

## APPARENT DEPREDATION OF CHESTNUT-COLLARED LONGSPUR NESTLINGS BY THE BROWN-HEADED COWBIRD

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The Brown-headed Cowbird (*Molothrus ater*) is an obligate brood parasite that lays eggs in the nests of more than 220 host species (Lowther 1993). Brown-headed Cowbirds typically reduce the reproductive success of their hosts by removing host eggs and producing nestlings that demand extensive care by host parents. Additionally, cowbird eggs require a shorter incubation period than the eggs of many host species (e.g., Briskie and Sealy 1990, Kattan 1995), and incubation of cowbird eggs may disrupt incubation of host eggs (McMaster and Sealy 1998). To parasitize a nest successfully, cowbirds must lay eggs in a host's nest when the host female is laying (or shortly thereafter, if cowbird eggs require a shorter incubation period than host eggs). However, some cowbirds also depredate nests much later in the nesting cycle, presumably to induce renesting (Smith and Arcese 1994, Arcese et al. 1996).

Depredation of hosts' eggs by cowbirds may include ejecting eggs from nests and sometimes eating eggs (Scott et al. 1992), puncturing eggs (which appears to function in assessment of egg development in the Shiny Cowbird, *Molothrus bonariensis*; Massoni and Roboreda 1999), or killing nestlings. Although accounts of depredation of nestlings by Brown-headed Cowbirds are rare, evidence indicates that this phenomenon has occurred in a variety of species (Dubois 1956, Tate 1967, Beane and Alford 1990, Scott and McKinney 1994, Grzybowski 1995, Sheppard 1996, Elliott 1999, Thompson et al. 1999, Granfors et al. 2001).

Here we report evidence for removal of Chestnut-collared Longspur (*Calcarius ornatus*) nestlings by a female Brown-headed Cowbird. These observations were made during a study of reproductive biology of a population of Chestnut-collared Longspurs at Benton Lake National Wildlife Refuge (BLNWR) in Cascade County, Montana (47° 40' N, 111° 27' W) from April to August in 1997 and 1998 and April to July in 1999 and 2000. As part of a long-term behavioral study (see Lynn et al. 2002), all individuals were banded with an aluminum U.S. Fish and Wildlife Service band and colored plastic leg bands for identification. We monitored all nests daily and assessed parental behavior during the nestling stage. Adults were captured at their nests with clap nets, which cover a 2.5 m × 7 m area of prairie when they are sprung.

Chestnut-collared Longspurs are infrequently parasitized by Brown-headed cowbirds (Hill and Gould 1997). In our study population, we found cowbird eggs in four (12.5%) of 32 Chestnut-collared longspur nests containing eggs in 1999. This was the only brood parasitism noted among 142 longspur nests monitored during incubation over four years at BLNWR (2.8% of nests parasitized). Brown-headed cowbirds are uncommon at BLNWR (U.S. Fish and Wildlife Service 1993).

On 11 June 1999, we conducted routine behavioral observations at a nest containing four two-day old nestlings. After 25 minutes of nest observation, both adults hovered near the nest and swooped into the grass, typical of nest defense from a ground predator (Hill and Gould 1997; Lynn pers. obs.). After 3 minutes, both the male and female left the territory. Several minutes later, a female cowbird flushed from the nest area. All four nestlings had been pulled from the nest; one had a laceration on the back of its neck, and all others were intact. We returned the nestlings to the nest cup, and the parents resumed feeding them. Five days later, we used a clap net at the same nest to capture the female longspur. When the net was sprung, we captured a

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female cowbird as well as the female longspur. In four years of capturing adult longspurs at their nests, this is the only incident in which we captured a bird other than the parental male or female.

On 8 June 1999, while checking another Chestnut-collared Longspur nest with a brood of three six-day old nestlings, we discovered all three nestlings alive and unharmed, but scattered within 15 cm of the nest. We returned the nestlings to the nest, and the adults eventually resumed feeding. Approximately 5 minutes later, we observed both the male and female hovering and making low swooping flights near the nest. About 1 minute later, a female cowbird flushed from the nest area. After several minutes of attacking by the longspurs the cowbird flew away without removing nestlings. We did not observe a cowbird approaching this nest again.

We also found five-day old nestlings scattered outside of two other Chestnut-collared Longspur nests on 7 and 13 June 1999. At both nests, all nestlings were intact, but part of the brood had died, presumably as a result of desiccation or exposure. Although we did not observe a cowbird at these two nests, the circumstances of the previous accounts suggest that a cowbird may have been responsible.

An alternative explanation for finding nestlings outside of their nests at all of the nests we have described is infanticide by a replacement male (or female) following divorce of the parental male and female or death of one parent (see Rohwer et al. 1999 for a review), but this can be ruled out, as all of our birds were color banded and all pairs remained stable. Another possibility is that the nestlings fledged early; however, fledging usually occurs on day 10 after hatching (Hill and Gould 1997; Lynn pers obs.), and the oldest of the nestlings found outside of the nest cup were six days old. Additionally, at least one nestling suffered a laceration. Thus, it is clear that the nestlings were removed from their nests, and our observations strongly suggest that a female cowbird was responsible.

Except for the instances described here, we have not found intact nestlings, alive or dead, scattered outside of their nests at the other 138 nests we monitored at this study site. Thus our observations were not likely due to depredation attempts by common nest predators or to brood reduction. Common predators on Chestnut-collared Longspur nests include Richardson's Ground Squirrels (*Spermophilus richardsonii*), garter snakes (*Thamnophis* spp.), Northern Harriers (*Circus cyaneus*), Short-eared Owls (*Asio flammeus*), and Short-tailed Weasels (*Mustela erminea*, Lynn et al. 2002). These data suggest that depredation of nestlings by cowbirds is generally uncommon in our study population. It is, however, possible that on other occasions another predator may have consumed nestlings pulled from a nest by a cowbird, leading us to underestimate cowbird depredation rates. However, we usually either witnessed depredation directly, or the condition of the nest following depredation suggested predators other than cowbirds were responsible (e.g., nesting was material torn out of many nests, suggesting a mammalian predator, and owl pellets were found near other nests).

It is reasonable to assume that nestlings would have died if we had not replaced them in their nests and that, consequently, adults would have initiated renesting. Indeed, at two of nests described here, nestlings that were pulled from their nests did die. Our observations of a cowbird returning to two nests suggest the cowbird(s) may have monitored the success of their nestling removal. Parasitizing nests late in the incubation phase is clearly unproductive for cowbirds, whereas depredating nestlings facilitates parasitism by inducing renesting (Arcese et al. 1996). Chestnut-collared Longspur nests may be easier to locate during incubation because females often do not stay near the nest until they begin incubating (Lynn pers. obs.). In summary, our observations provide circumstantial evidence that cowbirds removed nestlings from Chestnut-collared Longspur nests and that cowbirds monitored specific nest sites after a depredation attempt.

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