HAEMATOLOGICAL OBSERVATIONS IN TWENTY CAPTIVE MALE SAMBAR DEER (*Rusa unicolor*)

Joju Johns[1], George Chandy[2], Jacob Alexander[3], S. Sooryadas[4], K.D. John Martin[5], M. Shynu[6] and S. Ajithkumar[7]
Department of Veterinary Surgery and Radiology,
KVASU Centre for Wildlife Studies, Kerala Veterinary and Animal Sciences University,
Pookode, Wayanad, Kerala, 673576.

Received : 29.03.2017
Accepted : 01.06.2017

Abstract

Haematological study was conducted in twenty apparently healthy adult male Sambar Deer maintained at Zoological Gardens, Thiruvananthapuram, which underwent vasectomy under general anaesthesia.Samples were analysed usingan automatic haematology analyser calibratedforcaprine blood. The haemoglobin concentration, volume of packed red cells and total erythrocyte count were 9.6±0.3 g/dL, 29.3±0.7 % and 5.8±0.2×10^6/ µL respectively. The total leucocyte count was 3.6±0.2×10^3/µL and granulocyte, lymphocyte and monocyte counts were 47±1 %, 47±1 % and 6±1 % respectively.

Keywords: Sambar Deer, Rusa unicolor, Haematology, Blood indices.

Sambar deer (*Rusa unicolor*), the largest oriental deer species forms one of the most common ungulate exhibits in Indian zoos. These muscular ungulates are now vulnerable (Timmins *et al*., 2015) andare included in Schedule IIIof IndianWildlife Protection Act. Haematological variables provide a picture of the health status of animals and clues regarding pathological conditions. Unfortunately, detailed studies or references on haematological parameters of captive or wild Sambar Deer of India are limited. The general practice is to compare it with the normal values of domestic small ruminants like sheep and goat (Gupta *et al.*, 2007). Increased concern for the health status of captive wild animals and significance of haematological observations in their health management emphasise the importance of evaluating the normal haematological parameters. This study reports the haematological parameters of twenty captive Sambar deer stags.

Materials and Methods

Twenty apparently healthy adult male Sambar deer maintained at the Zoological Gardens, Thiruvananthapuram, Kerala, which

1. *PhD Scholar, Department of Veterinary Surgery and Radiology, CVAS, Pookode*
2. *Officer-in-charge, KVASU Centre for Wildlife Studies*
3. *Senior Veterinary Surgeon, Zoological Gardens, Thiruvananthapuram*
4. *Assistant Professor, Department of Veterinary Surgery and Radiology, CVAS, Pookode*
5. *Head of the Department, Department of Veterinary Surgery and Radiology, CVAS, Pookode*
6. *Assistant Professor, Department of Veterinary Biochemistry, CVAS, Mannuthy*
7. *Professor and Head, University Veterinary Hospital, Teaching Veterinary Clinical Complex, CVAS, Mannuthy*

Corresponding author: Email id : johnsjoju@gmail.com., Mob: 9447379572

underwent vasectomy were selected for the study. The herd was maintained on fodder and concentrate feed as per the Central Zoo Authority of India guidelines. Two millilitres of venous blood was collected in K_2EDTA vials (BD Vacutainer®, K_2EDTA, BD Franklin Lakes, NJ, USA) by jugular venepuncture immediately after induction of anaesthesia using 22G blood collection needles (Eclipse™, BD Vacutainer®, Blood collection needles, BD Franklin Lakes, NJ, USA). The samples wereexamined using veterinary haematological analyser (Exigo, Boule Medical AB, Stockholm, Sweden) with the calibrated values for caprine blood cells. Parameters like haemoglobin concentration (Hb), volume of packed red cells (VPRC), total erythrocyte count (TEC), total leucocyte count (TLC) and differential leucocyte count (DLC) were estimated. The mean corpuscular haemoglobin (MCH), mean corpuscular volume (MCV) and mean corpuscular haemoglobin concentration (MCHC) were calculated using Hb, VPRC and TEC values using the following formulas:MCH = (Haemoglobin x 10)/RBC; MCV = (PCV x 10)/RBC and MCHC = (Haemoglobin x 100)/ PCV. Descriptive statistics namely range, arithmetic mean, standard error and coefficient of variation (CV) were calculated for all the variables. One sample Kolmogrov test was done for testing whether the observations of each of the variables are following normal distribution.Statistical analysis was performed using Windows based software*viz.* Microsoft Excel and statistical software SPSS version 21.

Results and Discussion

The haemoglobin concentration, volume of packed red cells and total erythrocyte count were 9.6 ± 0.3 g/dL, 29.3 ± 0.7 % and 5.8 ± 0.2×10^6/µL respectively. The total leucocyte count was 3.6 ± 0.2×10^3/µL and granulocyte, lymphocyte and monocyte counts were 47 ± 1 %, 47 ± 1 % and 6 ± 1 % respectively.The range, mean values and statistical analysis data of the haematological observations are presented in Table 1.In all the cases p value for testing the normality was found to be greater than 0.05. This indicate that all the variables in this sample are normally distributed. The haemoglobin concentration and VPRC were in agreement with the observation of Singh *et al.* (2010) and Kumar and Dhar (2013). The total leucocyte and differential leucocyte count were within the reference ranges reported by Semiadi*et al.*(1995).

Wild animals have to be physically or chemically restrained for blood collection, which can be stressful for them.In the present study, blood was collected for haematological examination when the animals were chemically immobilised for vasectomy.Semiadi *et al.*(1995) observedincreased haemoglobin, total erythrocyte count and volume of packed cells values in unsedated Sambar deer. Activation of the autonomic nervous system during stress can result in the release of catecholamine from adrenal medulla leading to contraction of spleen and resultant haemoconcentration (Read *et al.*, 2000). Haematological parameters like red blood cell count, haemoglobin level, haematocrit and leucocyte count have been observed to vary significantly with different physical restraint protocols in Red deer, Chital deer and Bighorn sheep (Kock *et al.*, 1987; Chapple et al., 1991; Carragher *et al*., 1997). Hence, less stressful restraint protocols have to be adopted to minimize the influence on the haematological parameters. Boes (2010) opined that age, gender, reproductive status, stress levels and handling could lead to variation in haematological parameters in cervids. However, the herd's physical condition has to be considered when comparing the normal reference values. The neutrophil to lymphocyte ratio is typically less than or equal to unity in *Cervids* (Boes, 2010). The granulocyte to lymphocyte ratio was observed to be equal to one in the present study also.

Summary

The present study reports the haematological parameters of twenty captive male Sambar deer estimated using veterinary haematology analyser calibrated to caprine values.The haemoglobin concentration, volume of packed red cells and total erythrocyte count were 9.6 ± 0.3 g/dL, 29.3 ± 0.7 % and 5.8 ± 0.2×10^6/µL respectively. The total leucocyte count was 3.6 ± 0.2×10^3/µL and granulocyte, lymphocyte and monocyte counts were 47 ± 1 %, 47 ± 1 % and 6 ± 1 % respectively.

Table 1. Hematologic observations of twenty Sambar Deer stags

Parameter	Range	Mean ± SE	*CV*	*z value*	*P value*
Hb. (g/dL)	8-12	9.6 ± 0.3	12.6	0.633	0.818
VPRC (%)	25 - 37	29.3 ± 0.7	11.7	1.038	0.232
TEC ($\times 10^6/\mu L$)	4.6 - 7.4	5.8 ± 0.2	13.8	0.816	0.518
MCH (pg/dl)	15.5 - 17.7	16.7 ± 0.5	16.2	0.526	0.945
MCV (fL)	45.9 - 55.6	50.7 ± 1.2	10.4	0.485	0.973
MCHC (g/dL)	31.4 - 34.1	32.8 ± 0.4	10.5	0.84	0.481
TLC ($\times 10^3/\mu L$)	1.5-5.3	3.6 ± 0.2	25.8	0.595	0.87
Granulocytes (%) [Absolutecount] ($\times 10^3/\mu L$)	36 – 57 [0.7 -2.6]	47 ± 1 [1.7±0.1]	12.1	0.562	0.91
Lymphocytes (%) [Absolute count] ($\times 10^3/\mu L$)	36 – 57 [0.3 -2.5]	47 ± 1 [1.6±0.1]	15.0	0.763	0.605
Monocytes (%) [Absolute count] ($\times 10^3/\mu L$)	2 – 11 [0.03-0.5]	6 ± 1 [0.2±0.0]	48.8	0.627	0.827

References

Boes, K. M. 2010. Hematology of Cervids. In: Weiss, D. J. and Wardrop, K. J. (Ed) Schalm's Veterinary Hematology. Blackwell Publishing Ltd., pp. 918-926.

Carragher, J.F., Ingram, J.R. and Matthews, L.R. 1997. Effects of yarding and handling procedures in stress responses of Red Deer stags (*Cervus elaphus*). *Appl. Ani. Behaviour Sci.* **51**: 143-158.

Chapple, R.S., English, A.W., Mulley, R.S. and Lepherd, E.E. 1991. Haematology and serum biochemistry of captive unsedated Chital Deer (*Axis axis*) in Australia. *J. Wildlife Dis.* **27**: 396-406.

Gupta, A. R., Patra, R. C., Saini, M., and Swarup, D. 2007. Haematology and serum biochemistry of chital (*Axis axis*) and barking deer (*Muntiacus muntjak*) reared in semi-captivity. *Vet. Res. Commun.***31**: 801–808.

Kock, M.D., Clark, R.K., Franti, C.E., Jessup, D.A. and Wehausen, J.D. 1987. Effect of capture on biological parameters in free-ranging Bighorn Sheep (*Ovis canadensis*): evaluation of normal, stressed and mortality outcomes and documentation of postcapture survival. *J. Wildlife Dis.***23**: 652-662.

Kumar, V. and Dhar, P. 2013. Foreign body impaction in a captive sambar (*Rusa unicolor*). *Vet. Wld.***6**: 49–50.

Read, M., Caulkett, N. and McCallister, M. 2000. Evaluation of zuclopenthixol acetate to decrease handling stress in Wapiti. *J. Wildlife Dis.***36**: 450-459.

Semiadi, G., Wilson P.R., Muir, P. D. and Barry, T.N. 1995. Haematological values for captive Sambar Deer (*Cervus unicolor*). *Media Veteriner*.**II**: 41–44.

Singh, K., Kumar, A., Mahajan, S.K. and Saini, N. S. 2010. Successful forelimb amputation procedure on a Sambar Deer (*Cervus unicolor niger*).*J. Wildlife Rehabilitation and Med.***30**: 21–24.

Timmins, R., Kawanishi, K., Giman, B, Lynam, A., Chan, B., Steinmetz, R., Sagar B. H. and Samba Kumar, N. 2015. *Rusa unicolor*. The IUCN Red List of Threatened Species 2015: e.T41790A85628124. http://www.iucnredlist.org/details/41790/0 Downloaded on 23 February 2017. ■