

THE RELEVANCE OF "TERRITORIAL" BEHAVIOUR IN BLACK RHINO TO THEIR POPULATION MANAGEMENT

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Territorial behaviour is indicated by the repulsion of competing conspecifics from an area occupied by one individual, through overt defence or advertisement⁶.

Territorial black and white rhino males show aggression to other rhino which are not tolerated, and chase them away. The clarity of the territorial boundaries is uncertain, but territories are marked by spray urination, foot scraping and defaecation on accumulated dung piles. These probably define a core area within a wider home range where territorial defence is less rigorous, but still not absent in black rhino. Because of this fuzziness, we will refer to rhino "ranges" in this paper.

"Territorial" behaviour is of relevance to rhino population management, because it sets a limit to the numbers of competing rhino (mainly males) that can co-exist in a given reserve. When these numbers are exceeded, rhino social pressures escalate (mainly among males, but possibly also among females), leading to fighting, injuries and rhino deaths.

(The information here relates to mainly *D.b.minor*; *D.b.bicornis* the desert-adapted rhino, show different tolerance behaviours.)

RHINO TOLERANCE AND COMPETITION

Males

Information from Pilanesberg and other areas indicates that at the age of *ca* 10 years, male black rhino become suitably big, mature and pushy to start establishing a territory for themselves. Up to this stage, they are to a greater or lesser extent tolerated by established bulls, but run a serious risk of being killed or injured by these bulls if they are not suitably subordinate or careful.

The mothers of young bulls (from 1,5 to *ca* 7 years old) can play an important role in shielding their sons from the aggression of the big bulls. In Pilanesberg, young bulls in areas surrounded by established bull ranges have close ties with their mother until 6-8 years of age. Those in areas which have few established bull ranges around them start to break away from their mother at 2-4 years.

When a young bull does try to establish himself in a territory, he either has to do so in an unoccupied area, or fight another bull to win some turf. In Pilanesberg, such "upstarts" have little hope of winning a territory off a prime-aged bull (*ca* 17-30 years old), but can drive out or kill older bulls who are on the decline physically. Old bulls, if not killed, will move out to a quiet part of their former range and live a fringe existence (in terms of rhino social life) until they die.

Females

Female rhino are largely tolerated in males' and each other's ranges. A significant number of females are killed by fighting injuries however. Old female black rhino seem to be particularly prone to sustaining injuries to their rear ends. This seems to indicate that they are not being tolerated; but

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whether this is because of their reluctance to mate with males, or whether other male or female rhino are exhibiting dominance over these grannies, is unknown.

There is some indication that sub-adult females do not have it all their own way either. Firstly, Pilanesberg information shows that female calves break from their mothers at 2-4 years, and tend to spend the next 3-4 years wandering far and wide before settling into a home range and calving.

Secondly, young females are not often killed, but some seem to be pushed to the periphery (socially speaking) and are the butt of some aggression. (One Pilanesberg female died at 10 years without having bred, after lurking around the perimeter of the park as a loner; while another sustained a rump wound and a floppy ear and sticks to another peripheral range).

RHINO INTRODUCTIONS

Territorial behaviour is an issue during the introduction of rhino into established populations. In the initial phase of introduction of rhino to a reserve, all rhino are equally disoriented; dominance patterns are not yet established; and there is plenty of space for all. In Pilanesberg, for example, the initial introduction of 19 animals took 3 years, and no animals were lost until 4 years after this. (Some of the later male arrivals did get pushed around a bit, though, and social disruption does occur with later arrivals).

Rhino introduced into areas where the first-phase animals are well established, are at great risk of injury and death. Young males stand little chance of survival (as happened in Pilanesberg, Andries Vosloo), and even females can be killed because they are unknown to the established rhino (as happened in Andries Vosloo).

Special precautions should be taken, such as temporarily fencing in the new rhino until they settle down; and or boma'ing the rhino for a while and spreading their dung in their new area to familiarize their scent with established rhino, and make them feel "at home" on their release.

RANGE CHARACTERISTICS

The overall size and shape of rhino ranges is determined by the quality, quantity and distribution of food and water resources; and to a lesser extent the ranges of potential mates and competing animals. The ranges of dominant bulls therefore resembles jig-saw pieces over the resources of the reserve, and the number that result is partly a matter of geometry. Thus the number of dominant males that can be carried is not only related to the park's carrying capacity (CC), and is usually less than might be anticipated from overall CC estimates.

Areas far away (ca 10km in Pilanesberg) from permanent water will not become regular territories, although they may be used during the wet season. A highly clumped or limited water distribution will thus limit the number of territories and rhino in a reserve. Table 1 shows some estimates of range size for males in different parts of Africa. Figure 1 shows dominant male rhino range patterns in Pilanesberg from 1984-89, after introductions.

MANAGEMENT

Because territorial behaviour leads to injuries and deaths, good rhino management (aimed at maximum yield) should take careful account of population age structure and distribution, and especially male rhino behaviour.

Young, maturing bulls that are surplus to the jig-saw of territories, and that could cause disruptions, may need to be removed. Removing prime breeding males (territory holders) is more disruptive to breeding, as the replacement male will take time to settle and win over the female rhino for mating. Ageing prime males could however be removed to make room for young bulls (new blood).

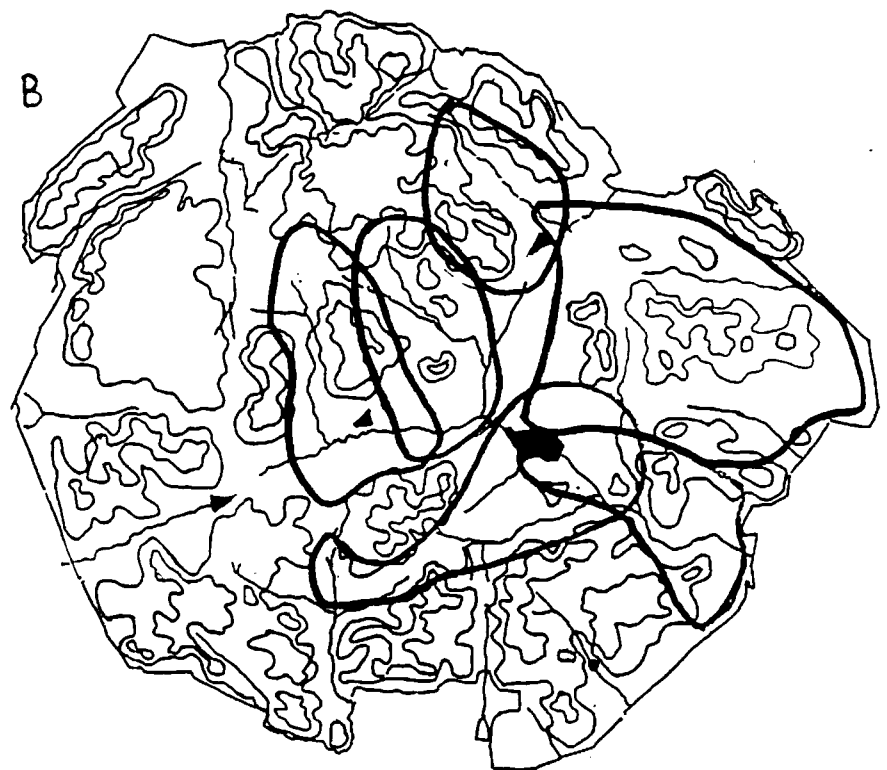
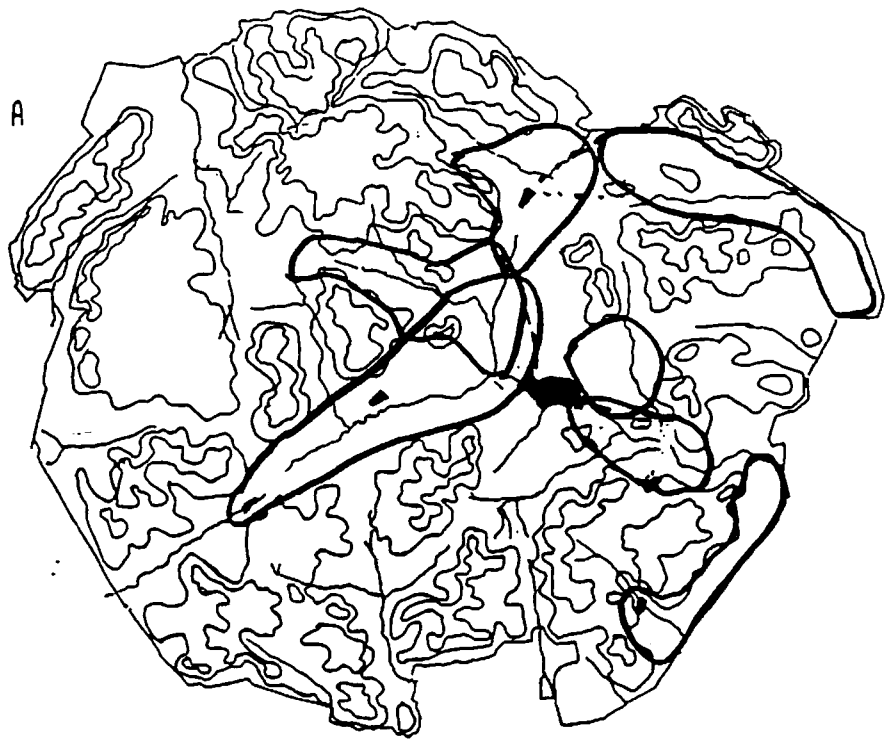


Figure 1: Dominant male black rhino range patterns in Pilianesberg after introductions (A: 1984; B: 1989)

Table 1: Range sizes of black rhino in different parts of Africa

LOCATION	RANGE SIZE (km ²)	REFERENCE
Masai Mara	5,6 - 22,7	Mukinya ²²
Serengeti	88 - 133	Frame ¹¹
Laikipia	15 - 70 (♂♂)	Brett ²
Ndumu	8,3 - 13,8	Goodman & Conway ¹³
Pilanesberg	16 - 60 (♀♀)	Adcock ¹
Pilanesberg	13,9 - 40,9 (♂♂)	Adcock ¹
Hluhluwe*	1,7 - 4,2	Hitchins ¹⁷
Andries Vosloo	0,5 - 2,0	Fike ⁹

* NB: this was in the 1960's when carrying capacity was much greater due to rhino food vegetation's ideal size structure and density

Females do seem less prone to injury or death through fighting-related high levels of social pressure. Usually such incidents are related to defence of their calves and/or failed courtship behaviour. However, such incidents should be carefully diagnosed, because they could imply that the population is nearing capacity for the habitat and territory conditions prevailing. Again, monitoring of the age structure and distribution of the animals should assist in making removal decisions to alleviate the situation.

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