

## Press release

### COLLABORATIVE GENETIC RESEARCH FOR THE BENEFIT OF THE CHEETAH IN SOUTH AFRICA

A collaborative national South African cheetah conservation genetics project was launched in 2004/2005. The main objective of the project is to share resources and expertise to address several priority questions for the conservation of the species in the country and also, to establish a genetic database for South African cheetah populations that will be comparable to international efforts in other African countries and elsewhere. In future, broader collaborative analyses of all existing genetic data would allow a more comprehensive review of the species' recent evolutionary history and to provide population genetic guidelines that can be incorporated into conservation management plans for the long-term preservation of one of the world's remarkable predators. Several Universities (UFS, Free State; UL, Limpopo and UP, Pretoria), governmental research institutes (National Zoological Gardens, NZG; a National Facility of the National Research Foundation; the Agricultural Research Council, ARC) and non-Governmental Organisations (De Wildt Cheetah and Wildlife Trust and the liaison forum the National Cheetah Conservation Forum, NCCF) are represented on the project team. The principal funding for the project has been provided by De Wildt and the Universities.

This project was identified and spearheaded by the De Wildt Cheetah and Wildlife Trust through the National Cheetah Conservation Forum of South Africa. During the past five years, the De Wildt Cheetah and Wildlife Trust has assisted and executed the relocation of 135 wild cheetahs onto selected private and State owned reserves and National Parks in South Africa. These cheetahs were removed from livestock and wildlife ranches in the Limpopo and North West Provinces of South Africa to prevent them from being destroyed by some angry and frustrated ranchers who view these vulnerable predators as vermin and problem animals due to predation on both domestic livestock animals and wildlife. Many ranches have become hunting ranches due to climatic changes. These wild cheetahs were relocated onto suitable reserves in South Africa in order to establish a viable cheetah population as part of a network of smaller isolated and fragmented populations in these fenced protected areas. The majority of these small reserves are only capable of sustaining a limited number of cheetahs and this inevitably causes concern from a genetic diversity point of view, as uncontrolled breeding could lead to serious inbreeding problems.

The wild free roaming cheetah population on ranching areas in South Africa also faces a threat in the form of illegal trade. Wild cheetahs are illegally captured and sold to wildlife dealers and non-reputable captive breeding centres in SA, who in turn either export these wild cheetahs as so called "captive bred" cheetahs to zoo's abroad, or sell these wild cheetahs into the canned hunting ventures. Information gathered through this project will be used in forensic cases to prevent the mentioned illegal activities from happening.

It is estimated that there are approximately 500 cheetahs in captivity in South Africa. These cheetahs are captive bred and/or taken from the wild to supplement the current captive cheetah population in South Africa. The project also has as one of its aims to advise captive breeders on the genetic health of the captive population and to assist in sourcing suitable genetic material for breeding purposes from throughout the existing captive cheetah population in order to prevent deleterious inbreeding and also to prevent the unregulated sourcing of genetic material from the already dwindling wild cheetah population.

Three genetic projects are currently underway to contribute to the efforts of the De Wildt Cheetah and Wildlife Trust and the NCCF. Marco de Sa is an MSc student in Genetics at UFS working under the mentorship of Prof Antoinette Kotze of the NZG, Miss Karen Ehlers (UFS) and Prof Paul Grobler (UL). The aim of his project is to establish a comprehensive genetic database including DNA profiles of captive and wild cheetahs in South Africa using microsatellites and other genetic markers. One of the outcomes of the database will be genetic recommendations with regard to the movement of cheetahs in South Africa and the management of captive populations. The database will also assist in forensic applications. At present microsatellite genotyping with 16 markers have been completed for more than 350 cheetahs. The ARC Livestock Business Division (LBD, Irene) will be responsible for the long-term maintenance of the database.

Sasi Sasidharan is a PhD student in the Veterinary Genetics Laboratory of the Faculty of Veterinary Science at UP working under the supervision of Prof Alan Guthrie. His study focuses on fitness correlations with genomic diversity in captive cheetah populations, with specific investigation of the king cheetah phenotype. Using collated data from captive populations, this study investigates the influence of genetic factors on susceptibility to amongst others, gastritis, dental abnormalities and babesiosis, and the effect on disease progression in animals. A further aim will be to investigate any lineage or genetic line-specific susceptibility to deterioration of multiple fitness components, especially within the king lineage. Linkage to specific

genomic regions in affected cohorts will also be investigated. The variability in parental relatedness in live and dead cubs between and within two captive populations, and with respect to possible cause of death and overall cub survival in the cheetah, will be investigated. Outcomes will include correlations between susceptibility and phenotype and between disease resistance and reproductive success under captive conditions.

Kiersten Herring is an MSc student in Animal Science and Genetics in the Department of Animal and Wildlife Science at UP. Her principal supervisor from this department is Dr Esté van Marle-Köster and she is co-supervised by Prof Paulette Bloomer (UP Department of Genetics). Her research evaluates whether scatology (DNA analysis from faeces) can be used as a non-invasive conservation tool for the cheetah in South Africa. Faecal and blood samples from a small group of captive cheetahs at De Wildt Cheetah and Wildlife Centre are currently used to validate the technique. Once the validation has been successfully completed, the method will be applied to faecal samples collected from the Limpopo Province. In future this methodology could contribute to the assessment of population size and genetic diversity of wild cheetahs in South Africa. Together with the results from Marco's and other studies, we want to determine the extent of natural gene flow between different regions within South Africa and southern Africa. The latter will determine at what regional level cheetah populations, including movement of animals, should be managed to contribute to the long-term conservation of the species.

A microsatellite marker panel including 12 microsatellite loci and a sex-linked marker has been standardized to ensure that information can be exchanged between national and international laboratories. Information regarding the marker panel can be obtained from Antoinette Kotze: [antoinette@zoo.ac.za](mailto:antoinette@zoo.ac.za)

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