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Hematological Parameters of House Gecko (*Hemidactylus frenatus)* in Ibadan Metropolis, Nigeria

Omonona Abosede Olayemi
Department of Wildlife and Fisheries Management, University of Ibadan, Ibadan, Oyo, Nigeria

Abstract: House gecko has become almost domesticated in every other homes in Nigeria especially Ibadan metropolis where this study was carried out due to its reduced flight zone. A total of 25 animals comprising 11 females and 14 males were collected for the study. Fresh blood was taken from the ventral abdominal vein into heparinised syringes for haematological analysis. Result revealed plasma protein density (4.709±0.48 g dL^{-1}), haemoglobin concentration (8.127±2.18 g dL^{-1}), red blood cell count (2.287±0.62) $*10^{6}$ μL^{-1}, white blood cell count (1.563±3181.85) $*10^{6}$ μL^{-1}, lymphocytes (68.273±3.17) $*10^{3}$ μL^{-1} and eosinophils (4.546±1.86) $*10^{3}$ μL^{-1} and of which values of the females were slightly higher than those of the male house geckos while the PCV (24.000±6.59%), Platelets (1.647±41403.12) $*10^{6}$ μL^{-1}, heterophils (27.182±4.58) $*10^{3}$ μL^{-1} and monophils (2.636±0.50) $*10^{3}$ μL^{-1} were slightly higher in males than in female house gecko studied in the five local government areas LGAs in Ibadan metropolis. There were no significant differences in the plasma protein, packed cell volume, hemoglobin concentration, red blood cell counts, platelets, lymphocytes, heterophils, monophils and eosinophils values of both male and female house geckos across the five LGAs while in contrast there was a significant difference in the WBC values of the male and female house geckos across the five LGAs of Ibadan.

Key words: Haematology, house gecko, *Hemidactylus frenatus*, sex, tropics, Nigeria

INTRODUCTION

Geckos are small to average sized lizards belonging to the family Gekkonidae found in warm climatic regions throughout the world. House gecko (*Hemidactylus frenatus*) is a native of south eastern Asia and the northern parts of Africa (Cook, 1990). A lot of studies have been carried out on geckos due to their closeness to man. Research areas include: Gecko breeding (Seufer, 1991); feeding the use of geckos in traditional medicine (Bauer, 2009); biology, husbandry and reproduction (Henkel and Schmidt, 1995); Pomp Climber which enables wall geckos to walk on ceilings and glasses without falling down (Autumn *et al*., 2006); general care and maintenance of gecko (McKeown and Zaworski, 1997). In recent times, the haematological parameters and blood cell of geckos are reported.

The shapes and colour of the blood components has been described: Red Blood Cells (RBC's) are oval in shape and presented a centrally located nucleus Salakij *et al*. (2002a, b). Data regarding the haematology of *Hemidactylus frenatus* especially in Africa are scarce therefore the aim of this study is to determine the haematological parameters of house gecko (*Hemidactylus frenatus*) in Ibadan metropolis, a city located in the south-western part of Nigeria.

MATERIALS AND METHODS

Study area: This study was carried out in Ibadan Metropolis which comprises of five local governments areas LGAs (Ibadan North, Ibadan North East, Ibadan North West, Ibadan South East and Ibadan South West), Oyo state. Ibadan is located on latitude 7°21` and 3°54`E. The area is located within the tropical rainforest (high forest).

Experimental animals and sample collection: A total of 25 samples were collected altogether in the five local governments including 11 females and 14 males. They were caught at night very close to bright electricitylit bulbs and transferred into a cage that was used to transport them to the laboratory for analysis. Fresh blood were taken from the ventral abdominal veins of the animals into heparinised 5 mL syringes but about 2 mL blood each was utilised, poured into sample bottles.

Haematological examination: Thin blood smears were made and stained with Giemsa stains while capillary tubes were filled up to three-quarter for centrifuge to determine the packed cell volume and the blood cells were counted using the standardized recount system in a modified Neubauer chamber (Frye, 1991) after addition of

appropriate diluents. Plasma protein density was estimated using a refractometer, Haemoglobin concentration (Hb) determined using a spectrometer (Jain, 1986) and differential white blood cell count using battlement method.

Statistics: Descriptive statistics was employed to estimate hematological parameters or variables which were summarized as means Standard Deviation (SD) and Standard Error of Mean (SEM) and student t-test was used to determine statistical significance.

RESULTS AND DISCUSSION

The haematological parameters of male and female wall geckos from the five local governments are shown in Table 1. These values were almost similar for both sexes. The t-test conducted showed that there was no significant effect of sex on the following haematological parameters: Plasma Protein PP ($p = 0.958$), Packed Cell Volume PCV ($p = 0.090$), Hemoglobin concentration Hb ($p = 0.686$), Red Blood Cell count RBC ($p = 0.232$), White Blood Cell WBC ($p = 0.10$), platelet ($p = 0.085$), lymphocytes ($p = 0.772$), heterophils ($p = 0.844$), monophils ($p = 1.00$). The p-value of eosinophils could not be computed because the standard error of the difference of the means of both sexes was zero. No differences were detected in male and female individual wall geckos from Ibadan North East in terms of haematological values.

Table 1: Summary of the Haematological parameters of wall gecko across the five LGAs

Parameters	Sex	N	Mean±SD	SEM	p-value
PP (g dL^{-1})	Male	14	4.636±0.51	0.153	0.773
	Female	11	4.709±0.48	0.146	-
PCV (%)	Male	14	24.000±6.59	1.986	0.631
	Female	11	22.455±5.75	1.734	-
Hb (g dL^{-1})	Male	14	7.127±1.18	0.357	0.159
	Female	11	8.127±2.18	0.658	-
RBC ($\times 10^6$ μL^{-1})	Male	14	2.108±0.50	0.150	0.505
	Female	11	2.287±0.62	0.188	-
WBC ($\times 10^3$ μL^{-1})	Male	14	1.294±4067.68	1226.453	0.043
	Female	11	1.563±3181.85	959.364	-
Platelet ($\times 10^6$ μL^{-1})	Male	14	1.647±41403.12	12483.510	0.201
	Female	11	1.445±56496.66	17034.384	-
Lymphocyte ($\times 10^3$ μL^{-1})	Male	14	67.273±4.38	1.322	0.594
	Female	11	68.273±3.17	0.954	-
Heterophil ($\times 10^3$ μL^{-1})	Male	14	27.182±4.58	1.381	0.224
	Female	11	24.636±3.67	1.106	-
Monophil ($\times 10^3$ μL^{-1})	Male	14	2.636±0.50	0.152	0.441
	Female	11	2.455±0.52	0.157	-
Eosinophil ($\times 10^3$ μL^{-1})	Male	14	3.909±1.51	0.456	0.439
	Female	11	4.546±1.86	0.562	-

Also there were no significant differences detected between sexes in any of the haematological parameters from Ibadan northwest and southeast LGAs while the t-test for wall gecko from Ibadan south west could not be computed because only one female sample was collected from this LGA. When the haematological parameters of male and female wall geckos were compared across the five LGAs, no significant differences could be found ($p>0.05$) in PP ($p = 0.773$), PCV ($p = 0.631$), Hb ($p = 0.159$), RBC ($p = 0.505$), platelets ($p = 0.201$), lymphocytes ($p = 0.594$), heterophils ($p = 0.224$), monophils ($p = 0.441$) and eosinophils ($p = 0.439$). In contrast there was significant difference ($p<0.05$) in the WBC across the LGAs ($p = 0.043$). This study reveals that the average plasma protein (4.709±0.48g dL^{-1}), haemoglobin concentration (8.127±2.18 g dL^{-1}), red blood cell count (2.287±0.62)$\times 10^6$ μL^{-1}, white blood cell count (1.563±3181.85)$\times 10^3$ μL^{-1} and white blood cell differentials; lymphocytes (68.273±3.17)$\times 10^3$ μL^{-1} and eosinophils (4.546±1.86)$\times 10^3$ μL^{-1} values of the females were slightly higher than those of the male house geckos, while the packed cell volume (24.000±6.59%), platelets count (1.647±41403.12)$\times 10^6$ μL^{-1}, heterophils (27.182±4.58)$\times 10^3$ μL^{-1} and monophils (2.636±0.50)$\times 10^3$ μL^{-1} were slightly higher in males than in female house gecko studied in the five LGAs in Ibadan metropolis. The PCV, RBC and WBC values were higher in males than in females of Free-Living Mediterranean Pond Turtles (*Mauremys leprosa*) (Hidalgo-Vila *et al*., 2007) which has also been reported for RBC values in other reptiles (Duguy, 1967, 1970; Frye, 1991).

Mean Corpuscular Volume (MCV) values were higher in females of Free-Living Mediterranean Pond Turtles than in males (Hidalgo-Vila *et al*., 2007). There were no significant differences in the PP, PCV, Hb concentration, RBC, platelets, lymphocyte, heterophils, monophils and eosinophils values of both male and female house geckos across the five LGAs. Reptile haematological parameters vary with season, age and sex. Values may even vary between laboratories (Campbell, 1996; Frye, 1991; Wilkinson, 2003) and these parameters can vary through the annual cycle or even throughout the life of the individuals (Hidalgo-Vila *et al*., 2007).

Age has been reported to affect blood parameters (including RBC, WBC and platelet counts among others) in a variety of new world primate species (Bush *et al*., 1982; Loeb, 1986; Vie *et al*., 1998; Riviello and Wirz, 2001; De Thoisy *et al*., 2001. The red blood cells in both male and female house geckos are higher than those in lacertid lizards (*Psammodromus algirus*) (1700,000 cells μL^{-1}) (Puerta *et al*., 2004) and was smaller than those published for birds and mammals (Shave and Howard, 1976; Mulley,

1979, 1980; Oyewale, 1994; Olayemi *et al*., 2002; Fox *et al*., 2008). Based on McMahon and Hamer (1975) study on sidewinder (*Crotalus cerastes*); haemoglobin, red cell counts and white cell counts are lower than those observed in this study. The values for PCV, RBC and haemoglobin were similar to those reported for the prehensile-tailed skink (Wright, 1993) common Iguana (Frye, 1991). The results obtained here were higher when compared to reference ranges for other herbivorous or omnivorous lizards such as the common iguana (Wetzel, 1998; Wagner and Wetzel, 1999) and bearded dragon (Ellman, 1997). Erythrocytes are morphologically similar among various species of reptiles (Bijlani, 2004).

In the present study WBC were identified as heterophils, eosinophils along with ruptured eosinophils and eosinophils with larger granules. These cells have also been described in other reptiles such as the turtle *Gopherus agassizii* and the lizard Pogona vitticeps (Dotson *et al*., 1995). Eosinophils and neutrophils were also described in reptilian blood (Salakij *et al*., 2002a, b). Widely accepted opinion is that reptilian and avian heterophils have functions similar to mammalian neutrophils (Montali, 1988).

CONCLUSION

This study has established the haematological parameters of a hitherto non-investigated reptile, house gecko (*Hemidactylus frenatus)* in Ibadan metropolis, Nigeria. The present data has also established a base line to which further studies may be compared.

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