Species Composition of a Mixed Ardeid Colony on Grand Lake, Oklahoma

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The cattle egret *(Bubulcus ibis)* is endemic to Africa but is naturally colonizing North America (1). The first documented record of cattle egrets in North America occurred in Florida in 1954, although undocumented sightings were reported as early as 1941 (2). Since 1954, the range of cattle egrets has expanded to include much of the United States and southern Canada (1). The first documented observation of the cattle egret in Oklahoma was in 1962, and nesting attempts by a few pairs were noted in 1963 (3). Currently, cattle egrets nest in multispecies heronries in Oklahoma (4).

A rapid expansion of a nonendemic species could have adverse impacts on ecologically similar species. Such impacts would be most pernicious if the invading species excluded an endemic species from a limited resource (e.g., nesting sites). Although herons and egrets often nest in large colonies (5, 6), some evidence suggests that nestsite competition can occur between cattle egrets and the endemic little blue heron *(Egretta caerulea).*

Our study provides baseline data on species composition in a heronry used by cattle egrets, little blue herons, great egrets *(Casmerodius albus),* and snowy egrets (*E. thula*). The heronry was located on Weed Island (36°37'N, 94°50'W) in Grand Lake, Delaware County, Oklahoma. Islands of similar size (ca. 2 ha) and shape occurred on the lake, but no additional heronries were noted. Great blue herons *(Ardea herodias)* and green-backed herons *(Butorides striatus)* were observed on the lake but did not use the heronry.

Observations were made from April through August 1987 from a boat about 60 m from the perimeter of the island. On 5 June at 1100 hours, we randomly selected 20 trees that were visible from the boat to determine the relative proportions of nesting egrets and herons and the number of young/nest. Only nests that were attended by adult birds were recorded. When the heronry was vacant by 31 August, we surveyed the island on foot to make a complete count of nests. Proportional data from the 5 June sample and the total count of nests were used to calculate the total number of nests/species. The number of young/nest multiplied by the number of nests/species provided an estimate of the number of offspring/species as of 5 June.

Nesting by great egrets was first observed on 17 April. By the end of April, all species of egrets and herons that used the heronry were actively nesting. The only vertical stratification of nests that we observed was greater use of tree tops by great egrets compared to other species. Cattle egrets were noted primarily in button bush *(Cephalanthus occidentalis),* but also in sycamore *(Platanus occidentalis)* and willow *(Salix* spp.*).*

We enumerated 522 nests (77 great egrets, 32 snowy egrets, 406 cattle egrets, and 7 little blue herons) on 5 June (Table 1). The number of offspring/nest ranged from 2.4 for great egrets to 4.1 for snowy egrets. We counted 2,088 nests on the entire island at the end of August. Cattle egrets accounted for 80% of the offspring in the heronry on 5 June (Table 1).

Our decision not to enter the heronry until the young fledged was made to eliminate unnecessary mortality; human disturbance can cause young to panic and fall from nests. We acknowledge that this decision may have biased our 5 June sample because the pro-

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TABLE 1. Species composition of herons and egrets on Weed Island in Grand Lake, northeastern Oklahoma, 1987.

Species	Nests counted 5 June (%)	Total number of nests[a]	Young/nest on 5 June	Total young on June 5[b]
Great egret	77(14.8)	309	2.4	741
Snowy egret	32(6.1)	127	4.1	520
Cattle egret	406(77.8)	1624	3.3	5359
Little blue heron	7(1.3)	27	2.6	70

[a] Nest proportion from 5 June sample × total count of 2088 nests on 31 August.
[b] Estimate as of 5 June; total number of nests × young/nest.

portion of nesting birds on the island's perimeter may not represent that of the interior. Cattle egrets have been noted in greater densities toward the interior of heronries than around the perimeter (5). Nevertheless, our estimate of the number of offspring/species on 5 June indicated that cattle egrets were the most fecund species in the heronry; e.g., we counted 76.6 cattle egret offspring for every one little blue heron offspring (Table 1).

The large number of cattle egrets did not seem to influence nesting success of great egrets because they arrived in the heronry first and selected tree tops to nest- perhaps due to their size and inability to fly unimpeded at lower levels on the island. Snowy egrets aggressively defend territories in communal nesting colonies (6) and therefore are not likely affected by cattle egrets. On the other hand, little blue herons are subordinate to cattle egrets (6) and were the least numerous nesting species in the heronry (Table 1). Unfortunately, nesting success of little blue herons prior to the arrival of cattle egrets in the Grand Lake area is unknown. Nevertheless, we speculate that cattle egrets could have a negative impact on little blue herons through usurpation of suitable nesting sites.

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