Short Communications

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Provisioning of Fledgling Conspecifics by Males of the Brood-parasitic Cuckoos *Chrysococcyx klaas* and *C. caprius*

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ABSTRACT.—Although post-fledging care by adult males seems unlikely in bird species that are obligate, interspecific brood parasites, there have been numerous reports of adult male *Chrysococcyx* cuckoos apparently feeding conspecific young. Most researchers currently view these observations with skepticism, in large part because *Chrysococcyx* and other cuckoo species engage in courtship feeding, and it is possible that field observers could mistake adult females receiving food from courting males for fledglings, especially given the similar appearances of females and juveniles. Here, we report an observation of an extended provisioning bout by an adult male Klaas's Cuckoo (*C. klaas*) feeding a conspecific individual with juvenile plumage and behavior, and we summarize our observations of similar occurrences in the Diederik Cuckoo (*C. caprius*) in Kenya. We suggest that the available evidence indicates that male provisioning, and hence potential parental care, is present in these brood-parasitic cuckoos at a higher frequency than currently recognized. The mechanism that causes males to associate with fledglings is unknown, but warrants further study.
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The genus *Chrysococcyx* comprises 15 species of small, Old World cuckoos (Sibley and Monroe 1990), of which all are thought to be obligate brood parasites (Davies 2000). Klaas's Cuckoo (*C. klaas*) has a wide distribution in sub-Saharan Africa, where it is known to parasitize a large number of passerine host taxa, often—but not exclusively—species of Sylviidae and Nectarinidae (Irwin 1988). Similarly, the Diederik Cuckoo (*C. caprius*) breeds throughout much of sub-Saharan Africa and has a broad range of hosts, primarily species of Ploceidae (Irwin 1988).

Over the past century, there have been numerous observations of male *Chrysococcyx* cuckoos feeding conspecifics that were thought to be fledglings (Moreau 1944, Friedmann 1968, Iversen and Hill 1983, Rowan 1983). In a literature review of provisioning behavior in brood parasites, Lorenzana and Sealy (1998) found 5 records of nestling or fledgling provisioning by Klaas's Cuckoo males and 11 such records for Diederik Cuckoo males; Friedmann (1968) discusses 12 and 15 such records, respectively, including some anecdotal reports. There is apparently only one equivalent report of a female *Chrysococcyx* cuckoo provisioning fledglings, and in that case, both the female and young were captive birds (Millar 1926, Lorenzana and Sealy 1998). Historically, a number of researchers (e.g., Moreau 1944, Friedmann 1968) considered parental care to be common in African *Chrysococcyx* cuckoos and believed that the behavior might be a primitive condition associated with a relatively recent evolutionary transition to brood parasitism. As researchers continued to document the prevalence of courtship feeding in these and other cuckoo species, more recent authorities (e.g., Rowan 1983, Irwin 1988, Lorenzana and Sealy 1998, Davies 2000) have suggested that the behavior is either misdirected courtship feeding or the result of human observers misidentifying adult females as fledglings. In practice, these and other possibilities are difficult to exclude. Although the plumages of adult African *Chrysococcyx* are highly sexually dimorphic, it is difficult to distinguish females from juveniles in the field (Rowan 1983).

Here, we report an observation of an extended provisioning bout by an adult male Klaas's Cuckoo feeding a conspecific individual with juvenal plumage and behavior, and we summarize our observations of similar occurrences in the Diederik Cuckoo. These ob-

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servations add to the body of evidence suggesting that male *Chrysococcyx* cuckoos may engage in intensive provisioning of juveniles.

KLAAS'S CUCKOO

Beginning at 10:08 UTC+3 on 15 August 2004, IJL, DRR, and WNW observed an adult male (by plumage) Klaas's Cuckoo in Lake Nakuru National Park, Kenya (00° 22′ S, 36° 03′ E). This bird was foraging at an extremely rapid rate of movement in the open canopy of a large yellow-barked acacia tree (*Acacia xanthophloea*). After watching the bird for a few minutes, we observed it deliver food to a second, sedentary cuckoo in the same tree. We noted the time, and for the next 26 min, we were able to keep both cuckoos under constant focal observation with at least one observer following each bird. This is apparently the longest-duration period of potential fledgling provisioning reported for *Chrysococcyx* (Friedmann 1968).

During our observation, the adult male cuckoo continued to forage rapidly within an approximate 40-m radius around the second cuckoo. The male returned to the second cuckoo 18 times while carrying food items, all of which appeared to be 1- to 3-cm-long lepidopteran larvae gleaned from the foliage and bark of the acacia. On 16 of the 18 visits, the second, more sedentary bird accepted and ate the caterpillar. On each visit, the adult male presented the food with his tail slightly cocked, but we observed no other conspicuous postures or behaviors potentially related to courtship. No copulations or attempted copulations occurred.

During our observation, the presumed juvenile moved among four perches, flying 3–4 m each time. These flights were notably more fluttery than those of the adult male and appeared typical of the weak flight exhibited by recently fledged birds. While perched, this bird also assumed the ''fluffed'' posture typical of recent fledglings, and it remained stationary between most provisioning visits. The observation ended when the presumed juvenile made a similar, but slightly longer flight into denser foliage and disappeared from our sight. Although the plumages of female and immature Klaas's Cuckoos are variable and overlap (Irwin 1988), we noted at the time that the bird being provisioned had a distinct white patch behind the eye and a white throat marked with substantial, dark barring—plumage characters more typical of juveniles (Irwin 1988).

DIEDERIK CUCKOO

On 28 May 2002 at 08:23, WNW observed a male Diederik Cuckoo feeding an apparent fledgling (based on plumage) at the Mpala Research Centre, Laikipia, Kenya (00° 17′ N, 36° 54′ E). The fledgling was perched about 3 m above ground in a *Balanites aegyptica* tree. During 15 min of observation, the adult fed the fledgling at least four times and continued to do so when the observer left the area. On 19 May 2003 at 10:15, WNW noted similar behavior at a site 100 m from that of the first observation. During this observation, an adult male Diederik Cuckoo gleaned insects from long grass and fed them to a fledgling (based on plumage) perched on a nearby acacia. We observed the male make six feeding trips before cattle flushed the birds.

DISCUSSION

Based on the posture, behavior, and plumage of the Klaas's Cuckoo that we observed being fed by an adult male, it seems highly likely that it was a recently fledged bird rather than an adult female being courted. We also noted that the adult male engaged in intensive (and, presumably, energetically costly) foraging for an extended period in order to provision this individual. Friedmann (1968) considered provisioning bouts as long as 15 min as ''suggestive of the fact that the catering adult was not merely indulging in courtship feeding.'' Our observation of an intensive provisioning period of nearly twice that duration further supports this interpretation. In contrast, courtship feeding in *Chrysococcyx* typically involves a series of stereotyped behaviors that we did not observe: the male's presentation of food while simultaneously cocking his head and vibrating his wings and tail, postural bowing movements by the male, vocalizations by the male or both individuals, or (in some cases) subsequent copulation (Irwin 1988).

When considered in concert, our observations and those in dozens of previous reports describing equivalent behaviors suggest that males of several African *Chrysococcyx* cuckoos may provision fledglings regularly. Post-fledging associations of adults and offspring also have been documented in other brood-parasitic taxa, such as the Brown-headed Cowbird (*Molothrus ater*; Hahn and Fleischer 1995). Indeed, previous reports have documented male Klaas's and Diederik cuckoos provisioning both pre-volant young and multiple fledglings (Moreau 1944, Friedmann 1968, Lorenzana and Sealy 1998), thus excluding misidentification of adult females as sufficient explanation for this behavior. We speculate that not only are females sometimes misidentified as fledglings, but perhaps older fledglings being provisioned by males are sometimes mistaken for females being courted. If earlier reports were correct and provisioning of fledglings by adult males is relatively common in the African *Chrysococcyx*, it raises interesting questions about the genetic relatedness of the interacting individuals and their underlying social system.

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LITERATURE CITED

DAVIES, N. B. 2000. Cuckoos, cowbirds, and other cheats. T. & A.D. Poyser, London, United Kingdom.

FRIEDMANN, H. 1968. The evolutionary history of the genus *Chrysococcyx*. U.S. National Museum Bulletin, no. 265, Smithsonian Institution, Washington, D.C.

HAHN, D. C. AND R. C. FLEISCHER. 1995. DNA fingerprint similarity between female and juvenile Brown-headed Cowbirds trapped together. Animal Behaviour 49:1577–1580.

IRWIN, M. P. S. 1988. Order Cuculiformes. Pages 58–104 *in* Birds of Africa, vol. III (C. H. Fry, S. Keith, and E. K. Urban, Eds.). Academic Press, London, United Kingdom.

IVERSON, E. AND B. HILL. 1983. Diederik Cuckoo feeds fledgling of same species. Bee-eater 34:47.

LORENZANA, J. C. AND S. G. SEALY. 1998. Adult brood parasites feeding nestlings and fledglings of their own species: a review. Journal of Field Ornithology 69:364–375.

MILLAR, H. M. 1926. Golden Cuckoo, *C. cupilus*. South African Journal of Natural History 6:28–29.

MOREAU, R. E. 1944. Food-bringing by African Bronze Cuckoos. Ibis 86:98–100.

ROWAN, M. K. 1983. The doves, parrots, louries, and cuckoos of Southern Africa. David Philip, Cape Town, South Africa.

SIBLEY, C. G. AND B. L. MONROE. 1990. Distribution and taxonomy of birds of the world. Yale University Press, New Haven, Connecticut.

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Widespread Cannibalism by Fledglings in a Nesting Colony of Black-crowned Night-Herons

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ABSTRACT.—I studied the diet and foraging behavior of fledgling Black-crowned Night-Herons (*Nycticorax nycticorax*) in a mixed-species nesting colony of Black-crowned Night-Herons and Snowy Egrets (*Egretta thula*) in New Orleans, Louisiana. In 1 of 5 years, cannibalism of nestlings that had fallen or climbed out of nests was common, accounting for 66 of 94 (70.2%) prey items taken by fledglings. Juveniles took younger conspecifics by both predation and scavenging. Isolated incidents of cannibalism among Black-crowned Night-Herons have been reported previously, but not on a colony-wide scale. *Received 2 December 2004, accepted 19 September 2005.*

Many researchers have studied the diets of adult and nestling Black-crowned Night-Herons (*Nycticorax nycticorax*; Bent 1926, Palmer 1962, Wolford and Boag 1971), but there are few data on the diet and foraging behavior of juveniles immediately after leaving the nest. Here, I provide the first report of wide-

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spread cannibalism and scavenging of conspecifics among fledglings in a nesting colony of Black-crowned Night-Herons.

METHODS

From 1 February to 18 July 2000, I monitored a colony of Black-crowned Night-Herons on Ochsner Island, Audubon Park, New Orleans, Louisiana (29° 56′ N, 90° 8′ W) as part of a long-term (1997–2001) study on reproductive success. Ochsner Island is a small (600 m^2) island in a man-made lagoon; the distance between the island and the shore of the mainland is approximately 6 m. The island's vegetation is dominated by Chinese tallowtree (*Sapium sebiferum*) and live oak (*Quercus* spp.). In 2000, 143 pairs of Black-crowned Night-Herons and 10 pairs of Snowy Egrets (*Egretta thula*) nested on the island. Nest height ranged from 1 to 7 m above ground. I recorded the diet and foraging behavior of approximately 70 juvenile night-herons from fledging until the end of the breeding season, when the members of the nesting colony dispersed. Night-herons were considered to have fledged when they left the nest permanently and were no longer fed by adults, at which point most were capable of clumsy flight. Prey items were identified by direct observation of foraging night-herons. Observations were made from the mainland, from which approximately half of the nests in the colony could be observed. I observed foraging juveniles for 546 hr.

RESULTS

Juvenile Black-crowned Night-Herons were fed by parents until 45 ± 3 (SD) days after hatching ($n = 23$). However, juveniles were able to climb out of the nest and onto surrounding vegetation as early as 30 days after hatching, returning to the nest when a parent approached with food. At 35 days, juveniles readily left their nests, often climbing out of the nest to solicit food from a nearby parent or unrelated adult night-heron.

Juveniles remained on the island for 1–3 weeks after leaving the nest permanently, forming small groups of one to four individuals from the same nest, or neighboring nests. Each group or lone individual occupied a small (7–9 m^2) territory on the ground and defended the area from passing adults and other fledglings (see Noble et al. 1938 for a full description of territoriality in juvenile night-herons). Fledglings rarely ventured into the water to hunt; rather, they spent most of their time foraging on the ground under active nests. Of 94 prey items that I saw juvenile night-herons consume, 66 (70.2%) were younger fledgling or nestling night-herons. I observed juveniles feeding on both chicks that they killed ($n = 20$) and chicks that were already dead when I began observations ($n = 46$). Other prey items included fish (10.6%), frogs (8.5%), brown rats (*Rattus norvegicus*; 4.3%), carrion dropped from active nests (3.2%), Wood Duck chicks (*Aix sponsa*; 2.1%), and a dead Snowy Egret nestling (1.1%).

Fledglings did not prey on chicks in nests or chicks perched in vegetation; they limited their attacks to nestlings on the ground that had fallen or climbed out of nests. Adults defended chicks in nests, but I never observed adults interfering with fledglings that were preying on chicks on the ground. Since older night-heron nestlings often left the nest to perch on nearby vegetation before fledging permanently, it was not always clear whether victims were nestlings that had fallen from nests or younger fledglings that had just left the nest. It is probable, however, that predation by fledgling night-herons increased mortality rates of chicks that had climbed out of the nest and would have otherwise been able to climb to safety. Older nestlings in low nests (<1.5 m above ground) often climbed out of the nest onto the ground before fledging, and were therefore more vulnerable to attacks than nestlings in high nests.

Small, weak, and moribund chicks were attacked more frequently than healthy-looking nestlings near the age of fledging. The victims were approximately 50–70% of the size of fledglings and appeared difficult to kill and consume. Fledglings killed younger conspecifics by striking them with their bills for up to 1 hr or more, and then consumed them by repeatedly striking the carcasses and laboriously tugging small pieces of meat from them.

Older fledglings were particularly skilled at preying on nestlings and appeared to focus their foraging attempts on nestlings to the exclusion of other prey. When a fledgling found an undefended nestling and began to attack it, other fledglings usually came to fight over the victim. In one case, I observed five fledglings attack and consume a 15-day-old nestling that had fallen from its nest.

DISCUSSION

Black-crowned Night-Herons are among the most opportunistic of North American herons. They employ several different foraging behaviors (Kushlan 1976) and consume a wide variety of prey, including fish, mollusks, insects, reptiles, amphibians, rodents, birds, eggs, carrion, refuse, and plants (Hancock and Kushlan 1984, Davis 1993). Night-herons will alter their foraging methods to concentrate on locally abundant resources, including mice (Allen and Mangels 1940), fish (Spanier 1980), and amphibians (Wetmore 1920). They have also been reported to systematically exploit rookeries of other colonially nesting birds, including Common Terns (*Sterna hirundo*; Marshall 1942, Collins 1970, Shealer and Kress 1991) and Franklin's Gulls (*Larus pipixcan*; Wolford and Boag 1971). Kale (1965) reported an instance of adult night-herons in a colony preying opportunistically on White Ibis (*Eudocimus albus*) and Great Egret (*Ardea alba*) chicks from the same mixed-species rookery, noting that ibis and egret chicks from neighboring nests constituted a major food source for night-heron chicks. Published reports of night-herons feeding on conspecifics, however, are limited to Wolford and Boag's (1971) report of a night-heron nestling that was regurgitated by another nestling. Williams and Nicholson (1977) reported a suspected instance of brood reduction in the Black-crowned Night-Heron, but did not find evidence of cannibalism.

There is virtually no information on the foraging behavior of night-heron fledglings during the period immediately after they leave the nest—after the adults have stopped feeding them but before they become adept at catching their own prey. Lorenz (1938) and Palmer (1962) reported that fledglings move through the colony and are able to beg food from any adult; however, Finley (1906) and Noble et al. (1938) found that adults do not feed juveniles on the ground. Data on the composition of fledgling diet are scarce, possibly because recently fledged juveniles may forage at night (Rockwell 1910, Davis 1993). In this study, I found that juveniles sometimes climbed back to the nest in the first 2–3 days after fledging, and were usually fed by the parents. After 3 days post-fledging, fledglings on the ground often grabbed the bills of passing adults in an attempt to stimulate them to regurgitate food, but were almost always unsuccessful.

Fledglings also seemed unable to fish efficiently in the deep water surrounding the island, at least for the first 7 or 8 days after fledging. I frequently observed fledglings in the water striking at floating sticks and pieces of leaves, but they rarely captured live prey. Fledglings occasionally picked up prey dropped by nestlings in active nests; on one occasion, a fledgling climbed into a low nest and pulled a fish from the bill of the fledgling to which it had just been delivered. Adults, by contrast, were never observed feeding on dead nestlings or other carrion, suggesting that they were more skilled at catching higher-quality, live prey.

Although I spent similar amounts of time observing the same rookery each year (1997–2001), cannibalism among Black-crowned Night-Heron fledglings was prevalent only in 2000. I observed night-heron fledglings feeding on dead night-heron and egret chicks only twice in 1998 and once in 2001. The species composition of the nesting colony was fairly constant across years, comprising 120–150 pairs of Black-crowned Night-Herons and 5–10 pairs of Great Egrets and Snowy Egrets; thus, the level of competition for food among fledglings on the island should not have been elevated in 2000. In other years, fledgling diets were dominated by fish and frogs. However, it is difficult to compare prey composition across years because I observed far fewer prey captures in other years, possibly because juvenile Black-crowned Night-Herons may forage mostly at night.

It is possible that cannibalism rates were exceptionally high in 2000 because local shortages of fish or other live prey forced fledglings to seek alternate food resources, but I was unable to document such a shortage. A food shortage would have affected the diet and foraging patterns of fledglings more than adults and nestlings, since adults often left the nesting colony to forage while fledglings remained on the island.

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LITERATURE CITED

ALLEN, R. P. AND F. P. MANGELS. 1940. Studies of the nesting behavior of the Black-crowned Night Heron. Proceedings of the Linnean Society of New York 50–51:1–28.

BENT, A. C. 1926. Life histories of North American marsh birds. U.S. National Museum Bulletin, no. 135, Smithsonian Institution, Washington, D.C.

COLLINS, C. T. 1970. The Black-crowned Night Heron as a predator of tern chicks. Auk 87:584–586.

DAVIS, W. E., JR. 1993. Black-crowned Night-Heron (*Nycticorax nycticorax*). The Birds of North America, no. 74.

FINLEY, W. L. 1906. Herons at home. Condor 8:35–40.

HANCOCK, J. AND J. A. KUSHLAN. 1984. The herons handbook. Harper and Row, New York.

KALE, H. W., II. 1965. Nestling predation by herons in a Georgia heronry. Oriole 30(March):69–70.

KUSHLAN, J. A. 1976. Feeding behavior of North American herons. Auk 93:86–94.

LORENZ, K. 1938. A contribution to the comparative sociology of colonial-nesting birds. Proceedings of the International Ornithological Congress 8: 207–218.

MARSHALL, N. 1942. Night desertion by nesting Common Terns. Wilson Bulletin 54:27–31.

NOBLE, G. K., M. WURM, AND A. SCHMIDT. 1938. Social behavior of the Black-crowned Night Heron. Auk 55:7–40.

PALMER, R. S. 1962. Handbook of North American birds, vol. I: loons through flamingos. Yale University Press, New Haven, Connecticut.

ROCKWELL, R. B. 1910. Some Colorado night heron notes. Condor 12:113–121.

SHEALER, D. A. AND S. W. KRESS. 1991. Nocturnal abandonment response to Black-crowned Night-Heron disturbance in a Common Tern colony. Colonial Waterbirds 14:51–56.

SPANIER, E. 1980. The use of distress calls to repel night herons (*Nycticorax nycticorax*) from fish ponds. Journal of Applied Ecology 17:287–294.

WETMORE, A. 1920. Observations on the habits of birds at Lake Burford, New Mexico. Auk 37:393–412.

WILLIAMS, M. D. AND C. P. NICHOLSON. 1977. Observations at a Black-crowned Night-Heron nesting colony. Migrant 48:1–7.

WOLFORD, J. W. AND D. A. BOAG. 1971. Food habits of Black-crowned Night Herons in southern Alberta. Auk 88:435–437.

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First Report of Black Terns Breeding on a Coastal Barrier Island

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ABSTRACT.—Black Terns (*Chlidonias niger surinamensis*) breed locally in freshwater wetlands across the northern United States and central Canada, often building their nests over shallow water on a floating substrate of matted marsh vegetation. Here, we report the first nesting record of this species on a coastal barrier island. The nest, which consisted of two eggs laid in a slight scrape of sand, was located on 6 July 2004 in a large breeding colony of Common Terns (*Sterna hirundo*) on Kelly's Island at Kouchibouguac National Park, New Brunswick, Canada. The observation also represents the current northeastern breeding limit for this species in North America. Both eggs hatched, but neither chick survived beyond 4 days. *Received 15 December 2004, accepted 5 October 2005.*

The North American subspecies of Black Tern (*Chlidonias niger surinamensis*) breeds locally across the northern United States and central Canada. Black Terns are semicolonial, typically nesting in productive, shallow freshwater marshes, semipermanent ponds, prairie sloughs, and along margins of lakes and rivers (Stewart and Kantrud 1984, Dunn and Agro 1995, Schummer and Eddleman 2003). Nests are generally placed in areas of calm water within stands of emergent bulrush (*Scirpus* spp.), cattail (*Typha* spp.), bur-reed (*Sparganium* spp.), or pickerelweed (*Pontederia cordata*; Cuthbert 1954, Dunn 1979, Mazzocchi et

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al. 1997). Nests are usually built over shallow water (0.5–1.2 m deep) on a floating substrate of matted, dead marsh vegetation, floating rootstalks and discarded pieces of wood, or muskrat feeding platforms; occasionally, nests are built on non-floating substrates, including muskrat lodges, flattened vegetation, and mud (Cuthbert 1954, Bergman et al. 1970, Dunn 1979). Nests often consist of dead vegetation arranged in a compressed pile with a shallow depression at the top (Dunn and Agro 1995).

Black Terns use coastal habitats during migration, winter, and in summer when nonbreeding birds aggregate in large flocks (100+ birds) on saltpans, marshes, estuaries, and brackish wetlands (Dunn and Agro 1995). Reports of Black Terns breeding in marine areas are extremely rare (Sirois and Fournier 1993). In the mid-1990s, a single nest was found at Seal Island National Wildlife Refuge (NWR), Rockland, Maine (C. S. Hall pers. comm.), and in both 2003 and 2004, two nests were located at Machias Seal Island, New Brunswick (C. M. Develin pers. comm.). The nests at these marine sites consisted of a small amount of dead vegetation in sparse common sheep sorrel (*Rumex acetosella*) and grasses, or they were placed on a granite rock surface. Nests were located in large, mixed colonies of Common (*Sterna hirundo*) or Arctic (*S. paradisaea*) terns. The nest at Seal Island NWR was ~30 m from the high-tide line, whereas the nests at Machias Seal Island were ~100 m from water. All five Black Tern nests in marine areas failed to fledge young.

The Canadian Maritime breeding population of Black Terns was estimated to be 150 pairs (Erskine 1992), with southern New Brunswick representing the species' northeastern breeding limit in North America (Dunn and Agro 1995). Since 2000, however, Black Terns (<4 birds annually) have been observed in mid- to late June with breeding Common Terns on four coastal barrier islands of Kouchibouguac National Park, New Brunswick. Surveys conducted from 2000 to 2003, however, did not confirm breeding (Christie et al. 2004; E. Tremblay pers. comm.).

Here, we report the first evidence of Black Terns breeding on a coastal barrier island. Kelly's Island (46° 50′ N, 64° 55′ W), 2 ha in size, is part of a 26-km crescent of barrier spits and islands that separate Kouchibouguac Bay of the Northumberland Strait from the shallow estuary-lagoon system of Kouchibouguac National Park (Beach 1988). The island is composed of sand and is vegetated by extensive stands of marram grass (*Ammophila breviligulata*); the island's outer edge consists of a gently sloping intertidal beach zone. The island supports a large breeding colony of Common Terns, which included 1,041 nests counted in 2004 (Parks Canada Tern Survey 2004).

On 6 July 2004 at approximately 17:00 AST, after the entire tern colony at Kelly's Island had flushed and taken flight, we identified a pair of adult Black Terns flying above the center of the island. One of the Black Terns descended and landed, and we subsequently identified a Black Tern nest with two eggs laid in a slight scrape of sand. The long, oval eggs were noticeably smaller (~34 × 24 mm) than the subelliptical eggs in nearby Common Tern nests (~42 × 31 mm; SRC pers. obs.). The Black Tern eggs were dark olive and marked with dark brown dots and blotches, the density of which was greater near the large end. Nearby Common Tern eggs were generally cream colored and finely marked with brown and black dots. The Black Tern nest and many of the Common Tern nests consisted of a small amount of dead vegetation loosely lining a scrape made in the sand. Both species nested in areas of the island where cover was sparse (5–15% marram grass). Whereas Common Tern nests were 0.5–30 m from the high-tide line, the Black Tern nest was 26.5 m from the water. Two Common Tern nests were within 3 m of the Black Tern nest.

On 20 July at 17:20, we returned to the nest and found a newly hatched chick and a pipping egg. The hatchling's down was predominantly cinnamon and black, except for a white belly and a white mask over the eye and cheek. A single adult Black Tern was observed flying 5–10 m directly above the nest. On 24 July, we checked the nest again and found both chicks dead at the nest; one adult Black Tern was flying 10–15 m above the island. The young were necropsied, but the cause of death was undetermined (S. McBurney pers. comm.).

Adult Common Terns at Kelly's Island readily exhibited aggressive displays toward the smaller Black Tern adults. Overt aggression typically involved brief aerial chases and attack by Common Terns as a Black Tern adult approached and descended toward its nest. Common and Black terns occasionally form mixed-breeding colonies elsewhere (Snow and Perrins 1998), and Common Terns have been known to defend nesting territories against other tern species, including Roseate Terns (*Sterna dougallii*; Burger and Gochfeld 1991, Nisbet 2002). Aggressive displays by Common Terns, and the close proximity of tern nests at Kelly's Island, may have compromised the survival of the Black Tern chicks by preventing the adults from providing sufficient food resources to their young, resulting in dehydration or malnutrition (S. McBurney pers. comm.). Nevertheless, our observations represent the first confirmed breeding of Black Terns on the barrier islands of Kouchibouguac National Park and represent the northeastern breeding limit for this species in North America.

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LITERATURE CITED

BEACH, H. (ED.). 1988. The resources of Kouchibouguac National Park: resource description and analysis. Kouchibouguac National Park, Environment Canada-Parks, New Brunswick, Canada.

BERGMAN, R. D., P. SWAIN, AND M. W. WELLER. 1970. A comparative study of nesting Forster's and Black terns. Wilson Bulletin 82:435–444.

BURGER, J. AND M. GOCHFELD. 1991. The Common Tern: its breeding biology and social behaviour. Columbia University Press, New York.

CHRISTIE, D. S., B. E. DALZELL, M. DAVID, R. DOIRON, D. G. GIBSON, M. H. LUSHINGTON, P. A. PEARCE, S. I. TINGLEY, AND J. G. WILSON. 2004. Birds of New Brunswick: an annotated list. New Brunswick Museum monographic series (natural science), no. 10. Saint John, New Brunswick, Canada.

CUTHBERT, N. L. 1954. A nesting study of the Black Tern in Michigan. Auk 71:36–63.

DUNN, E. H. 1979. Nesting biology and development of young in Ontario Black Terns. Canadian Field-Naturalist 93:276–281.

DUNN, E. H. AND D. J. AGRO. 1995. Black Tern (*Chlidonias niger*). The Birds of North America, no. 147.

ERSKINE, A. J. 1992. Atlas of breeding birds of the Maritime Provinces. Nimbus Publishing and Nova Scotia Museum, Halifax, Nova Scotia, Canada.

MAZZOCCHI, I. M., J. M. HICKEY, AND R. L. MILLER. 1997. Productivity and nesting habitat characteristics of the Black Tern in northern New York. Colonial Waterbirds 20:596–603.

NISBET, I. C. T. 2002. Common Tern (*Sterna hirundo*). The Birds of North America, no. 618.

SCHUMMER, M. L. AND W. R. EDDLEMAN. 2003. Effects of disturbance on activity and energy budgets of migrating waterbirds in south-central Oklahoma. Journal of Wildlife Management 67:789–795.

SIROIS, J. AND M. A. FOURNIER. 1993. Clarification of the status of the Black Tern (*Chlidonias niger*) in the Northwest Territories, Canada. Colonial Waterbirds 16:208–212.

SNOW, D. W. AND C. M. PERRINS. 1998. Black Tern (*Chlidonias niger*). Pages 796–799 *in* The birds of the Western Palearctic, vol. 1. Oxford University Press, Oxford, United Kingdom.

STEWART, R. E. AND H. A. KANTRUD. 1984. Ecological distribution and crude density of breeding birds on prairie wetlands. Journal of Wildlife Management 48:426–437.

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First Observation of Cavity Nesting by a Female Blue Grosbeak

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ABSTRACT.—On 21 May 2003, we discovered a completed Blue Grosbeak (*Passerina caerulea*) nest in an Eastern Bluebird (*Sialia sialis*) nest box. On 28 May, the nest contained four whitish-tan eggs with light-brown, streaky and spotty markings, an unusual color pattern for Blue Grosbeak eggs. Species' identification was confirmed by capturing the breeding female in the nest box, and confirmed again later with identification of the chicks as Blue Grosbeaks. To our knowledge, this is the first published account of cavity nesting, artificial or otherwise, for this species. *Received 27 September 2004, accepted 31 May 2005.*

The Blue Grosbeak (*Passerina caerulea*) is a large bunting in the family Cardinalidae and is relatively common in the southeastern United States. However, little is known of the breeding ecology of this species (Ingold 1993). The nest is typically cup-shaped and composed of twigs, rootlets, and bark, is often lined with grass and/or fine hair, and sometimes contains artificial debris, such as cardboard, cellophane, or newspaper (Stabler 1959, Bent 1968, Ingold 1993). Blue Grosbeaks commonly build their nests in riparian thickets, fallow fields, open woodlands, and hedgerows, usually from 1 to 4 m above the ground (Stabler 1959, Bent 1968, Ehrlich et al. 1988).

Here, we detail an observation of cavity nesting by a pair of Blue Grosbeaks. We discovered the nest during an ongoing study of Eastern Bluebirds (*Sialia sialis*) in Craighead County, Arkansas. During the winter of 2002, we erected approximately 200 Eastern Bluebird nest boxes at 2 m above ground, with each box being at least 100 m from adjacent boxes. The site is composed mostly of pastures and fallow fields, with some nest boxes located along mixed-hardwood forest edge.

We checked all nest boxes at least once per week to monitor nesting activity. On 21 May 2003, we discovered an unidentified, but complete, nest without eggs in a nest box in an area of open woodland dominated by northern red oak (*Quercus rubra*) and bordered on one side by a thin stand of privet (*Ligustrum* spp.). The nest was an open cup composed of grass, fine sticks, and several interwoven pieces of cellophane. Cellophane is commonly incorporated within nests of Blue Grosbeaks (Ingold 1993), possibly as a substitute for shed snakeskin, a common item in grosbeak nests (Strecker 1926). It is unclear why snakeskins are incorporated into grosbeak nests (Ingold 1993), but their addition to nest boxes with artificial nests may decrease predation (E. C. Medlin and TSR unpubl. data). This behavior is common in some obligate cavity-nesting species, including Tufted Titmouse (*Baeolophus bicolor*) and Great Crested Flycatcher (*Myiarchus crinitus*). We did not measure the nest, but the nesting material entirely covered the floor of the nest box (10 cm wide × 15 cm deep), and the nest cup covered the rear 70% of the nest-box floor. We estimated the inside diameter of the nest cup to be ~6–7 cm, which is similar to grosbeak nest-cup diameters reported by others (Ingold 1993).

On 28 May, we checked the nest again and it contained four oval eggs with light-brown, streaky and spotty markings, and a light, whitish-tan background color. Although Blue Grosbeak eggs are typically light blue to white and unmarked (Ingold 1993), some are lightly spotted with brown (Ingold 1993) or ''distinctly marked with dots and spots of chestnut and subdued lilac'' (Davie 1898:404). The size, color, and markings of the eggs we observed were similar to those of Brown-headed Cowbirds (*Molothrus ater*), so much so that we could not distinguish them from cowbird eggs. Although Blue Grosbeaks are frequent

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hosts of Brown-headed Cowbirds, and cowbirds are known to parasitize hosts nesting in nest boxes (Whitehead et al. 2000, 2002), we did not observe nest parasitism in any of our nest boxes during our 2-year study.

Prior to the discovery of the nest, we had observed a pair of Blue Grosbeaks near the nest box several times over a 2-week period. We suspected that the pair was nesting nearby, but not in the nest box. On 8 June, however, we captured a female Blue Grosbeak in the nest box by using a nest-box trap (Robinson et al. 2004); she was incubating the four eggs described above, which appeared to be pipping. When we revisited the nest again on 13 June, we found four nestlings approximately 5 days old and apparently in good condition. We identified the nestlings as Blue Grosbeaks (and not cowbirds) by virtue of their large conical bills and yellow rictal flanges. Although Brown-headed Cowbirds also have conical bills, grosbeaks' bills are obviously larger. In addition, Blue Grosbeak chicks have yellow rictal flanges (Baicich and Harrison 1997), whereas those of Brown-headed Cowbird chicks are cream-colored in the eastern subspecies (Baicich and Harrison 1997).

On 27 June, the nestlings were no longer in the nest. We assumed they fledged successfully because there were no obvious signs of nest predation, and predation at our field site is generally low (13% Eastern Bluebird nest predation; TJR and TSR unpubl. data).

Our observation of Blue Grosbeaks nesting in a nest box is unique for two reasons: (1) to our knowledge, this is the first record of cavity nesting by Blue Grosbeaks, and (2) the color pattern of the eggs was unusual. We know of few previously published reports of female Blue Grosbeaks laying eggs with brown spotty markings—a rare color pattern for Blue Grosbeak eggs (Davie 1898, Ingold 1993). Avian ecologists should be aware that cavity nesting occasionally occurs in this species; the behavior may merit closer examination.

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LITERATURE CITED

BAICICH, P. J. AND C. J. O. HARRISON. 1997. A guide to the nests, eggs, and nestlings of North American birds, 2nd ed. Academic Press, San Diego, California.

BENT, A. C. 1968. Eastern Blue Grosbeak. Pages 67–75 *in* Life histories of North American cardinals, grosbeaks, towhees, finches, sparrows, and allies (part 1) (O. L. Austin, Jr., Ed.). U.S. National Museum Bulletin, no. 237, part 1. [Reprinted 1968, Dover Publications, New York.]

DAVIE, O. 1898. Nests and eggs of North American birds. Landon Press, Columbus, Ohio.

EHRLICH, P. R., D. S. DOBKIN, AND D. WHEYE. 1988. Blue Grosbeak. Page 556 *in* The birder's handbook: a field guide to the natural history of North American birds. Simon and Schuster, New York.

INGOLD, J. L. 1993. Blue Grosbeak (*Guiraca caerulea*). The Birds of North America, no. 79.

ROBINSON, T. J., L. M. SIEFFERMAN, AND T. S. RISCH. 2004. A quick, inexpensive trap for use with nest boxes. North American Bird Bander 29:115–116.

STABLER, R. M. 1959. Nesting of the Blue Grosbeak in Colorado. Condor 61:46–48.

STRECKER, J. K. 1926. On the use, by birds, of snakes' sloughs as nesting material. Auk 43:501–507.

WHITEHEAD, M. A., S. H. SCHWEITZER, AND W. POST. 2000. Impact of brood parasitism on nest survival parameters and seasonal fecundity of six songbird species in southeastern old-field habitat. Condor 102:946–950.

WHITEHEAD, M. A., S. H. SCHWEITZER, AND W. POST. 2002. Cowbird host interactions in a southeastern old-field: a recent contact area? Journal of Field Ornithology 73:379–386.

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A New Record of the Endangered White-winged Nightjar (*Eleothreptus candicans*) from Beni, Bolivia

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ABSTRACT.—The ecology of the White-winged Nightjar (*Eleothreptus candicans*) is poorly known. Only three breeding populations (one from Brazil and two from Paraguay) are known, and populations are decreasing due to continuing destruction of *cerrado* habitat. On 14 September 2003, we took several photos of an unidentified nightjar in Beni Biosphere Reserve, Departmento Beni, Bolivia. The bird was later determined to be an adult male White-winged Nightjar. Interestingly, the only previous record for Bolivia was a male collected in 1987 at the same locality and time of year. Because the White-winged Nightjar is nonmigratory and secretive, we hypothesize that there may be a sustainable population of White-winged Nightjars in Bolivia, and the paucity of sightings may be due to the species' low detectability. *Received 16 December 2004, accepted 11 October 2005.*

The White-winged Nightjar (*Eleothreptus candicans*), a member of the Caprimulgidae (Cleere 1999, Pople 2004), was recently reclassified from the genus *Caprimulgus* to the genus *Eleothreptus* (Cleere 2002). Its known range and population size are very small, and its ecology has received attention only recently (Pople 2003). Parker et al. (1996) assigned the species High Conservation Priority and the IUCN lists the species as Endangered (IUCN Red List; Pople 2004). *E. candicans* is threatened by ongoing loss of its *cerrado* habitat (heavy grazing, trampling, invasive grasses, habitat conversion to plantations, and large-scale, uncontrolled grass fires; Cleere 1999, Pople 2004).

Until the 1980s, White-winged Nightjars were known only from two museum specimens collected at the beginning of the 19th century in Oriçanga, São Paulo state, and Cuiabá, Mato Grosso state, Brazil (Sclater 1866). Only three populations have been found, all in southern Brazil and eastern Paraguay: Emas National Park, Brazil (Rodrigues et al. 1999); Aguará Ñu, Mbaracayú Forest Nature Reserve, Paraguay (Lowen et al. 1996, Clay et al. 1998); and a recently discovered population at Laguna Blanca, Departmento San Pedro, central Paraguay (Anonymous 2002). Additionally, in 1987 a single male was captured and collected at the Beni Biological Station, Departmento Beni, Bolivia (Davis and Flores 1994). Despite specific searches for the species in subsequent years, however, it has not been relocated at Beni (Brace et al. 1997, Brace 2000, Pople 2004; R. Brace and J. Hornbuckle *in litt.*).

Surveys in Aguará Ñu have resulted in a population estimate of 40–150 individuals (Clay et al. 1998, Pople 2003) at that location. The number of birds observed in Emas National Park was 12 in September 1985 and only 1 in October 1990 and in November 1997 (Rodrigues et al. 1999). Although there are no other recently published records from Emas, the national park probably supports a sizeable population of *E. candicans* (Pople 2004) because Emas encompasses a large extent of apparently suitable habitat. The recently discovered population at Laguna Blanca in Paraguay is estimated to include a minimum of 30 birds (R. P. Clay *in litt.*).

On 14 September 2003 at 22:00 EDT, we photographed an unidentified nightjar on a termite mound between the Beni Biological Station (Estación Biológica del Beni; 14° 50′ S, 66° 17′ W) and Laguna Normandia (~1.5 km northwest of the station; see Fig. 3 in Brace et al. 1997), Departmento Beni in northern Bolivia. Later the bird was unambiguously identified as a male *E. candicans* (Fig. 1). Because it lacked visible wear on the remiges and pale flecking in the contour plumage, it is probable that the individual had recently completed a molt. If the species undergoes the same pattern of molt in both Beni Biosphere

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FIG. 1. Adult male White-winged Nightjar (*Eleothreptus candicans*) photographed on 14 September 2003 in Beni Biosphere Reserve, Departmento Beni, Bolivia. Photo by R. Šumbera.

Reserve and Paraguay (i.e., replacement of flight feathers in a single post-nuptial molt), it suggests that the species may breed considerably earlier in Bolivia than in Paraguay (where it breeds mainly between September and December).

Beni Biological Station is 180 km west of Trinidad and 50 km east of San Borja on El Porvenir Éstancia. El Porvenir Éstancia lies in the Llanos de Mojos, which is a lowland plain (~200 m elevation) characterized as savanna with forest islands. The habitat where we observed the White-winged Nightjar is a seasonally inundated savanna with a high density of termite mounds (Fig. 2).

Ours is only the second record of White-winged Nightjar in Bolivia, the first having been made in September 1987 (Davis and Flores 1994). Interestingly, both observations were made near Beni Biological Station at the same time of year (11 September 1987 and 14 September 2003). Despite a number of research programs that have been conducted at the station (A. B. Hennessey *in litt.*), there had been no additional records of White-winged Nightjar after 1987. R. C. Brace and J. Hornbuckle (*in litt.*), for example, searched for White-winged Nightjars and conducted mist-netting from mid-July through the end of August every year from 1992 to 1999, but recorded no White-winged Nightjars. Although the White-winged Nightjar is considerably less conspicuous than many other sympatric nightjar species common in Bolivia (R. G. Pople *in litt.*), it seems unlikely that there would be so few observations of the species if the area supported a small resident population. Rather, the two individuals recorded during the last 2 decades may have come from an undiscovered population elsewhere in the northern Bolivian lowlands. However, *E. candicans* is presumed to be a resident species. Indeed, radio-tracking work in Paraguay (Pople 2003) revealed that White-winged Nightjars are year-round residents, and a study of captive birds revealed a post-nuptial molt pattern typical of a nonmigratory species. Therefore, the occurrence of the two individuals at Beni Biological Station during the same time of year may indicate that some birds make local movements, possibly in response to fires (Pople 2004).

FIG. 2. Typical habitat of the White-winged Nightjar—wet savanna with termite mounds providing perches above the surrounding young vegetation. The forest in the background is Florida Fragment south of Laguna Normandia, 1.5 km northwest of Beni Biological Station, Departmento Beni, Bolivia. The photo in Figure 1 was taken within this area. Photo by T. Grim.

Neotropical savannas are under increasing human pressure due to large-scale conversion of grassland habitats to pastures (Marris 2005). Although the White-winged Nightjar is a typical savanna dweller and is adapted to irregular and small-scale fires, it likely has been negatively affected by regular and large-scale burning in recent years (Brace et al. 1997, Pople 2004). Conservation of savanna habitats—including *cerrado,* the primary habitat for *E. candicans*—has been neglected thus far. Because savanna habitats are facing greater threats than Amazonian rainforests, the conservation of *cerrado* habitat should become a top priority in the Neotropics (Marris 2005).

Our observation highlights the importance of Beni Biosphere Reserve for threatened ($n = 4$) and near-threatened ($n = 15$) bird species in Bolivia (Brace et al. 1997). Among these 19 species are 11 that rely wholly or partially on savanna habitat. So far, 500 bird species have been reported from Beni Biosphere Reserve (Brace et al. 1997, Brace 2000). We add to this list one more species: on the same day (14 September 2003) that we observed the White-winged Nightjar, we also recorded one Black-throated Saltator (*Saltator atricollis*).

We hypothesize that Departmento Beni in northern Bolivia holds a resident population of *E. candicans*, and that the paucity of records from Bolivia reflects the lack of intensive searches during the correct season and the low detectability of this species. We concur with Brace et al. (1997) that more information on the White-winged Nightjar's status is required, and we hope that our observation provides an impetus for further research on this elusive species.

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LITERATURE CITED

ANONYMOUS. 2002. A new population of the White-winged Nightjar. World Birdwatch 24:5.

BRACE, R. C. 2000. The avifauna of the Beni Biological Station: records to 1999. Estación Biologica del Beni, Bolivia.

BRACE, R. C., J. HORNBUCKLE, AND J. W. PEARCE-HIGGINS. 1997. The avifauna of the Beni Biological Station, Bolivia. Bird Conservation International 7:117–159.

CLAY, R. P., D. R. CAPPER, J. MAZAR BARNETT, I. J. BURFIELD, E. Z. ESQUIVEL, R. FARIÑA, C. P. KENNEDY, M. PERRENS, AND R. G. POPLE. 1998. White-winged Nightjars *Caprimulgus candicans* and cerrado conservation: the key findings of Project Aguará Ñu 1997. Cotinga 9:52–56.

CLEERE, N. 1999. Family Caprimulgidae (nightjars). Pages 302–386 *in* Handbook of the birds of the world, vol. 5: barn-owls to hummingbirds (J. del Hoyo, A. Elliott, and J. Sargatal, Eds.). Lynx Edicions, Barcelona, Spain.

CLEERE, N. 2002. A review of the taxonomy and systematics of the Sickle-winged and White-winged nightjars (Caprimulgidae). The Bulletin of the British Ornithologists' Club 122:168–179.

DAVIS, S. E. AND E. FLORES. 1994. First record of White-winged Nightjar *Caprimulgus candicans* for Bolivia. The Bulletin of the British Ornithologists' Club 114:127–128.

LOWEN, J. C., L. BARTRINA, T. M. BROOKS, R. P. CLAY, AND J. TOBIAS. 1996. Project YACUTINGA '95: bird surveys and conservation priorities in eastern Paraguay. Cotinga 5:14–19.

MARRIS, E. 2005. The forgotten ecosystem. Nature 437:943–944.

PARKER, T. A., III, D. F. STOTZ, AND J. W. FITZPATRICK. 1996. Ecological and distributional databases for Neotropical birds. Pages 118–407 *in* Neotropical birds: ecology and conservation (D. F. Stotz, J. W. Fitzpatrick, T. A. Parker, III, and D. K. Moskovits). University of Chicago Press, Chicago, Illinois.

POPLE, R. G. 2003. The ecology and conservation of the White-winged Nightjar *Caprimulgus candicans*. Ph.D. dissertation, University of Cambridge, United Kingdom.

POPLE, R. G. 2004. White-winged Nightjar *Eleothreptus candicans*. *In* Threatened birds of the world 2004. CD-ROM. BirdLife International, Cambridge, United Kingdom.

RODRIGUES, F. H. G., A. HASS, O. J. MARINI-FILHO, M. M. GUIMARÃES, AND M. A. BAGNO. 1999. A new record of White-winged Nightjar *Caprimulgus candicans* in Emas National Park, Goiás, Brazil. Cotinga 11:83–85.

SCLATER, P. L. 1866. Additional notes on the Caprimulgidae. Proceedings of the Zoological Society of London 1866:581–590.

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Predation of Eared Grebe by Great Blue Heron

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ABSTRACT.—Great Blue Herons (*Ardea herodias*) typically prey upon fish and other aquatic organisms, and they occasionally take small mammals and birds. We observed a Great Blue Heron attack, kill, and attempt to consume an Eared Grebe (*Podiceps nigricollis*). The heron was unable to swallow the grebe, and it abandoned the carcass after approximately 30 min. An examination of the carcass showed that the grebe lacked obvious physical deformities. Our observation, coupled with a similar one nearby, indicates that Great Blue Herons attack and kill birds larger than reported previously. *Received 11 January 2005, accepted 19 September 2005.*

On the morning of 14 November 2004, we witnessed an adult Great Blue Heron (*Ardea herodias*) attack, kill, and attempt to consume an Eared Grebe (*Podiceps nigricollis*) at Oso Flaco Lake (35° 00′ N, 120° 30′ W) in San Luis Obispo County, California. The incident occurred shortly after the heron landed near the grebe and began foraging in shallow (~30 cm deep) water. At approximately 11:25 PST, the heron caught the grebe with a stabbing motion as the grebe swam underwater. The heron then proceeded to subdue the grebe by grasping its neck, shaking it, and submerging it intermittently. After approximately 15 min, the grebe appeared to be dead. At this point, the heron briefly released the grebe to deliver several sharp blows to its head and chest area.

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The heron attempted several times to swallow the grebe, but it had difficulty maneuvering the grebe into its mouth. During one attempt, it was able to maneuver the carcass into position, but the grebe's diameter, its limp wings, or both prevented the heron from swallowing it. After attempting to swallow the grebe for approximately 15 min, the heron abandoned the carcass, preened briefly, and then flew off. The grebe weighed 255 g (weighed after the grebe was frozen and then thawed), and although that is low body weight for this species (Cullen et al. 1999), it is typical of grebes arriving on a wintering area after a migratory flight (Jehl 1997; J. R. Jehl, Jr. pers. comm.). When we examined the grebe, we found no deformities or obvious indications of poor condition (e.g., loss of pectoral muscle).

On the day previous to our observation (13 November 2004), H. R. Pedersen (pers. comm.) observed a Great Blue Heron at Lake Cachuma in Santa Barbara County, California (~130 km southeast of Lake Oso Flaco), capture an Eared Grebe. The heron was foraging and caught the grebe in shallow water, grasped it by the neck in the same manner we witnessed, and submerged it several times. After a brief struggle, the grebe escaped and appeared unharmed (H. R. Pedersen pers. comm.).

We know of no previous reports of Great Blue Herons capturing, killing, and attempting to consume Eared Grebes, or any other bird species of that size; however, McCanch (2003) reported a Grey Heron (*Ardea cinerea*) that had choked to death while attempting to ingest a Little Grebe (*Tachybaptus ruficollis*). Great Blue Herons have a diverse diet that includes songbirds and mammals of various sizes (Peifer 1979, Butler 1992), and they have been observed abandoning large prey items that they were unable to swallow (R. W. Butler pers. comm.). Thus, it is possible that the herons may have targeted the grebes as potential prey items, but were unable to successfully consume them because of their size. Alternative explanations are (1) that the herons mistook the grebes for fish or (2) that the herons were acting to defend a foraging area. Indeed, an observer at Lake Cachuma reported seeing a foraging heron attack and kill an American Coot (*Fulica americana*) with no attempt to eat it (L. R. Mason pers. comm.). The heron we observed, however, expended a substantial amount of effort subduing and attempting to consume the grebe, indicating a deliberate act of predation. Evidently, small grebes are potential prey items for Great Blue Herons, and herons may attack and kill large birds more commonly than is recognized.

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LITERATURE CITED

BUTLER, R. W. 1992. Great Blue Heron (*Ardea herodias*). The Birds of North America, no. 25.

CULLEN, S. A., J. R. JEHL, JR., AND G. L. NUECHTERLEIN. 1999. Eared Grebe (*Podiceps nigricollis*). The Birds of North America, no. 433.

JEHL, J. R., JR. 1997. Cyclical changes in body composition in the annual cycle and migration of the Eared Grebe *Podiceps nigricollis*. Journal of Avian Biology 28:132–142.

MCCANCH, N. 2003. Grey Heron choking on Little Grebe. British Birds 96:86.

PEIFER, R. W. 1979. Great Blue Herons foraging for small mammals. Wilson Bulletin 91:630–631.

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Abnormal Eggs and Incubation Behavior in Northern Bobwhite

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ABSTRACT.—A long-term (>5 years) study of Northern Bobwhite (*Colinus virginianus*) provided the first record of runt eggs and two observations of prolonged incubation. During 2004, we located two clutches (n = 11 and 9 eggs)—laid by the same hen—consisting entirely of runt eggs. Mean length, width, and mass were 18.8 mm, 15.4 mm, and 2.0 g, respectively, 26% of the volume and 24% of the mass of typical bobwhite eggs. Based on our long-term data set for bobwhites (n = 3,566 eggs), runt eggs occur at a frequency of 0.56%, within the range (0.02–4.32%) reported for other avian species. The two records of prolonged incubation behavior represented 75 days (326%) and 47 days (204%) beyond the normal incubation period (23 days) of bobwhites. This prolonged incubation behavior is in excess of the time frame reported for most birds exhibiting prolonged incubation (50–100% beyond normal incubation). *Received 31 January 2005, accepted 3 October 2005.*

Documenting anomalies in avian behavior often is an opportunistic endeavor given the rarity of such behavior and the short-term nature (<2 years) of most studies. An ongoing, long-term (>5 years) radiotelemetry project (The South Texas Quail Research Project; STxQRP) on Northern Bobwhite (*Colinus virginianus*) provided us with the opportunity to monitor bobwhite behavior over seven breeding seasons (1998–2004) on the Encino Division of the King Ranch, Inc., Brooks County, Texas. We provide the first record of runt eggs for Northern Bobwhite and two additional records of prolonged incubation behavior.

First record of runt eggs.—Runt eggs, also referred to as dwarf, cock, wind, and witch eggs (Rothstein 1973), are those noticeably smaller than the smallest expected for a given species (Mulvihill 1987; for suggested criteria, see Koenig 1980a). Although runt eggs have been reported for several avian species (e.g., Canada Goose, *Branta canadensis* [Manning and Carter 1977]; woodpeckers [Picidae, Koenig 1980b]; and Eastern Bluebird, *Sialia sialis* [Mulvihill 1987]), they normally occur at low frequencies (~1 per 1,000 to 2,000 eggs; Koenig 1980b, Mallory et al. 2004). Furthermore, runt eggs usually represent only a small proportion of a clutch (Rothstein 1973, Ricklefs 1975, Bartel 1986). Entire clutches consisting solely of runt eggs are extremely rare and have been reported only for Song Thrush (*Turdus philomelos*; M'William 1927), Gray Catbird (*Dumetella carolinensis*; Rothstein 1973), and Eastern Bluebird (Zeleny 1983). We report the first record of runt eggs for Northern Bobwhite and provide estimates of the frequency of such eggs.

On 21 June 2004, we located a radiomarked hen on a nest at the base of brownseed paspalum (*Paspalum plicatulum*). The clutch consisted entirely of runt eggs (n = 11). We monitored the hen for several days thereafter, but never located her at the nest site again. We concluded that she had abandoned the nest and we collected the eggs. During the following 5 weeks, the hen again paired with a male, and on 30 July, we documented a second clutch of runt eggs (n = 9) in a nest constructed in red lovegrass (*Eragrostis secundiflora*). The hen also abandoned this nest, and we collected the clutch on 2 August.

None of the runt eggs was viable (i.e., none contained yolk). Mean length, width, and mass of the runt eggs (n = 20) were 18.8 mm, 15.4 mm, and 2.0 g, respectively. The smallest reported measurements for bobwhite eggs are 26 mm (length) and 22.5 mm (width) (Bent 1932), and 8.2 g (Case and Robel 1974). Koenig (1980a) defined runt eggs as those with a relative volume (length $\times$ width^2 $\times$ $\pi/6$) <75% of the average. Mean length, width, and mass of bobwhite eggs are 30 mm, 24 mm, and 8.3 g, respectively (Bent 1932, Case and Robel 1974). Thus, the volume and mass

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of the runt eggs we found were only 26% and 24%, respectively, of the average.

We used data from STxQRP and Hernández (1999) to estimate the frequency of runt eggs in Northern Bobwhite. During 1999–2004 of the STxQRP, we located 392 nests and determined clutch size for 297 nests (n = 3,161 eggs). Hernández (1999) located 83 bobwhite nests in Shackelford County, Texas during 1997–1998 and determined clutch size for 35 nests (n = 385 eggs). Based on these combined data (3,546 normal-sized eggs + 20 runt eggs), runt eggs in bobwhites occur at a frequency of 0.56%, which is within the range (0.02–4.32%) reported for other avian species (Koenig 1980b, Mallory et al. 2004).

The mechanisms underlying the production of runt eggs are not entirely understood (Mulvihill 1987). However, runt eggs often are produced after temporary disturbance or damage (e.g., injury or infection) to the reproductive organs (Pearl and Curtis 1916, Romanoff and Romanoff 1949). Instances of entire clutches being composed of runt eggs suggest a congenital defect or permanent injury to the reproductive system (Mulvihill 1987). We presume the bobwhite hen that laid the runt eggs may have suffered from some type of permanent injury to her reproductive organs.

Prolonged incubation behavior.—Prolonged incubation beyond the normal time required for hatching has been reported for many avian species, including Killdeer (*Charadrius vociferus*; Powers 1978), Common Loon (*Gavia immer*; Sutcliffe 1982), and Long-eared Owl (*Asio otus*; Marks 1983). Most birds that exhibit prolonged incubation appear to incubate for at least 50–100% longer than necessary to hatch a clutch (Skutch 1962). Prolonged incubation (56 days) has been reported only once for Northern Bobwhite (Stoddard 1931), which is 33 days (143%) beyond the average incubation period (23 days). We report two additional records of prolonged incubation for Northern Bobwhite.

During our first observation of prolonged incubation, a bobwhite hen exhibited normal incubation behavior during a first nesting, and the eggs successfully hatched on 7 July 2003. However, the hen exhibited prolonged incubation of a second clutch. We discovered the nest on 11 August, and by 8 September, only 1 of 10 eggs had hatched. The female was not observed on the nest between 9 and 25 September, but on 26 September, the hen returned to the nest and resumed incubation until 5 December. Thus, the hen incubated the eggs for 28 days, abandoned the nest for 17 days, and then resumed incubation for another 70 days. The 98 days of incubation was 75 days (326%) beyond the normal incubation period for bobwhites.

We documented the second occurrence of prolonged incubation during the 2004 nesting season. On 18 June, we accidentally flushed an un-radiomarked hen from a nest. We returned to the nest site on 12 July, presuming the clutch had hatched, and found her still incubating the clutch. The hen continued incubating until 27 August, when the clutch was depredated. Assuming the hen had just begun incubation when we first found the nest, she incubated for at least 70 days, or 47 days (204%) beyond the normal incubation period for bobwhites.

Although only 1 of 10 eggs hatched in our first observation of prolonged incubation, Murray and Frye (1957) suggest that the hatching of even one egg is sufficient to satisfy the nesting instinct. In our observation, however, the hen continued incubation even though only one egg hatched. Hurst (1978) observed a similar phenomenon, during which a bobwhite hen continued incubation of partially hatched, dead chicks. The clutch consisted of 10 eggs: 1 infertile, 1 completely hatched, and 8 partially hatched. The eight partially hatched eggs contained fully developed chicks that had pipped and partially ringed their eggshells but had become ‘‘entombed.’’ Hurst (1978) did not report the length of time that the hen remained on the partially hatched eggs.

Prolonged incubation is thought to provide a safety margin for eggs that take longer than normal to hatch (Skutch 1962, Holcomb 1970). However, Holcomb (1970) suggested that prolonged incubation would be maladaptive for species capable of renesting. Bobwhites commonly renest two or three times per breeding season, regardless of previous nest fate (Stoddard 1931). Given that the two records of prolonged incubation occurred toward the end (July–August) of the normal nesting season for bobwhites (May–August), the opportunity for renesting was limited and may have contributed to prolonged incubation.

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LITERATURE CITED

BARTEL, K. E. 1986. Another record of runt eggs for the Tree Swallow. North American Bird Bander 11:3–4.

BENT, A. C. 1932. Eastern, Florida, and Texas Bobwhite. Pages 9–36 *in* Life histories of North American gallinaceous birds. U.S. National Museum Bulletin, no. 162. [Reprinted 1963, Dover Publications, New York.]

CASE, R. M. AND R. J. ROBEL. 1974. Bioenergetics of the Bobwhite. Journal of Wildlife Management 38:638–652.

HERNÁNDEZ, F. 1999. The value of prickly pear cactus as nesting cover for Northern Bobwhite. Ph.D. dissertation, Texas A&M University, Kingsville and College Station.

HOLCOMB, L. C. 1970. Prolonged incubation behaviour of Red-winged Blackbird incubating several egg sizes. Behaviour 36:74–83.

HURST, G. A. 1978. Unusual incubation behavior in Bobwhite. Wilson Bulletin 90:290–291.

KOENIG, W. D. 1980a. The determination of runt eggs in birds. Wilson Bulletin 92:103–107.

KOENIG, W. D. 1980b. The incidence of runt eggs in woodpeckers. Wilson Bulletin 92:169–176.

MALLORY, M. L., L. KIFF, R. G. CLARK, T. BOWMAN, P. BLUMS, A. MEDNIS, AND R. T. ALISAUSKAS. 2004. The occurrence of runt eggs in waterfowl clutches. Journal of Field Ornithology 75:209–217.

MANNING, T. H. AND B. CARTER. 1977. Incidence of runt eggs in the Canada Goose and Semipalmated Sandpiper. Wilson Bulletin 89:469.

MARKS, J. S. 1983. Prolonged incubation by a Long-eared Owl. Journal of Field Ornithology 54:199–200.

MULVIHILL, R. S. 1987. Runt eggs: a discovery, a synopsis, and a proposal for future study. North American Bird Bander 12:94–96.

MURRAY, R. W. AND O. E. FRYE, JR. 1957. The Bobwhite quail and its management in Florida. Game Publication 2, Florida Game and Fresh Water Fish Commission, Tallahassee, Florida.

M'WILLIAM, J. M. 1927. Some abnormal eggs of wild birds. Scottish Naturalist 66:108–110.

PEARL, R. AND M. R. CURTIS. 1916. Studies on the physiology of reproduction in the domestic fowl—XV. Dwarf eggs. Journal of Agricultural Research 6:977–1042.

POWERS, L. R. 1978. Record of prolonged incubation by a Killdeer. Auk 95:428.

RICKLEFS, R. E. 1975. Dwarf eggs laid by a starling. Bird Banding 46:169.

ROMANOFF, A. L. AND A. J. ROMANOFF. 1949. The avian egg. John Wiley and Sons, New York.

ROTHSTEIN, S. I. 1973. The occurrence of unusually small eggs in three species of songbirds. Wilson Bulletin 85:340–342.

SKUTCH, A. F. 1962. The constancy of incubation. Wilson Bulletin 74:115–152.

STODDARD, H. L. 1931. The Bobwhite quail: its habits, preservation and increase. Charles Scribner's Sons, New York.

SUTCLIFFE, S. 1982. Prolonged incubation behavior in Common Loons. Wilson Bulletin 94:361–362.

ZELENY, L. 1983. Miniature bluebird eggs. Sialia 5:127–128.