

CRANIOMETRICAL STUDY IN INDIAN ONE-HORNED RHINOCEROS (*RHINOCEROS UNICORNIS*)

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Key words: Craniometry, Indian one-horned rhinoceros

The information regarding the craniometry of carnivores and small ruminants had been published by Miller *et al.* (1979) and Borthakur *et al.* (1998). However, in large animals, specially in rhinoceros, the data is not available. Hence, the present investigation was designed to record the biometry of various skull parameters in one-horned rhinoceros (*Rhinoceros unicornis*) of Assam.

Three skulls of adult Indian one-horned rhinoceros irrespective of sex were collected from the Department of Anatomy & Histology, College of Veterinary Science, Guwahati. Subsequent to exsanguination, the skulls were macerated. Measurement of different skull, cranial, orbital, facial and mandibular parameters were recorded according to Miller *et al.* (1979) and Archana *et al.* (1998). The measurements were taken with Vernier callipers, thread and scale. The data was analysed according to Snedecor and Cochran (1967).

The mean (\pm SE) of craniometrical parameters of the skull of Indian one-horned rhinoceros are summarized in Table 1.

In order to determine the correlation between different parameters under study, simple

correlation co-efficients were computed. The parameters which were significantly correlated were then fitted into regression equation using the skull length and skull width (Table 2) as independent variable (X) and the other parameters of skull as the dependent variable (Y).

The skull length of Indian one-horned rhinoceros was 63.23 ± 0.15 cm, width 20.63 ± 0.18 cm and the cephalic index 32.63 ± 0.35 per cent indicating a longer head of rhinoceros as in cattle, and buffalo (Rao, 1967, Gupta and Sharma, 1990).

The cranial length varied linearly with the skull length. The cranial cavity length was significant ($P < 0.05$) with skull length and width. The findings were contrary to the findings of Gupta and Sharama (1990) and Gupta *et al.* (1991) in cattle and buffalo. The skull length and width were positively correlated with the orbital depth as also reported in cattle (Gupta and Sharma, 1990). The interorbital distance at caudal level was significant ($P < 0.05$) with skull length but had no effect on skull width. The mandibular length depended upon the skull width, while the skull length had no relationship with the length of mandible.

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Table 1
Mean (\pm S.E.) of craniometrical parameters of Indian one-horned rhinoceros

Parameters	Mean	SE
Skull measurements		
Length (cm)	63.23	0.15
Width (cm)	20.63	0.18
Index	32.63	0.35
Skull base length (cm)	61.33	0.43
Cranial (external measurements)		
Length (cm)	31.20	0.40
Width (cm)	16.50	0.29
Index 52.88	0.24	
Height 45.63	0.23	
Cranial cavity length (cm)	20.27	0.41
Foramen magnum measurements		
Length (cm)	5.60	0.17
Width (cm)	5.67	0.15
Orbital measurements		
Length (cm)	6.70	0.12
Width (cm)	6.70	0.15
Index	99.99	0.85
Depth (cm)	18.77	0.15
Inter orbital distance		
Anterior (cm)	16.65	7.15
Middle (cm)	20.70	0.12
Caudal (cm)	32.80	0.11
Facial measurements		
Length (cm)	33.23	0.15
Width (cm)	27.23	0.15
Index	81.95	0.07
Mandibular measurements		
Horizontal ramus length (cm)	53.77	0.14
Vertical ramus height upto condyle (cm)	26.50	0.29
Vertical ramus height up to coronoid process (cm)	27.70	0.12
Diastemal length (cm)	11.00	0.29
Maximum length of alveolar space (cm)	24.13	0.20
Width of body of mandible (cm)	3.40	0.29

Table 2
Simple regression equations for the prediction of parameters on the skull of Indian one-horned rhinoceros

S.No.	Predicted parameters (Y)	Known parameters X = skull length		Known parameters X=skull width	
		Correlation coefficient	Regression equation	Correlation coefficient	Regression equation
1.	Skull width	1.00	$Y = (97.1214 - 1.2096X)^*$		
2.	Skull index	0.99	$Y = (185.3650 - 2.4154X)$		
3.	Skull base length	0.98	$Y = (242.2780 - 2.8615X)$	0.99	$Y = (11.9752 + 2.3922X)$
4.	Cranial length (Ext.)	0.99	$Y = (-143.1782 + 2.7577X)$	-	-
5.	Cranial cavity length (Int.)	1.00	$Y = (197.9281 - 2.8096X)^*$	1.00	$Y = (27.6081 + 2.3203X)^*$
6.	Orbital depth	1.00	$Y = (81.7568 - 0.9962X)^*$	1.00	$Y = (1.8150 + 0.8216X)^*$
7.	Orbital index	0.39	$Y = (242.9903 - 2.2615X)$	-	-
8.	Interorbital distance (middle)	0.99	$Y = (70.4355 - 0.7865X)$	0.98	$Y = (7.4299 + 0.6431X)$
9.	Interorbital distance (caudal)	1.00	$Y = (82.9002 - 0.7923X)^*$	0.98	$Y = (19.5569 + 0.6418X)$
10.	Horizontal ramus length			1.00	$Y = (36.8015 + 0.8222X)^*$
11.	Length of alveolar space			0.96	$Y = (1.2748 + 1.1078X)$

* P < 0.05

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