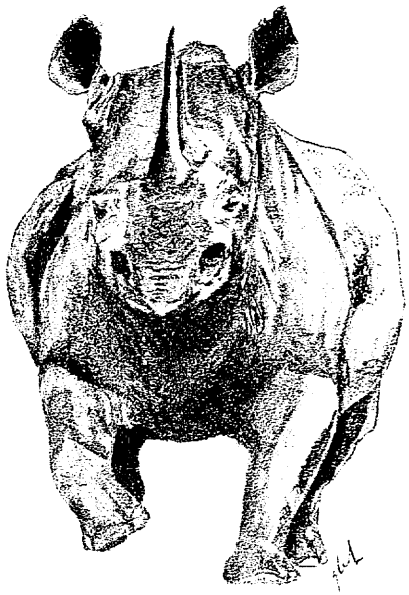
Preliminary Findings of Home Range, Diet and Midden Significance in a Black Rhino Bull

Chris Roche



Chris Roche

The movements of a Black Rhino bull were followed over the year November 1999 - November 2000 as a means to discovering diet, home range size and habitat preference in this species in the southern Timbavati. An identikit was compiled for this individual (Figure 1) and a feasibility study for future re-introductions was aimed at.

Introduction

In November 1999 a Black Rhino bull was released in the neighbouring Kingfisherspruit section of the central Kruger National Park (KNP). Within a few days, this animal had moved more than 10km to the Ngala traversing area flanking the Timbavati River. The preceding winter a younger Black Rhino bull had been seen on Ngala, as had the tracks of a Black Rhino cow and calf (Roche, 2000a). The fact that the study animal had selected the area flanking the Timbavati River, and in particular a band of *Acacia luederitzii* thicket that had twice been used by the younger bull, was considered significant. As very little published information on Black Rhino in the South African lowveld was available, an attempt to record diet, habitat preference, movements and any territorial behaviour was made. These findings are described here.

Home Range and Habitat Preference

Sightings and movements of the study animal, noted while tracking on foot, were plotted on a map of Ngala. When compared with a map of the drainage of Ngala and when specific local vegetation was mapped, the movements of the animal in the context of topography and habitat became clear. Repeated sightings and movements in certain areas were illuminating in garnering information on habitat requirements and this again helped in determining diet. Total range was impossible to calculate due to the animal spending some time within the Kruger National Park and this in any case is not likely to be truly reflective of the space needs of this species in the lowveld. This is primarily because of the very low current density in the central KNP and the lack of a cow within the study area. Movements were therefore not restricted by other Black Rhino and the absence of a female of the same species probably encouraged movement further afield. What is certain however, is that, like the White Rhino (Roche, 2000c), Black Rhino range sizes in the lowveld are likely to be as large as, (or larger than) those recorded elsewhere in South Africa. Within the recorded range however, a core area of repeated sightings was clear and this is represented in Figure 2. Figure 3 shows the specific vegetation occurring in that core range and can be divided into five distinctive types:

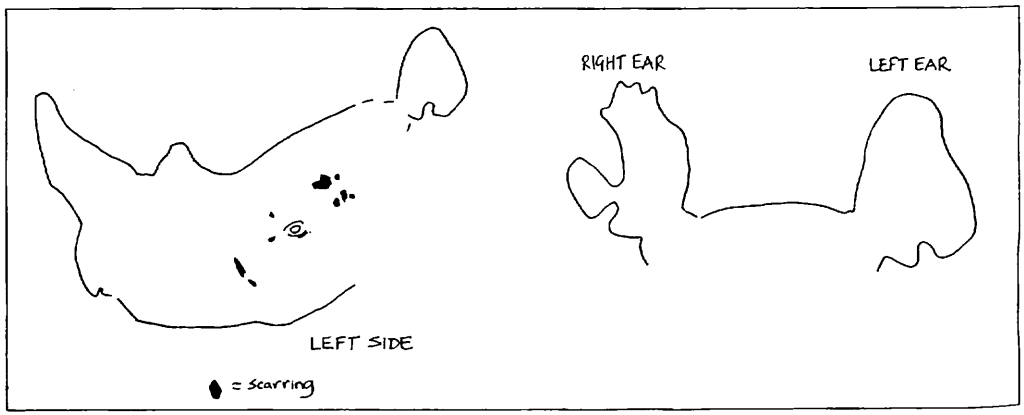
a) riverine forest and thicket (see Roche 2000d), b) *Acacia luederitzii/Euclea divinorum* thickets, c) *Euclea divonorum* thickets, d) stunted *Acacia nigrescens/Euclea divinorum* thickets, and e) *Spirostachys africana* thickets. All of these areas were repeatedly visited by the study animal and appear to be important habitats both in terms of structure and food requirements.

Pienaar recorded Black Rhino as being particularly abundant in former times in "the Nwatimhiri bush, the Gomondwane thickets, along the Timbavati river and in the Nyandu bush on the eastern boundary north of Shingwedzi" (Pienaar, 1963). Due to reintroductions of Black Rhino having taken place mostly in the south of the KNP no Black Rhino currently exist in the locality last mentioned by Pienaar. The current stronghold in KNP, however, is indeed in the area between the Crocodile and Sabie rivers in the Nwatimhiri and Gomondwane areas (Anon, 1999). This vegetation has been described as an *Acacia nigrescens/Combretum apiculatum* association (Gertenbach, 1983) and bears a marked resemblance in species composition to some parts of the Ngala traversing area (see: Roche, 2000d).

Diet and Midden Significance

Records of plant species and feeding were obtained in a similar fashion to other studies (Goddard, 1968, 1970, Mukinya, 1977, Oloo et al, 1994, Joubert, 1996) where observations were made when following tracks of the animal on foot. Browsing heights were between 50cm and 140cm with the characteristic '45 degree clip' of the Black Rhino being distinctive. While only 11 plant species were recorded in this study, 41 plant species recorded in the diet of this Black Rhino subspecies *(Diceros bicornis minor)* elsewhere in South Africa are known to occur in the southern Timbavati (Roche, 2000b: this does not include plants common to the diet of *D.b.bicornis* in Namibia, or that of *D.b. michaeli* in East Africa). There is likely to be some seasonal variation in diet similar to that noted elsewhere where forbs comprised a large component in the wet season (see for example: Joubert, 1996), but this was not noted at Ngala. Grass was recorded as eaten once in the wet season (Carmen van den Berg, pers comm.) and, as observed elsewhere (Goddard, 1968), is not likely to make up a significant portion of the diet.

Figure 1 : Identikit of Male Black Rhino at Ngala



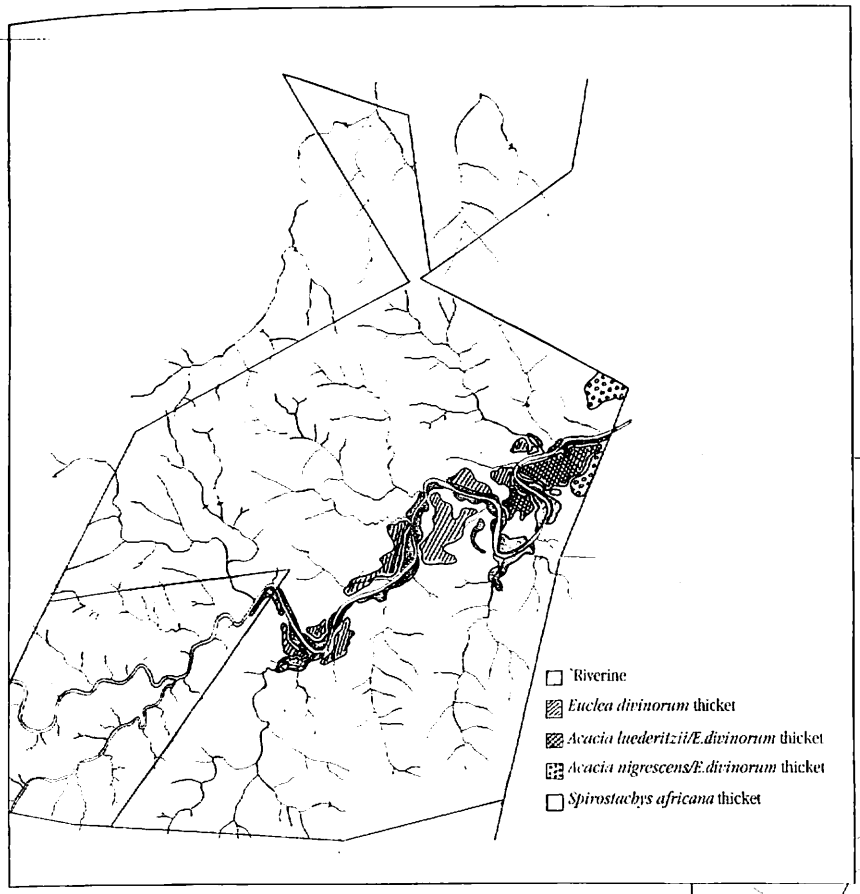


Figure 3: Habitat types in the core range of a Black Rhino bull

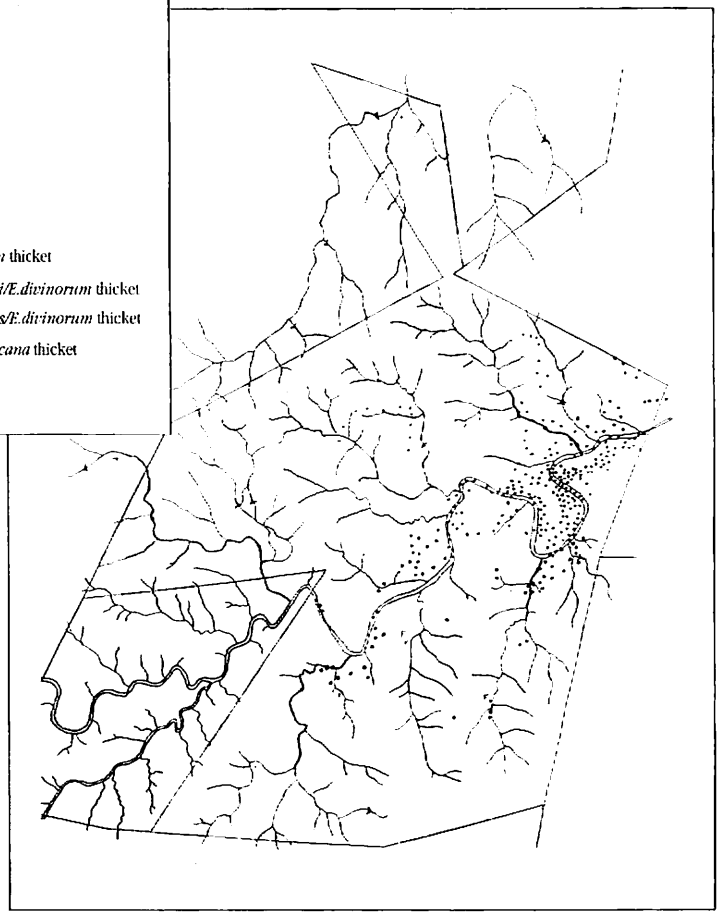


Figure 2: Sightings of a Black Rhino bull on Ngala, November 1999 to November 2000

Table 1 : Plant species recorded in the diet, or as midden sites, of a Black Rhino bull at Ngala, November 1999-November 2000

Plant Species	Rec. Ngala	No.as Mid.site at Ngala	Rec. Elsewhere
DIET			
Acacia luederitzii	Y	-	Y - Hluhluwe/Umfolozi
Acacia nigrescens	Y	-	Y - Hluhluwe/Umfolozi
Colophospermum mopane	Y	2	Y - Etosha
Dalbergia melanoxylon	Y	-	N
Lonchocarpus capassa	Y	1	N
Spirostachys africana	Y	1	Y - Hluhluwe/Umfolozi/Waterberg
Ozoroa paniculosa	Y	-	Y - Hluhluwe
Berchemia zeyberi	Y	-	Y - Hluhluwe/Umfolozi
Abutilon angulatum	Y	1	N
Strychnos madagascariensis	Y	-	Y - Waterberg
Argemone ochroleuca	Y	-	N
MIDDEN SITES			
Mundelea sericea		1	Y - Waterberg
Ormocarpum trichocarpum		1	Y - Hluhluwe
Combretum imberbe		1	N
Combretum hereroense		9	N
Euclea divinorum		12	Y - Hluhluwe/Laikipia
Euclea natalensis		1	N
Solanum panduriforme		1	Y - Hluhluwe
Gymnosporia senegalensis		1	Y - Hluhluwe
Terminalia sericea		2	
Unidentified forb		1	

RD = recorded in diet; Y = yes; N = no

No data on proportionate make up of the diet was gathered, of interest, however, were the recorded midden sites. Dung was crushed against smaller trees and bushes as well as over small clumps of forbs and on White Rhino middens. Black Rhino dung middens in East Africa have been described as being placed at random (Kingdon, 1979; Estes, 1991) but the importance of dung in olfactory communication in both African rhino species leads one to believe that the placement of middens cannot be coincidental. This is supported by the repeated use of only a few plant species as midden sites. By far the majority of midden sites recorded were against just two species, *Euclea divinorum* and *Combretum hereroense*, and this again seems to rule against coincidence as a factor in midden placement. As is evident from Table 1, most of the plant species recorded in midden sites have been recorded in the diet of Black Rhino, either at Ngala or in the previously mentioned study areas, and it would seem logical to assert that, in this study, food plants were important in the placement of Black Rhino middens. This hypothesis does not assert that Black Rhino proclaim 'ownership' of food plants by dung marking against them, only that potential communication between Black Rhino with overlapping ranges would be heightened by marking against plants that are likely to attract black rhino attention for reasons other than communication. The same logic would hold for the midden sites recorded on top of White Rhino middens, as well as for the midden recorded against a dead

Combretum imberbe which was positioned next to a favoured wallow (the *Euclea natalensis* midden site included *E. divinorum* and might have been marked only in association).

Discussion

The area along the Timbavati River, its larger tributaries and the thornveld habitat to the south of it represents good Black Rhino habitat. Favoured areas within the home range of the study animal included mature riverine forest and thicket, *Acacia luederitzii/Euclea divinorum* thicket, *Euclea divinorum* thicket, *Acacia nigrescens/Euclea divinorum* thicket and *Spirostachys africana* thicket. This preference separated this animal from the local White Rhino population for whom these were highly rejected areas. Diet composition follows trends from other areas within South Africa with plants of the Mimosaceae and Fabaceae families featuring strongly in the diet. It also appears as if midden sites might point towards plant species utilisation in Black Rhino diet.

Acknowledgments

Thank you to Errol Pietersen for shared information as well as all rangers and trackers at Ngala who provided information on the study animal, and in particular Elvis Kubayi who always had the energy to track this bull.

References

Adcock, K. 1994. The relevance of 'territorial' behaviour in black rhino to their population management. In: Penzhorn, B.L. & Kriek, N.P.J (Eds), 1994. *Proceedings of a Symposium on Rhinos as Game Ranch Animals.* Wildlife Group of the South African Veterinary Association, Onderstepoort.

Anon, 1999. Rare Game Survey - May 1999, unpublished figures.

Emslie, R.H. & Adcock, K. 1994. Feeding ecology of black rhinos. In: Penzhorn, B.L. & Kriek, NPJ (Eds), 1994 *Proceedings of a symposium on rhinos as game ranch animals.* Wildlife Group of the South African Veterinary Association, Onderstepoort.

Estes, R.D. 1991. *The Behaviour Guide to African Mammals.* University of California Press, California.

Gertenbach, W.P.D. 1983. Landscapes of the Kruger National Park. *Koedoe* 26:9-121.

Goddard, J. 1968. Food preferences of two black rhinoceros populations. *East African Wildlife Journal* 6:1-18.

Goddard, J. 1970. Food preference of the black rhinoceros in Tsavo National Park. *East African Wildlife Journal* 8:145-161.

Hitchins, P.M. 1968. Records of plants eaten by mammals in the Hluhluwe Game Reserve, Zululand. *Lammergeyer* 8:31-39.

Hitchins, P.M. 1969. Influence of vegetation types on home ranges of black rhinoceros in Hluhluwe Game Reserve, Zululand. *Lammergeyer* 10:81-86.

Joubert, J. 1996. On the clover trail: the plight of the world's rhinos.

Kingdon, J. 1979. *East African Mammals: an Atlas of Evolution in Africa*, Volume 3(B), Academic Press, London.

Mukinya, J.G. 1977. Feeding and drinking habits of the black rhinoceros in Masai Mara Game Reserve," *East African Wildlife Journal* 15:125-138.

Oloo, T.W., R. Brett & T.P. Young, 1994. Seasonal variation in the feeding ecology of black rhinoceros (Diceros bicornis L) in Laikipia, Kenya, *African Journal of Ecology* 32:142-157.

Pienaar, U de V. 1963. The large mammals of the Kruger National Park: their distribution and present day status," *Koedoe* 6:1-37.

Roche, C. 2000a. Ngala - Environmental review 1999. *Ecological Journal* 2:104, CC Africa, Benmore.

Roche, C. 2000b. Black rhino *(Diceros bicornis minor)* reintroduction to the southern Timbavati: a real contribution to African conservation. unpublished proposal.

Roche, C. 2000c. Notes on Territory and Home Range Size of the White Rhinoceros in the Southern Timbavati. *Ecological Journal* 2:130-133, CC Africa, Benmore.

Roche, C. 2000d. An Introduction to the Geology and Vegetation Types of Ngala. *Ecological Journal* 2:110-113, CC Africa, Benmore.

Skinner, J. & Smithers, R.H.N. 1990. *Mammals of the Southern African Subregion.* Univ. of Pretoria, Pretoria

Walker, C. 1994. Black Rhino on Private Land - the experience of Lapalala Wilderness, South Africa. In: Penzhorn, B.L & Kriek, NPJ (Eds.), 1994. Proceedings of a Symposium on Rhinos as game ranch animals, wildlife Group of the South African Veterinary Association, Onderstepoort.