

SEARCHING FOR THE SAUDI GAZELLE

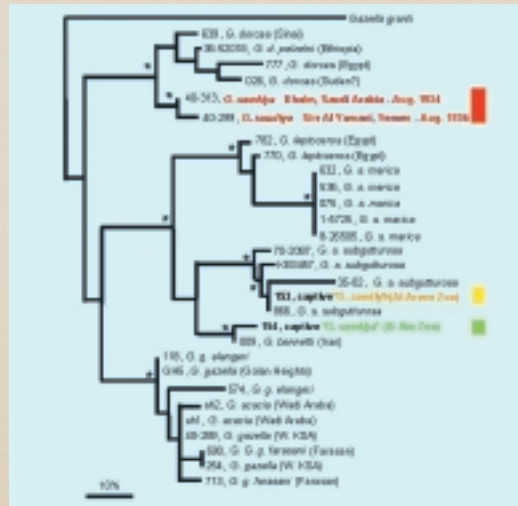
Correct identification of a species is central to guiding conservation action, and genetic analysis is an important tool for resolving identities. Conservation biologists at the King Khalid Wildlife Research Centre in Saudi Arabia set out to confirm the identity of three alleged populations of captive Saudi gazelles using genetic techniques. This was done to determine whether the Saudi gazelle existed in captivity, since it is thought to be extinct in the wild.

Regional Centre for Conservation Genetics

Conservation of endangered species requires considerable financial commitment, as well as effective allocation of limited financial resources. This necessitates a critical evaluation of each recovery effort, and tough questions need to be answered. Are the goals of the conservation effort achievable? Will they have a significant impact on the survival of the species? And perhaps most importantly, are the animals or populations identified for conservation really what we think they are?

Such questions are addressed at the King Khalid Wildlife Research Centre (KKWRC) in Saudi Arabia, operated through the Zoological Society of London under contract to the Saudi Arabian National Commission for Wildlife Conservation and Development. One of the primary areas of research conducted at the centre is genetic analyses of threatened and endangered wildlife. The Conservation Genetics laboratory was established in 1995, and has become a leading centre for conservation genetics research nationally, and in the region.

A laboratory technologist loads DNA samples into an automated analysis machine at the KKWRC Conservation Genetics Laboratory.



A phylogenetic tree, showing the true Saudi gazelle DNA (red) clustered together with that of dorcas gazelles. Gazelles misidentified as Saudi gazelles are shown (green and yellow), and cluster with other Arabian species.

Questionable Identification

The Saudi gazelle, or *afri*, is endemic to the Arabian Peninsula, but related to the north African dorcas gazelle. It was reported to be extinct in the wild in the 1980s, although animals referred to as *afri* were held in two wildlife parks and a private collection in the region. The three populations did not look similar, however, nor did they have the same number of chromosomes, so it seemed unlikely they belonged to the same species.

The Conservation Genetics Laboratory at KKWRC set out to determine if any or all of those captive animals were identified correctly. If so, they would be extremely valuable animals and could form the basis for a captive-breeding programme and recovery effort for the species. If not, biologists could focus their conservation efforts elsewhere.



Most living antelope species are recognized as unique based on analysis of their morphology. Gazelle species, however, have inter-bred in captivity, which complicates the process of identification, and modern techniques in molecular biology are needed to allow biologists to examine the structure of animals' DNA to identify individuals.

The Real Saudi Gazelle

To begin the investigation of the *afri*, biologists needed an undisputed sample of *afri* DNA with which to compare living specimens. As no wild populations of *afri* are known, skins of *afri* stored in museums offered the only solution. Eighteen *afri* specimens were located in the Natural History Museum, London. These had been collected in the 1930s, when wild herds of *afri* were still found on the Arabian Peninsula. Very small pieces of skin were clipped from the museum skins to serve as sources of *afri* DNA, which had remained intact for long periods in properly preserved specimens. This provided a wealth of valuable genetic information to answer the conservation question.

DNA from 5 museum specimens was examined and compared to DNA from living gazelles. That comparison yielded three conclusions. First, the DNA from all museum specimens was similar, indicating that they all belonged to the same species. Second, the DNA from museum specimens was distinct from any living species of gazelle, with the closest relative being African dorcas gazelles. That result was exactly what was expected if the museum specimens were indeed *afri*.

Finally, the DNA from museum *afri* differed significantly from DNA from the

living animals identified as *afri* in the wildlife parks and private collection, indicating that the living animals were misidentified. Further testing of the misidentified captive gazelles showed that they belonged to other, more common Asian gazelle species.



This gazelle, once suspected of being an *afri*, was found by genetic analysis to be a Chinkara from Asia.

The captive animals originally thought to be *afri* were shown to have no conservation significance for *afri* recovery. It is now reasonable to conclude that the Saudi gazelle has a high likelihood of being extinct, both in the wild and in captivity. That is disappointing news for all concerned with conservation of biodiversity. Nonetheless, that knowledge will allow conservation resources to be allocated toward other threatened species that need conservation action.

The King Khalid Wildlife Research Centre is managed by ZSL, under contract to the National Commission for Wildlife Conservation and Development.

Further Reading:

Hammond, R. L., W. Macasero, B. Flores, O. B. Mohammed, T. Wacher, and M. W. Bruford. 2002. Phylogenetic reanalysis of the Saudi gazelle and its implications for conservation. *Conservation Biology* 15:1123-1133.

KKWRC contact: kkwrc.ksa@zajil.net

ZSL contact: cp@zsl.org

Tel: +44(0)20 7449 6304

Fax: +44(0)20 7483 4436

October 2003



Conservation Programmes

A fragment of gazelle DNA sequence as displayed by the automated sequencer. Each peak represents a nucleotide.

