TOOTH REPLACEMENT AND DENTITION OF THE BLACK RHINOCEROS (*DICEROS BICORNIS* LINN.)

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Within a collection of fifty-eight black rhinoceros skulls from the Hluhluwe Game Reserve, Zululand, a number of known-age specimens enabled the formulation of ageing criteria based on tooth replacement. Twenty-four of the specimens in the collection showed variation from the normal dental formula, three of these skulls possessing incisors in the lower jaw.

Skulls of known age were from calves whose approximate dates of birth had been noted, and whose mothers' characteristic horn shapes and ear-tears enabled their recognition. The specimen H 30, an animal seven years three months old, was born earless and hence easily recognisable.

The stages of tooth replacement in the mandible are shown in Table A.

TABLE A
Tooth eruption in the lower jaw of the Black Rhino.

Coll. No.	*Age*	*Premolars* 1	2	3	4	*Molars* 1	2	3
H101	Foetus	—	(D)	(D)	—	—	—	—
H100	± 3 months	(D)	(D)	(D)	(D)	—	—	—
H.40	9 months	(D)	D	D	(D)	(P)	—	—
H.11	14 months	D	D	D	D	(P)	(P)	—
H.34	16 months	D	D	D	D	(P)	(P)	—
H.22	18 months	(P)	D	D	P	P	(P)	—
H.46	20 months	P	D	D	P	P	(P)	—
H.47	± 2 years	P	(P)	(P)	P	P	(P)	—
H.18	1 m.m.	P	P	P	P	P	(P)	—
H.39	1 m.m.	P	P	P	P	P	P	(P)
H.30	7 yrs. 3 mths.	P	P	P	P	P	P	P
H.35	Mature	P	P	P	P			

D — Milk or deciduous tooth
P — Adult or permanent tooth
Brackets indicate tooth in process of eruption.

From this sample it can be seen that at approximately three months of age, all the premolars are in the process of eruption. The second and third premolars are more advanced than the other two. By nine months of age the first molar has begun to erupt, this tooth has fully developed by eighteen months by which time the first permanent premolar and the second molar are erupting.

The remaining milk premolars are replaced at about two years of age. By seven years of age the third molar has almost completely erupted, the remaining teeth being fully developed.

TABLE B
Black Rhino Skull and Mandibular Tooth Measurements
(Measurement in millimetres.)

Note:
D — Milk or deciduous tooth
P — Adult or permanent tooth
Brackets indicate tooth in the process of erupting
a — tooth absent

No.	*Sex*	*Age*	*Greatest length*	*Condylo-basal*	*Zygomatic width*	*Post-Orbital Constr'ion*	*Lambloid width*	*Nasal length*	*Nasal width*	*Mandible length*	$P_1.L$	$P_2.L$	$P_3.L$	$P_4.L$	$M_1.L$	$M_2.L$	$M_3.L$	P_2-M_3
H101	—	Foetus	—	107	68	53	49	62	151	—	(D)	(D)	—	—	—	—	—	—
H100	♀	±3m	243	243	145	77	62	62	75	—	(D)	(D)	(D)	(D)	—	—	—	—
H888	—	±3m	—	—	—	—	—	—	—	208	—	(D)	(D)	(D)	—	—	—	—
H.40	♀	9m	—	—	—	—	—	—	—	263	(D)	35	43	(D)	(P)	—	—	—
H.11	♂	14m	442	423	261	93	142	138	121	341	25	45	52	61	(P)	(P)	—	—
H.34	♀	16m	—	—	260	94	—	141	118	349	20	31	43	44	(P)	(P)	—	—
H.22	♂	18m	524	494	298	102	161	161	150	413	(P)	30	39	44	49	(P)	—	—
H.46	♀	20m	415	395	247	99	124	115	124	356	24	40	46	52	48	(P)	—	—
H.47	♂	±2y	462	453	261	92	140	153	122	386	22	(P)	(P)	56	59	(P)	—	—
H.18	♂	imm.	—	—	276	92	150	171	138	384	25	41	48	58	56	(P)	(P)	—
H.39	♂	—	451	440	269	96	138	156	130	355	23	38	48	55	53	(P)	(P)	—
H.30	♂	7y3m	—	—	322	114	—	184	170	448	21	38	50	53	59	67	(P)	—
H.35	—	mat	589	555	331	118	178	181	183	465	22	38	48	48	59	60	47	257
H.37	♂	,,	570	542	318	101	184	—	—	438	16	28	39	44	51	52	50	250
H.29	♂	,,	596	546	313	103	189	190	160	446	18	31	41	45	53	51	46	262
H. 8	♂	,,	571	529	317	105	184	186	170	445	a	29	40	44	53	50	46	265
H.16	♂	,,	616	—	334	120	205	188	186	467	a	29	39	44	50	49	46	251
H.27	♀	,,	576	537	338	105	192	190	180	460	a	28	35	41	47	51	47	241
H.19	♀	,,	557	535	317	110	185	—	—	435	a	32	42	43	50	53	42	266

m — months y — years

The measurements were taken as shown in Figures 1 and 2.

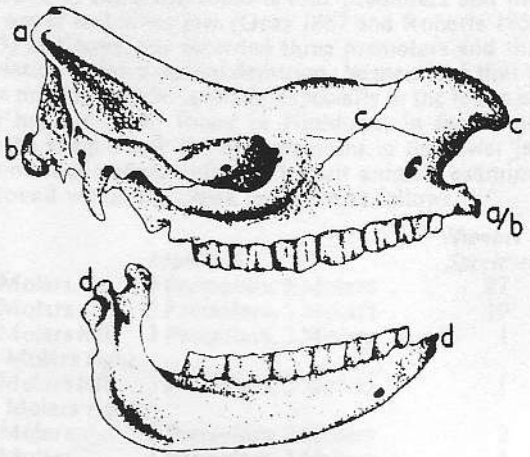

FIGURE 1
Lateral view of rhino skull, showing points between which measurements were taken.

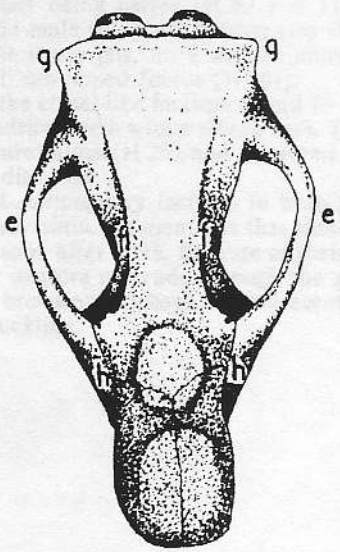

FIGURE 2
Dorsal view of rhino skull, showing points between which measurements were taken.

DENTITION

The basic dentition of the black rhino is four premolars and three molars in both upper and lower jaw. (Gray 1867 and Roberts 1951).

Ritchie (1963) in Kenya, has recorded three premolars and three molars as a variation to the standard dentition; he mentions that the first premolar is missing in older animals, especially in the lower jaw. This condition has also been found in Hluhluwe, in fact almost 40 per cent of the sample lack the first premolar in the lower jaw.

Of the fifty-one skulls of sub-adult and adult animals examined, the variations found within the cheek teeth are as follows:

Maxilla	*Mandible*	*Number of Specimens*
4 Premolars, 3 Molars .	4 Premolars, 3 Molars . .	27
4 Premolars, 3 Molars .	3 Premolars, 3 Molars . .	19
3 Premolars, 3 Molars left 4 Premolars, 3 Molars right	3 Premolars, 3 Molars . .	1
4 Premolars, 3 Molars left 3 Premolars, 3 Molars right	3 Premolars, 3 Molars . .	1
3 Premolars, 3 Molars .	3 Premolars, 3 Molars . .	2
3 Premolars, 3 Molars .	4 Premolars, 3 Molars . .	1

It can thus be seen that there is considerable variation from the standard formula within this sample.

Within the collection, three of the specimens have two pairs of lower incisors, two animals being calves (H 40 and H 888), the other a fourteen-month-old male (H 11). A further two skulls have one pair of incisors in the lower jaw, on a mature animal (H 29) and the other from a well developed foetus (H 101).

These incisors are not the chisel-like incisors found in the Asian rhino, but are simple cylindrical teeth with a closed root. The largest incisors were from the mature animal (H 29), and measured 22.7 mm. in length and 4.9 mm. in diameter.

Flower (1876) recorded rudimentary incisors in both jaws of a young black rhino from Abyssinia. He mentions that these incisors, if ever present, disappear soon after birth. Because of their size, it is highly unlikely that these incisors protrude through the gums, and certainly do not assist in browsing. Perhaps those present in calves could be of some use in suckling.

PLATE 1 Lateral view of skull of black rhino, to show dentition.

PLATE 2 Lower jaw of young black rhino, with two incisors on each side.

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