



## HAEMATOLOGICAL PARAMETERS OF THE WILD CAUGHT EMBALLONURID BAT, *TAPHOZOUS KACHHENSIS* (DOBSON)

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### Abstract:

A study was carried out with the aim of establishing hematological parameters of a colony of Emballonurid bat, *taphozous kachhensis* in vidarbha region. Insectivorous bats play an essential role in keeping populations of night flying insects in balance but little is known about their basic physiology. Haematological parameters of an individual reflect the health status of that animal. Thus, the objective of this study is to investigate relationship between the reproductive status and statistical significant difference of haematological parameters in male and female microchiropteran insectivorous bat, *Taphozous kachhensis* during lactation phase. Haematological parameters determined were haemoglobin, packed cell volume (PCV), mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH), mean corpuscular haemoglobin concentration (MCHC), erythrocyte count, platelet count, total leukocyte count (TLC), differential leukocyte count (DLC) and erythrocyte sedimentation rate (ESR). High haemoglobin% and high number of erythrocytes with low mean corpuscular haemoglobin (MCH) suggests the high oxygen carrying capacity of blood in *Taphozous kachhensis*. No statistically significant differences were observed in the haematological parameters between male and female bats during lactation. The values from this study can be used to create baseline data of microchiropteran bat *Taphozous kachhensis* found in central India.

**Key words:** *Taphozous kachhensis*, lactation, Haematological parameters, microchiropteran bat

### INTRODUCTION

Bats comprise more than 20% of the mammalian species of the world. The study of the haematological parameters is of immense importance because these are the indicators of the physiological condition of an animal (Koopman *et al.*, 1995; Dawson and Bortolotti, 1997; Heard and Whittier 1997). Haematological parameters are affected by age, gender, reproductive phase, food availability and quality (Korine *et al.*, 1999; Smucny *et al.*, 2001; Hassimoto *et al.*, 2004; Asadi *et al.*, 2007 and Kinoti, 2008). Bats requires special physiological adaptations like high metabolic rate to meet the energy demands during flight. Thus objective of the study is to evaluate the values of haematological indices among normal male and lactating female of Emballonurid bat, *Taphozous kachhensis*. The results of the study may be used as reference values in the assessment of the health status of normal males and lactating females of *Taphozous kachhensis*.

### MATERIAL AND METHODS

The present study was conducted during August 2014, when female bats were in lactation phase. Identification of the animal was done using standard monograph (Bates and Harrison, 1997). The animals were captured with the help of mist net of the mesh size (10mm) from Ambai Nimbi, 45 kilometers from Bramhapuri (M.S.). After capturing the bats, males and female bats were separated and were brought to the laboratory. These

were anesthetized with ether and weighed on the electronic weighing balance. Blood samples from anesthetized bats were collected from the pectoral and subclavian veins in EDTA thoroughly mixed or double oxalated anticoagulated Eppendorf tube, without hurting the animal. All the specimens were released back to the nature after recovery from the anesthesia. Haematological parameters were determined by using auto analyzer. Raw data was analyzed to give mean, standard error and significance using Statistical Package for Social Sciences (SPSS 10.0).

### RESULTS

Body mass and haematological parameters of adult male and female *T. kachhensis* is shown in table 1. No significant differences were observed in haematological parameters and body mass of normal male and lactating female. However body mass of females was comparatively higher than the normal males. In lactating female mean values of haemoglobin%, packed cell volume, MCHC and RBC count were slightly lower than in the corresponding groups of adult males. However MCV, MCH, platelet count, total leucocyte count and erythrocyte sedimentation rate was higher in males. Differential leucocyte count revealed the low eosinophils and monocytes with high number of Polymorphonuclear neutrophils and moderately high number of lymphocytes. Basophils were not observed (Table. 2).

**Table 1. Body mass and haematological parameters of adult male and female *T. kachhensis*. Results presented as mean  $\pm$  SE. (n=10)**

Parameters	Male	Female
Body mass [gms]	38.49 $\pm$ 1.15	41.54 $\pm$ 1.07
Haemoglobin [gms/dl]	16.5 $\pm$ 0.23	15.4 $\pm$ 0.30
P.C.V [vol%]	52.82 $\pm$ 0.66	50.07 $\pm$ 0.68
Mean corpuscular volume (MCV) [fL]	45.41 $\pm$ 1.60	50.34 $\pm$ 1.42
Mean corpuscular haemoglobin (MCH) [Pg]	14.32 $\pm$ 0.59	15.59 $\pm$ 0.58
Mean corpuscular haemoglobin concentration (MCHC) [%]	31.38 $\pm$ 0.42	30.95 $\pm$ 0.71
Total RBCs [mill./cmm]	11.78 $\pm$ 0.49	10.01 $\pm$ 0.27
Platelet count cmm.	3.06 $\pm$ 0.09	3.086 $\pm$ 0.15
Total WBCs [mm <sup>3</sup> ]	7,175 $\pm$ 367	7,758 $\pm$ 281
Erythrocyte sedimentation rate (ESR) [mm]	9.03 $\pm$ 0.11	9.95 $\pm$ 0.16
RBC Morphology	Microcytic, normochromic	Microcytic, normochromic

**Table 2. Differential white blood cell (WBC) count (%) in *T. kachhensis*. Results presented as mean  $\pm$  SE. (n=10)**

Types of WBC's	Granulocytes			Agranulocytes	
	Neutrophils	Eosinophils	Basophils	Lymphocytes	Monocytes
Male	51.52 $\pm$ 1.60	1.2 $\pm$ 0.24	00	43.8 $\pm$ 1.43	3 $\pm$ 0.33
Female	48.7 $\pm$ 1.45	1.1 $\pm$ 0.17	00	48.3 $\pm$ 1.87	3.3 $\pm$ 0.36

## DISCUSSION

The values of haematological indices observed in *Taphozous kachhensis* were within a range of values reported in other species of *Taphozous* and other reported insectivorous bats. As bats having higher metabolic rates, to cope with this, these are having high haemoglobin percentage, Haematocrit (%) and RBC count when compared with other terrestrial mammals (Wolk and Ruprecht, 1988; Korine *et al.*, 1999; Ratnasooriya *et al.*, 2005). Our results disagree with Desai *et al.* (2012) as the reported values of haematological parameters in *Taphozous nudiventris* were in the range of haematological parameters of human beings.

The Total and differential leukocyte count of lactating females and males were computed and given in the table 1 and 2 respectively. Observed values of total leucocyte count in *T. kachhensis* adult males and lactating females was in the range of 4200-7200/mm<sup>3</sup> and 3800-7100/mm<sup>3</sup> respectively. Schinnerl *et al.* (2011) had reported the lower values total leucocyte count for insectivorous emballonurid, molossid and vespertilionid bat species than for mostly phytophagous phyllostomid bat species. Our values are considerably lower when compared with human (Guyton, 1981) and phyllostomid

bat species (Schinnerl *et al.*, 2011). Our results are in agreement with Schinnerl *et al.* (2011).

Wolk and Ruprecht (1988) in serotine bat *Eptesicus serotinus* and Paksuz *et al.* (2009) in insectivorous microchiropteran adult bats *Rhinolophus euryale*, *R. mehelyi*, *R. ferrumequinum*, *R. hipposideros*, *Miniopterus schreibersii*, *Myotis capaccinii* and *M. myotis* have noted the five types of WBC's in peripheral blood smears. However Ratnasooriya *et al.* (2005) have not reported the basophils in blood smears of microchiropteran bats *Miniopterus schreibersii*, *Taphozous melanopogon* and *Hipposideros lankadiva*. Our results are in agreement with the Ratnasooriya *et al.* (2005) as basophils were not observed in the peripheral blood smear of *T. kachhensis* during the study. Differential leucocyte count of *T. kachhensis* showed similarity with the reference values observed for normal human beings (neutrophils: 50.00-70.00; eosinophils: 1.00-4.00; basophils: 0-10; monocytes: 2.00-8.00 and lymphocytes: 20.00-40.00) (Guyton, 1981; Vander *et al.*, 1994). However in the current study the elevated percentage of lymphocyte was noted in both males and females. Most of the leukocytes observed were neutrophils while lymphocytes were the predominant leukocytes.

**Conclusion:**

Current study showed blood characteristics of *T. kachhensis* are well adapted to carrying the increased oxygen demands of flight. Haematological profile of male and female *Taphozous kachhensis* could be considered as a reference values and this may serve as a guide to assess the state of health in these bats.

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