

Forum

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MALARIA IN CAVE-ROOSTING PERUVIAN BATS

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Limestone caves in the Tingo Maria valley in the Peruvian Amazonica are not very extensive. Most passages have become blocked by calcite for, within this region of high rainfall (1300 mm annually), deposition of calcite goes on at a very rapid rate. Since the caves are so small, many have no Dark Zone and they are of little interest to the sporting caver. However, they contain much to attract ecologists. Endangered echo-locating Oilbirds (*Steatornis caripensis*) roost in some, and these import food for a wealth of guanobious invertebrates.

Two species of cave roosting, insectivorous bats are common in the Tingo Maria caves. These are 5cm long sheath-tailed bats, *Peropteryx macrotis* and 10cm *Carollia perspicillata* Phyllostomatid bats. *Peropteryx macrotis* roost singly, that is usually more than 60cm from the next individual. They are most frequently found in the Entrance Zones of caves, and never beyond the limit of light penetration. *Carollia perspicillata* roost in colonies much deeper in.

One of the most extensive caves in the Tingo Maria area, La Cueva del Nido de Guacamayo (Macaw's Nest Cave), comprised just 238m of passage. It is situated at about 690m above sea level, overlooking the Rio Monzon within the Cueva de las Lechusas (Oilbird) Nature Reserve in the Bella Durmiente limestone massif. Surveys and details of the ecology of this cave have been published elsewhere (University of Southampton 1982; Wilson 1983). About fifty *Carollia* leaf-nosed bats were found roosting within La Cueva del Nido de Guacamayo around the limit of light penetration into the cave.

Beneath the *Carollia* roost was a pool of stagnant water 80cm deep. Larvae and pupae of *Aedes* mosquitoes were found in abundance in the water and adult *Aedes* were resting on the cave walls near the bat roost. These mosquitoes seemed to be spending their entire life cycle in the cave: the adult females take blood from the *Carollia* bats and the larvae feed in the guano-enriched water below the roost. If this *Aedes* mosquito population never needs to leave the cave, the males (which never bite and are normally sustained by nectar) would be unable to feed.

Fieldwork

Four individual *Carollia* and eight *Peropteryx* bats roosting in La Cueva del Nido de Guacamayo were captured and their ectoparasites removed. *Carollia perspicillata* was host to *Strebla curvata*, and *Peropteryx macrotis* to *Trichobius longipilus* ectoparasites. Both parasites were flies of the family Streblidae.

Blood samples were taken from each bat by cardiac puncture or by piercing a vein on the leading edge of the wing. Thin blood smears were made using a BDH blood film maker; these smears were air dried, fixed in methanol, dried again and sealed in a polythene box with silica as a desiccant. The slides were Gram stained on return to the UK by which time some slides had grown mouldy.

The blood smears revealed several life stages of haemosporidian protozoan parasites.

Unfortunately the parasites infecting three of the *Peropteryx* were in too poor a condition to be identified beyond doubt but those infecting all four *Carollia* resembled *Polychromophilus* "bat malaria" (R S Bray, pers. comm., 1983). The material collected was insufficient to make a more precise identification than this.

Only one or two parasites were seen per slide, indicating that the intensity of haemosporidia infecting the *Peropteryx* bats was very low. Less than half of the *Peropteryx macrotis* were infected.

All four *Carollia* were infected with haemosporidia. These were *Polychromophilus*-like parasites which were present in greater numbers than noted in the *Peropteryx* bats. In *Carollia* less than one red blood cell in 100 contained parasites (ie a parasitaemia of less than one per cent). The fact that all *Carollia* bats examined were infected implies that there was ample opportunity for transmission to occur in such a close community. It is likely that the *Aedes* mosquitoes present in the cave were acting as the vector for these *Polychromophilus*-like parasites.

Neither bat species appeared to be suffering any ill-effects from their parasites. The parasites discovered in these Peruvian bats are almost certainly undescribed species, *Polychromophilus*-like haemosporidia being exceedingly rare in bats from the American continent although they are well known in Old World bats (Garnham 1973). These parasites are among the hundred or so species of malaria-like organisms which infect mammals; they are akin to the five malaria species which cause disease in man. Fortunately these parasites are very host specific so bat malarias are not infective to man nor can human malarias infect bats.

Bats and bat ectoparasites are held at the British Museum (Natural History), London SW7 5BD; duplicate bat specimens and the *Aedes* have been deposited at the Natural History Museum in Lima: Museo de Historia Natural "Javier Prado", Av. Arenales 1256, Lima 14.

This work was carried out during the 1982 Southampton University Peru Expedition which was partially funded by the W.A. Cadbury Charitable Trust and the Gilchrist Educational Trust. The laboratory work was carried out at the Southampton Medical School Pathology Dept. British Drug Houses (Poole) kindly donated the blood film spatulae, and Chance Proper microscope slides. We are indebted to J E Hill and Tony Hutson of the British Museum, London, for promptly identifying the bats and insects respectively and to Drs R S Bray (Imperial College, London) and J R Baker (ITE Culture Centre of Algae and Protozoa, Cambridge) for looking at the parasites.

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Received August 1988

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