



ELEPHANT RESEARCH

– A · P · N · R –

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In this issue I will focus on the vegetation as critical resource to elephants. In addition to the regular features, some of the relevant findings of previous elephant research conducted within the APNR will be discussed.

LOOKING AT THE VEGETATION

For your interest I have attached a comprehensive scientific briefing on the vegetation as a separate document to this newsletter (vegs.doc). I here summarise in point form the most important findings and considerations.

Previous findings

- Woody browse constituted 80% of the diet of elephants within the Association of Private Nature Reserves (APNR) during the dry season. During the wet season the browse to grass ration assumed near equal proportions.
- *Grewia* species (velvet-, white-, sandpaper- and giant raisin) made up 41% and 37% of all woody species that were utilised by family units and bull groups respectively. Hence *Grewia* species were identified as the principle dietary species of elephants within the APNR.
- Both bull groups and family units frequently accepted a narrow range of 6-8 woody species which included raisin species, mopane, sickle bush, knob thorn and false marula for both social units of elephant. Family units included Zebra wood more frequently in their diet than bull groups while bulls utilised marula, sandpaper bush and red bushwillow more extensively than family units.
- The dry season diets of bulls were similar in woody species composition to those of family units. Bulls were however found to utilise plant parts high in calcium while cows selected plant parts high in sugar and low in fibre content. These findings indicate that family units

may be energy limited during the dry season. The larger skeletons, longer growth curves and accelerated tusk formation of bulls as opposed to cows, could possibly explain their need for calcium rich diets.

Your input from the questionnaires

- Results from the questionnaires indicate that landowners were least concerned about elephant impact on raisin species and mopane trees. Knob thorn and marula were regarded as aesthetically important species to landowners.
- The majority of landowners also thought that the vegetation structure had changed over time with bush encroachment increasing and tall trees being lost to the system.
- A number of relatively simple techniques (e.g. Wire netting and bee hives) have been shown to successfully reduce bark stripping of trees such as knob thorns. Prevention of tree felling appears less simple. Methods will need to be designed and evaluated in the APNR.

Quote

The virtue of the universe is wholeness. It regards all things as equal - Lao Tzu-

Scrutinising concepts and beliefs

- Carrying capacity is a dated concept and of limited value when determining sustainable population size in variable environments.
- Keeping ecosystems static for extended periods could lead to a loss of resilience and stability in the long run.
- Utilization of preferred species by elephants will still occur even at low population densities.
- The loss of species diversity as a result of modifications to the vegetation by elephants, have yet to be documented.
- Management objectives should consider the temporal scale on which they wish to base management decisions.
- Change is a part of ecosystem functioning and all changes in the vegetation structure should not be perceived as detrimental to the system.
- Expanding elephant populations could cause future populations to be more susceptible to episodic mortality (e.g. drought induced) which would mainly affect juvenile recruitment.
- The APNR elephant population is adjacent to a high density zone of elephants within the Kruger National Park. This implies that we can expect elephant numbers to increase over time, especially if the APNR offers an artificially enhanced habitat (e.g. High density of water points).
- Dispersal as a natural population regulatory process should prevent local over-utilisation of the vegetation.

- The extensive network of artificial water points in the APNR could potentially interfere with dispersal.
- Vegetation surveys should consider not only annual mortality rates of tree species of concern to landowners but also their recruitment rates.
- Exclusion experiments would be a useful way of establishing what factors are influencing recruitment rates and to effectively monitor cause-effect relationships.

I would like to use this opportunity to thank the following people and organisations for sponsoring different aspects of my previous fieldwork.



The David Shepherd Conservation Foundation
Globaltrack
Anne Anderson

Sponsorship for the present study has come from:



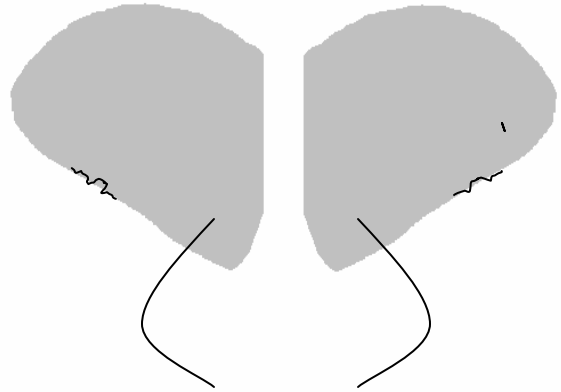
Tony McClellan (sponsored the costs of 7 satellite collars)
Charlie Irish (donated two digital cameras)
Anonymous Klaserie landowner (financial contribution)

WHO'S-WHO.....?

This regular feature will serve as an introduction to individual elephants with which we have become familiar in the APNR. Here we focus on an elephant named Classic...



Photo Colin Rowles on Fife (Klaserie)



Classic has been gracing the APNR with his presence for more than two months. He is an old elephant, probably close to 50 years old with long tusks. Although his tusks aren't very thick, their length gives him an impressive appearance. If you are fortunate enough to sight him and get a clear frontal view of him, you will notice how symmetrically his tusks arc outwards. When I first sighted him, his features were reminiscent of the classical drawings made of elephants in days gone by, hence the name Classic.

Kings camp reported seeing a large tusked bull on the Vielmetter property on the 18th October. Dale Jackson from Tanda Tula managed to photograph him as he crossed over into Klaserie at dusk.

Yuval Erlich photographed Classic at Senelala on the 21st October. Colin Rowles subsequently took this photograph of him on the 23rd October on Fife in the Klaserie. Thereafter he has been sighted in the Umbabat on De Luca's property by Shaun Kyle, on the 12th November in the company of four bulls, one of which had a floppy ear. Rudi Jones from Gomo Gomo has since then sighted him in the vicinity of Voëldam on Peru. Classic was still in the company of four other bulls when he was last sighted on the 26th November.

As Classic would be a most suitable candidate for the next Green Hunt, I would appreciate it if you could report any sightings of him. I have included a sketch of his ear pattern so that you can identify him with certainty.

Taking elephant photographs

Several landowners have contacted me and generously offered to assist with the collection of elephant photographs and sightings, so I have provided the following guidelines to those of you who are keen to give us further assistance.

The following tips are applicable to both conventional and digital photographs:

If you have a digital camera, take as many photographs as time permits. If you are taking conventional photos you will probably have to be more selective, as development is costly. Although the following information may look daunting, please remember that I would appreciate ANY information and photographs that you would be willing to supply. I will be able to process the information more efficiently if you follow the instructions below,

- 1) Carefully note the **DATE, TIME** and **LOCATION** of the sighting. Be as specific as possible about your location. If you don't have a GPS in your possession, please provide a description that will help me to GPS the location at a later stage.
- 2) If you are using conventional photographs, please number your spools and write down the photo number.
- 3) If you are using a digital camera it would be very helpful if you could write down the photograph numbers.
- 4) Evaluate each individual that you photograph according to its **TAMENESS INDEX**.
Tameness codes:
 - 1= elephant totally relaxed and does not take notice of your presence when vehicle within 20m.
 - 2= elephant notices you by either interrupting its activity (stops chewing or feeding; listens while swivelling trunk which hangs limply; opens its eye; lifts trunk to smell). Elephant is initially skittish on vehicle's approach but calms down within 10 min when vehicle within 20m. Elephant may then move forward in a relaxed manner to try to see you better and may hesitantly touch the vehicle, sway, and foot-swing or touch temporal glands etc.
 - 3= elephant shows signs of agitation and aggression (flaps ears; dips head and stands tall; kicks up dust; trumpets; attacks a tree or bush; tusks the ground; musth bulls will gush or dribble urine more profusely when agitated). Tail may arch and defecation takes place while the frightened animal tends to avoid the vehicle.
 - 4= strong positive (charges) or negative (runs away as quickly as possible). Please state which as +4 or -4.
- 5) If you can't get a frontal picture of an individual with ears spread, take each ear from either side whether a bull or a cow. The intention is to use your photograph to trace the margin of the ear so that we can identify the same individual in future from characteristic holes, nicks or tears in either of the ears.

- 5) If there is a large group of elephant **BULLS**, it would be more useful to have both ears from an individual than only one ear from a number of individuals. If you see a group of 10 elephants for example, I would prefer just one complete elephant's ID than all 10 with one ear photographed from each, especially if we are unable to piece together which ears belong to which individuals. Please remember to record that the ID that you got was from an aggregation of 10 elephants, therefore take your time and concentrate on one animal within the group. When you have both ears photographed, you can pick another elephant. Nevertheless, I will appreciate ALL photographs that are supplied. If you see a bull in **MUSTH**, always preferentially photograph him. Adult bulls are indexed according to their reproductive state as follows:
- Temporal gland secretion:** **0** = nil, **1** = wet, **2** = flow up to mouth line, **3** = flow below mouth line
- Temporal glands:** **0** = not swollen, **1** = swollen around opening, **2** = swollen beyond opening, cheek bone still visible, **3** = swollen completely, cheek bone not visible.
- Urine dribbling:** **0** = nil, **1** = sheath opening wet, **2** = sheath opening and hind legs wet, but not dribbling urine, **3** = dribbling urine continuously.
- 6) Please mark an elephant bull's ID with **NB** if you think that he possibly qualifies as a big tusker (over 80 lbs) because of the length and thickness of his tusks.
- 7) When you see a family unit with **COWS** and their offspring, concentrate on any adult female within the group that has significant features like skew tusks, a large tear or hole, a deformed calf etc. Chances are that with time, I will know which herd you sighted by just one good ID picture of a particular adult cow within the group. If you have time you can systematically collect ID's from other adult cows with less distinctive features, or sub adults, or juveniles within the herd. Please record any newly born calves and try to get pictures of the mother. Count how many animals are within the group. If there are large bulls associating with the family unit preferentially collect their IDs and as mentioned earlier, try to get one good ID from a cow with significant features.
- 8) If any of you would be interested, then I could supply an elephant identification kit which has all the necessary datasheets for you to complete with the photos that you take. Depending on the demand, we may have to charge a small fee for each kit to cover our photocopying expenses.

FACT-FILE: Elephant Communication

The complex social organisation of elephants denotes an elaborate **COMMUNICATION** system which includes tactile-, chemical-, visual-, acoustic- and most recently even seismic **SIGNALLING**.

Elephants use more than 70 kinds of vocalisations and 160 different visual and tactile **SIGNALS**.

TACTILE COMMUNICATION is particularly apparent in forging family bonds and in the early 'education' of calves. Tactile signals function as short distance communication tools.

CHEMICAL COMMUNICATION often involves the smelling of urine, faeces and the temporal glands. Bulls perform flehmen to evaluate a females breeding condition. After smelling the female's urine or vulva, the air is puffed into a passage in the upper palate which sends it to the Jacobson's organ where the chemical cues are tested. Elephants frequently greet by putting their trunk tips in each other's mouths which is also thought to involve olfactory communication and the Jacobson's organ. While the temporal glands of females drain in proportion to their level of excitement, these glands drain prominently when bulls are in musth. Scientists speculate that one reason why musth bulls frequently rub their temporal glands against tree's trunks is to leave chemical evidence of their presence. Wind-borne scent can provide elephants with the clues to approaching danger, each other's presence, emotional and physiological states and even to some extent the trails over which they have passed. Chemical cues are thus often long lasting and can function over both short and long distances.

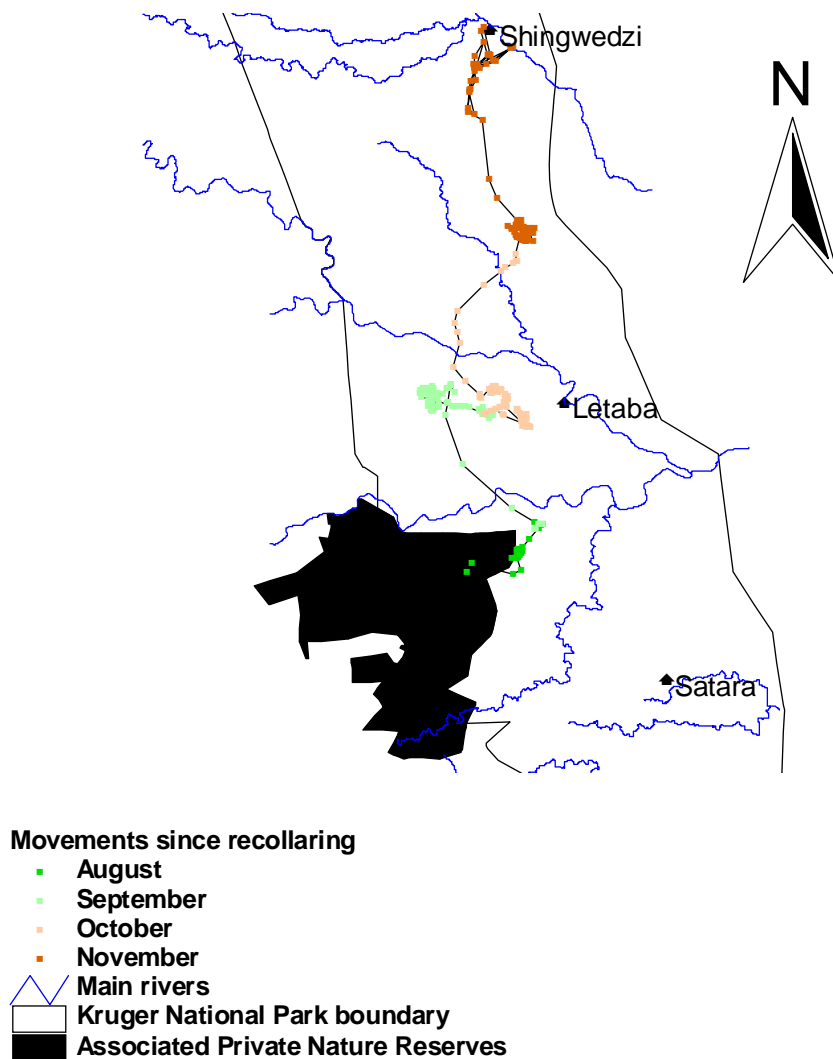
VISUAL DISPLAYS by elephants function over short distances and are often used in adversarial contexts. Different combinations of head, ear and trunk positions convey different signals. Females in oestrous have a characteristic gait while musth bulls walk with a head-held high posture and swaying strides. The 'musth walk' is distinct enough to be recognised by a trained observer at a distance of over a kilometre.

ACOUSTIC COMMUNICATION in elephants ranges from high-pitched sounds like trumpets with short wave-lengths to low-frequency infrasonic growls and rumbles. Humans can hear with a frequency range as low as 20 hertz while elephants emit sounds with frequencies between 14-35 hertz. Forest elephants can make calls as low as 5 hertz which is two octaves below the lowest sounds that human can hear. Infrasound can travel six miles or more, as low-frequency sounds propagate more efficiently than high-pitched sound. Females are found to be more talkative than males. When analysing 26 types of calls made by adult elephants, scientists found 19 calls were made only by females, three were made by adults of both sexes while only four were exclusively used by males.

Recently it has been shown that it is physically possible for elephants to communicate via vibrations of the ground (**SEISMIC SIGNALLING**). Elephants appear to communicate by sensing seismic vibrations through their feet with the soft skin on the pads of their feet acting like the head of a drum. Vibrations transmitted through their skeletons can be picked up by their exceptionally large middle-ear bones. Signals are transmitted through the ground in the form of vibrations for distances as much as 50km when elephants trumpet, make mock charges or stomp their feet. These findings could help explain why elephants have the apparent ability to detect thunderstorms well beyond the range that the sound of the storm can carry. Elephants also characteristically display the foot-lifting behaviour prior to the arrival of another herd. The raising and lowering of a single foot while the whole herd freezes probably help elephants to work out from which direction the vibrations are coming.

Where is Mac?

After receiving the last newsflash on Mac's re-collaring, which took place on the 20th of August 2003, I am sure that you are wondering where Mac is. Since he was re-collared Mac has moved approximately 569 km north. The figure below depicts his route back to the Kruger National Park where he is at present 12 km south of Shingwedzi. He has followed an almost identical route to the one he took in August of last year when he left us to return to the Kruger after dropping out of musth. Five 'hotspots' along his route north can broadly be described as having sufficient water with *Colophospermum mopane* featuring as the dominant vegetation type. We will all be waiting in anticipation for him to return to us when he comes into musth in May 2004!



SPECIAL REQUESTS

We will be unable to meet the objectives of this study which were mentioned in the previous newsletter, without your input and support. I therefore have the following requests and appeals to make...

QUESTIONNAIRES:

I would very much appreciate it if you could send me your completed questionnaire as soon as possible. Only 76 questionnaires out of 499 have been returned to me. You could either email, fax, post, or alternatively you could leave the completed questionnaire at the control gate in a sealed box that will be provided for this purpose. You are also welcome to deliver it personally at the Elephant Research office based at Tanda Tula in the Timbavati. Please remember to rank the plant species according to your level of concern for them. Some respondents have omitted to do so.

ELEPHANT IDENTIFICATION KIT:

If you are keen to assist in the collection of elephant ear patterns or if you have taken any elephant photos and would like to make these available, I would be most appreciative. Please contact me so that we can make an arrangement. If you are interested in ordering an identification kit, email me as soon as possible.

NEWSLETTER:

If you would like to contribute to the newsletter in any way, please do not hesitate to contact me, especially if you have come to know specific elephants over the years and have some interesting stories to tell.

ELEPHANT MORTALITIES:

I am in the process of compiling a comprehensive list of elephant mortalities and would like to make an appeal to any landowners to contact me if they have either had elephant mortalities on their land or are in possession of the lower jaws of dead elephants. The jaws are used to estimate the age of the dead elephant. If you happen to come across an elephant carcass, could you also kindly report it as soon as possible and prevent predators from destroying the jaws.

DONATIONS AND SPONSORSHIPS:

This costly project is dependent on donations and sponsorships. Although Save The Elephants and Tanda Tula Safari Camp have supported this project both financially and logistically, we are still dependent on donations for the duration of the project. Donations can be made to 'Elephant Research APNR', account number 033356165, Standard Bank, Hoedspruit, Branch Code 052752. All contributors will be acknowledged in forthcoming popular and scientific publications.



OUR NEXT NEWSLETTER.....

*In the next issue of **Elephant News** we will look at some interesting encounters with elephants.*

I wish you all a very happy festive season until our next edition in 2004!