



Original investigation

The genetic status of naturally occurring black-nosed impala from northern South Africa

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ABSTRACT

The impala (*Aepyceros melampus* ssp.) is a widespread antelope species occurring in sub-Saharan Africa. The two recognized subspecies have non-overlapping distribution ranges, with no known natural mixture of these subspecies until human interference. A number of common impala individuals (*A. m. melampus*) displaying phenotypic characteristics commonly observed in the black-faced impala (*A. m. petersi*), namely black facial markings, were seen on a farm in the Limpopo Province, South Africa. This farm falls outside the natural distribution range of *A. m. petersi*. We therefore aimed to identify the taxonomic placement of these individuals (i.e. *A. m. melampus* or *A. m. petersi*) through phylogenetic and molecular clock analyses using D-loop and cytochrome subunit *b* sequence data. Our results showed that these black-nosed impala from Limpopo are in fact *A. m. melampus* individuals. The existence of the black-nose phenotype in common impala could be more widespread than previously estimated. The occurrence of introgression between the two subspecies in this region could, however, not be fully excluded, and can only be fully assessed through the use of nuclear DNA analysis.

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Introduction

Two subspecies of the impala (*Aepyceros melampus* ssp.) are recognized to occur in sub-Saharan Africa. The common impala (*A. m. melampus* – Fig. 1a) occurs widely in the south-eastern regions of Africa, with distribution ranging from South Africa through eastern Botswana, Zimbabwe, Zambia and Mozambique to Tanzania and Kenya (East and Estes, 1998). In contrast, the black-faced impala (*A. m. petersi*) is confined to a small area in northern Namibia and south-western Angola (Fig. 2; East and Estes, 1998). The two subspecies are primarily distinguished by the presence of a prominent black facial marking observed in *A. m. petersi*, stretching from the nose to the horns and from the base of the ears through the line of the eyes (Skinner and Chimimba, 2005). Historically, *A. m. petersi* was only observed in north-western Namibia and south-western Angola, with no *A. m. melampus* west of the Caprivi (Nersting and Arctander, 2001; Skinner and Chimimba, 2005). However, during the 1970s large numbers of *A. m. melampus* were introduced to Namibia, bringing about the possibility of hybridization between the subspecies (East and Estes, 1998; Lorenzen and Siegismund,

2004). Nersting and Arctander (2001) suggested that possible interbreeding between the subspecies could have occurred in Etosha National Park, Namibia, following a phylogeographic study using mitochondrial DNA (mtDNA). Lorenzen and Siegismund (2004), however, found no signs of hybridization between the *A. melampus* ssp., using eight microsatellite markers to assess the genetic diversity of *A. m. petersi* in Etosha. The possibility of introgression was however not dismissed and still poses a threat to *A. m. petersi* populations (Lorenzen and Siegismund, 2004).

A privately-owned game farm in the Limpopo province of South Africa reported the presence of a significant proportion of prominently “black-nosed” impala, based on scrutiny of camera-trap records (Figs. 1 b–d and 2). Regular *A. m. melampus* individuals may possess a shaded area between the nose and horn base (Fig. 1a), but the black facial markings on the regular impala photographed in the Limpopo province closely mimic the dark phenotype found in *A. m. petersi*. There is anecdotal evidence of “black-nosed” individuals observed at very low frequencies in other parts of the northern Limpopo province and in the Kruger National Park. The specific property where black-nosed animals were photographed borders on Botswana and has been in possession of the same owners since the 1940’s with no records of the artificial introduction of impala from elsewhere. There are also no records of translocations of *A. m. petersi* into the Limpopo province (J. Kruger, Limpopo

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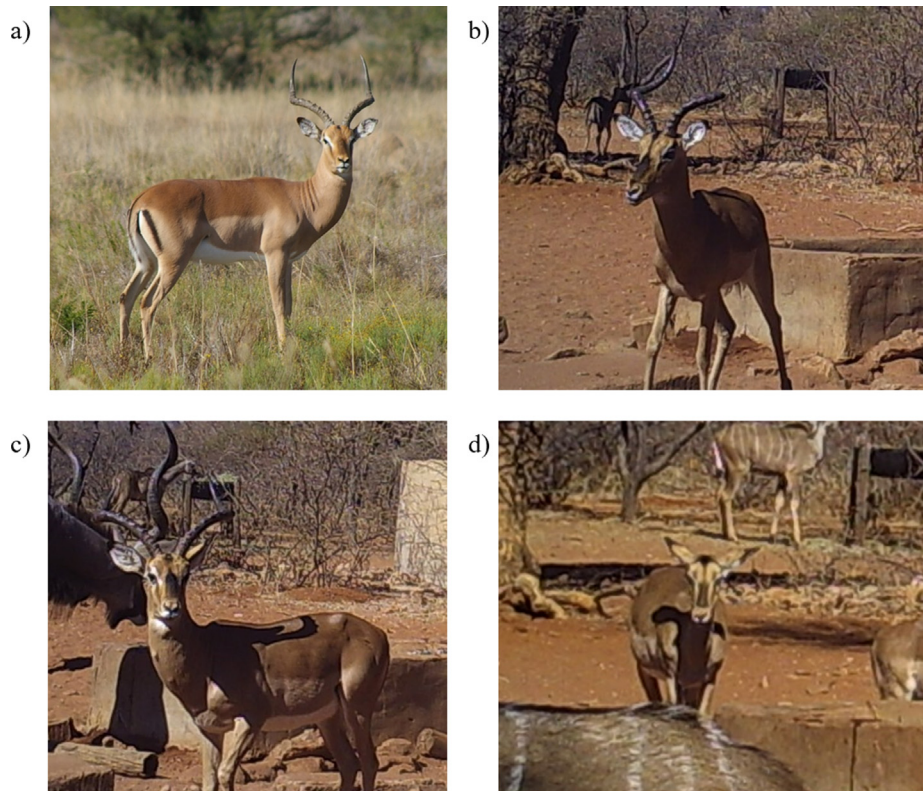


Fig. 1. Black-nosed impala observed in camera trap records in the Limpopo Province of South Africa (b–d), with common impala for comparison (a). (Photos: a: J.P. Grobler; b–d: E. Pretorius).

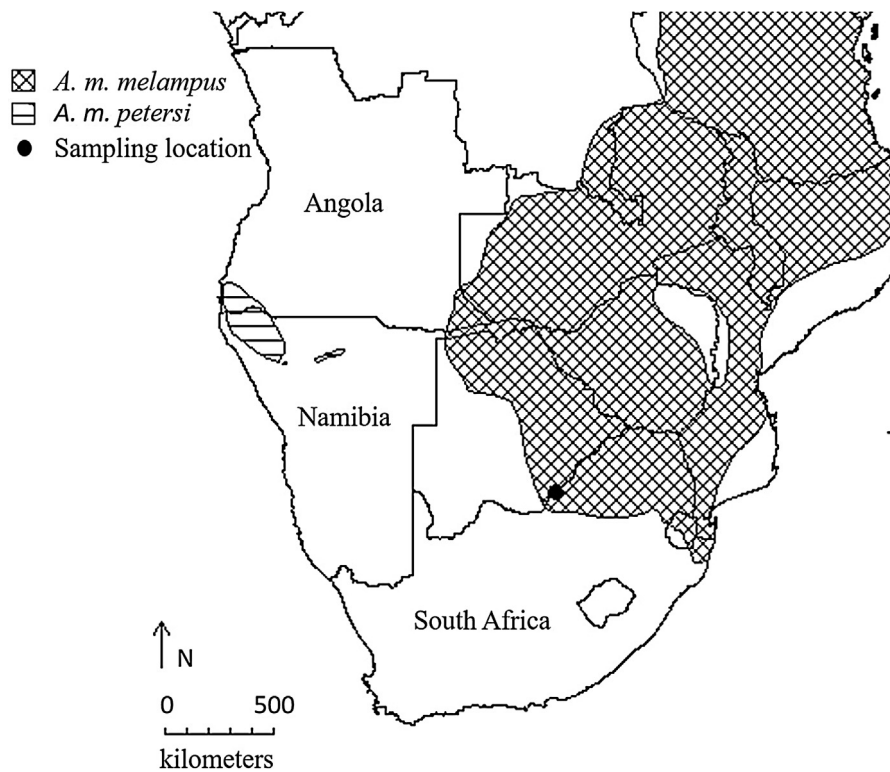


Fig. 2. Distribution map of common and black-faced impala (*Aepyceros melampus* spp.). The diagonally crossed area represents the distribution of common impala and the horizontal lines represent the black-faced impala distribution in Namibia and Angola (IUCN, 2008). The black dot represents the sampling locality of the Limpopo black-nosed impala.

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