

NOTES ON CATTLE EGRET BREEDING

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THE Cattle Egret (*Bubulcus ibis*) has been reported in all of the continental United States and in most of the southern provinces of Canada. Breeding colonies are established throughout the coastal Gulf states, along the Atlantic seaboard, as far north as Wisconsin and Ontario, and westward in Texas, Oklahoma, Arkansas, and California. The Cattle Egret's extension of range has been well documented, but very little information has been published on its reproduction.

METHODS

I studied a breeding colony of egrets on several small islands in Lake Griffin on the northeast corner of Lake County, Florida during the nesting seasons of 1970 through 1972. The dominant vegetation on the islands, and that used for most nesting, was Florida elder (*Sambucus simpsonii*). The colony contained approximately 150 nests each year. I watched the birds daily in 1971 during the height of the nesting season from 17 April to 4 June from a blind built in the colony where nest concentration was heaviest the year before. I took about 2400 35-mm color transparencies of the birds' activities.

Some 20 active nests were within 4 m of the blind. Nests were marked with colored surveyor's tape; eggs in marked nests were measured (length and maximum width), weighed on a triple beam balance, and marked with individual numbers the day they were laid. Eggs from 22 others nests were measured and weighed for a total of 103 sets of egg data. Egg and nesting counts were made in other parts of the heronry in an effort to detect possible lower reproduction success in nests near the blind. On the day each chick hatched in a marked nest, it was weighed and distinctively toe clipped. All surviving chicks were leg banded with a USFWS band. In 1971 we banded 100 chicks and in 1972 we banded 200.

RESULTS AND DISCUSSION

Clutch and egg size.—Mean clutch size in 36 nests was 2.86 eggs per nest with a range of 2 to 5 (1 nest). Blaker (1969) in a survey of 155 marked nests of Cattle Egrets near Cape Town, South Africa found the same mean clutch size (2.86). Dusi and Dusi (1968) in an Alabama study gave the clutch size as 2.42 in 50 nests.

The mean clutch size of the nests from which eggs were measured in the immediate area of the blind was 2.7 (14 nests), while clutch size on other parts of the island averaged 2.95 eggs per nest (22 nests).

The light blue eggs had a mean weight of 24.0 g with a range of 19.0 to 28.4 g. Mean dimensions of the 103 eggs measured were 33.4 by 43.4 mm with a range of 30.0 to 34.5 mm in width and 40.0 to 49.0 mm in length. Dusi (1966) measured 73 eggs and reported dimensions in width of 30.8 to 35.1 mm and length from 41.3 to 49.0 mm.



Fig. 1. Size difference in chicks 5, 7, and 9 days of age.

Incubation period.—Eggs were laid at 2-day intervals. Incubation began when the first egg was laid, and the eggs hatched at 2-day intervals in the same sequence they were laid. Mean incubation period of the individual eggs was 24 days. Of 32 marked eggs, 25 hatched in 24 days, 1 hatched in 23 days, 2 hatched in 25 days, 1 failed to hatch, and 3 eggs disappeared from the nest during incubation. Palmer (1962: 447) states the exact incubation (using marked eggs) as unknown. His

references includes estimates of 21–24 days, 26 days, 25 days or 26 days, and about 3 weeks. Blaker (1969) reported incubation periods of 22 to 26 days with a mean of 23.7 days in 20 eggs. In 61 nests observed by Blaker (1969) 17.6% of the eggs disappeared and 17.8% failed to hatch. Egg mortality was 35.4%, much higher than the 12.5% in this study.

Chick size and survival.—Newly hatched chicks weighed from 16.1 to 25.8 g with a mean of 20.7 g in 41 chicks weighed. Of the 28 live chicks hatched in the marked nests, 20 fledged for a mean of 1.8 per nest.

In nests where three chicks hatched, the last hatched rarely lived. The asynchronous pattern of egg-laying and hatching gives a decided advantage to the first chick. It begins to eat first and is larger and dominant over those that hatch later (Fig. 1). Blaker (1969) found in South Africa that the third or fourth chick usually died of starvation on about the 10th day after hatching.

In one nest chicks that hatched 11 May, 13 May, and 15 May were weighed at hatching, on 16 May, and again on 25 May. On 16 May the last hatched (1-day-old) was the same weight as at hatching, the second had doubled its weight in only 3 days, and the first hatched had tripled its weight in 5 days. The smallest chick remained about the same size for the next 4 days and then disappeared. When the two older chicks were weighed 14 days after the first had hatched, their weights had each tripled in the 9 days. The remains of the third chick were found at this time mashed into the floor of the nest.

Feeding behavior.—The parent bird teaches the first chick to eat soon after it hatches by offering it a regurgitated bolus of food in the partially opened beak (Fig. 2). It touches the bolus to the chick's beak until the chick is stimulated to peck at it, swallowing part and dislodging some that falls into the nest. The chick picks up and swallows much of this material from the nest floor. The parent bird eats any food not consumed by the chick. In 2 to 5 min another portion is offered, and the process continues until the chick refuses further offerings.

By the time the second chick is hatched the first is eating well. I never saw an adult teach the second or third chick to eat. They apparently learn to eat by imitating the older chick and picking at scraps dislodged by the older bird's feeding.

By the time the first chick is 4 to 5 days old it aggressively grasps the beak of the adult, pulls its head down to stimulate regurgitation, and is able to receive the bolus and swallow it directly from the adult bird's beak (Fig. 3). The older chick will peck at the head of its smaller nest mates and often forces them to retreat from the adult bringing food. The later hatched birds stand little chance of obtaining food until the oldest is satisfied, then the next in size has a chance to eat.



Fig. 2. Adult offering first hatched chick a regurgitated bolus of insects. The bolus is held in front of the chick stimulating it to peck and swallow the material.

My notes from 19 May illustrate this point. "Watched adult feeding three chicks in nest, ages 6 days, 4 days, and 2 days respectively: 6-day-old chick received the first five boluses the adult delivered. The 4-day-old bird captured the sixth and seventh boluses. Only a portion of the seventh bolus dropped by the 4-day-old chick reached the 2-day-old bird. Did not see the adult that stood on the edge of the nest deliver any further food. The two largest chicks settled contentedly on the nest, while the youngest continued begging cry for food." Two days later the youngest bird was gone from the nest.

The newly hatched chicks were brooded constantly by one parent for about 14 days. By the time the chicks are 14 to 21 days old, both parents spend the daylight hours foraging and leave the chicks unattended, the same behavior noted by Blaker (1969) and Siegfried (1972) in South Africa. At this age, the chicks frequently left the nest but stayed near, often meeting the returning parents with increased excitement, begging postures, flapping wings, and calling—apparently distinguishing their parents from the other adult birds.

At 5 to 6 weeks of age, the chicks seemed as large as their parents. They attacked the adults so violently to stimulate regurgitation that they and the parent sometimes fell to the ground. The parents attempted



Fig. 3. The oldest chick grasping the adult's beak in beak-grab feeding. The bolus passes directly to the chick.

to avoid the violent confrontations by darting into the nest area, regurgitating in beak-grab feeding rapidly, and leaving immediately.

The 5-to-6-week-old chicks defended the nest area from other egrets but did not attack their brood mates except during feeding. At this age the juveniles were able to fly, but spent the day in the tops of the elders within 1 to 2 m of the nest, returning to the nest occasionally to rest.

Development of nestlings.—Several color changes in body parts appear as the chick matures. The light yellowish beaks, legs, and irises at

hatching darken during the first 3 weeks of life. These early beak color changes from yellow to black were also noted by Blaker (1969) and Siegfried (1972). At 3 weeks of age the iris has lost much of its pale yellow color and is light gray. Only the tip of the beak remains a light yellow. The legs are greenish black at 3 weeks and black by 5 weeks of age. At 5 weeks the iris is steel gray.

At age 5 to 8 weeks these parts change again. The iris takes on a yellowish tinge that progresses to the yellow of adult irides. The beak begins to change from black to yellow. Starting at the tip the color becomes yellowish green, then changes in the lower mandible and ventral edge of the upper beak. Last to change is the dorsal portion of the beak, and some birds show dark spots in the culmen for some time. The distal tibia changes to greenish yellow, but the tarsus and feet remain black, in contrast to the adult's yellow tarsus.

The tarsus of the adult birds is dark during the fall and winter, changing to the deep red during courtship. During nest building and egg-laying the tarsus of the adult fades to orange, then to yellow, and remains lemon yellow during the entire brooding period. Although the 6- to 8-week-old birds in the colony were about the same size as the adults, it was easy to distinguish them by tarsus color.

Nesting period.—The nesting period of this colony was long. The first eggs were noted 21 April and eggs were still present 18 July 1971. This extended period doubtless protects against loss of all the year's young from a single catastrophe such as a windstorm or a heavy rain.

Interspecific competition.—Great Egrets (*Casmerodius albus*), Snowy Egrets (*Egretta thula*), Anhingas (*Anhinga anhinga*), and Louisiana Herons (*Hydranassa tricolor*) began nesting in the colony several weeks before the Cattle Egrets, and there was little interspecific competition for nest sites. The Cattle Egrets were much more aggressive towards their own kind than they were to the other species. I saw no case in which a Cattle Egret drove one of the other species from its nest. In contrast, I saw two cases of nesting Snowy Egrets driving Cattle Egrets away from their nests. In many cases Snowy Egrets and Louisiana Herons nested successfully within 20 cm of a Cattle Egret nest. Dusi (1968) felt that general chaos accompanying the roosting of Cattle Egrets caused the destruction of poorly constructed nests of Little Blue Herons (*Florida caerulea*) in Alabama. This I never saw in my colony. Dusi and Dusi (1968) noted that the Little Blue Heron nested first and that there was little strife between the species. Jenni (1969) in a 3-year study at Lake Alice near Gainesville, Florida also concluded that nest competition between Cattle Egrets and other herons was not significant.

Jenni (1969) and Fogarty and Hetrick (1973) both showed that no

competition exists between Cattle Egrets and other herons and egrets for food. Apparently the increase in Cattle Egret numbers is not at the expense of these species, but rather a response to an available empty ecological food niche.

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SUMMARY

Nesting Cattle Egrets were studied from a blind in a colony on a small island in central Florida during 1970, 1971, and 1972. Clutches were two to five eggs (mean 2.86). The fresh weight of eggs was 19 to 26.5 g (mean 24.0 g). Newly hatched chicks weighed 16.1 to 25.8 g (mean 20.7 g). Hatching and fledgling success were 87.5% and 71% respectively. Eggs were laid at 2-day intervals and hatching was asynchronous 2 days apart; incubation period was 24 days. Changes in beak, iris, and leg color in young birds are described. Cattle Egrets did not compete for nesting material or nest sites with other waterbirds nesting in the same colonies and did not exhibit notable aggression toward other species nesting nearby.

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