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Antelope Specialist Group

GNUSLETTER

In this issue. . .

ASG NEWS

Welcome to the New Editor of the *Gnusletter*

Stephen Shurter, Director of Animal Management, Husbandry and Health at The Wilds in Cumberland, Ohio, responded to my request in the last *Gnusletter* for a volunteer to take over as editor 2007, after I complete the 25th year of my editorship: 1982-2006. His offer is particularly welcome as Steve is Chair for the Antelope and Giraffe Advisory Group of the American Zoo and Aquarium Association. As editor he will be in an ideal position to facilitate communication and cooperation between researchers, managers, and conservationists of wild and captive antelope populations. It is also noteworthy that Steve's experience includes several years of field work in Africa:

He lived in the Democratic Republic of Congo (DRC) from 1987-1991 while working with the okapi conservation project in the Ituri Forest for Gilman International Conservation. In 1990 he participated with the WCS Ituri Forest okapi and duiker study projects, and took part in a survey of Eastern giant eland in Digba Reserve, DRC. In 2004 he participated in the International Przewalski's Gazelle Conservation Workshop held in Xining, China, and is currently working with various organizations to help develop a Western giant eland conservation program in Senegal.

So thank you, Steve, for your willingness to step into the coming breach. He can be reached at sshurter@thewilds.org.

Publication of the Sixth International Wildlife Ranching Symposium

The International Foundation for the Conservation of Wildlife (IGF) is very pleased to announce that the proceedings of the 6th International Wildlife Ranching

Current theory is that the proportion of bulls in bachelor groups and/or in the breeding herds is affected by these climatic cycles through the physical condition of the bulls and that this trend is an artifact of the movement of bulls in and/or out of the herds. Bulls in good physical condition can perhaps compete better for mating opportunities and therefore enter the herds, while bulls in poor condition drop out of herds to regain condition in bachelor groups where competition for resources is less intense than in the large breeding herds.*

The current trend is for an increasing proportion of bulls and this year the bulls showed an increase from 3.7% to 5.3% of the total population (see Whyte (2004) for further detail).

Herd size distribution

The herd size distributions for all censuses since 1969 are given in Figure 14 and Table 18. Mean herd sizes have also been calculated for each respective year, and an average for all years is given. Average herd size over all years was 246.4 (SD = 43.7). The SD is rather low suggesting that there is not much variation from year to year. The major deviation from this mean occurred during extreme drought years. Buffalo herds tend to fragment during droughts, because intra-specific competition for food intensifies in larger herds as the drought progresses. This can be clearly seen in Table 18 and Figure 14 in which the "mirror image" between the number of herds and average herd size can be seen – as herds fragment, herd size goes down but number of herds increases. The current trend resulting from the past few good years has been for fewer herds with a larger average herd size.

Regional Trends in population structure

Bulls

The trends in the bachelor component in all of the respective Regions closely follow those of the population as a whole. Data are only available from 1985 onwards, and these are presented in Table 20 and Figure 15. Declines in all Regions were experienced, culminating in the nadir in 1999/2000, five years after the end of the dry cycle (see discussion related to Table 16 above). In all Regions there have since been good recoveries.

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*Confirmed by the research of Prins, H.H.T. 1996. *Ecology and Behaviour of the African Buffalo.* Chapman and Hall, London (Ed.)

NAMIBIA

Are black-faced and common impala interbreeding in Etosha National Park, Namibia?

E. D. Lorenzen

The following is a short summary of a research project carried out at the

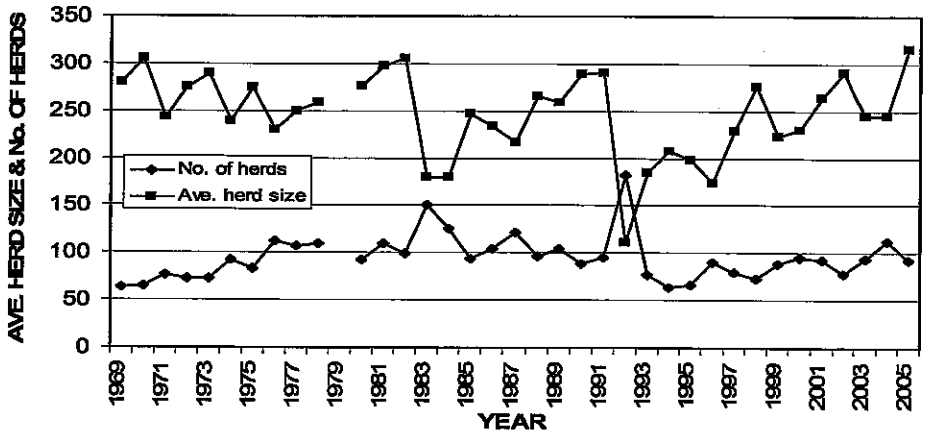

Figure 14: Average buffalo herd sizes and number of herds recorded in respective censuses in the Kruger National Park between 1969 and 2005.

Department of Evolutionary Biology, University of Copenhagen, Denmark in collaboration with the Namibian Ministry of Environment and Tourism. The aim of the study was to determine whether interbreeding occurs between the endemic black-faced impala and the common impala—a subspecies introduced to Namibia during recent decades—in the Etosha National Park, using molecular genetic techniques.

Background

The black-faced impala (*Aepyceros melampus petersi*) is one of two recognized subspecies of impala and has derived its name from its characteristic black nose blaze, which (among other traits) distinguishes it from the common impala (*A. m. melampus).* Historically, it occurred as an isolated population in southwest Africa, more than 900 kms west of the common impala range. Once plentiful, it is now listed as *vulnerable* by the IUCN.

Translocations have played a major role in the recent history of the subspecies in Namibia. To increase the dwindling numbers in the country during the 1960s, black-faced impala were captured near the Angolan border and translocated to the Etosha National Park. This was a great success, and the ~1500 individuals found here essentially provide a pure genetic reservoir of the subspecies for conservation efforts. These could include future translocations of animals to commercial farms or zoos, or reintroductions such as the 1993 augmentation of 16 black-faced impala from Etosha to their natural distribution range in northern Namibia, where only 500 individuals are believed to survive in fragmented populations.

Although translocations can aid the conservation of endangered species, they can also create new threats. Problems following translocation arise when contact between previously geographically separated but closely related groups (such as subspecies) results in interbreeding. If there are no barriers to gene flow, genetic characters can potentially be transferred from one group to another, changing the genetic composition of the native populations and leading to a loss of local adaptation. Interbreeding can lead to the extinction of populations and species, representing a serious threat especially to rare species that come into contact with other, more abundant species. Interbreeding following the translocation of game species has previously been reported between the blesbok and bontebok, and the black and blue wildebeest.

In a bid to further increase numbers of the black-faced impala in Namibia, individuals were sold from Etosha to commercial farms during the 1970s. Simultaneously, common impala, which historically do not occur west of the Caprivi, were introduced to Namibia in the thousands from South Africa. Because of their vast numbers, they are much less costly than black-faced impala. In an effort to afford the black-faced impala further protection, the US Department of Interior banned any import of black-faced hunting trophies to the US in 1980. This paradoxically exacerbated the efforts to increase numbers of black-faced impala: the extra economic cost of purchase along with the US ban now deterred farmers from obtaining, or maintaining, herds of this subspecies.

Farms with both black-faced and common impala have reported mixed herds. Although there has been no direct evidence of hybridization, it is widely believed to occur. At present, five farms bordering Etosha have common impala. As the Etosha fence is not adequately maintained, animals have easy access to and from the park, potentially resulting in interbreeding between subspecies, genetically swamping the vulnerable and endemic black-faced impala. This realization prompted the Namibian Ministry of Environment and Tourism to draft a national management plan to restructure the current management of the subspecies in Etosha. Before implementation, a study of the hybrid status of the Etosha impala was required. As noted in the IUCN *Antelope Specialist Group Report* in 1998, "Prevention of this possibility [interbreeding] and development of methods for identifying and registering pure herds are high priorities in the conservation of the threatened black-faced impala".

The study

Using a set of nuclear genetic markers termed microsatellites; the specific aims of the study were to estimate the levels of genetic differentiation between black-faced and common impala, and to evaluate the degree of interbreeding between subspecies in Etosha NP.

A total of 168 impala samples from nine locations was sampled using a crossbow with biopsy arrows. These were analyzed using eight highly variable microsatellite loci, which produced a unique genotype for each individual, enabling individual recognition of the impala samples. All together, 137 black-faced individuals were analyzed (~8% of the Etosha population). Three populations of common impala were sampled from Chobe (Botswana), Shangani (Zimbabwe) and Samburu (Kenya).

The common impala samples included in the analyses were used to produce a genetic baseline of the common impala subspecies. The genotypes of the black-faced individuals from central Etosha, which were least likely to have been affected by interbreeding with the bordering commons, were used to produce a genetic baseline of the 'pure' black-faced subspecies. This was necessary to estimate the genetic distinctiveness, also termed the level of genetic differentiation, between subspecies. Subsequently, the genetic composition of the remaining black-faced individuals from localities close to the bordering commons were

compared with that of the baselines, to assess the degree of genetic input from each of the subspecies. This was done by calculating the probability of an individual's genotype being derived from one group of origin (i.e. if it was 'pure') or two groups of origin (if the individual was the result of interbreeding).

Outcome

Reflecting their morphological differences, significant genetic differentiation was found between the black-faced and common impala subspecies. Surprisingly, across all analyses carried out on the data, we found no evidence of genetic admixture within Etosha. Park staff maintain they have not witnessed any common impala inside Etosha, although managers on bordering farms claim to have black-faced impala on their land which have escaped from the park.

Impala are socially structured, occurring in small herds. Their social structure involves bachelor herds and harem herds consisting of females and their offspring, accompanied by a territorial male. Solitary black-faced males, but no solitary females, have been observed in Etosha. As the black-faced impala are considerably larger than common impala, solitary common impala males entering the park would be likely to be subordinate to black-faced impala males. Hence they would have difficulty competing for black-faced harems, reducing the risk of hybridization within Etosha. This is consistent with interviews carried out with commercial farmers who have both subspecies on their farms. While there is no concrete evidence of hybridization, farmers claim to have mixed herds. They maintain that black-faced impala males are seen with a harem of common impala females, but common impala males are never observed with a herd of black-faced females. Therefore, the fact that no interbreeding is taking place inside the park does not imply that none is taking place on farms with both subspecies.

Due to logistical constraints in Namibia, we were unable to obtain samples from the five commercial farms bordering Etosha. The genetic composition of the farm populations could be markedly different from that of the Botswana, Zimbabwe and Kenya animals used as reference populations for the common subspecies, and this should be taken into account before concluding whether interbreeding is taking place or not.

The black-faced impala in Etosha is a unique animal of valuable economic potential for Namibia, and managers and parties involved in the conservation of the black-faced impala should not be led to hazardous management decisions, which in turn could compromise the genetic integrity of this vulnerable subspecies. We therefore hope this study generates further interest to initiate sampling of common impala from bordering farms. Genotyping these will aid in a more conclusive study of the interbreeding status of the black-faced impala in Etosha.

Further information

A full report of the study has been published in: Lorenzen & Siegismund (2004). No suggestion of hybridization between the vulnerable Black-faced impala (*Aepyceros melampus petersi*) and the Common impala (*A. m. melampus*) in Etosha NP, Namibia. *Molecular Ecology*, 13: 3007-3019.

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