

HAEMATOLOGY OF THE AUSTRALIAN SEA LION, *Neophoca cinerea*

Authors: NEEDHAM, D. J., CARGILL, C. F., and SHERIFF, D.

Source: Journal of Wildlife Diseases, 16(1) : 103-107

Published By: Wildlife Disease Association

URL: <https://doi.org/10.7589/0090-3558-16.1.103>

The BioOne Digital Library (<https://bioone.org/>) provides worldwide distribution for more than 580 journals and eBooks from BioOne's community of over 150 nonprofit societies, research institutions, and university presses in the biological, ecological, and environmental sciences. The BioOne Digital Library encompasses the flagship aggregation BioOne Complete (<https://bioone.org/subscribe>), the BioOne Complete Archive (<https://bioone.org/archive>), and the BioOne eBooks program offerings ESA eBook Collection (<https://bioone.org/esa-ebooks>) and CSIRO Publishing BioSelect Collection (<https://bioone.org/csiro-ebooks>).

Your use of this PDF, the BioOne Digital Library, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Digital Library content is strictly limited to personal, educational, and non-commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne is an innovative nonprofit that sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

HAEMATOLOGY OF THE AUSTRALIAN SEA LION, *Neophoca cinerea*

D. J. NEEDHAM,¹ C. F. CARGILL,² and D. SHERIFF²

Abstract: The haematology of the Australian sea lion *Neophoca cinerea* was studied in a breeding colony on Kangaroo Island, South Australia. The methods used to catch and restrain the animals are described and the haematology of 38 animals of varying age and sex groups is recorded. Total values for both erythrocytes and leucocytes were similar to those of other marine mammals and were in the ranges of 4.77 to 6.08×10^6 mm³ and 6.3 to 14.6×10^3 mm³, respectively. Erythrocytes volumes were very large, measuring from 96 to 112 mm.³ The packed cell volumes ranged from 48.3 to 64.2% and the haemoglobin values from 16.2 to 21 gm percent. The neutrophil lymphocyte ratio varied from 0.5 to 6.2 and in some animals absolute lymphocyte values were less than $1,200$ mm.³ In many animals the percentage of eosinophils was greater than 20% , suggesting parasitic disease.

INTRODUCTION

The Australian sea lion, *Neophoca cinerea*, inhabits the offshore islands and several beaches along the coastlines of South and Western Australia.

Marlow,⁵ Stirling¹⁰ and Ling and Walker⁴ all have studied the annual cycle and general behaviour of sea lions along the South Australian coastline but no record of haematologic data from animals in their natural environment is available.

This report describes the methods used to restrain animals for both physical and clinical examination and details the haematology of 38 Australian sea lions from the Seal Bay colony on Kangaroo Island, South Australia.

MATERIALS AND METHODS

The animals examined were part of a breeding colony of Australian sea lions inhabiting the area around Seal Bay on the southern coast of Kangaroo Island, off the coast of South Australia (137°E

and 36°S). Approximately 500 animals are in the colony.

The equipment made to capture the animals consisted of a circular hoop 750 mm in diameter with an attached handle 2.8 m long, constructed of aluminum tubing 25 mm diameter, 3 mm thick. A large hessian bag or net was attached to the hoop with metal wool bale clips.

When an animal was selected for examination, it was approached directly and quickly "bagged" or netted, if possible, as it propped before retreating. Otherwise it was chased and "bagged" on the run. Once their heads were in the bags, animals were much more tractable.

Restraint of the sea lions was effected by rotating the animal to a dorso-lateral recumbency and using the hoop over the neck and chest to hold the animal down; the aid of 2 to 3 assistants was necessary. As far as possible the sea lions were restrained with their spine in dorsal flexion.

Blood was collected from one of the brachiocephalic veins by a blind punc-

¹ 655 Lower North East Road, Paradise, S.A., Australia, 5075.

² Institute of Medical and Veterinary Science, Adelaide, S.A., Australia, 5000.

ture method (Ridgway, pers. commun.; Sweeney, pers. commun.). The scapula-humeral joint and the manubrium sternum were palpated with the thumb and forefinger of the left hand. With the needle attached to the syringe, the skin was punctured mid way between the palpated landmarks and the needle directed towards the manubrium. When the tip of the needle reached the manubrium, the needle was "walked" dorsally to the edge of the bone and then thrust a further 1-1.5 cm into the animal.

Blood was collected using a 10 cm \times 15 gauge needle and 10 ml disposable syringe, and transferred to a 5 ml bottle containing dipotassium EDTA. Examinations were carried out within 24 hours.

Samples from 38 animals were examined and 10 different parameters were either measured or calculated. Erythrocyte (RBC) and leucocyte (wbc) numbers, haemoglobin (Hb) values, packed cell volume (PCV), mean corpuscular volume (MCV) and mean corpuscular haemoglobin concentration (MCHC) were determined using a Model S Coulter Counter.^[a] The differential leucocyte counts were determined from blood smears stained with Wrights Stain.⁹ One hundred leucocytes were counted. Smears were stained with New Methylene Blue for reticulocytes.

Females were classed as being in early lactation (pups weighing less than 20 kg); late lactation (pups weighing more than 20 kg), and non lactating.

RESULTS AND DISCUSSION

The methods used for restraint and blood collection proved more successful than those described by Palumbo *et al.*⁶ Blood could be collected without removing the animal from the bag and firmer neck restraint was possible.

The mean value and range for RBC's and WBC's are recorded in Table 1. In each case the mean value and range of values for the population sample as well as various subgroups within the sample are recorded.

Values for the total RBC and WBC counts fell within relatively narrow ranges and were similar to those recorded for the majority of non-marine mammals⁹ and marine mammals.^{3,7,12} The values are compared with those of marine mammals in Table 2. In some animals the RBC's had a central area of pallor but this did not appear to affect the MCHC. Less than 1% of reticulocytes were present in any of the smears examined.

The WBC counts suggest that bacterial infections are not a problem in the herd. However, the more aggressive, injury prone adult males were not examined.

A number of the females had some neutrophils containing well-defined structures similar to the female sex-buds described in other mammals. These were not present in the neutrophils of male animals examined.

The neutrophil-lymphocyte ratio varied remarkably between animals but without any significant difference between groups (Table 1). The values for circulating lymphocytes were lower than those recorded for most other mammals except possibly the dog.⁹ Griner² recorded relative lymphocyte counts in 3 Harbor seal (*Phoca vitulina*) as low as 9% with an absolute count of 1,206 mm.³ In this study absolute lymphocyte counts ranged from 1,196 to 5,974 mm.³

Eosinophil counts varied considerably, with absolute values ranging from 84 to 4773 mm.³ This suggests that internal parasites may be a significant disease problem in the herd as the animals appeared to be quite free of external parasites when examined at the time of bleeding. High eosinophil counts

[a] Coulter Electronics, Edith Road, London, W14, England.

TABLE 1. Erythrocyte and Leucocyte values for the Australian sea lion (*Neophoca cinerea*).

	Group (38)	Males					Females			
		Sub-adult Males (7)	Yearlings (8)	Total (23)	Late Lac- tation (6)	Early Lac- tation (13)	Non- Lactating (4)			
Erythrocytes ($\times 10^6$ per mm^3)	Range Mean	4.77-6.08 5.53	5.05-5.99 5.61	4.77-6.08 5.46	4.87-6.08 5.49	4.77-6.05 5.36	5.48-5.87 5.72			
Hb (gm%)	Range Mean	16.2-21.0 19.0	17.5-20.9 19.55	16.2-21.0 18.71	16.2-20.4 18.45	16.6-19.8 18.32	19.4-21.0 20.38			
PCV (%)	Range Mean	48.3-64.2 56.27	53.6-62.0 57.7	48.3-64.2 55.69	49.8-59.3 54.08	48.3-60.0 54.36	58.0-64.2 60.95			
MCV (μm^3)	Range Mean	96-112 102.9	100-109 103.8	96-112 103.2	97-108 101.6	96-108 102.6	103-112 107.8			
MCHC (%)	Range Mean	31.1-35.0 33.6	32.4-35.6 33.53	31.1-34.4 33.53	32.7-34.2 33.57	33.0-34.4 33.79	31.1-34.2 32.63			
Leucocytes ($\times 10^3$ per mm^3)	Range Mean	6.3-14.6 11.29	7.7-12.8 11.39	6.3-14.6 11.29	6.3-13.3 9.75	8.7-14.6 11.72	9.5-13.9 12.2			
Neutrophils (%)	Range Mean	31-83 56.3	33-83 51.5	31-76 56.9	31-76 57.0	38-76 56.1	46-76 59.3			
Lymphocytes (%)	Range Mean	12-59 31.0	14-56 39.6	12-59 29.6	17-59 35.3	12-49 27.1	13-35 29.8			
Monocytes (%)	Range Mean	0-7 1.7	0-5 1.4	0-7 2.0	0-4 2.2	0-7 2.5	0-2 0.5			
Eosinophils (%)	Range Mean	1-38 10.9	1-13 7.5	1-37 11.4	1-12 6.3	8-27 13.9	6-20 11.5			
N/L Ratio	Range Mean	0.5-6.2 2.44	0.6-5.9 1.9	0.5-6.2 2.5	0.5-4.5 2.0	0.8-6.2 2.8	1.4-5.8 2.6			

() Number of animals

TABLE 2. Comparison of erythrocyte and leucocyte values in the Australian sea lion (*Neophoca cinerea*) with published values for other pinnipedia

	Australian Sea Lion	California Sea Lion ^{11,12}	Harbor Seal ^{11,12}	Southern Elephant Seal ¹	Northern Elephant Seal ³
RBC (x10 ⁶ per mm ³)	4.77-6.08 (5.53)*	4.38±0.7	5.45±0.7	3.21-4.7	5.55±0.26
Hb (%)	16.2-21.0 (19.0)	15±2.1 12.6-14.7	19±1.3 34.4-38.6	—	—
PCV (%)	48.3-64.2 (56.3)	45±5 39-41	52±6 48-51	66-71	—
MCV (μm ³)	96-112 (102.9)	—	79.9-100	—	192
WBC (x10 ³ per mm ³)	6.3-14.6 (11.3)	9.23±1.55	8.01±1.0	12.21	9.52±1.85
Neutrophils (%)	31-83 (56.3)	64±13	60±21	—	55±11
Lymphocytes (%)	12-59 (31.0)	28±10	33±22	—	38±14
Monocytes (%)	0-7 (1.7)	4±2	4±2	—	3±1
Eosinophils (%)	1-38 (10.9)	4±4	1±1	—	4±1

*(mean)

have been recorded in various Odontocetes^{7,8} but not in Pinnipeds.⁷ However, Ridgway's⁷ values were from animals in captivity. The eosinophils were characterized by large numbers of very small round reddish staining

granules which occasionally had a bluish tinge. The granules were usually concentrated at one side of the cell and did not obscure the nucleus. Morphologically the eosinophils most resembled those of the sheep.

Acknowledgements

We are grateful for the assistance of Messrs. Paul Heap and Ken Munro of the Northfield Pig Research Centre who made the equipment used for catching and restraining animals; Dr. J.K. Ling and Mr. G. Walker of the S.A. Museum who assisted with the planning and conduct of the project. Dr. P.R. Harvey of the Department of Agriculture and Fisheries provided facilities and equipment and together with Messrs. J. Lehman, R.J. Clare and P. Pitkin assisted with the handling of animals. Mrs. Helen Schneemilch of the Institute of Medical and Veterinary Science assisted with the haematology and the co-operation of the National Parks and Wildlife Service of the S.A. Department of the Environment is also acknowledged.

LITERATURE CITED

1. BRYDEN, M.M. and G.H.K. LIM, 1969. Blood parameters of the southern elephant seal (*Mirounga leonina*). *Comp. Bioch. and Physiol.* 28: 139-148.
2. GRINER, L.A., 1971. Malignant leukemic lymphoma in two harbor seals (*Phoca vitulina geronimensis*). *Amer. J. Vet. Res.* 32: 827-830.

3. LENFANT, C., 1969. Physiological properties of blood of marine mammals. Ch. 4, In *The Biology of Marine Mammals*. S.H. Anderson Ed. Academic Press New York, U.S.A.
4. LING, J.K. and G.E. WALKER, 1976. Seal studies in South Australia: Progress report for the year 1975. *Sth. Aust. Nat.* 50: 4, 59-68.
5. MARLOW, B.J., 1968. The sea-lions of Dangerous Reef. *Aust. Nat. Hist.*: June 1968: 39-44.
6. PALUMBO, N.E., J. ALLEN, C. WHITTON and S. PERRI, 1971. Blood collection in the sea lion. *J. Wildl. Dis.* 7: 2-291.
7. RIDGWAY, S.H., 1972. *Homeostasis in the aquatic environment*. pp. 653-655. In *Mammals of the Sea - Biology and Medicine*. S.H. Ridgway, Ed. Charles C. Thomas, Springfield, Illinois U.S.A.
8. ROBINSON, A.J., M. KROPATKIN and P.M. AGGELER, 1969. Hageman factor (factor XII) deficiency in marine mammals. *Science* 166: 1420-1422.
9. SCHALM, O.W., N.C. JAIN and E.J. CARROL, 1975. Normal values in blood morphology with comments on species characteristics in response to disease. pp. 82-218. In *Veterinary Haematology* Lea and Febiger. Philadelphia, Pennsylvania, U.S.A.
10. STIRLING, I., 1972. Observations on the Australian sea lion (*Neophoca cinerea* (Peron)). *Aust. J. Zool.* 20: 271-279.
11. SWEENEY, J.C., 1974. Procedures for the clinical management of pinnipeds. *J. Am. vet. med. Ass.* 165: 811-814.
12. WALLACH, J.D., 1972. The management and medical care of pinnipeds. *J. Zoo. An. Med.* 3: 4, 45-72.

Received for publication 23 January 1978
