



RhODIS® and eRhODIS®: The Rhinoceros DNA project



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In 2006 the Veterinary Genetics Laboratory (VGL) at the Faculty of Veterinary Science identified a need to develop expertise in animal forensic testing and in 2009 the project provided a validated method to obtain an individual DNA profile from any part of the rhinoceros horn in order to link it to the animal that it was taken from. A ground-breaking programme was developed called RhODIS® to collect and catalogue DNA from rhinos and rhino horns. This serves to develop and provide the following:

- Tool to differentiate legal and illegal horns in stockpiles
- Can trace horn to its origin in African countries
- Increasing numbers of rhino DNA profiles being added to the database
- Standard operating procedure for each poaching incident
- Can be used in the conviction and subsequent sentencing of numerous individuals for poaching, smuggling and possession
- Cooperation with police and wildlife investigators
- Rhino poaching and wildlife crime as sociological phenomenon

How does RhODIS® work?

RhODIS® (Rhino DNA Indexing System) stores a unique genetic fingerprint for every rhino that has been sampled. The concept is based on the Combined DNA Indexing System (CODIS) used by American law enforcement to store the genetic fingerprints of humans.

The method uses genetic (DNA) sequences known as short tandem repeats (STRs) to create a fingerprint or barcode that is unique to each animal. Included in this barcode are a gender marker and a species marker that can differentiate between black and white rhinos, the two most common African rhino species.

The technique uses a tiny amount of DNA (less than 20mg of horn is needed), and is so accurate it can be used as evidence in court cases. The VGL has since produced sample collection kits, as well as an app version of the RhODIS® system called eRhODIS®. In addition, the RhODIS® team have provided training to more than 400 law enforcement and conservation workers in South Africa, Namibia, Swaziland, Kenya and India. South Africans trained on the system include SAPS investigators, prosecutors, Green Scorpions, veterinarians and wildlife officials. The training covers principles of DNA profiling for forensics, and ensures that field samples at the poaching crime scene are correctly collected through the use of RhODIS® forensic kits.

Progress

In 2012, the South African government passed legislation stating that all captured rhinos and horns should be sampled and sent to the VGL for inclusion in the database. All poaching cases are also sampled and profiled. Evidence submitted in this way has led to the conviction of several local poachers and foreign agents working with them.

The RhODIS® team have prepared around 200 forensic reports based on RhODIS® data thus far, and submitted them to the court in the form of affidavits. Of these, around 50 poaching incidents have been linked to other forensic evidence (either rhino horn or other evidence). As a result various poachers have already been convicted although some of these cases have not yet reached court.

The RhODIS® system could become the standard for producing DNA profiles that can be analysed and compared in a global database. In 2016 the VGL was instrumental in an agreement reached by global experts to use enhanced international DNA testing of rhinos.

Early in 2016 the VGL was selected as one of the 16 winners of the global Wildlife Crime Tech Challenge, an initiative of USAID in partnership with National Geographic, the Smithsonian Institution and the TRAFFIC wildlife trade monitoring network.

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