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HAEMATOLOGY OF *VARANUS BENGALENSIS* IN RELATION TO BODY WEIGHT

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In *Varanus bengalensis* RBC count, Hb content, PCV %, WBC and thrombocyte counts are positively correlated whereas ESR is negatively correlated with body weight in both the sexes. The increase in male and female with respect to RBC number (b=0.1983 and 0.1794), PCV% (b=0.1954 and 0.1683), WBC count (b=0.3858 and 0.3076) and thrombocyte count (b=0.3553 and 0.3344) per gram body weight are higher in males than in females whereas the increase in Hb content in females is higher than males (b=0.0431 and 0.0565). The ESR in males decreases at higher rate than in females (b= -0.1463 and -0.1133). The average RBC count × 10^6/mm^3 (m=0.91; f=0.85), Hb in g/100 ml (m=11.65; f=11.12), PCV% (m=27.15%, f=25.26%) WBC count × 10^3/mm^3 (m=9.34; f=8.81) and thrombocyte count × 10^3/mm^3 (m=9.86; f=9.59) are higher in males but ESR in mm/ in females (m=4.79; f=5.39).

INTRODUCTION

The erythrocyte size with relation to body weight in reptiles has been studied by few workers (Brown, 1971; Frair, 1977; Verma, 1978; Banerjee & Mishra, 1982). Variations in different blood parameters in different reptiles have been reported by Baker & Kline (1932), Hutton (1961), Duguy (1970), Choubey & Singh (1977), Hota (1977) and Verma & Banerjee (1981). This paper reports on the changes in different blood parameters in *Varanus bengalensis* in relation to different body weight groups.

MATERIAL AND METHODS

Two hundred *Varanus bengalensis* of different size were procured from

local catchers during April/May 1983 for the present study. There were 10 groups (A—J) according to their increasing body weight In each group to individuals were considered. The average weight of each group with standard error (± s. e) were as follows :

Group	Average body weight in g ± s. e.	
	Male	Female
A	288.4 ± 2.63	276.7 ± 1.54
B	366.4 ± 1.56	355.5 ± 1.37
C	402.8 ± 1.26	403.3 ± 1.20
D	574.5 ± 0.70	595 4 ± 1.70
E	710.2 ± 1.80	697.6 ± 1.18
F	778 0 ± 0.77	767 7 ± 1.00
G	800 0 ± 1.30	821.3 ± 0 80
H	850.0 ± 2.16	850.0 ± 1.06
I	902.3 ± 1.95	890 0 ± 2 00
J	950.0 ± 2.00	920.6 ± 1.36

Cardiac blood was used for the present study and the methods as given by Dacie & Lewis (1975). The co-efficient of regression (slope = b) and correlation (r) were calculated to establish the relation between the blood parameters and the body weight.

RESULTS AND DISCUSSION

The RBC count, Hb content, packed cell volume (PCV), erythrocyte sedimentation rate (ESR) are given in Table I, WBC and thrombocyte counts in Table II and co-efficient of correlation (r) and equation of these blood parameters with relation to body weight are given in Table III.

Frair (1977) recorded low red cell count in sea turtles with longer lengths of upper shell. Verma & Banerjee (1981) did not find a definite increase

Table I. Some haematological values in male (m) and female (f) *Varanus bengalensis* of different body weight groups. (Each value is mean of 10 observations; ± = Standard Error)

Group	Sex	RBC no × 10^6 /mm^3	Hb in g/100 ml	PCV %	ESR in mm/hr
A	m	0 65 ± 0.01	10.24 ± 0.11	20.2 ± 0.62	5 95 ± 0.18
	f	0.65 ± 0.01	10.00 ± 0.20	22.1 ± 0.55	6.15 ± 0.13
B	m	0 69 ± 0.01	10.40 ± 0.12	22.5 ± 0.43	5.15 ± 0.22
	f	0,76 ± 0.01	10.22 ± 0.11	22.4 ± 0.42	555 ± 0.20
C	m	0.93 ± 0.01	13.90 ± 0 07	28.0 ± 0.49	4.55 ± 0.16
	f	0.95 ± 0.01	11.34 ± 0.11	22.6 ± 0.50	5.50 ± 0.14
D	m	1.09 ± 0.02	13.42 ± 0.15	33.4 ± 0.76	4.50 ± 0.12
	f	0.99 ± 0.01	11.72 ± 0.14	23.8 ± 0.66	5.50 ± 0.14
E	m	0.99 ± 0.01	12.70 ± 0.10	30.0 ± 0.67	4.85 ± 0.15
	f	0.99 ± 0.01	12.90 ± 0.07	28.4 ± 0.58	5.25 ± 0.20

F	m	0.96 ± 0.02	11.70 ± 0.17	28.4 ± 0.58	4.60 ± 0.18
	f	0.95 ± 0.01	12.10 ± 0.14	30.2 ± 0.55	5.05 ± 0.12
G	m	0.96 ± 0.01	11.60 ± 0.16	28.2 ± 0.40	4.15 ± 0.13
	f	0.91 ± 0.17	11.80 ± 0.11	27.8 ± 0.47	5.10 ± 0.14
H	m	0.94 ± 0.01	11.20 ± 0.20	28.0 ± 0.70	4.50 ± 0.10
	f	0.89 ± 0.02	10.74 ± 0.12	27.1 ± 0.55	5.05 ± 0.12
I	m	0.95 ± 0.01	11.38 ± 0.17	27.5 ± 0.40	4.10 ± 0.12
	f	0.85 ± 0.01	10.40 ± 0.10	26.2 ± 0.51	5.10 ± 0.12
J	m	0.89 ± 0.02	10.96 ± 0.18	25.3 ± 0.76	5.60 ± 0.20
	f	0.78 ± 0.01	10.00 ± 0.16	22.0 ± 0.60	5.65 ± 0.17
Mean	m	0.91 ± 0.04	11.65 ± 0.34	27.1 ± 1.18	4.79 ± 0.18
	f	0.85 ± 0.05	11.12 ± 0.32	25.2 ± 0.96	5.39 ± 0.10

Table II. Average WBC and thrombocyte number in different body weight of *Varanus bengalensis*.
(All values are mean of 10 observations; ± = Standard Error)

Group	WBC no × $10^3/mm^3$		Thrombocyte no × $10^3/mm^0$	
	male	female	male	female
A	7.18 ± 0.39	6.74 ± 0.41	7.80 ± 0.24	7.66 ± 0.29
B	7.13 ± 0.14	7.15 ± 0.28	7.76 ± 0 25	7.50 ± 0.18
C	8.19 ± 0.34	8.10 ± 0.25	8.18 ± 0.26	8.26 ± 0.19
D	8.16 ± 0.30	8.37 ± 0.35	9.38 ± 0.14	9 30 ± 0.17
E	9.16 ± 0.23	8.92 ± 0.22	9.86 ± 0.34	8.90 ± 0.30
F	9.65 ± 0.23	9.44 ± 0.37	10.34 ± 0.22	10 30 ± 0.18
G	11.68 ± 0.51	10.68 ± 0.38	11.76 ± 0.69	11 20 ± 0 28
H	11.27 ± 0.27	10.25 ± 0.33	11.66 ± 0.15	11.70 ± 0 14
I	10 82 ± 0.27	10.42 ± 0.31	10.04 ± 0 19	10.42 ± 0.19
J	10 20 ± 0,11	9.00 ± 0.14	10.72 ± 0.06	10.63 ± 0.35
Mean	9.34 ± 0.52	8.81 ± 0.40	9 85 ± 0.04	9.59 ± 0.47

or decrease in RBC number in *Trionyx gangeticus*. Similar was the state of affairs in *Varanus* but it was true that in both the sexes the number increased with body weight and the rate was higher in males than in females (Table III)

Table III. Coefficient correlation(r) and equation showing the relation between different blood parameters and body weight groups in *Varanus bengalensis*.

Parameters analysed Body weight (W) Vs.	Sex	Equation	'r'
RBC count	m	$\log Y = -0.6013 + 0\ 1983 \log W$ $Y = 0.2504.10^{6}\ W^{0\ 1983}$	0.5201
	f	$Y = -0.5691 + 0\ 1794 \log W$ $Y = 0.2697.10^{6}.W^{0\ 1794}$	0.5712
Hb content	m	$\log Y = 0.9443 + 0.431 \log W$ $Y = 0.7966.W^{0\ 0431}$	0 2001
	f	$\log Y = 0\ 8968 + 0.0565 \log W$ $Y = 7.7054\ W^{0\ 0565}$	0.2763
PCV %	m	$\log Y = 0.8848 + 0.1954 \log W$ $Y = 7\ 6706.W^{0\ 1954}$	0.5728
	f	$\log Y = 0.9304 + 0.1683 \log W$ $Y = 8\ 5192.W^{0\cdot 1683}$	0 6084
ESR	m	$\log Y = 1.0859 - 0\ 1463 \log W$ $Y = 12.1870.W^{-0\ 1463}$	-0.5085
	f	$\log Y = 1.0463 - 0.1133 \log W$ $Y = 11.1249.W^{-0\ 1133}$	-0.7660
WBC count	m	$\log Y = -0.1120 + 0.3858 \log W$ $Y = 1.2943.10^{3}.W^{0\cdot 3858}$	0 90. 8
	f	$\log Y = 0.0836 + 0\ 3076 \log W$ $Y = 1.212\ .10^{3}.W.^{0\ 3076}$	0.9019
Thrombocyte count	m	$\log Y = -0.0026 + 0.3553 \log W$ $Y = 0.9941.10^{3}.W^{0}.^{3553}$	0.8341
	f	$\log Y = 0.0452 + 0\ 3344 \log W$ $Y = 1.1098.10^{3}.W^{0\ 3344}$	0.9093

which may be accounted for higher average RBC number in males as was recorded in other reptiles by Pienaar (1962) and Duguy (1970).

Hutton (1961) found no significant variation in Hb content with body weight in *Pseudemys scripts olegans* but in the present study we observed higher rate of increase in females than in males (Table III) although the values increased upto a certain weight (Groups D and E) and then recorded a decreasing trend. Haemoglobin remains packed in the cytoplasm of the erythrocytes and so for increased Hb content the RBC number should also increase which was found true in the present study. Again the higher rate of increase in females should give higher RBC number in females than males which was not found in this study. It is thus accounted that the larger erythrocytes of females (Banerjee & Mishra, 1982) must have accomodated the increased Hb molecules.

Several authors have reported increase in PCV% in different reptiles with size (Choubey & Singh, 1977; Frair, 1977; Verma & Banerjee, 1 81). In *Varanus* the PCV% increase in males at higher rate like RBC number which gave significant higher average PCV% in males than in females.

The ESR has been found to decrease at higher rate in males (Table III) due to higher rate of increase in RBC count in males as ESR is negatively correlated with RBC count (Banerjee, 1968).

Leucocyte count has been reported to increase upto a certain body weight in *Calotes versicolor* (Hota, 1977) and in *Natrix stoleta* (Choubey & Singh, 1977). Similar increasing trend has been observed in both the sexes of *Varanus*. It has further been recorded to increase at higher rate in males than in females and this may be accounted for significant higher average WBC number in males than in females. This is contrary to the findings of Pienaar (1962) and Hota (1977) who reported higher WBC number in some female reptiles. Thrombocyte count in *Varanus* increases at higher rate in males than in females and results higher average number in males.

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