rican region. Although activity has been reduced because of a pause in funding from the Italian government for most of 2002, resumption of funding for a further two years is expected towards the end of this year. Since the last edition of *Pachyderm*, experts in the programme have worked towards improving management of the black rhinos in Liwonde National Park in Malawi (ecological and institutional evaluation) and have supported a study of ecological and human factors limiting the black rhino population of West Kunene Region in Namibia. Assistance has been provided in the development of new national rhino conservation strategies in Botswana and Namibia. The project to improve the security and management of rhino horn stocks in the SADC region, implemented by TRAFFIC, has developed a comprehensive rhino horn and product database/GIS on horn stockpiles in 41 countries. The latest version (1.31) of the site-level WILDb rhino monitoring database has been issued and is now in use for several rhino populations in Zimbabwe and Botswana. A national-level version of WILDb will be available shortly. This will include automated queries that can produce a number of standard SADC RMG (Rhino Management Group) indicators of rhino population performance. WILDb is also being modified to deal with clean animals, incomplete observations and observer rating and will be able to generate data input files compatible with RHINO 2.0. The inaugural meeting of the SADC Rhino Recovery Group (RRG) was held in May 2002, with membership from the six SADC countries involved in present or future projects to reintroduce rhino populations (Angola, Botswana, Malawi, Mozambique, Tanzania, Zambia). The support and coordination enabled by SADC RRG is expected to provide the basis for a sustained effort by member states in re-establishing viable rhino populations using resources and expertise drawn from the SADC region.

Horn fingerprinting technique update

Rajan J. Amin[1] and Richard H. Emslie [2]

[1] Zoological Society of London
[2] IUCN SSC African Rhino Specialist Group/ Ecoscot Consultancy Services

Validatory statistical research undertaken by Rajan Amin and an MSc student has provided a good test of how reliable different techniques and models are for predicting the species or source of new rhino horn samples (that is, ones not used in building the models). The result of this work, which was sponsored by the Italian-funded SADC Regional Programme for Rhino Conservation, confirmed that horn fingerprinting can reliably differentiate between species and horns from different countries or regions. However, jackknife validations of park discrimination models confirmed Richard Emslie's earlier suspicions—that sample sizes would need to be increased to more than the current four to five samples per park for reliable discrimination of source within a park or area (unless one was dealing with a park with very unusual geology such as Pilanesberg National Park). The next phase of research is to undertake an experimental analysis of additional samples to determine how many samples per park are required for reliable source discrimination at the finer spatial scale.

Dr Amin's research also found that Bayesian and probabilistic neural networks produced better discrimination models using fewer variables than the original models developed by Dr Emslie using classical canonical variates analysis (discriminant function analysis). Final horn fingerprinting models and the resultant user software will therefore be based on neural network analysis.

Other research planned includes investigating the use of novelty detectors to identify whether or not samples have come from areas not yet included in the continental horn-fingerprinting database.

Anglo-American Research Laboratories are also approaching the final stages of developing a standard multi-element analysis package that will be able to quantify the abundance of about 70 rarer elements and isotopes more cheaply and more accurately (Richard Holdsworth, pers. comm.). Using their Finnegan-Mat-element high-resolution magnetic-sector inductively-coupled-plasma mass-spectrometer, abundance measures can be calibrated against known standards and expressed in parts per billion. Using the same sample of horn, but at a different dilution, inductively-coupled-plasma optical-emission-spectroscopy can also be used to quantify a suite of the commoner elements. These

data are also calibrated against known standards and expressed in parts per million. In particular the new multi-element package is likely to produce repeatable results into the future. Thus the use of these two techniques together appears to offer a much cheaper and more efficient way to get reliable, calibrated and quantitative measures of the abundance of a whole suite of heavier elements and isotopes. Analysis may cost as little as 100 South African rand (approximately USD 10) per sample.

We will keep readers of *Pachyderm* informed of any future developments.

Training in radio collar assembly, telemetry and GPS for Tsavo ecosystem rhino staff

Benson Okita[1] and Martin Mulama[2]

Kenya Wildlife Service, Rhino Programme, PO Box 40241 Nairobi, Kenya
[1] Programme Scientist, email: bokita@kws.org
[2] Programme Coordinator, email: biomass@kws.org

The Kenya rhino programme has translocated numerous rhinos to Tsavo East National Park (Galana IPZ). The translocated rhinos are fixed with horn-implant transmitters or radio collars before they are released so that their movements and ranging patterns can be tracked. This has been found essential in rhino monitoring and surveillance.

To consolidate the security of the Tsavo rhinos, rhino staff from Tsavo East and Tsavo West National Parks (Ngulia Sanctuary) were trained in radio telemetry (rhino radio tracking) and the use of global positioning system (GPS) receivers. These skills are used for rhino monitoring and security. During this period, selected Kenya Wildlife Service (KWS) personnel in veterinary and animal capture units were also trained in assembling, using and recovering radio collars.

KWS procures radio collars as needed from abroad. The collars are costly and delivery usually takes a long time. This hampers the release of rhinos. The delay in delivery and the exorbitant prices are often attributed to collar assemblage processes involving skills that KWS personnel lack.

The training exercise for nine participants was held between 29 October and 3 November 2001 at Tsavo East National Park. Mr Gus van Dyk of North West Parks and Tourism Board in South Africa trained the participants in radio collar assembly and telemetry, and Mr George Muriuki, senior research technologist at KWS, trained them in the use of GPS.

Training in assembling, fixing and recovering radio collars

In this training exercise, focus was on two KWS personnel from the veterinary and animal capture units. The topics covered included

- general information on radio collar and implant transmitters
- introduction to radio collar parts
- procedures for fitting radio collars and related equipment
- practical hands-on training in radio collar assembly
- recovery of transmitters

Training in radio telemetry

Although the rhino staff at Tsavo East and West National Parks had undergone basic training in tracking radio-collared animals, a refresher course was necessary to improve performance. The focus was on four rhino officers and two veterinary staff. The two main topics covered by the training were the introduction to radio telemetry technology and application, and detailed training in rhino radio tracking techniques and equipment.

Training in use of GPS receivers

GPS receivers are currently being introduced into rhino sanctuaries in Kenya for use in routine surveil-