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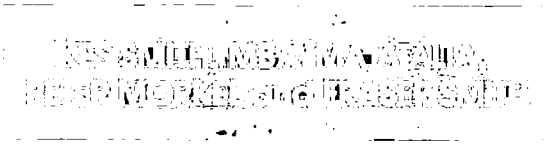
RADIO TELEMETRY AT GARAMBA NATIONAL PARK HAS BEGUN TO OFFER RESEARCHERS INVALUABLE INSIGHTS INTO THE MOVEMENTS AND BEHAVIOUR OF THE LAST KNOWN WILD POPULATION OF NORTHERN WHITE RHINO



The following article is adapted from a report prepared for the World Wide Fund for Nature (WWF) on immobilisation of northern white rhino. The project was sponsored by WWF with support from International Wildlife Veterinary Services (Namibia) and the Rhino & Elephant Foundation.

Only 15 northern white rhinos remained in the park when the Garamba National Park Project began in 1984. These animals in north-eastern Zaire were the last wild population of the subspecies *Ceratotherium simum cottoni*. Today they number 31, but at a density of only 0.003 per square kilometre, they are difficult to find for protection and study.

Radio telemetry of the rhinos was first proposed in 1983 to improve the chances for monitoring them. But it was decided at the time that the possible risks of immobilisation to so valuable a population were not justified. It proved possible to give them a reasonable degree of protection through general improvements to anti-poaching efforts. However, as the population expanded, and poaching pressure resulting from the Sudanese war increased, protection and monitoring were becoming more difficult, and detailed studies were complicated by the time it took to locate rhinos.

The subadults cause particular problems of location and identification. Young are identified relative to their mothers, but when they leave the mother only sex, estimated age, nose wrinkle patterns and ear hair serve to identify the individuals. The latter two are no use for aerial monitoring. The former can often only bring the choice down to one of two or three different individuals. Subadult males disperse to peripheral areas, where they are particularly difficult to find. Some individuals are not seen for a year or more at a time and during that period one cannot be sure of their continued survival. To study feeding behaviour, communication and daily activities, researchers needed to be able to find the rhinos more easily.

In early 1992 the Président Délégue General of the "Institut Zairois pour la Conservation de la Nature" agreed to the radio collaring of a sample of the rhinos, provided that it was carried out by a suitably qualified and experienced veterinarian and that all possible precautions were taken to ensure the safety of the rhinos.

Dr Peter Morkel of International Wildlife Veterinary Services (IWVS) and Dr Louis Geldenhuys of Etosha Institute of Ecology were chosen to do the immobilisations and, thanks to their efforts, IWVS organised and purchased the transmitters and receivers, and the Rhino & Elephant Foundation paid for their travel. (Due to problems of timing, Dr Geldenhuys was, in the end, unable to participate.)

Radio telemetry was intended to improve protection of the rhinos directly, by revealing their whereabouts, and also indirectly, by contributing to understanding of their ranges, habitat use and social interactions. As a spin-off immobilisation for radio collaring would permit blood and tissue sampling for genetic analysis of this very small population, as well as pathological investigations.

In early June of 1992, four rhinos were immobilised. Kes Smith and Mbayma Atalia went on the initial flights to locate and identify the specific individual animals to be darted. Later they joined the ground team going to the approximate location of the selected rhinos while pilot Fraser Smith flew veterinarian Peter Morkel for the darting.

Then, staying high to avoid disturbing the animals unduly, pilot Smith kept the darted rhinos in sight and guided the ground team to them when they went down. This was vital to

in Africa and the ban on hunting them and trade in horn was firmly in place. Yet the species collapsed to the point where we now have only 2 500 surviving in a few countries, mainly in southern Africa, hanging on grimly to an uncertain future.

South Africa has the largest population, a distinction held until recently by Zimbabwe. In 1990 the Natal Parks Board again took a bold decision: to dispose of some black rhino. At their first black rhino auction, in June of that year, they realised the highest price ever paid for the species when Dale Parker of Lapalala Wilderness successfully bid R2.2 million.

There was shock and amazement among wildlife followers at the prices paid. Some people had doubts – did the private sector have the expertise or capability of caring for such a rare species? Only time would tell. The Natal Parks Board, however, was delighted as the proceeds gave their conservation coffers a handsome boost. Suddenly the black rhino had an economic value and again, the private sector had led the way.

But perhaps the larger point was that the private sector had a choice: if people wanted black rhino on their reserves, it had become a possibility, but they would have to pay for the privilege, and pay dearly. (In Kenya, by contrast, rhino belong to the state regardless of where they live. The private landowner becomes custodian and spends money on essentials such as fencing and security, but the state agency has a complete say on management issues.)

When people make the choice of owning the black rhino for pleasure, for tourist reasons, to help conserve rare species, for breeding purposes and subsequent resale, or for hunting, the fact is, it was done for the white rhino and must surely now be done for the black rhino. The black rhino has real economic value now quite aside from its horn, and given the ability of private enterprise to meet all manner of challenges, this value must improve the animal's chances in the longer term.

That's the theory. In reality, protecting such an asset is far from easy. The situation facing all rhino has worsened dramatically as numbers in most countries have plunged and organised crime continues to penetrate even carefully guarded sanctuaries. Five white rhinoceros have recently been slaughtered in the most protected of all African sanctuaries, the Kruger National Park.

The small sanctuary concept – keeping rhino in limited areas – has great merit because it improves monitoring enormously. The ability to monitor rhino and staff daily, if not hourly, is essential. That sanctuaries be well away from areas of high human settlement is an important prerequisite. Running such a sanctuary is costly, however, as well as being labour intensive. But as this form of rhino conservation grows, so too will the opportunities for breeding to improve the black rhino's overall status and thus pave the way for sale of surplus rhino to establish new populations and perhaps eventually allow hunting of mature bulls at premium prices.

One can rely on private sector operators to develop new strategies for rhino conservation now that they are in the game. The breeding of endangered or rare species is a noble pursuit, if viewed idealistically. Yet one should also be prepared to view it in a business light. It has been said that there are no perfect men in this world – only perfect intentions. If someone's intention is to make money breeding black rhino and success leads to the enhancement of the status of this species, then so be it. Business-minded people are amazed that one does not trade in rhino horn. If illegal harvesting of horns is the root cause of the problem and the gravest threat to rhinos, then why not deal with the sympton?

It would indeed be a sad day (and there are those who believe it will come) if we were so preoccupied with keeping rhinos alive at all that we wouldn't even consider trade in their horns. Trade in horn might *help* the species survive. Similarly, where is the harm in allowing an ageing bull to be hunted for the good of his own kind? There are some perfect men with perfect intentions who won't let either of these options get much of a hearing.

We should not accept that. We need to press for bold new initiatives and explore every means at our disposal on behalf of the black rhino. It worked for the white rhino.

5Y-KEZ above young male, Channel 2, with Pete Morkel, Mbayma Atalia and guards.

ensure the safety of the operation and minimise the time the rhinos were down. The grass was too long for good visibility on the ground.

Blood samples and tooth impressions were taken and various body measurements made while the rhinos were immobilised. Their ears were notched for long-term identification, and the piece of ear removed kept for genetic analysis. The pattern of their nose wrinkles was also diagrammed as an identification aid.

Radio collars were chosen as the mounting for the transmitters (rather than horn or ear tag mounts) because collars have been used successfully on rhinos in the Pilanesberg National Park and in Royal Chitwan National Park. They are tried and tested pieces of equipment with a good range and long battery life – both important factors in Garamba, where the rhino range is more than 1000 square kilometres and long-term follow-up is planned. Collars may also serve as a visual deterrent to poachers, and can help guards in rhino monitoring.

Researchers in the Luangwa Valley found problems with wide collars rubbing the ears of black rhinos, and white rhinos have a narrow space in which the collar can fit between ears and neck humps. But Morkel and others working in Namibia have avoided this problem by modifying the collars, and this procedure was followed in Zaire.

The collars were basically the standard MOD 505 manufactured by Telonics, where the transmitter hangs below the neck and the two ends of the dipole antenna pass up on either side of the animal's neck, sandwiched in the collar. To modify it, each collar was cut off at the ends of the antennae, whose tips were pulled through a hole to the outside of the collar to extend the range. Heavy duty upholstery elastic in a loose canvas sleeve was then sandwiched between the two layers of one end of the collar and rivetted in place. On the rhino this part then went over the head behind the ears and was rivetted into the opposite side of the collar with the canvas 'concertina-ed' to allow for expansion.

This modification has the dual advantages of protecting the rhino from any abrasive damage and allowing for expansion due to growth of young rhinos, although it has the disadvantage of not lasting as long on the rhino as a standard collar.

The four rhinos immobilised were three subadult females and one young male. Only three were radio-collared, however, because when initially darted, one female did not go down. The dart penetrated her neck at an angle and little or none of the drug entered the muscle. Although she was later redarted and sampled and measured, the researchers decided against collaring her because the earlier dart wound on her neck might have caused an abscess to develop under a collar.

All other immobilisations were straight for-

ward. The young male was found to have horn wounds from fighting: his right eye was closed up and slightly clouded, the left eye had a wound just behind it, and he had other wounds on his neck and rump. All were treated with antibiotics.

Ticks collected were taken to the Veterinary Research Institute at Onderstepoort. The main genetic analyses are to be carried out at the Department of Molecular Genetics, National Museums of Kenya, to establish genetic viability within the population, parental lines and degrees of inter-relationship, and the contribution to breeding by all the adult males, and to compare the genetics of the northern and southern subspecies of white rhinos.

Rhino observations

Tracking of the collared rhino has been both from the ground with hand-held antennae and from the air with twin antennae mounted on the wing struts of the aircraft.

Range of reception of signals was at first disappointing. Even from the air at the normal rhino search height of 300 feet, range on initial tests was only two kilometres. The terrain is gently undulating, with no points of elevation close to the rhino area for tracking from the ground. The grass was about a metre high at the time of immobilisation and growing rapidly. Telonics offered much useful advice, and subsequent work has yielded better results. By increasing aircraft height to 1500 feet, signals at 15 km were received. On the ground with line-of-sight, signals at six km were received.

The idea of having continual monitoring on the ground by guards on foot has not proven very feasible during the long grass season. With reduced reception and visibility due to grass height, and with the extent of the rhino movements, it is necessary to have a vehicle available to search the area and to provide a high platform.

Nevertheless, results so far have been extremely interesting. The researchers found more shifting in the composition of the subadult groups than they had previously been able to gauge. They have been able to observe attempted territorial take-over by the young male and have been able to investigate further the question of inter-individual communication. Also they have been able to direct patrols to cover areas not previously considered high priority for rhino protection.

The two subadult females did not move great distances. The first one immobilised, referred to for tracking purposes as Channel 1, was with an older subadult female at the time. They were believed to be sisters. The older one had remained with her mother (F4) after the birth of the younger one, and they had occasionally been joined by another subadult female, believed to be the next older sister. They were thus a close-knit family. When another calf was born to F4, these two sisters left, possibly chased out from F4's immediate family group.

Subsequent to the immobilisations, the two did not rejoin each other. On many subsequent occasions they were within a few kilometres of each other, but Channel 1 remained alone on all our observations except for a temporary association with F4 and her calf. Once when tracking her from the ground, she became aware of the people and approached very close. This is a phenomenon two of the authors have noted before with lone subadults. They appear to be seeking company. The older subadult subsequently joined up with the other collared female, Channel 3.

This second collared female, Channel 3, was with a young male subadult when darted. He stayed close by the whole time she was immobilised and after she was revived they called to each other with the "mewing" call and "huff-panting" and rejoined. They were seen together until the female apparently came into oestrus. The young male was chased away by the male, called M9, and the female joined up with Channel 1.

The peripheral young male collared, Channel 2, was located several kilometres west of the core rhino area. His horn wounds had almost certainly resulted from an attempt to take over a territory or mate with females in another male's area. He is fully grown and well muscled, but his horns are still relatively short. He remained in the western area for two weeks and invariably hidden in patches of long grass. Then he was found moving east and south, but

later he appeared to be moving back for another try at the territory. In August he was found well within M9's area and in a region frequently used by females and subadults. When approached M9 was seen feeding in the direction of the signal and Channel 2 walking rapidly south of M9's home range. Later Channel 2's collar was found in an area of well trampled grass where the two males had obviously been fighting.

His collar had been fitted on 6 June, and came off on 5 August in the fight, broken at the point of attachment of elastic to collar. The first collar fitted, Channel 1's, was attached on 3 June and came off shortly before 3 August. It was found close to a dead tree: it appeared the rhino had caught the collar in a projection tree and broken it, and it further appeared to be a relatively focused action rather than the passing result of general rubbing. This collar had also broken at the point of attachment of the elastic.

The canvas had rotted and torn, exposing the vulnerable point of entry into the stiff material of the collars. It was felt that the elastic-modified collars are well worthwhile for the safety and comfort of the rhino, but that at least two layers of elastic are needed, stronger canvas, and possibly reinforcement at the point of attachment.

Plans are to continue radio collaring as early as possible in the next dry season to allow maximum time for intensive follow-up. Double elastic and reinforcing will be used, and a solid state digital sound recorder will be attached to one collar to make recordings of all rhino communication, and to investigate communication by infrasound.

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Collar attachment and measurements, Channel 1. Brian Clarke, Kes Smith, Mbayma Atalia and guards