Recovering human DNA from trafficked endangered species

Steve Knight

The problems of illegal poaching of wild animals are well known and unfortunately very widespread. Endangered species of plants, animals and birds are constantly being taken from the wild, killed or hunted for the trade in 'traditional' medicine, skins, furs, feathers, and eggs. To help combat this trade, the Convention on International Trade in Endangered Species of Wild Fauna and Flora convention (CITES) was agreed as long ago as 1963.

Also known as the Washington Convention, CITES is a multilateral treaty to protect endangered plants and animals from the threats of international trade. It was drafted as a result of a resolution adopted in 1963 at a meeting of members of the International Union for Conservation of Nature (IUCN). CITES entered into force on 1 July 1975. Its aim is to ensure that both importation and export of specimens of animals and plants included under CITES, does not threaten the survival of the species in the wild. CITES currently affords varying degrees of protection to more than 38,000 species.

Unfortunately, many endangered species live in areas of the world where enforcement is weak and there are few resources to combat poaching. Combined with the high value of the traded animal resources and the huge illegal profits to be made from this trade, policing the Convention has become ever more difficult.

Against this background, research being undertaken by conservation charity ZSL, in conjunction with a PhD programme of Liverpool John Moores University, aims to improve the recovery of forensic human DNA from samples of trafficked species covered by CITES. Working at ZSL's Institute of Zoology, the project, supervised by Louise Gibson and run by Alexandra (Alex) Thomas aims to establish the best method of trace DNA recovery across a range of species.

Alex's experiment aims to shed light on the use of de-convoluted DNA profiles for this work. Using six species samples, including an elephant tusk, deer antler, and snakeskin, each object is marked into four 'zones' with tape, representing randomised collection sites for each of the four recovery methods being trialled. Each object is then handled by volunteers for one minute in-turn ensuring all four zones are touched with the hope they deposit DNA onto the surface. In addition to, this each volunteer donates a buccal swab so a DNA profile can be produced and compared against any recovered DNA. A record is then made of the last volunteer to touch each item. The key aim of the study is to establish whether human DNA can be recovered from wildlife specimens, and if so, which is the best method. However, if DNA profiles are recovered and they consistently match against the last person to handle the item it provides useful intelligence for investigators building a case.

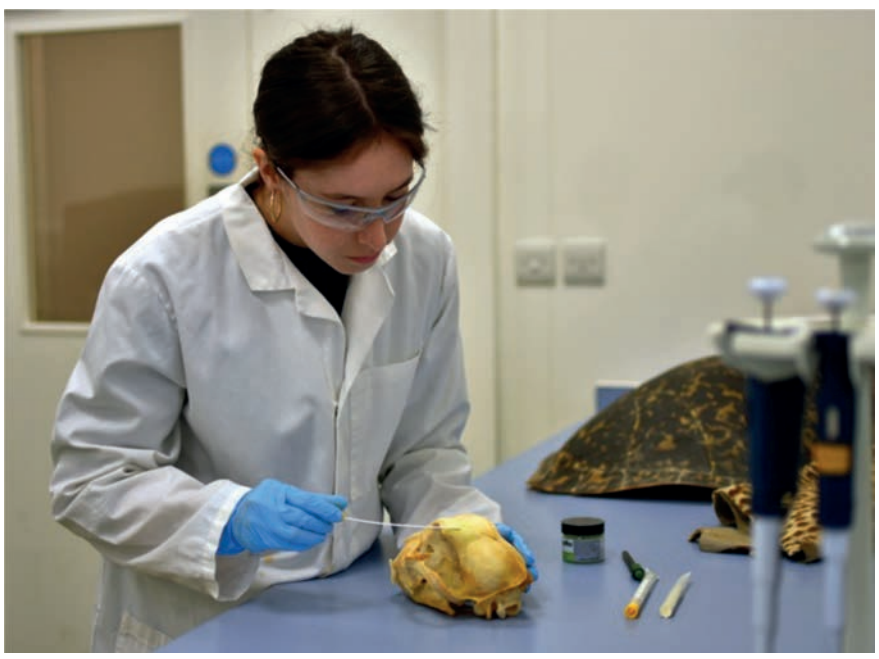

Figure 1: Alex Thomas taking a DNA swab from a Cheetah skull.

Alex commented: "I am looking at four different recovery methods to obtain the DNA from the surface that will go for analysis. My aim is to develop a quick and easy method of DNA recovery and preservation that can be used by Police and Conservation Officers out in the field just from the back of a truck." Reflecting the local environment where most poaching takes place, Alex continued: "It needs to be appropriate technology - robust scientifically yet still easy for non-specialists to take and store the sample. The complex analysis will of course be conducted back in the lab, but the important aspect is to preserve as much of the DNA as possible at the crime scene."

Figure 2: Poachers fingerprints and associated DNA on a tortoise shell identified under UV light.

Staff from Ziath, now part of Azenta Life Sciences, assisted in the research during a recent visit to help Louise Gibson establish a Biobank at the Institute of Zoology using some of the many thousands of archived veterinary samples stored there. Commercial Director Steve Knight and Ziath's Product Manager Avash Anderson were duly 'swabbed' and invited to handle the test objects. Steve said: "Ziath is a leader in tracing and managing stored DNA samples, so the chance to take part in this important experiment during our visit was too good to miss. We are excited to see if Alex can develop a method that will work out in the field to help preserve some of our most threatened wildlife."

Following completion of her PhD studies Alex Thomas hopes to publish her findings and make the technique widely available to enforcement agencies worldwide working to address illegal poaching and protect wildlife.

The Author & Further Information: Steve Knight is Commercial Director of Ziath Ltd. For more information on sample tracking using 2-D barcoded tubes, please visit www.ziath.com.

For more information on the important conservation work of ZSL, please visit www.zsl.org