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HAEMATOLOGY AND BLOOD CHEMISTRY OF THE BLACK DUCK *Anas superciliosa*

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Abstract: Some haematologic and blood chemical values have been determined for the black duck, *Anas superciliosa,* captured in the western fringes of Sydney. Data did not show evidence of sexual dimorphism.

INTRODUCTION

The black duck *(Anas superciliosa)* is widely distributed throughout Australia but concentrates in greatest numbers in the deep permanent vegetated swamps of the Murray-Darling basin.[3] Haematologic and blood chemistry values have not been reported for this species. This paper presents some haematologic and blood chemical values for black ducks held in captivity.

MATERIALS AND METHODS

In Autumn, 1977 nine female and eight male adult black ducks were captured in a spring-loaded cotton net at Bringelly, New South Wales, as part of a study investigating the biologic control of the insect vectors of *Plasmodium* sp. They were housed in a poultry shed with sawdust bedding and fed *ad libitum* on commercially produced duck crumbles [1] for four weeks before sampling.

The birds were bled from the brachial vein. A 2 ml sample of blood was collected in 5.0 mg of EDTA for haematology. Additional blood was allowed to clot, and the serum used for biochemical analysis.

Haematology

Cell counts were performed within 2 h of collection and after mixing for at least 10 min.

Haemoglobin (Hb) was estimated using a modified oxyhaemoglobin technique. A test tube was filled with 8 ml of a 0.6% solution of concentrated ammonium hydroxide in distilled water. A 20 mm^3 sample of blood was immediately discharged into the ammonia solution, mixed well and allowed to stand for 1 h. The tube was then inverted several times and centrifuged for 10 min at 2000 × g. The colour density of the supernatant was then measured colorimetrically and the values compared with those on a standard curve prepared using haemoglobin standards. [2]

Erythrocyte (RBC) counts were determined on an electronic Coulter Counter. [3] The packed cell volume (PCV) was calculated after centrifuging blood for 6 min. in a microhaematocrit centrifuge.

White blood cell (WBC) counts were determined by methods previously described for avian blood.[7] Differential cell counts were performed on blood films using the modified battlement technique.[10] Blood films were prepared at the time of blood collection, air dried, fixed in methanol for 3 min and stained with Giemsa. At least 200 cells were counted for each bird.

[1] Millmaster Feeds, Enfield, N.S.W. Australia.

[2] Red Cross Blood Bank, Clarence Street, Sydney, Australia.

[3] Coulter Counter, Model A - Coulter Electronics Inc., Hialeah, Florida, USA.

Serum Biochemistry

Serum usually was analysed within 24 h of collection. If kept overnight it was snap frozen at -20 C immediately after collection. Serum Glutamic pyruvic transaminase (SGPT), serum glutamic oxaloacetic transaminase (SGOT) and serum alkaline phosphatase (SAP) were assayed at 37 C using commercial kits. [1] Lactic dehydrogenase (LDH), inorganic phosphorus (IP), total bilirubin, total serum lipid and plasma glucose were assayed at 25 C using commercial kits. [4] Samples for plasma glucose determination were refrigerated immediately after collection, separated from RBC within 1 h and analysed within 3 h of collection.

Blood urea nitrogen (BUN) was assayed at 37 C using a commercial kit. [5]

Total protein was measured on a temperature compensated refractometer. [6] Serum protein fractions were separated electrophoretically for 25 min at constant voltage (200v) and amperage (2.5A) on cellulose polyacetate strips and measured by a densiometric method using a digiscreen. [7]

TABLE 1. Composite data ($\bar{x} \pm$ S.D.) of haematology from 17 black ducks.

Parameters	Males	Females	Total Group
Number	8	9	17
Hb (g/100 ml)	12.88	13.03	12.96
	±1.25	±1.52	±1.36
PCV (%)	40.00	40.40	40.24
	±3.82	±4.90	±4.29
Erythrocytes	2.79	2.77	2.78
(x 10^6/mm^3)	±0.19	±0.26	±0.22
M.C.V.	143.15	146.15	144.68
(μm^3)	±7.73	±11.90	±9.96
M.C.H.	46.06	47.08	46.60
(pg)	±2.39	±3.56	±3.02
M.C.H.C.	32.18	32.28	32.23
(%)	±0.65	±1.52	±1.16
Leucocytes	19.93	19.53	19.70
(x 10^3/mm^3)	±5.67	±7.73	±6.60
Heterophils	4.54	5.10	4.86
(x 10^3/mm^3)	±1.31	±2.81	±1.37
Lymphocytes	13.71	12.45	13.03
(x 10^3/mm^3)	±4.00	±5.55	±1.53
Monocytes	1.46	1.46	1.46
(x 10^3/mm^3)	±1.06	±0.99	±0.99
Eosinophils	0.15	0.28	0.22
(x 10^3/mm^3)	±0.14	±0.25	±0.16
Basophils	0.07	0.22	0.16
(x 10^3/mm^3)	±0.12	±0.19	±0.15

[4] Boehringer Mannheim Australia Pty. Ltd., Smithfield, 2164 N.S.W. Australia.

[5] Sigma Chemical Company, St. Louis, Missouri 63178, USA.

[6] American Optical Corporation, Scientific Instruments Division, Buffalo, New York 14215, USA.

[7] Gelman Instrument Company, Ann Arbor, Michigan 48106, USA.

Serum osmolarity was measured on an osmometer. [a]

Results for comparison between male and female data were analysed using student's t-test.

RESULTS

Haematology

Table 1 presents haematologic values for 17 black ducks. No significant

TABLE 2. Composite data ($\bar{x} \pm$ S.D.) of serum biochemistry of 15 black ducks.

Parameters	Males	Females	Total Group
Number	6	9	15
Lactic Dehydrogenase (μ/l)	351.80 ±80.50	283.50 ±77.60	312.80 ±83.50
Alkaline Phosphatase (μ/l)	17.80 ±5.60	23.30 ±14.70	20.90 ±11.70
Serum Glutamic Oxaloacetic Transaminase (μ/l)	61.00 ±24.00	52.50 ±33.90	55.90 ±29.70
Serum Glutamic Pyruvic Transaminase (μ/l)	12.90 ±7.70	11.60 ±4.70	12.10 ±5.90
Plasma Glucose (mg/100 ml)	186.66 ±27.33	168.88 ±24.83	175.83 ±26.50
Total Serum Lipid (mg/100 ml)	1542.00 ±80.00	1357.00 ±198.00	1430.00 ±183.00
Total Bilirubin (mg/100 ml)	0.31 ±0.04	0.33 ±0.00	0.33 ±0.04
Blood Urea Nitrogen (mg/100 ml)	1.50 ±0.28	1.48 ±0.42	1.49 ±0.36
Inorganic Phosphorus (mg/100 ml)	3.13 ±0.85	3.30 ±1.37	3.23 ±1.15
Total Protein (gms/100 ml)	4.57 ±0.22	4.16 ±0.45	4.32 ±0.42
Pre-Albumin (gms/100 ml)	0.06 ±0.05	0.06 ±0.02	0.06 ±0.03
Albumin (gms/100 ml)	3.24 ±0.22	2.91 ±0.27	3.04 ±0.30
α Globulin (gms/100 ml)	0.37 ±0.22	0.40 ±0.28	0.39 ±0.25
β_1 Globulin (gms/100 ml)	0.06 ±0.05	0.06 ±0.04	0.06 ±0.04
β_2 Globulin (gms/100 ml)	0.47 ±0.12	0.38 ±0.09	0.41 ±0.11
γ Globulin (gms/100 ml)	0.36 ±0.18	0.34 ±0.07	0.35 ±0.12
Albumin/Globulin Ratio	2.78 ±0.82	2.67 ±0.78	2.71 ±0.77
Serum Osmolarity (mOsm/Kg)	306.50 ±4.76	304.19 ±1.91	305.38 ±3.53

[a] Advanced Digimatic Osmometer Model 3DII - Advanced Instrument Inc., Needham Heights, Massachusetts 02194, USA.

differences were observed between males and females for any of the parameters.

Biochemistry

Table 2 presents levels for some biochemical values in 15 black ducks. No significant differences were observed between males and females, however, the mean value for males was generally slightly higher.

DISCUSSION

Differences between the sexes for Hb and PCV have been reported for ducks[6] (breed not specified), but no significant differences were found in the present study and this agrees with the work of Shave and Howard[9] on the Mallard *(Anas platyrhynchos platyrhynchos)*.

The Hb values presented here are lower than those reported for the Mallard[8] and laboratory ducks[2] (breed not specified) but higher than values reported for a group of six-week-old Pekin ducklings.[1] This could be due to slight seasonal changes[9,5] or might only reflect species or age differences.

Results for the WBC count in Table 1 are similar to those of Magath and Higgins[8] but values for lymphocytes are higher and heterophils lower than those presented by Hewitt[4] on laboratory ducks (breed not specified) and Lucas and Jamroz[7] *(A. platyrhynchos platyrhynchos)*. However, all these counts were performed on smaller numbers of birds.

Small differences appeared to exist for LDH, SAP, SGPT, total lipid, total serum protein and plasma glucose between male and female data but these were not statistically significant.

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LITERATURE CITED

1. BROWN, J.M.M. and L. ABRAMS. 1965. Biochemical studies on aflatoxicosis. Onderstepoort J. Vet. Res. 32: 119-146.
2. DUKES, H.H. and L.H. SCHWARTE. 1931. The haemoglobin content of the blood of fowls. Am. J. Physiol. 96: 89-93.
3. FRITH, H.J. 1967. *Waterfowl in Australia.* Angus and Robertson Ltd., Halstead Press, Sydney. p. 168.
4. HEWITT, R. 1942. Studies on the host-parasite relationships of untreated infections with *Plasmodium lophurea* in ducks. Am. J. Hyg. 36: 6-42.
5. KOCAN, R.M. and S.M. PITTS. 1976. Blood values of the canvasback duck by age, sex and season. J. Wildl. Dis. 12: 341-346.
6. KUHL, P., G. FRITSCH, W. WELSCH and H. WERNER. 1928. Quoted by BURKER, K. Handbuck der Normalen und pathologischen physiologies, Berlin. Julius Springer Vol. 6, p. 33.
7. LUCAS, A.M. and C. JAMROZ. 1961. *Atlas of Avian haematology.* Agr. Monogr. 25, USDA, Washington, D.C.
8. MAGATH, T.B. and G.M. HIGGINS. 1934. The blood of the normal duck. Folia. Haematologica 51: 230.
9. SHAVE, H.J. and V. HOWARD. 1976. A haematologic survey of captive waterfowl. J. Wildl. Dis. 12: 195-201.

10. STEEL, J.D. and L.E. WHITLOCK. 1960. Observations on the haematology of thoroughbred and standardbred horses in training and racing. Aust. vet. J. 36: 136.

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