Haematological studies on apparently healthy donkeys in Oodi, Kgatleng district Botswana

E.Z. Mushi[1], M.G. Binta[2] and R.T. Ndebele[1]

[1] *Department of Animal Science and Production, Private Bag 0027, Gaborone, Botswana*
[2] *National Veterinary Laboratory, Private Bag 0035, Gaborone, Botswana*

Abstract

Baseline haematological data was obtained when blood samples were analysed from 75 donkeys from Oodi, Kgatleng district, Botswana. The data were found to compare favourably with that obtained by previous workers in Africa.

Introduction

Veterinary clinical haematology is a useful diagnostic tool in the practice of veterinary medicine (Campbell and Coles, 1986). However, its usefulness has been limited due to a paucity of information on reference values for particular management systems. In Botswana, donkeys are mainly used for draught power and only occasionally used for meat. For most of the year donkeys in this country are released to graze and roam freely and are only kraaled during the ploughing season when they are required. Very little supplementation is provided and they are forced to scout for their own water most of the time. Reference haematology values for donkeys (*Equus asinus asinus*) have been recorded from several countries in Africa including Egypt (Botros *et. al.,* 1970), Kenya (Maloiy and Boarer, 1971), Nigeria (Ikede *et. al.,* 1977) and Zimbabwe (Hill, 1989). Since there are no haematology reference values for donkeys in Botswana, blood samples from apparently healthy donkeys were analysed so as to determine baseline blood values.

Materials and methods

Blood was collected by jugular venipuncture into EDTA vacutainer bottles from 75 apparently healthy adult male and female animals from the Tswana breed of donkeys in Oodi, Kgatleng district of Botswana. The blood was despatched for analysis within one hour of collection. The sampling was completed within one month to eliminate seasonal variation. The erythron indices, namely:- total red blood cell count (RBC); haemoglobin (Hb) and haematocrit (Hct), were determined using a cell counter (Model S +IV, Coulter Electronics, USA). The machine automatically calculated the mean corpuscular volume, the mean corpuscular haemoglobin, the mean corpuscular haemoglobin concentration and determined the platelet number. While the white cell count (WBC) was recorded, the rest of the leucogram namely, the percentages of individual white cells (differential white cell counts) were determined on Giemsa stained slides using a microscope at x 100 magnification by counting 100 white cells manually on an electronic digital counter (Coulter Electronics, USA).

The erythrocyte sedimentation rate (ESR) was conducted on the blood of Tswana donkeys at one-hour intervals by the Wintrobe method with the tube held vertically (Jain and Kono, 1975, Jain, 1986). The mean diameter of the red cell was estimated by means of a calibrated eye piece (Model, Nikon, Tokyo, Japan) as previously described (Jain, 1986). Significant differences between parameters were determined using Student's "t" tests.

Table 1: Means, standard deviations (sd) and ranges of red blood cell parameters from donkeys in Botswana (n=75)

Parameter	Unit	Mean	sd	Range
Haemoglobin	g/l	110.00	16.2	59.70 - 154
Red cell count	$x10^{12}/1$	5.72	0.99	4.25 - 9.17
Haematocrit	1/1	0.31	0.04	0.24 - 0.42
Mean corpuscular volume	fl	55.63	6.17	40.50 - 69.40
Mean corpuscular haemoglobin	pg	19.92	2.12	15.60 - 23.50
Mean corpuscular haemoglobin concentration	g/dl	35.87	1.42	31.40 - 39.90

Results and discussion

The values obtained for RBC counts, Hb and Hct are shown in Table 1 and for differential leucocyte counts and platelets in Table 2. The RBC, Hb and Hct were comparable to those obtained by previous workers (Table 3). This observation indicated that in spite of nutritional and climatic (high ambient temperature) constraints, the Tswana donkey has adapted to maintain homeostasis. This tendency was further shown by the fact that these donkeys though neither dewormed, nor deticked had acceptable erythron values. The mean for Botswanan donkeys was higher than the means for donkeys in other African countries (Table 3). Internal parasites have been shown to reduce erythron indices (Owen and Slocombe, 1985) as a result of iron loss through the gut. In the present study, strongyle worm eggs were found in the faecal samples obtained from the donkeys. The mean WBC value for the Tswana donkeys, 11.29± 4.90 $x10^9/1$ (Table 2) was lower than the mean values reported by other African workers (Table 3). It is possible that the higher leucocyte counts obtained from other African donkeys was suggestive of some degree of stress. The present study was conducted during the resting period when donkeys were not being used for ploughing or other work.

The mean ESR of 50 mm/hour for the Tswana donkeys was comparable to the mean ESR reported for the donkey (Neser, 1923), but lower than that reported for horses, 59 mm/hour (Benjamin, 1979). The diameter of the Tswana donkey erthrocyte was found to range from 5.0 -7.1µm with a mean of 6.0µm which was comparable to values for South African donkeys (Neser, 1923).

Table 2: Means, standard deviations and ranges for total and differential leucocyte counts and platelet counts in blood from donkeys in Botswana (n=75)

Parameter	Unit	Mean	sd	Range
White cell count	$x10^9l$	11.29	4.90	10.16 - 12.42
Neutrophils	%	44.80	12.65	20.00 - 74.00
Lymphocytes	%	44.03	12.38	22.00 - 78.00
Monocytes	%	5.16	2.29	2.00 - 10.00
Eosinophils	%	9.69	6.56	2.00 - 24.00
Platelets	/µl	199 000	79 390	63 000 – 375 000

Table 3: Means, standard deviations (sd) and ranges for haematology values for donkeys by previous workers in Africa

Reference	n	Haemoglobin		Red cell count ($x 10^{12}/1$)		Haematocrit (1/1)		White cell count ($x 10^9/1$)	
		Mean	± sd	Mean	± sd	Mean	± sd	Mean	± sd
Ikede *et. al.*, 1977 (Nigeria)	10	87.6	-	5.04	-	0.29	-	13.50	-
Maloiy and Boarer 1971 (Kenya)	5	110.0	-	5.06	-	0.35	-	-	-
Botros *et. al.*, 1970 (Egypt)	40	100.0	14.0	4.50	0.50	0.32	0.032	16.60	1.40
Hill, 1989 (Zimbabwe)	15	124.7	12.6	5.87	0.67	0.36	0.042	12.78	3.36
TOTAL	70	422.3	26.6	20.47	1.17	1.32	0.074	42.88	4.76
Mean	17	105.6	13.3	5.12	0.59	0.33	0.037	14.29	2.38
Botswana - Present study	75	110.0	16.2	5.72	0.99	0.31	0.040	11.29	4.90

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