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## NOTES

**OBSERVATIONS OF LITTLE BLUE HERONS NESTING IN NORTH DAKOTA, AND AN INSTANCE OF PROBABLE NATURAL HYBRIDIZATION BETWEEN A LITTLE BLUE HERON AND A CATTLE EGRET**—The little blue heron (*Egretta caerulea*) is native to North America and most commonly breeds along the coast of the southeastern United States and the Gulf of Mexico through Central America and into South America (Rodgers and Smith 1995). In North America, little blue herons rarely nest outside their coastal range. However, nesting has been documented at several locations in the northern plains including Brown, Kingsbury, and Charles Mix counties, South Dakota (Naugle et al. 1996, Tallman et al. 2002); Pope County, Minnesota (Green and Janssen 1975); and possibly in southeastern Saskatchewan (Nero and Lein 1971, Smith et al. 1996). In North Dakota, there have been several spring and summer observations of little blue herons, but nesting has been confirmed only once (Jones and Malcolm 1978, Lokemoen 1979). In 1976, Jones and Malcolm (1978) observed the first breeding record (6 nests) for little blue herons in North Dakota at J. Clark Salyer National Wildlife Refuge in McHenry County. Here, we report successful nesting attempts of little blue herons, and a probable hybrid pairing of a little blue heron and a cattle egret, at a multi-species breeding colony at Chase Lake National Wildlife Refuge (Stutsman County) in central North Dakota. We also describe the water conditions under which the heron and egret rookery became established at the refuge.

Chase Lake National Wildlife Refuge (1,775 ha) was established in 1908 to protect a nesting colony of American white pelicans (*Pelecanus erythrorhynchos*), whose numbers had dwindled to a few dozen pairs by the turn of the twentieth century. The refuge occurs within the Missouri Coteau physiographic region (Bluemle 1991), which is characterized by morainic, gently rolling plains interspersed with wetlands, prairie pastures, planted grasslands, hayfields, and cropland. Chase Lake is a shallow, 830-ha alkaline lake that has no outlet and is fed largely by ground water and run-off (Swanson et al. 1988). During the past two decades, the nesting colony at Chase Lake has grown considerably (Sovada et al. 2005), both in waterbird abundance and diversity. The refuge currently supports tens of thousands of waterbird nests during the breeding season, making this the largest mixed-species waterbird colony in North Dakota (R. E. Martin, North Dakota Birding Society, personal communication).

The colony's growth occurred during a period of rapid range expansion of ciconiiforms in North America, especially in the northern prairie region (e.g., Naugle et al. 1996, Shaffer et al. 2007). Rising water levels (beginning in 1993) likely contributed to the rapid establishment of herons and egrets at the Chase Lake colony after the original

nesting islands were inundated and new islands formed as peninsulas were cut off from the mainland. The largest of the new islands on the southeast side of the lake supported many large clumps of tall shrubs. Common chokecherry (*Prunus virginiana*) was the dominant tall shrub, but some clumps also contained round-leaved hawthorn (*Crataegus rotundifolia*). In 1995, cattle egrets (*Bubulcus ibis*) first established a colony of about 20 nests in a small clump of chokecherries on this island. The cattle egret is native to Spain, Portugal, and northern Africa, but has extended its distribution worldwide (Crosby 1972, Browder 1973, Fogarty and Hetrick 1973, Telfair 2006). Cattle egrets arrived in the United States in the mid-1900s (Telfair 2006), and first began nesting in North Dakota in 1976 at the same colony where Jones and Malcolm (1978) documented the first nesting record of little blue herons in the state. The egret and heron colony on this island gradually grew in numbers and area; in due course, great egrets (*Ardea alba*), snowy egrets (*E. thula*), and black-crowned night-herons (*Nycticorax nycticorax*) also began nesting in the clumps of tall shrubs on the island. By 2007, there were over 1,600 ciconiiform nests on this island.

On 8 June 2007, we observed an adult little blue heron flying near the nesting island. In the weeks that followed, we regularly observed an adult little blue heron perched on top of a dead branch in a large chokecherry clump containing approximately 87 cattle egret nests, 3 black-crowned night-heron nests, and 3 snowy egret nests. When the shrub clump was approached, the little blue heron extended its head and neck horizontally, in what appeared to be a defensive posture, while simultaneously vocalizing. A similar display was identified as an "alert" behavior by Rodgers (1979), who described this behavior as the heron's attempt to locate disturbance and inform intra- and interspecific neighbors. We did not immediately locate the little blue heron nest, but assumed that one was present because of our repeated observations (i.e., the island was visited every 3–4 days throughout the breeding season) of defensive behavior by the adult heron in the same general location within the chokecherry clump. In an effort to minimize disturbance to nesting birds, including newly hatched pelicans, most of our early observations of this adult little blue heron were made from a distance.

On 11 July 2007, we approached the site and located the stick nest that was defended by the single adult little blue heron. The nest was about 1.5 m above ground in a chokecherry and contained two nestlings, about one-quarter adult size. The plumages of both nestlings were white with smoky-gray tipped outer primaries, a diagnostic character of little blue heron nestlings and juveniles (Rogers and Smith 1995). The bare parts of the nestlings were characteristic of nearby cattle egret nestlings and included dark-gray colored bills, lores, legs, and feet. We did not observe an adult

cattle egret attending to the young, although there were many adult cattle egrets nesting within close proximity (<0.05 m) of the little blue heron nest. Based on the intermediacy of characters (i.e., color of the nestlings' plumage, bill, lores, and legs; the smoky-gray color of the outer primary tips) and the absence of a second adult little blue heron, we concluded that the nestlings were the progeny of a hybrid pairing of a little blue heron and a cattle egret. Although not commonly reported (McCarthy 2006), hybrid relationships involving herons and egrets have been reported in the literature (Kushlan and Hancock 2005). Published hybrid pairings included little blue heron and cattle egret in California (Bailey et al. 1989), little blue heron and tricolored heron in Arizona (Phillips et al. 1964), little blue heron and snowy egret in Florida (Sprunt 1954) and California (DeSante et al. 1973), snowy egret and cattle egret in Texas (Telfair 1983), and tricolored heron and snowy egret in South Dakota (Meeks et al. 1996). The adult little blue heron associated with this hybrid nest was observed near the two juveniles until they joined groups of juvenile cattle and snowy egrets and night-herons in late July or early August. On 9 August 2007, one of the fledged hybrid juveniles was observed within 5 m of the hybrid nest with a group of adult and juvenile cattle egrets; the dark-gray coloration of the bare parts had not changed but the smoky-gray tipped primaries were more pronounced than when first observed on 11 July 2007. We observed hundreds of cattle egret young, and none exhibited this character (i.e., dark-tipped primaries), either as a nestling or as a fledgling.

On 17 July 2007, four adult little blue herons were observed flying in circles over the shrub clump containing the hybrid nest; this was the only day four adult little blue herons were observed. On 25 and 26 July and 3 August, two adult little blue herons were observed standing several meters from the hybrid nest and exhibiting the same defensive postures mentioned above. On 9 August 2007, we identified a second little blue heron nest, located approximately 2.5 m from the site of the hybrid nest. The stick nest was about 2 m above the ground in a chokecherry; three recently fledged juveniles (about one-third adult size) were standing on a branch near the nest. All three juveniles had white plumages, smoky-gray tipped outer primaries, and greenish-yellow legs, feet, and loreal areas, all of which are characteristic of young little blue herons (Rodgers and Smith 1995). Their bills were greenish-yellow at the base that faded to bluish pink and culminated with a light gray tip. A digital video camera was deployed at this nest from 9–15 August 2007 to document activity at the nest. Two adult little blue herons were recorded feeding the three juveniles on several occasions. There were no recordings of cattle egrets interacting with the three young from the second nest.

Chase Lake has unique features (i.e., large lake with islands) that attract large congregations of colonial-nesting waterbirds, including thousands of pelicans, double-crested

cormorants (*Phalacrocorax auritus*), gulls (*Larus spp.*), herons, egrets, white-faced ibises (*Plegadis falcinellus*), terns (*Sterna spp.*), and night-herons. Because of its high alkalinity, in most years Chase Lake does not support fish, tiger salamanders (*Ambystoma tigrinum*), or other aquatic vertebrates (Sovada et al. 2005), which are important items in the diets of many colonial-nesting waterbirds, including herons, egrets, and ibises (Ohlendorf et al. 1974, 1979). For example, the little blue heron prefers small fish (i.e., 1–2 cm long) in its diet (Kushlan 1978). Given this situation, the little blue herons, as well as many of the other colonial-nesting waterbirds at the Chase Lake colony, are forced to forage elsewhere in nearby wetlands (Sovada et al. 2005). The cattle egret, on the other hand, has been described as an opportunistic feeder, foraging primarily on grasshoppers, crickets, frogs, toads, or almost any other small animals that adults encounter (Jenni 1973). Thus, the cattle egret has foraging options near their nesting sites, and we have observed them feeding on terrestrial insects on the island.

In conclusion, the presence of other colonial nesting waterbirds (Burger 1981), recent changes in water conditions (Naugle et al. 1996), and prevalence of tall shrubs for nesting (Naugle et al. 1996) likely provided attractive nesting conditions for the little blue heron and other species of egrets and herons at Chase Lake. Lokemoen (1979) predicted that the status of ciconiiforms in North Dakota would undergo rapid changes in future years, including that little blue herons would start breeding in more areas in the state. Our observations documented the second nesting record of little blue herons in North Dakota, and this record has been accepted by the North Dakota Bird Records Committee (Record No. 07-052; D. Svingen, North Dakota Records Committee, personal communication). Our observations also provided evidence for the second hybrid pairing of a little blue heron and a cattle egret in North America (Bailey et al. 1989). It is unknown whether nesting little blue herons will persist at the Chase Lake colony or whether the species has extended its breeding range into the Dakotas. Members of the Manitoba Avian Research Committee (2003) have suggested that the northerly nesting records of the little blue heron in Minnesota and the Dakotas do not represent a permanent range extension for nesting. Persistence of nesting by little blue herons at Sand Lake National Wildlife Refuge in Brown County, South Dakota, since 1980 (Tallman et al. 2002) would argue against that statement. During subsequent visits to the Chase Lake colony in 2008 and 2009, we observed adult little blue herons exhibiting defensive behaviors in the colony, indicating that the species continues to nest on the island.

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