

Recruitment in a Small Black Rhino Population

Anthony Hall-Martin

Kruger National Park, P/Bag X402, Skukuza 1350, South Africa

INTRODUCTION

A population of black rhino of the Kenyan subspecies *Diceros bicornis michaeli* occurs in the Addo Elephant National Park of South Africa. Times animals (now a population of 17) are descended from four wild-caught Kenyan animals which were translocated in 1961 and 1962. The details of their introduction and initial management can be found in Hall-Martin and Penzhorn (1977). In late 1977 the park area available to these black rhino was enlarged to the present 8 596 ha. The rhino are free-ranging in this area which also supports populations of other large mammals (Table 1).

The population dynamics of this rhino group have been monitored and the observations are summarized below, since they have direct relevance to initiatives to build deli small rhino populations elsewhere.

MANAGEMENT

The animals are not handled in anyway. Routine management consists only of maintaining perennial water supplies and protection within the fenced area of the Park.

INTERFERENCE

During September 1977 a regrettable introduction of three bulls from Natal, of the subspecies *D. b. minor*, was made. One of these bulls had only one external ear. As this was thought to be due to a genetic condition (known from elsewhere in Africa — Goddard, 1969; Hitchins, this issue) the bull was immobilised and castrated in 1979. Later observations of the castrated bull attempting to mate with cows, and keeping other bulls away from them, led to him being shot. The other two *D. b. minor* bulls were removed in May 1981, in compliance with a resolution of the African Rhino Specialist Group of IUCN/SSC taken at its Kilaguni, Kenya meeting in 1980.

A further consequence of the decision of the National Parks Board of Trustees of South Africa to implement the SSC resolution was that three calves, possibly sired by Natal bulls, were removed from the Park in May 1983. These three animals were exchanged with the National Zoological Gardens in Pretoria for an adult cow of the subspecies *D. b. michaeli*. The transfer of this cow from a zoo to the wild was not successful and she died after three months at Addo.

The remaining animals, all pure *D. b. michaeli*, have been undisturbed since 1981 and their prospects for the future are good.

MONITORING

Because of the nature of the vegetation at Addo — which is a dense thicket of mainly evergreen and succulent shrubs and small trees (Hall-Martin, et al. 1982), in which visibility is limited, and access restricted to a few roads and elephant paths — it is difficult to keep records of the rhino. All animals were, therefore, darted in May 1977 when they were still held in a relatively small fenced paddock, and were marked by ear tags ('Lone Star' type) and had notches cut in their ears.

The tags lasted a few years and then fell out. The notches, however, have allowed observations of known individuals to continue. A helicopter census of the Park (now carried out annually) during which all rhino are identified and photographed, is the major means of recording data on the reproductive performance of the populations. When calves reach the age of 2-3 years, before they leave their mothers, they are darted and marked by ear notches. Three young animals were caught and marked in 1986 and more will be marked in 1987. The ultimate objective is to have all animals marked.

Figure 1. Map showing location of Addo Elephant National Park.

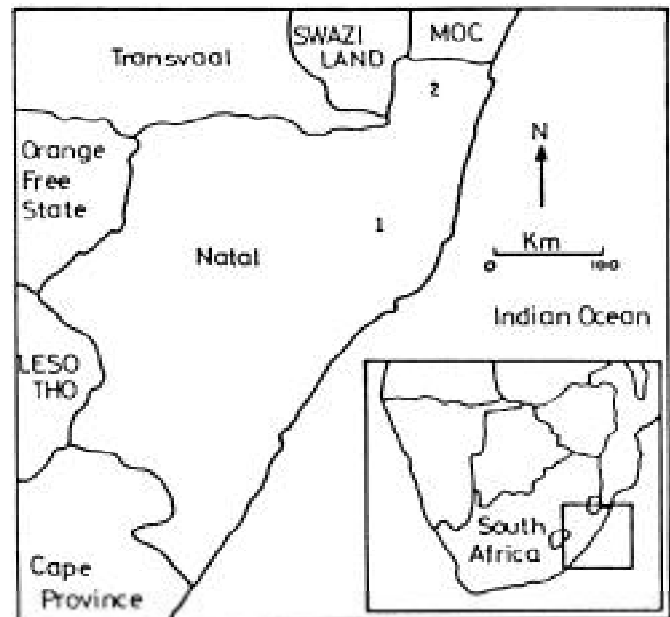


Table 1. The large mammals of the Addo Elephant N.P.

Species	Numbers					
	1978	1979	1981	1983	1985	1986
Elephant	92	102	108	116	117	118
Buffalo	247	269	75	120	42	52
BlackRhino	9	11	16	19	16	17
Kudu	152	203	192	493	361	361
Bushpig	22	38	26	23	11	3
Bushbuck	80	81	109	206	123	137
Duiker	193	384	392	489	194	238
Eland	119	138	52	37	49	54
Red Hartebest	26	27	27	24	23	26

REPRODUCTIVE PERFORMANCE

From the records which have been kept some data can be derived to assess the reproductive performance of the population:

a. Age at first calving

Six cows born in the Park have calved and the ages of first conception and calving are shown in Table 2.

Table 2. Ages of cows at first conception and calving

Cow	Age Conception	First Calving
Lucky Star	7 years 2 months	8 years 5 months
Doreen	6 years 9 months	8 years
Blom	9 years 1 month	10 years 4 months
Slattery	3 years 10 months	5 years 1 month
Ida	6 years 3 months	7 years 6 months
Vega	4 years 10 months	6 years 1 month

The ages at first calving are higher than those given in the literature for wild black rhino (Goddard, 1970) but of the order reported for captives (Mentis, 1972). The records for the first three cows given above (mean age at first calving 8 years 11 months) were derived from the period when the animals were living at an unnaturally high density and when only one adult bull, or no adult bull was available. The age at first calving for the second group of three cows is 6 years 3 months. Four adult bulls were available at the time when the first two of these cows conceived, and three when the third conceived. These latter records are, therefore, more likely to be representative of what may be expected from this population in the future.

b. Calving intervals

Intervals between successive calves have been recorded on 16 occasions. Records exist for seven cows (Table 3).

Table 3. Recorded calving intervals for cows in Addo Elephant N.P.

Cow	Calving interval (months)	Mean (months)
Brunni	27+32+52+34	36
Ida (Snr)	46+24	35
Doreen	33+28+33+58	38
LuckyStar	114 + 36	(75)
Blom	48	
Slattery	35	
Ida (Jnr)	39+28	33

Three of the four longest calving intervals (46,52 and 114 months) were associated with the initial period of poor conditions at Addo. The mean of the remaining 13 intervals is 35 months. If the two longest of these are regarded as unusually long, then the mean for the remaining 11 intervals is 32 months. This mean is closer to others recorded in the literature (Mentis, 1972) but nevertheless somewhat longer than the 27 months suggested for wild black rhinoceros (Goddard, 1967; Joubert and Eloff, 1971).

c. Sexual maturity of bulls

There is little evidence of the age of bulls at full 'sexual' maturity and first mating. One bull was killed by an older bull at the age of 8 years 5 months which suggests that he was regarded as a rival at that age. One successful mating, according to strong circumstantial evidence, occurred when another bull was 6 years old.

d. Observed rate of increase

For the purpose of this calculation the performance of the population at Addo from 1977 to 1986 was assessed. The hybrid animals (removed in 1983) were considered to be part of the population in the model, but the Natal bulls not. The population growth over the 9 years is described by the equation:

$$\log_e \text{ population} = 2.11 + 0.0917t \text{ (where } t \text{ is years)}$$

This observed rate of increase $r=0.0917$ (giving a finite rate of increase of 9.6% per annum) is slightly higher than the rate of 9.00/0 calculated for the Kruger National Park population (Hall-Martin, 1982), and is considerably higher than that of Hluhluwe Game Reserve in Natal (5.3%) (Hitchins and Anderson, 1983), or, historically, the 7.0% at Ngorongoro and 7.2% at Olduvai in Tanzania (Goddard, 1967). Other Natal populations such as Umfolozi have a higher rate of increase of 11.0% (Hitchins and Anderson, 1983).

e. Seasonality of conception

The records of 28 conceptions at Addo are shown diagrammatically relative to long term rainfall (Figure 3). There appears to be a clear spring to mid-summer peak in conception time.

FUTURE PROSPECTS

With the improvement in their circumstances it can be expected that the Addo black rhino population will increase at about 10% per annum. The carrying capacity for Addo has not yet been calculated. However, it would seem that a case could be made for the translocation of surplus black rhino from Addo within the next decade.

No firm decision has yet been taken on what could become of surplus animals from Addo. The demand for animals to found other populations in protected areas would most likely be regarded as sufficient justifi-



Figure 2. D.b.michaeli in Addo Elephant N.P. The skin on the sides of these animals appears more curregated than in Southern African sub-species.

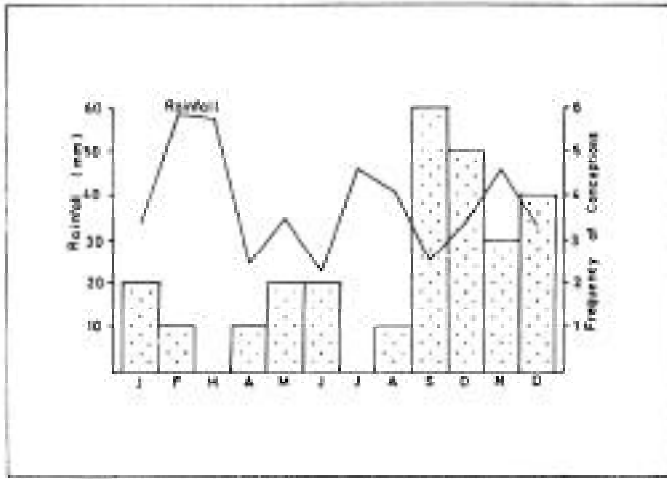


Figure 3. Frequency of conceptions of black rhino in the Addo Elephant National Park (1962-1984).

cation for removing black rhino from Addo. Enlargements to Addo, by the purchase of surrounding land, could ensure that a larger population, ultimately delivering more animals for translocation, could be maintained.

The National Parks Board of South Africa is now fully committed to an extensive black rhino conservation program. It may be the only organisation controlling viable populations of more than one subspecies of black rhino. It has the Addo population (*D. b. michaeli*) which currently numbers 17 animals, a population of 135 *D. b. minor* in the Kruger National Park and 5 *D. b. bicornis* in the Augrabies Falls National Park (this assumes that these animals are recognised as belonging to this subspecies as suggested by Hall-Martin, 1985). During 1987 a further group of 7 *D. b. bicornis* are due to be introduced to the Vaalbos National Park.

Any other available black rhino habitat in South African national parks will be stocked with either *D. b. bicornis* from Namibia or

D. b. minor from Natal or Kruger. The options of establishing a second *D. b. michaeli* population in a suitable protected area, or returning the surplus animals from Addo to Kenya and Tanzania at some future time remain to be explored.

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Earlessness in the Black Rhinoceros – A Warning

P.M. Hitchins

P.O. Box 8, Mfolozi, Zululand 3925, South Africa

Unilateral or bilateral earlessness (i.e. lack of pinnae) in the black rhinoceros has been recorded from a number of populations in eastern and southern Africa (Goddard, 1969; Hitchins and Anderson, 1983). These authors have attributed the condition to predation on black rhinoceros calves by spotted hyaena *Crocuta crocuta* whilst Goddard (1969) suggests that a genetic character, a sex influenced or sex-linked gene could also be responsible for a congenital deformity.

The black rhinoceros population in the Hluhluwe/Corridor/Umfolozu Game Reserve complex, has been monitored at various intervals between 1961 and 1985 by the author. Physical characteristics of all individuals seen were recorded over this period, which resulted in comprehensive data on missing ears and/or tails or parts of tails of various individuals. Prior to 1961 earlessness was first observed in early 1955 (N. Deare, pers. comm.) in the north of Hluhluwe Game Reserve: an adult female with its left pinna missing. Later during 1955 a male calf was born with both pinnae missing and with no external openings.

From 1955 to 1985 a total of 23 individuals in Hluhluwe Game Reserve amid Corridor showed the earless condition (one or both pinnae absent) and an additional 15 individuals had either a portion of the tail or the whole tail missing (Table 1; Figures 1, 2 and 3).

In the earless condition (n = 23), 21 animals were examined in the

Table 1. Number of black rhinoceros with missing ears and/or tails or portions of tails in Hluhluwe Game Reserve amid Corridor, 1955-1985.

Sex	One pinna absent	Both pinnae absent	One amid tail absent	One and portion of tail absent	Tail absent	Portion of tail absent
H LU H LUW E:						
Male	7	1	1	2	—	7
Female	3	2	—	—	3	3
Unsexed	1	—	1	—	—	—
CORRIDOR:						
Male	—	1	—	—	—	—
Female	2	1	—	1	—	2
TOTAL	13	5	2	3	3	12