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HEAT REGULATION IN THE GREAT-BILLED HERON *Ardea sumatrana*

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The Great-billed Heron *Ardea sumatrana* may suffer heat stress while feeding. This may result in a conflict between the needs to feed and to regulate temperature.

INTRODUCTION

There is little information about herons in Australia, apart from papers by Hindwood (1933), Recher and Recher (1968, 1972), Recher (1972a, b), Lowe (1983) and Recher *et al.* (1983). Gill (1979) describes the display of the Great-billed Heron, a species occurring from Australia to South-east Asia. The following account is of an opportunistic observation that I have interpreted as heat regulation in this species.

SITE AND WEATHER CONDITIONS

Middle Arm Jetty consists of an improvised

boat ramp on the right (north-east) bank of the Blackmore River, which merges into Haycock Reach and Middle Arm, Port Darwin, Northern Territory. The waterway is lined with mangroves, and the locality, about 14 km west of the Stuart Highway, is rarely visited except by fishing parties, birdwatchers and museum collectors.

On 13 April 1983 I arrived at the boat ramp at about 1300 hr. A Bushnell 600 mm telescope fitted with a 25× eyepiece was set up on a tripod to scan the mangroves on the left (south-west) bank of the river, which is about 400 m wide at this place.

The weather was clear, with a temperature and relative humidity in Darwin (about 30 km NNW) at noon of 29°C and 62 percent respectively. Low tide in Darwin was 1.82 m at 1243 hr. The monsoon season had started very late but had average 'wet' rainfall. A gentle breeze was noted.

OBSERVATIONS

Just after low tide, a Great-billed Heron walked out of a creek mouth draining the mangroves on the left bank of the river almost opposite the boat ramp. It fed for about 20 minutes by 'walking slowly' and 'standing and waiting' in shallow water (Kushlan 1976, Hancock and Elliott 1978), and then disappeared, probably moving into the mangroves.

At 1430 hr a Great-billed Heron was seen at the same creek mouth, standing in shallow water with its wings extended at right angles from the body and turned to bring the tips of the flight feathers almost down to the water. In this position the entire underwing surfaces were exposed to the sun. Some underwing coverts were seen fluttering in the wind, and the flight feathers were slightly twisted, allowing passage of air between the feathers. The fluttering coverts and other plumage appeared to be dry. The neck was held erect, with the head at right angles to the neck, the bill gaping, and the gular pouch quivering rapidly.

I watched the heron for 26 minutes and recorded the following behaviour:

In water, exposed to the sun as described (5 min.);

In mangrove, standing and gaping with wings obscured (5 min.);

In water, exposed to the sun as described (3 min.);

Feeding by 'walking' and 'waiting' method (8 min.);

In water, exposed to the sun as described (5 min.).

At about 1500 hr, the bird walked up the creek, probably to keep up with the top of the rising tide, and was almost immediately lost from sight.

DISCUSSION

Kushlan (1976) and Hancock and Elliott (1978) describe feeding postures of some heron species in which shade from a wing canopy may facilitate location and capture of prey. During my Middle Arm observation, the underwings faced the sun and no shadow was cast underneath or ahead of the wings. The bird's stance, together with the vertical position of the neck with the bill at right angles, does not match any of the feeding techniques described by Kushlan (1976) or Hancock and Elliott (1978). The gaping and gular pouch quivering indicated cooling.

The noon temperature in Darwin of 29°C on 13 April was close to the April mean day temperature for Darwin of 28.3°C. Neither this temperature, nor the relative humidity of 62 percent, was excessive for the area, and would have fallen when the observation was made between 1430 and 1500 hrs. However, these are shade readings. Given a difference of 20°C between mean sun and shade readings in Sydney, it might reasonably be expected that the foraging Great-billed Heron was exposed to a temperature of about 50°C before allowing for the cooling effect of the wind blowing over the water, which could not be measured.

CONCLUSION

I inferred from the rapid panting and gaping, and from the absence of shadow under or ahead of the wings, that the position of the wings was related to heat regulation and not to location and capture of prey. I considered that a conflict existed between the need to feed on the low tide and the need to regulate body temperature while foraging in the sun. Although shade was available in the mangroves, a satisfactory degree of heat regulation must have been achieved by opening the wings in a breeze blowing over the open water.

It is interesting that H. F. Recher (pers. comm.) has made observations of Great Blue Herons *A. herodias* in Florida, United States, holding the wings to form a 'solar bowl' on cool to cold sunny days, the birds appearing to be sun-baking for warmth.

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REVIEW

Atlas of Victorian Birds. W. B. Emison, C. M. Beardsell, F. I. Norman and R. H. Loyn. Graphics and analyses by S. C. Bennett, 1987. Department of Conservation, Forest and Lands, and Royal Australasian Ornithologists' Union, Melbourne, Australia. 271 pp. \$25.00

Atlas of Victorian Birds is based on the records of the Royal Australasian Ornithologists' Union's Atlas of Australian Birds, collected during 1977-1981, to which are added nearly 65 000 more records compiled by the National Parks and Wildlife Division of Victoria, Department of Conservation, Forests and Lands (formerly Fisheries and Wildlife Services, Ministry of Conservation). This expands the duration of data collection from January 1973 to June 1986.

The distribution of species is depicted in maps of 10 minute grids, together with graphs and tables of reporting rates. An extensive introduction defines the scope, scale and taxonomy

of the work, together with explanations of the species' accounts. As well as a general map of Victoria, three figures outline rainfall, elevation and physiographic regions. There are detailed tables describing terrestrial and aquatic habitats, followed by comprehensive information on the 22 physiographic regions; metropolitan Melbourne to a radius of 30 km is included as an area highly modified by human population. A gazetteer is provided.

The 229 species are generally presented two per page, but this is occasionally increased with distribution maps excluded for rarely reported species, mostly pelagic seabirds. The publication achieves a high degree of clarity, but the benefits of this are somewhat reduced by the small scale of the maps. This results in patterns of distribution being clearly depicted, but leaving the final interpretation of [more exact] locality to the reader. An overlay of vegetation zones would have been a useful accessory.

The distribution maps and text raise some interesting questions, two of which are briefly noted here. There is strong evidence in the literature of a seasonal movement by Olive Whistlers *Pachycephala olivacea*, but this does not explain the isolated population in western Victoria. My personal records included two individuals of this species during two visits to the same place on a ti-tree-lined creek, about 38°34'S., 142°55'E., in May 1985 and October 1986. Formerly the Heytesbury Forest, now cleared for agriculture, would have been suitable habitat for the species. The extent of this area was described by Donald MacLean, who, writing of the view from the top of Mt Leura (38°14'S., 143°09'E.) in 'The Man from Curdie's River', said, "the waving tops of innumerable trees . . . this Heytesbury Forest Country stretches south from the mountain to the sea". Future investigation of the remaining creekside thickets may show Olive Whistlers are more widely distributed than shown in the Atlas.

Perusal of the text also suggests other areas of research. In Sydney, Grey Butcherbirds *Cracticus torquatus* are found in sclerophyll forest with a dense understorey, where this cryptic species exploits all the habitat for food, even behaving like a flycatcher to take insects on the wing. Bulky items are not impaled on a spike, but are secured for butchering [dismembering] in favoured wedges in broken or dead branches. Is the citation of spiking in the Atlas text a repetition of an old error, or are there variations in the behaviour of individuals of the same species?

The Atlas of Victorian Birds could be protected against hard wear by the addition of a self-adhesive vinyl to the soft cover. This work will serve as a useful reference, most particularly for the information on plants and physiography. The RAOU's Atlas of Australian Birds of course is a major source of material and the Victorian Atlas is thus best used as a companion to that publication.

Copies are obtainable from the Royal Australasian Ornithologists' Union, 21 Gladstone Street, Moonee Ponds 3039, or from the Department of Conservation, Forests and Lands Information Centre, 240 Victoria Parade, East Melbourne 3002.

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