Coghlan, A., 2003. Forensic tests track rhino poachers. New Scientist 2003 September 6: 9

https://www.newscientist.com/article/dn4124-forensic-tests-track-rhino-poachers/

Forensic tests track rhino poachers

By Andy Coghlan

6 September 2003

Two forensic tests could curb illegal trade in poached rhino horn. The tests look for the genetic or chemical signatures of rhino horn in products such as powdered Asian medicines and Yemeni ornamental daggers. They can specify the species of rhino, and the individual game reserve in which the animal was killed.

Poaching has helped reduce the population of black rhinos by over 90 per cent in the past 60 years, according to the World Conservation Union's (IUCN) Red List of Threatened Species. Numbers have recovered from a low of 2410 in 1995, but only by a few hundred animals each year.

White rhino are still vulnerable, particularly the northern white rhinoceros, and the illegal trade in rhino horn is thought to have reduced the population of wild Javan rhino to less than 200.

As recently as June 2003, 10 kilograms of horn was seized in Vietnam, and conservation organisations say that matching rhino products to a particular species and place of origin would let them map poaching sites and illegal trade routes.

It would "provide vital clues to cut off the supply sources and trade chains throughout the world", says Crawford Allen, enforcement support coordinator of TRAFFIC International in Cambridge, UK, which monitors trade in wildlife.

Gene fragments

One test is the first to detect rhino DNA in various products. Developed by James Lee's team at the Central Police University in Taoyuan, Taiwan, the test multiplies fragments of the *cytochrome b* gene found in mitochondrial DNA.

Each of the five rhino species has a unique version of the gene, the researchers will report in an upcoming issue of *Forensic Science International*.

The other test chemically “fingerprints” seized samples of raw rhino horn, revealing both the species and individual game reserve from which the horn came. This is possible because rhino horn is made of compacted hair, not bone, so it mirrors the profile of elements in the animal’s diet.

“The chemistry of the horn is influenced by the soil chemistry, climate, geology and vegetation in specific areas,” says Rajan Amin of the Institute of Zoology in London, who helped develop the chemical test. For example, volcanic residues at one reserve in Pilanesberg in South Africa have a very distinctive strontium concentration, which shows up in the horn.

Grasses and herbs

The chemical test uses a mass spectrometer to measure the ratios of carbon-12 to carbon-13, and nitrogen-14 to nitrogen-15, in a sample. The ratios vary depending on diet, and reveal whether horn came from white rhinos, which eat grasses, or black rhinos, which eat herbs and woody plants (*Knowledge-Based Systems*, vol 16, p 329).

An optical emission spectrometer also quantifies the ratios of common trace elements, such as iron and copper, and a specialised mass spectrometry technique picks up heavier isotopes such as strontium-88. A computer analyses the data to determine the species and location from which the horn came.

The IUCN’s African Rhino Specialist Group is improving the chemical test, but it is not yet ready to use as evidence in court. “We need more samples from specific parks to give results more statistical certainty,” says Amin.

But together the two tests “should assist wildlife authorities, law enforcement authorities, prosecutors and the judiciary in detecting and penalising illegal trade in rhinoceros”, says a spokesman for CITES, the Convention on International Trade in Endangered Species.