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FOOD OF WINTERING CATTLE EGRETS *Ardea ibis*

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Regurgitates and oesophageal contents from five Cattle Egrets *Ardea ibis* found dead under powerlines near a winter roost in northern New South Wales were analysed. The major prey components (by number) were orthopteran insects (42.8%), spiders (22.6%), flies (22.0%) and lepidopterans (7.9%). Both the range of prey, and those types comprising the major components, were similar to that previously reported taken by breeding Cattle Egrets, although there were some differences in the relative proportions. Although based on only a small sample the results suggest that prey eaten by non-breeding birds wintering within the egrets' breeding range in north-eastern New South Wales is similar to that consumed in summer.

INTRODUCTION

The prey taken by breeding Cattle Egrets *Ardea ibis* in coastal eastern Australia has been the subject of detailed studies conducted at heronries in the Lockyer Valley, south-eastern Queensland, and in the Hunter Valley, eastern New South Wales (NSW) (McKilligan 1984; Baxter and Fairweather 1989; McConnell and McKilligan 1999). These studies primarily sampled the food fed to nestlings, obtained as boluses regurgitated by advanced chicks. McKilligan (1984) also examined the alimentary canal contents of twenty-one adults shot at the heronry. There are no published Australian data on the diet of Cattle Egrets outside the breeding season (Marchant and Higgins 1990; McKilligan 2005).

Cattle Egrets in eastern Australia are summer breeders (mainly present at heronries between October and March), dispersing in autumn and returning in spring. Cattle Egrets may be sedentary or migratory, with the recovery of marked individuals indicating those from south-eastern Queensland and northern NSW tend to winter south of their natal heronries, primarily along coastal eastern and south-eastern Australia (Marchant and Higgins 1990; McKilligan *et al* 1993).

Between 1993 and 2007 trees beside a small dam close to my residence at Goolmangar, near Lismore, in the Richmond Valley in north-eastern NSW, were used annually as a winter roost by up to 100 Cattle Egrets. The roost was used mainly between May and October, although in some years birds were present from late January. The closest active heronries during the period 1993–2007 were at Ballina and (briefly) Casino, respectively 35 kilometres ESE and 25 kilometres SW of Goolmangar (Gosper and Holmes 2002).

Periodically Cattle Egrets were found dead or injured below powerlines about 200 metres from the Goolmangar roost. This report presents an analysis of material recovered from the stomachs of egrets that struck the lines.

METHODS

Incidental observations of movements by groups of Cattle Egrets to and from the roost were made on an almost daily basis as a consequence of the roost's proximity to my residence. For much of the year egrets dispersed north up the Goolmangar Creek valley in the mornings, returning in small flocks late in the afternoon. Returning groups typically flew low over pastures on the floodplain, travelling more or less parallel to the creek. At a point about 300 metres north of the roost, the creek, fringed by a tall riparian zone, deviated to the eastern edge of the floodplain. Here the returning egrets passed through a narrow gap in the trees, cleared and maintained around powerlines running north – south over the creek. Once through this opening the birds passed low over a second set of powerlines, running east – west across the Goolmangar Creek floodplain, before being forced to gain elevation to clear a belt of dense, leafy trees about 80 metres beyond and parallel to the lines, as they continued directly to the roost. Whereas egrets departing the roost in the morning initially moved off in rather loose formations and flew much higher, returning birds flew in tight formations, low and direct, following the same flight path each afternoon for many weeks at a time.

A total of twelve egrets was found dead or injured below the powerlines during the period reported on here. All were found under a 60-metre section of dual cable powerline, immediately adjacent to my residence, which lay directly in the flight path of egrets returning to the roost in the evening. Injured birds found in the evening were placed in a box overnight and two that survived were successfully released the following morning, apparently having been concussed but not having suffered permanently debilitating injury. Birds discovered in the morning, most likely having struck the lines the previous afternoon, were invariably dead. In two instances the carcasses, when found, had been partially eaten, most probably by foxes.

Prey items were recovered from five egrets in the form of regurgitates from injured birds, and by dissection of birds found dead. Regurgitates were collected from two apparently concussed birds held overnight, and two boluses were located on the ground beside a third bird when found approximately three hours after its probable time of injury. Two of the dead birds were collected and frozen, with the oesophagus later removed. The intact oesophagus, from a bird found partly eaten, was also removed but found to be empty. Samples were stored in alcohol for later analysis.

RESULTS

Most collisions appeared to involve single birds (i.e. one bird only found dead or injured), but in two instances two birds were found close together under the lines. During casual observation of egret flocks returning to the roost, 'near misses' were witnessed on a number of occasions when birds were seen to swerve at the last moment to avoid the lines. On 17 May 1995 an actual collision was observed when one of a flock of about 20 birds struck a cable at 1733 hours and tumbled to the ground. The bird was stunned but otherwise uninjured, the only physical evidence of the impact being the loss of feathers from an area two centimetres by one centimetre on the forehead. On another occasion, when two birds were discovered in the late evening (2140 hours), one had apparently recovered sufficiently to fly off when an attempt was made to capture it.

From the samples collected, a total of 318 prey items (minimum number of individuals by head count) was identified, together with an amount of fragments, some unidentifiable (Table 1). The number of individual prey items identified per sample ranged from 34 to 93. Contents were almost entirely animal, comprising spiders, insects, and reptiles. Overall, orthopteran insects comprised 42.8 per cent (by number) of prey items, spiders 22.6, flies 22.0 and Lepidoptera 7.9. Single pieces of green grass (ca. 40 mm in length) were also present in samples B and E.

Orthopterans and spiders were the major components in all samples except E, which contained a large number of very small bush flies in addition to many fragments (grasshopper, beetle, moth (adult and larvae) and cockroach) that could not be scored individually. Lesser numbers of Lepidoptera larvae and flies were also represented in all or most samples. In four of the five samples (A–D) the relative proportions of major prey types were similar: orthopterans 51.7 per cent (range 47.3 - 56.4%), spiders 25.8 (21.8–30.1%), lepidopterans 10.3 (6.3–14.7%) and flies 6.7 (0–9.1%).

TABLE 1

Stomach contents of five non-breeding Cattle Egrets found dead or injured under powerlines at Goolmangar, north-east New South Wales, between 1993 and 2007.

Animals	**Specimens by date of collection** (contents listed as minimum number of individuals by head count) A# (17/05/95)	B# (14/06/04)	C (14/06/04)	D (02/10/05)	E# (17/10/05)	Percentage of total (n=318)
Arachnids						
spiders	28	22 (+ 1 sac)	12	8	2	22.6
Insects						
Blattodea						
cockroaches	2	2	0	1	frag.	1.6
Mantodea						
mantids	1	0	0	0	0	<1.0
Orthoptera						
crickets	3 (+ frag.)	0	7	0	2	
grasshoppers	41	42	24	17	frag.	42.8
Hemiptera						
cicadas	1	0	0	0	0	<1.0
Coleoptera						
beetles	2	0	0	3 *(Heteronychus arator)*	frag.	1.6
Lepidoptera						
moths	0	0	0	4	frag.	
larvae	7	5	7	1	1 (+ frag.)	7.9
Diptera						
flies	8	7	5 (blowflies)	0	c. 50 (small bush flies)	22.0
Hymenoptera						
ants	0	0	0	0	1 (flying ant)	<1.0
Reptiles						
skinks	0	1 *(Lampropholis delicata)*	0	0	1* (forepart only)	<1.0

regurgitates * species unidentified

DISCUSSION

In egrets returning from foraging pastures to evening roosts most food is likely to be held in the oesophagus (cf. McKilligan 2005). Once food has entered the digestive tract it may be affected by differential digestion, however in birds such as egrets, food recovered from the oesophagus is not likely to be significantly affected, and prey items are mostly intact (Baxter and Fairweather 1989; McKilligan 1984). Oesophageal contents from birds found dead may have been subject to post-mortem digestion (cf. Briggs *et al* 1985 and authors cited therein). Some samples may also have been incomplete as in most instances birds were not found until several hours after the time of collision, or the following morning, and food may have already been disgorged as a result of being concussed (and not detected as the bird may have moved).

The results of the limited sampling of stomach contents described here suggest that the diet of non-breeding Cattle Egrets wintering within the species' breeding range in north-eastern NSW is essentially similar to that of breeding birds in summer. At heronries in south-eastern Queensland and eastern NSW orthopterans, spiders, reptiles, frogs and flies are important food items for both nestlings (D. Gosper unpub. data Gillett's Ridge heronry 1966; McKilligan 1984; Baxter and Fairweather 1989) and adults (McKilligan 1984). As in prey taken by breeding egrets, orthopteran insects constituted the largest component in this study. Spiders, however, were relatively more numerous (22.6% in this study compared with 3.1% in adults in the Lockyer Valley (McKilligan 1984)), as were flies and lepidopterans. No frogs were found in the stomachs of wintering birds.

Apparent differences in the proportions of the major prey components between summer and winter probably reflect differences in the relative abundance of the prey types in local pastures at different times of year, rather than a seasonal shift in prey preferences. It has been reported that (Australian) Cattle Egrets wintering in New Zealand, consume mainly earthworms (Heather 1982), and that in South Africa, birds spending the non-breeding season in winter rainfall zones also switch to a diet of mainly earthworms (Siegfried 1971). McKilligan (1984, 2005) suggests that Cattle Egrets moving from the species' breeding range to the primarily winter rainfall areas of south-eastern Australia over winter may exhibit a similar seasonal change in food preferences. Further data from throughout the Cattle Egret's wintering range are needed in order to more fully understand the species' diet.

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