

**BEHAVIOURAL ECOLOGY OF THE CARACAL IN THE K GALAGADI
TRANSFRONTIER PARK, AND ITS IMPACT ON ADJACENT SMALL STOCK
PRODUCTION UNITS**

by

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Summary

A study was done on the behavioural ecology of caracals in the Kgalagadi Transfrontier Park, and their potential impact on the small stock-farming enterprises along the border of this park with Namibia.

To fit caracals with radio-collars it was necessary to capture animals by using the most humane and efficient methods. This required that the most effective bait and lure combination for use in box traps must be selected. The most effective bait and lure

combination in the present study was fresh chicken with a shiny foil lure that was suspended in the back of a single-door box trap. To further optimise selectivity of the capture technique, box traps that were too small for lions, brown and spotted hyaenas were positioned in areas of known caracal activity. Refinements to the cage design included the introduction of a crush plate to handle captured caracals. This crush plate limited the freedom of movement of the caracal by physically restraining it inside the box trap. The benefit of using the crush plate was that an accurate dose of the immobilising drug could be administered, with a hand-held syringe. Once the caracal had been collared, weighed and measured, it was returned to the box trap to recover. The box trap was placed in a cool area and the caracal was only released once it had fully recovered from the effects of the immobilising drugs.

To determine whether the ranges of caracals from the Kgalagadi Transfrontier Park extended beyond the border of the Park, caracals that had ranges in the vicinity of the Namibian border were captured and collared. The collared animals were located regularly with the aid of radio-telemetry. On all occasions the caracal's location were confirmed visually. The GPS position of each caracal location was recorded. Where appropriate, the ranges of the caracals were calculated by using two statistical and one non-parametric method with two current range estimation computer programs. This enhanced the comparability of the results of this study with future studies. Caracals in the Kgalagadi Transfrontier Park have larger ranges than caracals in other areas of southern Africa. The ranges of caracals from the Kgalagadi Transfrontier Park extend beyond the borders of the Park into Namibia. This indicates that the border fence does not hinder the caracal movements and that the caracal population in South Africa is contiguous with that of southern Namibia.

The Shrubby Kalahari Dune Bushveld is a homogeneous habitat but it does display repetitive and distinct vegetation stratification over a short distance. The habitat stratification is based on the position of the vegetation relative to the slope of the sand dunes. The three habitat components that were used were the dune streets, dune slopes and dune crests. The contribution of each of these components to the total habitat use was calculated by using a non-mapping method. The utilisation of the various habitat components by the caracals was based on spoor-tracking data for a number of individuals from June 2000 to July 2002. It was found that caracals utilised the dune slopes and dune crests in a higher proportion than that in which they occurred, but that they used the largest habitat type, the dune streets, less often than expected. In addition, the preferential utilisation of various plant species by the caracals in conjunction with specific types of behaviour was investigated. It was shown that caracals utilised specific plant species for specific stationary behaviours.

Hunting is a fundamental activity of any predator. A large proportion of the activity of a caracal is devoted to searching for and hunting of prey. To investigate the nature of the hunting behaviour of the caracal and to calculate their hunting success, caracal spoor was followed with the assistance of an experienced Kalahari San tracker. The tracker described the behaviour as it unfolded along the length of the spoor. Hunting behaviour was subdivided into six intrinsically linked behavioural components. From these observations it was clear that caracals adopted a tactic of lying in wait to ambush prey rather than trying to locate prey first and then stalking it. Further, an optimal hunting strategy for caracals was modelled based on the sequences of behavioural components that were recorded for all the hunts. It is clear that there is an optimal hunting strategy, but this strategy is variable and adaptable based on the situation and prey. Large prey was chased over longer distances than small prey. The hunting success rate of caracals

in the Kgalagadi Transfrontier Park is low when compared to other predators in this region and with similar sized predators elsewhere. This is likely to be because of the relatively low prey density and the strict protocol that was used in the present study when identifying successful kills. Observations of the killing techniques that caracals used on larger prey could be seen from the bite marks on carcasses of prey. However, the killing technique that was used on small prey could not be observed because the method of observation that was used was indirect, and caracal often consume small prey totally. When caracals cached carcasses of large prey, they regularly returned to them for further feeding bouts.

Prey selection by caracals in the Kgalagadi Transfrontier Park was determined by using scat analysis and records of known prey that had been hunted. The prey consisted of a high proportion of rodents, but surprisingly few bird remains were found in the scats, even though there seems to be an abundance of birds that would be suitable as prey. Insect remains were found in a high proportion of the scats and this indicated that although insects might not contribute significantly to the total prey biomass, caracals do eat insects. Plant material was found in many of the scats, but in the majority of cases this is probably attributable to accidental ingestion whilst grooming or feeding. However, seeds of tamma melons in the scats indicate that caracals may eat tamma melons to supplement their moisture uptake, as do other predators in this area.

Many authors have proposed that animals may forage optimally, although whether this theory holds in the case of predators when hunting has not been substantiated yet. It is possible that caracals follow an optimal search pattern relative to Brant's whistling rats in the hot season. This was based on a comparison of the frequency of occurrence of

Brant's whistling rat colonies along randomly placed transects with the frequency of occurrence of colonies along caracal spoor.

Namibian farmers feel that caracals from the Kgalagadi Transfrontier Park actively move across the border, into Namibia, to prey upon small livestock. To investigate whether this was the case, spoor counts were used as an index of caracal density. The spoor density in the interior of the Park was compared with that along the Park's border with Namibia. If the spoor density were higher along the Namibian border than in the interior of the Park, it would indicate that caracals being attracted to the border areas. It was found that in the hot season there was a lower caracal spoor density along the border of the Park than in the interior. However, in the cold season there was an equal density of spoor along the border and in the interior. The results indicate that the caracals avoid the border areas in the hot season, but that they increase their utilisation of the border areas in the cold season when the natural prey are depleted and the small stock are lambing.