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HAEMATOLOGICAL INVESTIGATIONS IN EAST AFRICAN BIRDS OF PREY

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Abstract: Packed cell volume, haemoglobin and erythrocyte counts are given for 52 East African birds of prey of 21 species. Whilst the majority of the birds sampled were "normal", some were injured or diseased. The results are discussed and attention is drawn to the possible value of haematology in clinical diagnosis.

INTRODUCTION

In recent years there has been increased interest in the diseases of both captive and free-living birds of prey (Orders Falconiformes and Strigiformes). However, clinical work has often been hampered by the relative dearth of proven laboratory diagnostic techniques in these birds.

In a previous publication[3] attention was drawn to the paucity of data on the haematology of birds of prey despite the known value of such information in the diagnosis of disease in poultry.[1] Recently Elliott *et al.*[6] published a useful account of their haematological findings in raptors but no other papers on this subject have been traced.

During the course of an investigation into the diseases and causes of death of East African birds of prey[4] a number of blood samples were examined. There was some indication that the haematological findings could prove useful in clinical diagnosis and the results are, therefore, reported here.

The paper records packed cell volumes (PCV), haemoglobin (Hb) values and red cell (rbc) counts of captive and free-living East African birds of prey, all of which were examined in Kenya.

MATERIALS AND METHODS

The birds sampled fell into two groups, those that were considered "normal" even though in some cases they had previously received veterinary treatment, and those that had either been submitted or found as sick or injured birds.

Blood samples were taken from the brachial vein with the bird restrained on its back. Certain of the laboratory techniques were described previously[5] and follow Leonard.[7] Packed cell volumes were measured using a micro-haematocrit centrifuge (Hawksley, Sussex, England) and haemoglobin estimations by a conventional mammalian colorimeter method.[2]

Red cell counts were performed manually using Natt and Herrick's solution as described by Leonard.[7] Blood smears were fixed with methyl alcohol stained with Giemsa's stain and the results are presented in some cases.

RESULTS

These are shown in Tables 1 and 2. Red cell counts are given in millions. "Free-living" birds are those that were bled in the wild or within 5 days of coming into captivity.

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TABLE 1. Haematological Data for "Normal" Birds of Prey

Species	Number of birds sampled	Number of blood samples	Mean PCV	Range	Mean Hb	Range	Mean rbc	Range
Secretary bird (*Sagittarius serpenterius*)	2	2	37.5%	36-39%	22.3	22.3	1.51	1.23-1.79
Gabar goshawk* (*Melierax gabar*)	2	4	32.8%	29-39%	16.4	16.4	1.72	1.45-2.32
Pale chanting goshawk* (*Melierax canorus*)	1	1	32%	32%	16.4	16.4	1.59	1.59
Black sparrowhawk (*Accipiter melanoleucus*)	2	3	41.8%	41-42%	24.4	18.6-29.8	2.33	1.98-2.67
African harrier hawk (*Polyboroides typus*)	2	6	46.7%	45-49%	24.2	21.6-26.0	2.29	2.15-2.46
Augur buzzard (*Buteo rufofuscus*)	3	7	30.8%	28-31%	18.4	13.2-23.0	1.74	1.44-1.98
Wahlberg's eagle** (*Aquila wahlbergi*)	2	2	32.5%	31-34%	16.9	16.0-17.9	1.53	1.41-1.65
Tawny eagle (*Aquila rapax belisarius*)	1	9	42.3%	39-49%	16.4	11.3-20.8	2.21	1.81-2.97
Steppe eagle (*Aquila rapax orientalis*)	1	1	35%	35%	17.8	17.8	2.12	2.12
African hawk eagle (*Hieraaetus fasciatus spilogaster*)	1	12	40.1%	32-47%	21.9	20.1-23.1	2.31	1.67-3.67
Long-crested hawk eagle (*Lophaetus occipitalis*)	1	1	41%	41%	13.2	13.2	4.02	4.02

TABLE 1 — Continued

Species	Number of birds sampled	Number of blood samples	Mean PCV	Range	Mean Hb	Range	Mean rbc	Range
African fish eagle (*Haliaeetus vocifer*)	2	2	41.5%	41-42%	22.3	22.3	2.04	1.89-2.19
Lanner falcon (*Falco biarmicus*)	1	1	47%	47%	20.1	20.1	2.78	2.78
Black-shouldered kite (*Elanus caeruleus*)	1	2	48.5%	48-49%	19.6	15.0-24.1	2.00	1.86-2.13
African kite (*Milvus migrans parasitus*)	6	9	40.4%	31-46%	20.3	16.7-23.1	1.93	1.65-2.71
Lizard buzzard (*Kaupifalco monogrammicus*)	1	3	44.7%	39-51%	24.8	22.3-26.0	2.69	2.65-2.76
Hooded vulture (*Necrosyrtes monachus*)	1	4	40.9%	36-44%	20.4	17.5-23.1	1.94	1.76-2.20
Barn owl (*Tyto alba*)	11	12	43.7%	36-52%	18.7	11.5-23.1	2.16	1.70-2.75
Spotted eagle owl (*Bubo africanus*)	1	4	40.5%	39-41%	20.4	18.2-23.1	1.85	1.36-2.46
Verreaux's eagle owl (*Bubo lacteus*)	1	1	36%	36%	17.9	17.9	1.26	1.26
African wood owl (*Ciccaba woodfordi*)	1	1	31%	31%	—	—	1.75	1.75

Key *Includes one free-living bird.
**Includes two free-living birds.

TABLE 2. Haematological Data for Injured and Diseased Birds of Prey.

Species	PCV	Hb	rbc	History
Augur buzzard	29%	16.0	1.73	Presented with fractured wing, 12% immature erythrocytes in smears.
Augur buzzard	39%	—	2.04	8 days later, 2% immature erythrocytes.
African fish eagle	44%	20.1	2.33	Prior to release following successful treatment of injury.
African fish eagle	37%	14.6	1.74	Picked up following release; injured and in poor condition.
Steppe eagle	24%	10.8	0.68	Presented with fractured humerus. Poor condition, dehydrated, pale and dry mucous membranes.
Steppe eagle	30%	—	1.2	5 days later, following fluid therapy and feeding.
Steppe eagle	37%	16.4	1.8	12 days post admission.
Steppe eagle	48%	12.3	2.34	40 days post admission, returned to finder.
Steppe eagle	32%	13.9	1.86	60 days later Lesions of "bumblefoot".
Steppe eagle	45%	16.0	2.35	Following successful treatment of "bumblefoot".
Tawny eagle	33%	18.0	1.83	Lesions of "bumblefoot".
African kite 1)	24%	13.8	1.53	Presented in thin and dehydrated condition. Died.
African kite 2)	29%	14.1	1.55	Presented with diarrhoea.
African kite 3)	56%	14.6	2.36	21 days after laparotomy and release.
African hawk eagle	41%	23.1	—	Day of laparotomy.
African hawk eagle	48%	20.8	2.64	7 days after laparotomy.
African hawk eagle	43%	—	2.36	14 days after laparotomy.
Barn owl	25%	10.5	0.89	One of three youngsters, died of aspergillosis.

DISCUSSION

A detailed analysis of the results is impracticable in view of the small number of samples examined. While the birds in Table 1 were considered "normal", it must be borne in mind that most had at some stage been presented for clinical treatment. In addition, Kabete is at a relatively high altitude (1,500 m) and movement of birds there could itself have prompted a change in haematological values.

The results obtained for normal birds generally correspond closely with those given for raptors by Cooper[3] and Elliott *et al.*[6] However, the haemoglobin values tend to be lower than those reported by the latter authors. Some of the figures in this survey showed considerable fluctuation—PCV's and rbc's for the African hawk eagle, for example—but no explanation could be found for this. In other cases the correlation between PCV, Hb and rbc is not very close; again the reason is obscure. The colorimetric method of Hb estimation was the only one available to the author for this study and it could be argued that this has the possible disadvantage of being influenced by the presence of red cell nuclei. However the estimation was always carried out by the same person and this was considered likely to make any error constant.

As may be seen from Table 2, there is evidence that lowered haematological values, indicative of anaemia, may occur in injured or diseased birds of prey. The augur buzzard is a particular case; a lowered PCV and an increase in immature erythrocytes in smears appeared associated with a recent compound fracture. Within 8 days the PCV had increased and % immature erythrocytes decreased, indicative of recovery.

The African fish eagle was another bird that was presented injured and in poor condition and the low haematological figures obtained were considered indicative of anaemia associated with injury and reduced food intake.

A particularly interesting set of results are those for the steppe eagle. The first (low) figures were obtained when the bird was presented with a fractured left humerus and in very poor condition. The response to fluid therapy and feeding is indicated by the rise in both PCV and rbc values. Two months after return to its finder the bird was readmitted with lesions of "bumblefoot" and the figures were again reduced but these showed a marked improvement following treatment. These findings would suggest anaemia associated with "bumblefoot".

The tawny eagle in Table 2 also had bumblefoot but the lesions were milder and restricted to only one digit; its PCV was significantly lower than the figures for "normal" tawny eagles but its Hb was near the top of the range.

African kite (1) showed low values when presented in very poor condition. Despite fluid therapy and force-feeding it died overnight. Death was attributed to dehydration and inanition, probably following a failure to establish itself and feed in the wild.

African kite (2) showed a low PCV (29%) on the two occasions when it was bled. It again was in poor condition when presented and showed severe diarrhoea. Unfortunately a blood specimen was not obtained following treatment.

African kite (3) was a hand-reared bird which was sexed by laparotomy[5] Unfortunately no haematology was performed before release but the high PCV recorded 21 days after release was attributed to dehydration. The African hawk eagle which was sexed by laparotomy but was not released also showed a rise in PCV in the 7 days following operation. This returned to "normal" on the 14th day. The significance of such fluctuations in PCV is in doubt but they would add support to the hypothesis that haematological values might be influenced by traumatic injury.

The barn owl is of interest. It and its siblings (included in Table 1) differed considerably in size; on arrival, for example, they weighed 380, 340 and 280 g, respectively. This one however never

thrived and when bled for haematology it showed the relatively low figures recorded in Table 2. It died of aspergillosis but its siblings were released.

The figures obtained in this survey are, as far as is known, the first from captive and free-living East African birds of prey. The results suggest that reduced haematological parameters are associated with traumatic injury or disease and as such may be of value in clinical diagnosis.

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