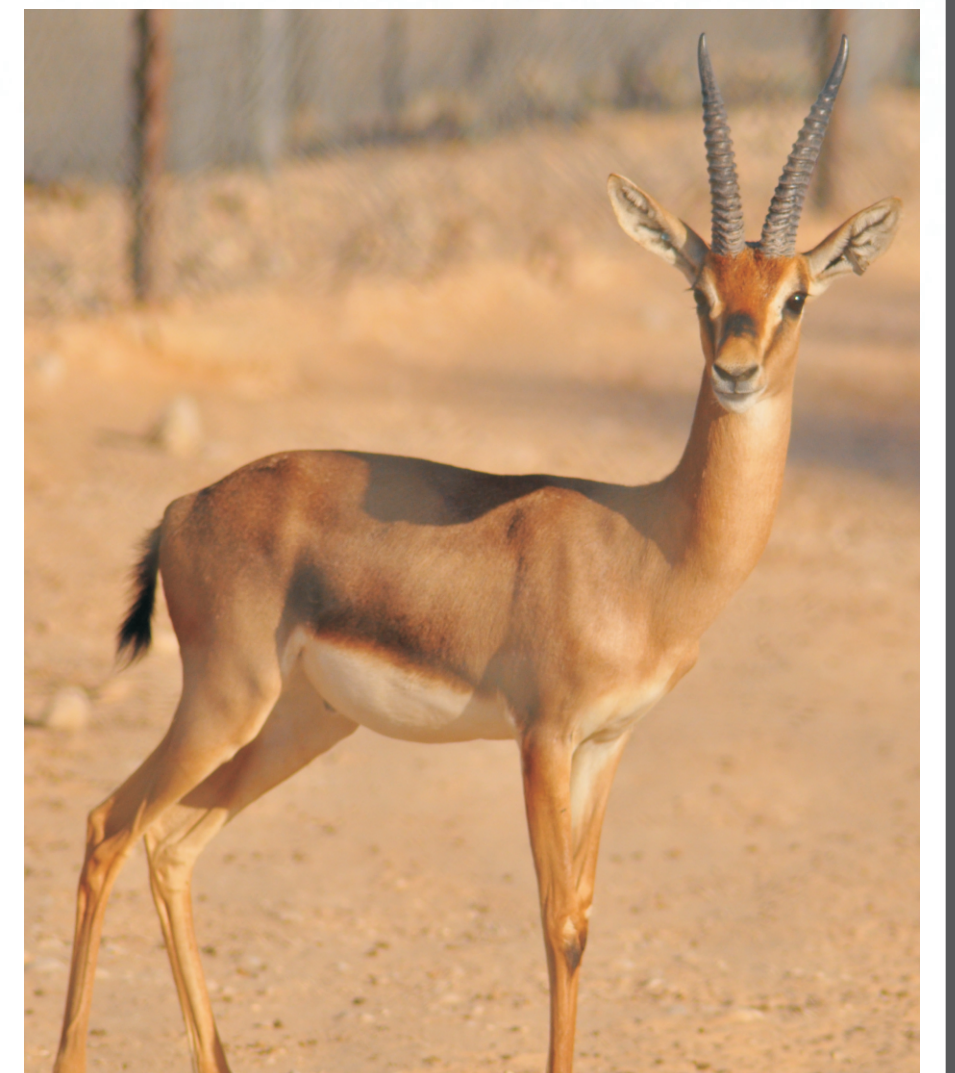


Population Genetic Analyses refute the Species Status of Farasan Mountain Gazelles (*Gazella gazella*)

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Background

Mountain gazelles (*Gazella gazella*) are Red Listed as ‘vulnerbale’ by the IUCN. Most recently the total population of *G. gazella* – which shows a continued downward trend – comprises less than 15,000 animals worldwide with an estimated 1,700 occurring in Saudi Arabia, including 1,000 that occur on the Farasan Islands (IUCN 2009). Gazelles are known to occur on these islands since at least 1825. But the question of how long these gazelles occur on the Farasan Islands could not yet be answered. Two, not mutually exclusive hypotheses regarding the origin of these Farasan gazelles have been forwarded: (1) colonization of the islands during the last glacial maximum and corresponding sea level minimum and (2) an introduction by sea men, who may have moved animals to and from the islands. Recent attempts were undertaken to treat the Farasan gazelles as a distinct species with major implications for conservation purposes (Groves 2011).



Results and Discussion

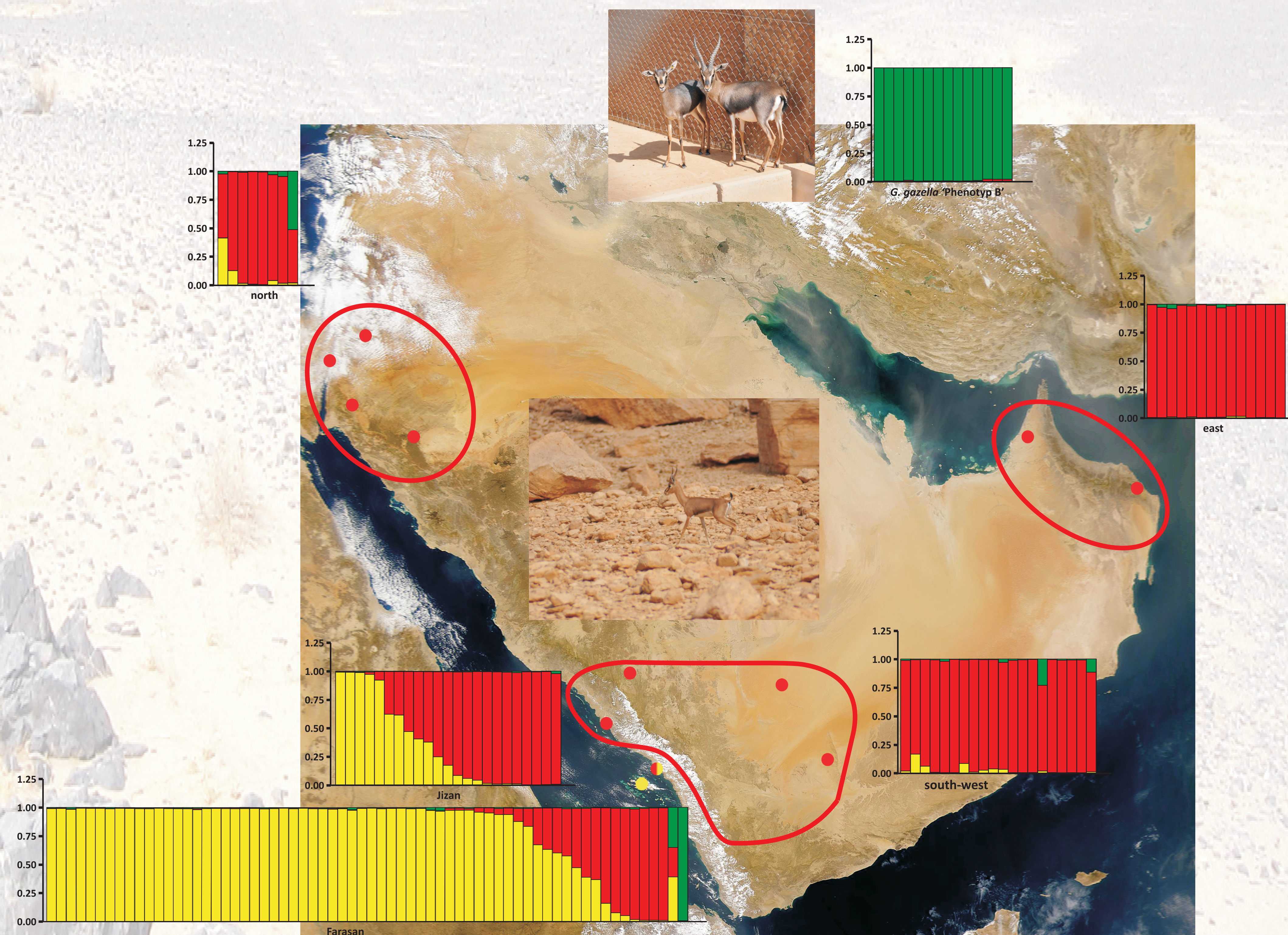
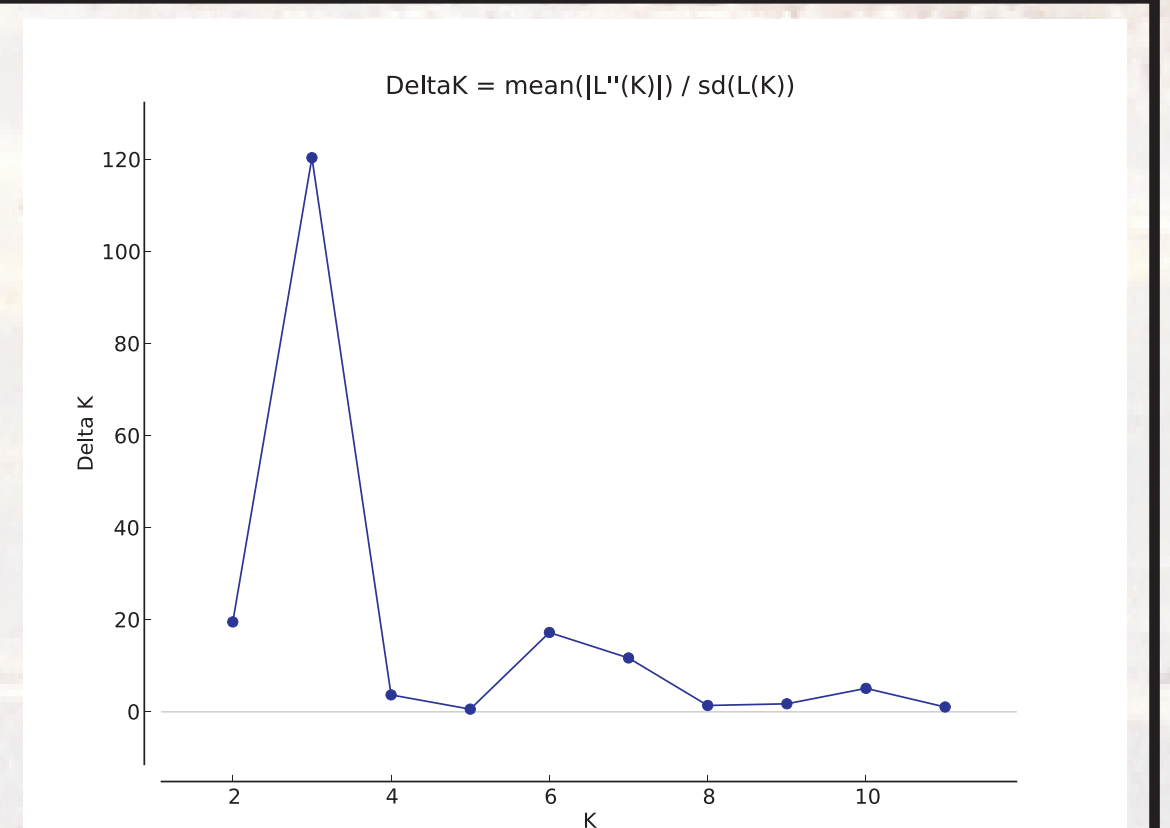
Mountain gazelles originating from the mainland of the Arabian Peninsula (*i.e.* the clusters ‘north’, ‘east’, ‘south-west’) show highgenetic conformity despite their wide geographic distribution (red cluster).

Animals occurring on the Farasan Islands belong to two clusters (yellow and red). Although the majority of island gazelles formed a separate cluster (which may be explained mainly by genetic drift), overall genetic distinctiveness to mainland gazelles was weak. Admixture of both clusters is evident, suggesting that mountain gazelles from the Farasan Islands did not evolve in isolation, and that gene-flow with mainland gazelles is ongoing. Therefore, mountain gazelles from the Farasan Islands are certainly not a distinct species or subspecies.

Animals confiscated in Jizan (the mainland harbour close to the Farasan Islands) could partly be identified as gazelles from Farasan.

We further investigated a phenotypically distinct taxon held at different breeding centers (‘phenotype B’).The exact provenance of these gazelles remains obscure. In our analyses these animals formed a distinct genetic cluster with no equivalent on the mainland. Only a single individual from the Farasan Islands showed genetic similarity to this group; this remains to be investigated further.

We analysed allelic variation at 11 microsatellite loci in 143 specimens from the Farasan Islands and the Arabian Peninsula. We employed the software STRUCTURE to identify the number of genetically distinct clusters (*K*) and used the method introduced by Evanno et al. (2005) to detect the uppermost hierarchical level of structure; the most likely number for *K* was determined as 3.



Perspective

We hypothesise that the genetic pattern found on the Farasan Islands follows a classic ‘island-mainland model’. To examine this hytothesis we will employ ‘Isolation-Migration-Tests’ with different scenarios evaluating the best model by model selection.

References

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