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ABSENCE OF BLOOD PARASITES IN BIRDS ON HERON ISLAND, GREAT BARRIER REEF

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INTRODUCTION

As part of an on-going study on the prevalence of haematozoa in Australian birds (Adlard *et al.* 2003), a small survey was carried out on a limited number of species on Heron Island. The results of that survey are reported here.

MATERIALS AND METHODS

Heron Island is located some 60 kilometres off the Queensland coast on the Great Barrier Reef in the western Pacific Ocean at 23°27'S, 151°55'E. Over a five day period from 18th February 2002, 104 birds were examined for the presence of blood parasites. The four species sampled were 30 *Anous minutus* Boie (Black Noddy: 7 Adult, 23 Juvenile), 30 *Puffinus pacificus* (Gmelin) (Wedge-tailed Shearwater: 29A, 1J), 29 *Gallirallus philippensis tournelierie* Schodde and de Naurois (Buff-banded Rail: 22A, 7J) and 15 *Zosterops lateralis chlorocephalus* (Latham) (Silver-eye: 13A, 2J). Sample sizes were restricted by licence to a maximum of 30 for each of the four species.

The Rails and Silver-eyes were caught in baited traps; the Noddies were hand-caught at the nest and the Shearwaters were hand-caught at night with the aid of a torch. Thin blood smears were made from peripheral blood collected from the brachial vein, except for the Silver-eyes where it was taken from a clipped toe. The blood smears were fixed in 100 per cent methanol for three minutes and stained with Giemsa at 1:10 in buffered distilled water at pH 7.2 for one hour. All smears were examined under a Zeiss microscope at ×100–×400 magnification. Any ticks observed were carefully removed for identification and examination. Giemsa-stained squash preparations of one larval tick were also prepared. Remaining ticks were preserved in 70 per cent alcohol. All birds were released after sampling.

RESULTS

No parasites were found in any of the stained blood smears. Four almost fully engorged larval argasid ticks were removed from the under wing of a juvenile Noddy and were identified as being *Ornithodoros capensis* Neumann. No parasites were observed in the stained preparations from the larval *O. capensis*, although undigested avian blood cells were readily identifiable. Hippoboscid flies were observed to fly from two of the Noddies being handled.

DISCUSSION

On many oceanic islands that lack any permanent source of fresh water, the usual insect vectors associated with transmission of many genera of avian haematozoa are absent. In such situations any potential vectors are limited to those which do not rely on fresh water in which to breed, but like hippoboscid flies live on the host for much of the time, or are seasonal feeders usually associated with nesting activity, such as acarines (ticks and mites). These latter parasites transmit species of *Babesia* and *Hepatozoon* (ticks), and *Atoxoplasma* (mites). Additionally they may also be vectors of a range of rickettsial and viral organisms. Hippoboscids may be vectors of *Haemoproteus* spp.

Staff at the Heron Island Research Station (HIRS) have observed a decline in the populations of Black Noddies and Wedge-tailed Shearwaters in recent times, although statistical data for this are lacking. However, this decline has coincided with an increase in the number and frequency of staff (and visitors) being bitten by ticks. Thus it could have been expected that a larger number of birds would be found to harbour ticks. A small number of larval ticks were found feeding only on one juvenile Noddy although some of the other juveniles showed evidence of recent tick feeding activity. Since acarine activity is generally nidiferous most birds become infected with haematozoa as nestlings and consequently parasites are usually easier to detect in these birds than in adults when latent infectons may predominate.

The absence of haematozoan genera transmitted by acarines in any of the birds does suggest that such parasites may be absent in the Heron Island populations. Although hippoboscid flies were observed to fly from two of the Noddies, no evidence of haemoproteid infection was found. In general, seabirds have low prevalences of haematozoa. On Aldabra in the Indian Ocean only a single Brown Noddy *Anous stolidus pileatus* (Scopoli) was observed with an intraerythrocytic parasite thought to be *Haemoproteus* (Lowery 1971). Shearwaters too seem to be relatively free of infection and the largest sample examined, 401 Manx Shearwater *Puffinus puffinus* (Brünnich) in the United Kingdom also failed to show any parasites (Peirce and Mead 1978).

There is only one report of haematozoa from *Gallirallus* spp., that of *Atoxoplasma* from a chick of the Stewart Island Weka (Laird 1959). The birds sampled during the present survey were all adults or late juveniles, so it is possible that subclinical infections with *Atoxoplasma* could have been present.

Perhaps the most surprising absence of parasites was in the Silver-eyes. Zosteropidae usually have relatively high prevalences of a range of haematozoa especially on Indian

Ocean islands (Lowery 1971; Peirce *et al.* 1977). Conversely, Laird (1959) found only *Atoxoplasma* in five of eight species from various South Pacific islands. However, Laird's samples were all prepared from cardiac blood of shot birds which possibly enhanced the detection rate of otherwise latent infections. To confirm the apparent absence of *Atoxoplasma* from the Heron Island Silver-eyes it would be necessary to sample nestlings.

The results of the study on Heron Island support the general observations from published data of similar surveys on oceanic islands, that there is a higher prevalence and diversity of avian haematozoa on Indian Ocean islands (see Lowery 1971; Peirce *et al.* 1977) than on Pacific Ocean islands (i.e. Laird 1959; Peirce and Brooke 1993; Steadman *et al.* 1990).

Ornithodoros capensis is known to be a vector of Soldado virus, an arbovirus isolated from ticks in the Seychelles (Converse *et al.* 1975) and incriminated as the cause of death and nest desertion in Sooty Tern *Sterna fuscata nubilosa* Sparmann colonies (Feare 1976).

Although no investigations into the presence of rickettsial or viral infections were performed during the present study, the results suggest that whatever the cause for the apparent decline in populations of some bird species on Heron Island, avian haematozoa are not involved.

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REFERENCES

Adlard, R. D., Peirce, M. A. and Lederer, R. (2003). Blood parasites of birds from southeast Queensland. *Emu* (in press).

Converse, J. D., Hoogstraal, H., Moussa, M. I., Feare, C. J. and Kaiser, M. N. (1975). Soldado virus from *Ornithodoros (Alectorobius) capensis* (Ixodoidea:Argasidae) infesting sooty tern colonies in the Seychelles, Indian Ocean. *Am. J. Tropical Med. Hygiene* **24:** 1010–1018.

Feare, C. J. (1976). Desertion and abnormal development in a colony of sooty terns *Sterna fuscata* infested by virus-infected ticks. *Ibis* **118:** 112–115.

Laird, M. (1959). *Atoxoplasma paddae* (Aragão) from several South Pacific silvereyes (Zosteropidae) and a New Zealand rail. *J. Parasitol.* **45:** 47–52.

Lowery, R. S. (1971). Blood parasites of vertebrates on Aldabra. *Philos. Trans. Royal Soc. London B* **260:** 577–580.

Peirce, M. A. and Brooke, M. de L. (1993). Failure to detect blood parasites in seabirds from the Pitcairn Islands. *Seabird* **15:** 72–74.

Peirce, M. A., Cheke, A. S. and Cheke, R. A. (1977). A survey of blood parasites of birds in the Mascarene Islands, Indian Ocean. *Ibis* **119:** 451–461.

Peirce, M. A. and Mead, C. J. (1978). Haematozoa of British birds IV. Blood parasites of birds from Wales. *J. Nat. Hist.* **12:** 361–363.

Steadman, D. W., Greiner, E. C. and Wood, C. S. (1990). Absence of blood parasites in indigenous and introduced birds from the Cook Islands, South Pacific. *Cons. Biol.* **4:** 398–404.