Short Communications

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Interspecific Nest Sharing by Red-breasted Nuthatch and Mountain Chickadee

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ABSTRACT.—We report an observation of interspecific nest sharing between Red-breasted Nuthatches (*Sitta canadensis*) and Mountain Chickadees (*Poecile gambeli*) near Williams Lake, British Columbia, Canada. The nest contained two Red-breasted Nuthatch and three Mountain Chickadee nestlings. The nest was attended by a pair of Mountain Chickadees earlier in the observation period and later by an adult female Red-breasted Nuthatch; all five nestlings fledged. Competition for nest sites due to a decrease in cavity availability may have contributed to this occurrence.

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The advantage of nesting in cavities is often high success, but cavity nesters must compete with other individuals and species to secure this resource. Competition for cavities can limit population densities where cavity availability is low (Brush 1983, Peterson and Gauthier 1985, Holt and Martin 1997). Red-breasted Nuthatches (*Sitta canadensis*) regularly excavate new cavities; however, they also may reuse or renovate existing cavities. Mountain Chickadees (*Poecile gambeli*) primarily reuse existing cavities, but very infrequently renovate or excavate cavities (KM unpubl. data). Both species are common at our study sites in the Williams Lake area of British Columbia, Canada. The area consists of interior Douglas-fir (*Pseudotsuga menziesii*) and lodgepole pine (*Pinus contorta*) interspersed with patches of grassland and stands of quaking aspen (*Populus tremuloides*; Martin and Eadie 1999). Red-breasted Nuthatches and Mountain Chickadees are resident species that compete for similar nest sites, as both prefer mixed forest with a strong conifer component and have similar cavity preferences (Ghalambor and Martin 1999, McCallum et al. 1999, Martin et al. 2004).

Chickadees and nuthatches, along with Downy Woodpeckers (*Picoides pubescens*), comprise a sub-group of small-bodied cavity nesters competing for cavity resources in the nest web (Martin et al. 2004). The rate of extra-group cavity reuse among nuthatches and chickadees is low (17%) relative to the rate of reuse (70%) for primary cavity nesters (Aitken et al. 2002). Thus, high intra-group cavity reuse is the primary source of competition for nest sites among chickadees and nuthatches. If absolute or relative availability of suitable cavities decreased, competition in this group would increase, promoting cavity acquisition strategies, such as usurpation or nest sharing. Steeger and Dulisse (2002) reported increased competition and aggression among cavity nesters in response to changes in the relative abundance of nest sites. Usurpation also occurs in response to decreased nest-site abundance (McCallum et al. 1999). Although not previously reported among Red-breasted Nuthatches and Mountain Chickadees, nest sharing could result from cavity competition if nest initiation by a subordinate pair occurs prior to occupation by a dominant pair, and if the new occupants do not destroy the progeny of the initial pair. In this note, we report a case of interspecific nest sharing, where adults of both species attended the nest, and young of both species were reared to fledging.

OBSERVATION

In May and June 2004, during the course of our 10-year field investigation of cavity nesters in an area approximately 40 km west of Williams Lake, British Columbia, Canada, we monitored a case of nest sharing involving Mountain Chickadees and Red-breasted Nuthatches (Martin et al. 2004) in a quaking aspen. On 31 May, we observed two adult

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Mountain Chickadees attending the nest and taking insects into the cavity. On 1 June, PAR flushed an adult Mountain Chickadee from the cavity. This was the last detection of adult chickadees at or near the nest. At this time, the cavity was presumed to contain Mountain Chickadee chicks of unknown age. On the next visit (7 June) a female Red-breasted Nuthatch was tending the nest; she entered the cavity with food twice within 5 min. PAR visually inspected the cavity and found five chicks (two nuthatch and three chickadee). On 10 June, the female nuthatch made frequent (approximately once per min) foraging trips from a nearby Douglas-fir tree to the nest. At least two fecal sacs were removed during 6 min of observation. On 11 June, ARN observed all five chicks still in the cavity, and two nuthatch chicks (estimated at 16 days of age) fledged during the observation period. The fledgling nuthatches were seen the next day foraging with the adult nuthatch on and near the nest tree while the cavity still contained three healthy chickadee nestlings. With fewer chicks in the cavity, ARN could see that the nest was lined with fur, typical of chickadee nests, but fresh pitch had been applied to the cavity entrance, which is typical of Red-breasted Nuthatch nests. During this observation, the adult female nuthatch arrived at the cavity without food and vocalized toward the cavity from a nearby branch, apparently encouraging the remaining Mountain Chickadee nestlings to fledge. The female nuthatch then provisioned the chickadee nestlings twice, removing fecal sacs following both visits. On 16 June, the cavity was empty, and with no evidence of predation, we presumed that the chickadees had fledged successfully. Because no birds were banded, subsequent sightings of Red-breasted Nuthatches or Mountain Chickadees in the area could not be associated with this nest.

The study plot where the observation occurred was in a 26-ha stand of mixed deciduous and coniferous forest consisting of 85% Douglas-fir, 4% lodgepole pine, 8% spruce (*Picea* spp.), and 3% quaking aspen. In 2002, we found four Red-breasted Nuthatch nests, and in 2003, we found one nuthatch and five Mountain Chickadee nests. The study plot was selectively harvested in the fall of 2003. The nest tree (recently dead aspen, 30.2 cm dbh) was situated at the edge of the cutblock. In 2004, the first post-cut year, we monitored two Red-breasted Nuthatch and two Mountain Chickadee nests in addition to the shared nest cavity. This was our only observation of interspecific nest sharing and brood rearing in our 10-year study of cavity nesters, during which we monitored 691 nests of small cavity nesters (52 Black-capped Chickadee, *Poecile atricapillus*; 42 Downy Woodpecker; 340 Mountain Chickadee; and 257 Red-breasted Nuthatch).

DISCUSSION

Although active competition—in the form of aggression before clutch initiation and nest usurpation before and during incubation—is frequently reported (Ghalambor and Martin 1999, McCallum et al. 1999), this is the first record of Mountain Chickadees and Red-breasted Nuthatches successfully rearing their young in a nest attended by both parental species. In our study area, nuthatch nest density more than tripled from 0.03 nests/ha during 1996–2000 to 0.10 nest/ha during 2001–2004; during the same period, chickadee nest density increased from 0.05 to 0.14 nests/ha (KM unpubl. data). This may be a result of regional changes in tree condition and an increased abundance of forest insects (KM unpubl. data). Nuthatches and chickadees prefer dead and decaying aspen trees, which composed <7% of trees on our stands (Martin et al. 2004). Furthermore, nest-site availability decreased at a local scale, due to cutting on the site. Thus, both the absolute and relative availability of nest sites decreased in our study area. These factors, combined with the recent tripling of nuthatch and chickadee populations, may have increased encounter rates and interspecific competition, facilitating the nest-sharing occurrence.

We were able to confirm nest sharing because we visited the nest tree and inspected the cavity visually on multiple occasions. Unfortunately, we did not locate this nest until after the eggs had hatched; thus, we could not determine the circumstances during clutch initiation and incubation. We suspect that Mountain Chickadees initiated the nest because the cavity was lined with fur. In addition, Mountain Chickadees consistently fledge in 21 days (McCallum et al. 1999), whereas Red-breasted

Nuthatches remain in the nest anywhere from 14 to 21 days (Ghalambor and Martin 1999); therefore, the nuthatches could have fledged before the chickadees, even if the nuthatch eggs were laid after the chickadee eggs. Last, we did not observe a male nuthatch at the nest. Given the aggressive nature of male nuthatches and the fact that nuthatch pairs can out-compete Mountain Chickadee pairs (ARN unpubl. data), we suspect the absence of a male nuthatch was an important contributing factor in this occurrence of interspecific nest sharing.

Others have reported interspecific nest sharing where two species laid eggs in the same nest, and in some cases, successfully fledged broods because of cooperative incubation and feeding of nestlings (Skutch 1961, Sundkvist 1979). In Norrbotten, Sweden, a pair of Pied Flycatchers (*Ficedula hypoleuca*) and a female Common Redstart (*Phoenicurus phoenicurus*) shared a nest box and successfully reared the young of both species, despite aggressive encounters between the species during incubation (Sundkvist 1979).

Variation in timing of breeding and dominance can result in cross-species broods. Cavity-nesting Great Tits (*Parus major*) and Blue Tits (*Parus caeruleus*) regularly produce cross-species broods when the earlier-nesting, socially subordinate Blue Tits initiate clutches that are subsequently usurped by the later-nesting, but dominant, Great Tits (Slagsvold 1998). Our nest-sharing observation had some similarities to the tit example, as Mountain Chickadees are subordinate to nuthatches but tend to initiate clutches about 3 days earlier (KM, ARN unpubl. data). Because chickadees do not readily defend their territories against intrusions by nuthatches (ARN unpubl. data), the female nuthatch may not have been deterred by territorial behavior of the chickadee pair.

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Nelson's Sharp-tailed Sparrow Nest Parasitized by Brown-headed Cowbird

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ABSTRACT.—On 22 July 2004, we found a Nelson's Sharp-tailed Sparrow (*Ammodramus nelsoni*) nest in Sheridan County, Montana, containing a single Brown-headed Cowbird (*Molothrus ater*) nestling that was about to fledge. A punctured sharp-tailed sparrow egg was found below the nest. This is the second definitive report of cowbird brood parasitism of a Nelson's Sharp-tailed Sparrow nest and the first indicating successful rearing of a cowbird by this host species. The impact of cowbird parasitism on nesting success of Nelson's Sharp-tailed Sparrow has not been studied, but our record indicates that nest failure (i.e., producing no host young) may be an outcome for some nests of this species. *Received 18 January 2005, accepted 10 August 2005.*

During an inventory of wetland-associated bird species in northeastern Montana, we surveyed wetlands on McCoy Creek, Sheridan County (48° 49′ 57″ N, 104° 35′ 36″ W), in June and July 2004 to observe the activities of singing grassland sparrows found there. On 19 July, TJN and MPN saw a pair of Nelson's Sharp-tailed Sparrows (*Ammodramus nelsoni*) carrying food four times and fecal sacs three times during 75 min of observation, but could not find the nest. On 22 July, TJN and MPN found the nest after watching the adults make two feeding trips to the same general area.

The nest was in dense wetland vegetation of sedges (*Carex* spp.), rushes (*Scirpus* spp.), and unidentified grasses about 100 cm tall; the nest rim was 23 cm above ground. The nest was built of coarse grass and lined with finer grasses; inside cup dimensions were 3.5 cm deep and 5.0 cm in diameter, typical for nests of this species (Greenlaw and Rising 1994). The nest contained a single Brown-headed Cowbird (*Molothrus ater*) nestling that filled the entire nest cup. The cowbird was well feathered, with sheathing present on the proximal two-thirds of the primaries; we estimated that it was about 8 days old, or within a few days of fledging (Scott 1979). We photographed and videotaped the nest contents and surrounding area and deposited digital copies with the Montana Natural Heritage Program in Helena.

On 24 July, we revisited the nest and found it empty. We assumed the cowbird nestling had fledged, but neither saw nor heard the sparrows or the cowbird during 30 min of observation. We found a single, punctured sharp-tailed sparrow egg on the ground below the nest that had been overlooked on the day the nest was discovered. The egg measured 17.5 × 14.2 mm, was bluish-white in color, and was covered with numerous fine, light-brown maculations—typical in size, coloration, and markings for Nelson's Sharp-tailed Sparrow, although slightly shorter than average (Greenlaw and Rising 1994). The eggs and nest of Le Conte's Sparrow (*A. leconteii*) are similar (Lowther 1996) to those of Nelson's Sharp-tailed Sparrow, and, in northeastern Montana wetlands, Le Conte's Sparrow is sympatric with Nelson's Sharp-tailed Sparrow (PH pers. obs.); however, we neither saw nor heard any Le Conte's Sparrows at this site on any of our five visits. Thus, we are confident that the nest and egg belonged to the pair of Nelson's Sharp-tailed Sparrows we observed near the nest site. The nest and punctured egg were collected and deposited in the Philip L. Wright Zoological Museum at the University of Montana, Missoula (UMZM 18620).

Our observation of cowbird brood parasitism on Nelson's Sharp-tailed Sparrow is significant for several reasons. First, it is only the second definitive record of a cowbird parasitizing this host species. The first was of a single cowbird egg found in a clutch of four sharp-tailed sparrow eggs near Brandon, Man-

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itoba, on 20 June 1962 (Hill 1968). In his comprehensive summary of host species, Friedmann (1963) listed an earlier, third-party recollection of an associate who found a Nelson's Sharp-tailed Sparrow nest containing a cowbird egg, but no additional details regarding date or location were provided; thus, the record is hypothetical. Second, our report is the first to confirm that this species can successfully rear a cowbird nestling (Friedmann and Kiff 1985, Greenlaw and Rising 1994, Shaffer et al. 2003). Third, our observation indicates that nest failure (i.e., producing no host young) is a possible outcome when cowbirds parasitize Nelson's Sharp-tailed Sparrow, perhaps resulting in reproductive failure for an entire breeding season.

Nelson's Sharp-tailed Sparrow is arguably among the most poorly known of North American sparrows. In particular, very little information is available on this species' nesting ecology or its habitat requirements in the northern prairie states and provinces (Greenlaw and Rising 1994) because the nests are notoriously difficult to locate. Therefore, the impact of parasitism by Brown-headed Cowbirds on populations of Nelson's Sharp-tailed Sparrow in the northern Great Plains is unknown. Friedmann (1963) was probably overly optimistic in concluding that the nesting habitat used by Nelson's Sharp-tailed Sparrow would buffer it from significant cowbird parasitism. On a small North Dakota site occupied by both Le Conte's and Nelson's Sharp-tailed sparrows (Murray 1969), all five Le Conte's Sparrow nests found were parasitized, indicating that cowbirds were active in the habitat where sharp-tailed sparrows nested. Studies of additional Nelson's Sharp-tailed Sparrow nests may prove that cowbird parasitism is more frequent than evidence currently indicates.

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Dunking Behavior in American Crows

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ABSTRACT.—Dunking behavior, the immersion of food items in water, is a relatively rare behavior in birds. I observed American Crows (*Corvus brachyrhynchos*) dunking several types of food in rain puddles at Mont-Royal Park, Montréal, Québec, Canada. Pieces of dry bread and unshelled peanuts were provided in two experiments to test the potential effects of item size (bread) and shell softening (peanuts) on crow behavior. Crows dunked large pieces of bread more often than small ones. Dunking unshelled peanuts did not speed up the opening process. These observations further support the suggestion that food dunking among birds facilitates food ingestion by softening large, hard items. *Received 3 November 2004, accepted 11 July 2005.*

Dunking behavior, the immersion of food items in water, is a relatively rare behavior in free-ranging birds; fewer than 40 species have been reported dunking food (Morand-Ferron et al. 2004). Prevalent among these records are members of the genera *Quiscalus* (5 species out of 6) and *Corvus* (7 species out of 43). In this paper, I describe dunking behavior in another corvid species, *Corvus brachyrhynchos*. Although well known among naturalists (C. Caffrey pers. obs.), dunking behavior in American Crows has not been reported in the literature. Reports of unusual behaviors are useful in estimating the taxonomic distribution of innovative behaviors, which can be used to test predictions in neurobiology, ecology, evolution, and cognition (Reader and Laland 2003).

On 21 September 2003, at 11:00 EST, I observed a single crow pick up two pieces of dry white bread (3 × 3 cm) that had been thrown on the ground near the entrance of the Lac-aux-Castors section of Mont-Royal Park in Montreal, Quebec, Canada. The bird then flew to a nearby (10 m) rain puddle and dunked the food in it twice before eating it on the spot. On 23 September, I returned to the park and again witnessed a free-ranging crow dunking bread. Between 23 September and 16 October, I observed at least three different individuals (birds were not marked, but sometimes they dunked almost simultaneously in different puddles) dunking fresh and dry bread and unshelled peanuts. I also observed crows eating dry dog food pellets ($n = 16$), maraschino cherries ($n = 2$), and live crickets ($n = 6$) that I placed 8 m from the nearest rain puddle; however, I observed no crows dunking these items (all previously reported as dunked by other species; see table in Morand-Ferron et al. 2004).

From these observations alone, it is difficult to determine the function of dunking behavior in wild American Crows. Among the different functions suggested for this behavior in birds, using food as a sponge for bringing water to nestlings (Koenig 1985) can be ruled out because the events I observed occurred many weeks after juveniles had fledged. Washing soiled food (Simmons 1950, Watkin 1950, Caldwell 1951, Jordheim 1965, Wible 1975, Johnson 1976, Seibt and Wickler 1978, Vader 1979, Zach 1979, Schardien and Jackson 1982, del Hoyo et al. 1996, Henry et al. 1998) also may be ruled out because the food items were soiled during the process of dunking clean food into muddy rainwater.

I conducted two field experiments with bread and peanuts to examine two possible determinants of dunking: the effect of item size on the dunking frequency of bread and the advantage that dunking might offer in softening peanut shells (making them easier to open). In the first set of trials, I tested the hypothesis that dunking hard food would be more prevalent with larger items (too large to be swallowed whole) than with smaller items. I provided crows ($n = 3$) at Mont-Royal Park with two sizes of dry bread: small (2 × 2 cm, $n = 16$) and large (4 × 4 cm, $n = 17$). I ran one trial per day between 10:00 and 12:00 on

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4 days in October 2003. During each trial, I recorded the behavior of crows provided with 6 to 10 pieces of bread. One piece at a time, I threw bread on the ground, alternating between the two sizes each time. I noted whether the crow that took the piece dunked it in a nearby puddle (8 m away) or ate it dry. A chi-square test revealed that the large pieces were dunked more often than the small ones (58.8 versus 18.8% respectively; $\chi^2 = 5.53$, df = 1, $P = 0.014$). This result suggests that the size of food items might influence the frequency of dunking behavior in birds.

In the second set of trials, I tested the hypothesis that crows dunking peanuts could accelerate the shelling process by softening the shell in water. The potential advantage of reduced handling time, however, needs to be distinguished from the possibility that dunking peanuts lubricates them and allows the bird to swallow them whole. I observed the latter behavior once in Ring-billed Gulls (*Larus delawarensis*)—which also have been reported dunking crackers (Stokes and Stokes 1985)—but not in crows. From 10:00 to 12:00 on 4 days between 26 September and 16 October 2004 and on 4 days between 7 and 14 April 2005 ($n = 5$ trials in 2004 and $n = 6$ in 2005), I provided crows with unshelled peanuts near a rain puddle (8 m away) at Mont-Royal Park. On each day, I made a similar number of observations on peanuts that crows dunked and did not dunk ($n = 4$–8 peanuts per day). I defined shelling latency as the time it took to access the second peanut inside a two-peanut shell, not including the time spent in locomotion. I discarded observations where the crow did not eat the second peanut but cached it in the grass ($n = 3$). On average, shelling latency was 55.1 sec ± 35.7 SD when the crows dunked ($n = 22$) and 65.4 ± 48.6 sec when crows did not dunk the peanuts ($n = 26$; $t = 0.818$, df = 46, $P = 0.42$); thus, dunking did not accelerate the peanut-shelling process. After extracting them from the shell, crows sometimes dunked peanut halves in water, which resulted in removal of the peanut skin. This behavior has also been observed in Common Grackles (*Quiscalus quiscula*; Wible 1975).

The function of dunking behavior seems to vary depending on the species performing it and the item dunked. For example, raptors kill live prey by holding it under water (e.g., *Accipiter nisus*; Weekley 1997). Shorebirds are thought to wash muddy items by rinsing them in water before consumption (e.g., *Tringa hypoleucos*; Simmons 1950). Studies on Carib Grackles (*Quiscalus lugubris*) have revealed that birds dunk dry bread more often than fresh bread (Morand-Ferron et al. 2004) and that dunking hard items reduces handling time (JM-F unpubl. data); these results suggest that food dunking among Carib Grackles is a food-processing technique to facilitate the ingestion of items that otherwise would be difficult to swallow. My observations on American Crows dunking bread suggest a similar function. A peculiarity of corvid dunking behavior seems to be its variability: observations indicate that dunking is used to transport water to nestlings (*Corvus corax*; Hauri 1956), drown live prey (e.g., *Pica nuttalli*; Blackburn 1968), wash soiled items (e.g., *Corvus caurinus*; Zach 1979), and soften hard (*Corvus corone*; Goodwin 1986) or large items (*Corvus brachyrhynchos*; this study). My observations add to the diversity of dunking behaviors reported for corvids and further support Goodwin's (1986) suggestion that dunking may be a standard part of the feeding repertoire in the genus *Corvus*.

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An Apparent Case of Cooperative Hunting in Immature Northern Shrikes

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ABSTRACT.—Cooperative hunting is a behavior rarely observed in passerine birds. I observed two immature Northern Shrikes (*Lanius excubitor invictus*) apparently hunting cooperatively while preying on American Tree Sparrows (*Spizella arborea*) in central Alaska. During each of three foraging attempts, both shrikes appeared to work together to flush prey from dense cover into the open where it was then pursued. Cooperative hunting in this otherwise solitary species may be an adaptive behavior among inexperienced birds to increase their foraging efficiency, or to compensate for seasonal fluctuations in the accessibility or availability of prey. *Received 6 December 2004, accepted 9 July 2005.*

Many raptorial birds are considered solitary predators (Schoener 1969); however, more social forms of foraging may be adaptive if the outcome results in increased foraging efficiency or compensates for fluctuations in prey populations (Packer and Ruttan 1988, Ellis et al. 1993). Cooperative hunting in mammals has been extensively documented in large, social carnivores (Packer and Ruttan 1988) and some diurnal raptors (Hector 1986, Bednarz 1988, Yosef 1991). Only rarely, however, has social foraging been reported in passerine birds (see Bowman 2003). Generally, social foraging is not thought to be a common foraging strategy within the genus *Lanius*, although a case of cooperative hunting was observed in mated Loggerhead Shrikes (*Lanius ludovicianus*; Frye and Gerhardt 2001). In this paper, I report an apparent case of cooperative hunting by immature Northern Shrikes (*Lanius excubitor invictus*).

The observation took place in Denali National Park, Alaska (63° 44′ N, 149° 22′ W) between km 28.1 and 28.8 of Denali Park Road, near a small tributary creek of the Savage River. Vegetation at the site was primarily riparian, with many species of willow (*Salix* spp.) ranging in height from 1 to 5 m, contrasting markedly with the surrounding vegetation. Vegetation in the surrounding area was characteristic of the taiga/tundra interface, consisting of widely spaced, stunted 1- to 5-m-tall white spruce trees (*Picea glauca*); dwarf birch (*Betula glandulosa*), willow (*Salix* spp.), and blueberry (*Vaccinium uliginosum*) were the dominant cover species. Elevation at the site was approximately 880 m, with marked topographical relief in the surrounding area. Ambient temperature at the time of the observation was −4° C.

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While driving along the Denali Park Road on 19 September 2003, I noticed two Northern Shrikes perched in close proximity to one another. I observed and photographed both birds from ≤12 m and identified them as immature birds—based on the fine dusky vermiculations on their underparts, an overall brownish appearance, and grayish-brown supercilia (Cade and Atkinson 2002). As I exited my vehicle at 10:30 AST, both birds flew approximately 50 m and perched approximately 20 m apart in a thick patch of willows 3–5 m in height. Both birds then flew into the willow thicket, where I could see them sporadically as they hopped along branches.

Suddenly, one of the shrikes flew up out of the thicket, chasing an American Tree Sparrow (*Spizella arborea*). The shrike pursued the sparrow upward, making quick, horizontal lunges at the sparrow as it continued to ascend. After 5–6 sec, the shrike and the sparrow reached an altitude of approximately 30 m above the ground. At this point, the second shrike joined in the pursuit, with both shrikes alternately making horizontal lunges at the sparrow. After an additional 8–10 sec, the sparrow made a quick vertical descent to a willow thicket. The shrikes discontinued their pursuit of the sparrow and flew back to the original willow thicket, where they perched several meters apart near the top.

One of the shrikes then began to sing irregularly, uttering a series of trills and warbles as described by Cade and Atkinson (2002). After approximately 2 min, both birds flew into the willow thicket. At about 10:45, one shrike emerged from the willow thicket, chasing an American Tree Sparrow upward in much the same manner as in the previous chase. Within 5–6 sec, the second shrike joined in the pursuit. Following several alternating horizontal lunges by the shrikes, the sparrow made a quick vertical descent and flew into dense vegetation. The two shrikes returned to the original willow thicket and flew back into cover. At 10:50, another American Tree Sparrow—pursued by both shrikes—flew up out of the thicket. In contrast to the first two pursuits, all three birds reached an altitude of ~45–50 m above the ground, and both shrikes made 10–15 horizontal lunges at the sparrow. The sparrow, which showed signs of fatigue, began a slightly more horizontal descent than the one made during the previous two chases. One of the shrikes then began a direct pursuit of the sparrow, which was flying almost completely horizontally. After pursuing the sparrow for ~8–10 sec, covering a distance of approximately 150 m, the shrike captured the sparrow by grasping it with its bill and quickly transferring the prey to its feet. The shrike then flew to a large willow, perched, and bit the sparrow's head and neck, apparently killing it.

At this point, the second shrike flew in, perched ~5 m away from the first shrike, and uttered a loud ''waik'' call (Cade and Atkinson 2002). The first shrike, responding with a similar call, flew approximately 120 m to the east and perched at the top of a small spruce. The second shrike pursued the first shrike, perching nearby and again uttering the waik call. Grasping the sparrow with its feet, the first shrike flew ~400–500 m farther before disappearing over a ridge, with the second shrike in pursuit. Thereafter, I was unable to refind the birds; thus, I could not determine whether the prey item was shared.

Although little is known about the diet of Northern Shrikes during autumn migration, passerine birds are thought to represent only a minor portion of the summer and winter diet, in both number and biomass (Cade 1967, Atkinson and Cade 1993). Compared with other prey taxa, Northern Shrikes have very low foraging success when hunting birds (Cade and Atkinson 2002), often taking them by surprise and only rarely in flight (Cade 1967). Although insects constitute a large proportion of the Northern Shrike's diet (Atkinson and Cade 1993), the extremely cold autumn temperatures in this region would likely reduce their availability as potential prey. Access to small mammals—another significant part of the shrike's diet—might be limited in dense, shrubby habitat such as that along Denali Park Road. Therefore, small flocks of migrating passerines may represent an opportunistic, albeit highly important food source for shrikes migrating through this area in late autumn. By hunting cooperatively, inexperienced shrikes may overwhelm or surprise elusive prey, thereby reducing the potential for escape and increasing hunting success. Consequently, social foraging may be adaptive, by increasing the foraging efficiency on this highly elusive, though seasonally abundant food resource.

According to Ellis et al. (1993), my observation may represent true cooperative hunting—a form known as sibling group hunting, wherein two or more sibling fledglings hunt cooperatively. Although I could not determine whether these birds were siblings, small groups of immature shrikes during the early part of autumn migration are thought to consist of siblings (Cade and Atkinson 2002). Whereas true cooperative hunting has never before been reported in the Northern Shrike, cooperative hunting by sibling groups may be an adaptive strategy used by younger, less experienced raptorial birds to improve hunting efficiency (Packer and Ruttan 1988, Ellis et al. 1993). As individual birds develop their hunting skills and increase their foraging efficiency, the need to hunt cooperatively probably declines (Bosakowski and Smith 1996, Brown et al. 2004). Alternatively, as shrikes migrate farther south, other prey taxa may once again become more available and accessible, resulting in a smaller proportion of birds in their diet and fewer instances of social foraging. Generally, previous accounts of cooperative hunting in passerines, such as Common Raven (*Corvus corax*; Hendricks and Schlang 1998), Loggerhead Shrike (Frye and Gerhardt 2001), and Florida Scrub-Jay (*Aphelocoma coerulescens*; Bowman 2003), have involved mated adult pairs cooperatively hunting large or dangerous prey. My observation is novel in that it involved immature passerines cooperatively hunting smaller prey. Further study is required to determine the frequency and adaptive significance of social foraging in passerine birds.

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A Field Observation of the Head-down Display in the Bronzed Cowbird

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ABSTRACT.—We describe a photodocumented field observation in Sinaloa, Mexico, of a head-down (or ‘‘preening invitation’’) display performed by a male Bronzed Cowbird (*Molothrus aeneus*), which elicited both grooming and pecking responses from a female Great-tailed Grackle (*Quiscalus mexicanus*). Previously, such displays by parasitic cowbirds and responses by conspecific or various heterospecific bird species have been documented mainly under aviary conditions; most field observations have involved Brown-headed (*M. ater*) and Shiny (*M. bonariensis*) cowbirds. The function and evolutionary significance of such interspecific interactions remain elusive, but continued documentation of such occurrences may help elucidate their biological significance. *Received 10 December 2004, accepted 2 August 2005.*

On 17 December 2003 at 08:15 MST, we observed a mixed group of icterids, including 40 Great-tailed Grackles (*Quiscalus mexicanus*), 20 Bronzed Cowbirds (*Molothrus aeneus*), and 1 Brown-headed Cowbird (*M. ater*), in several small palo verde (*Cercidium* spp.) trees along the southern shoreline of the Eustaquio Balbuena reservoir in Guamuchil, Sinaloa (25° 28′ N, 108° 06′ W). Among these birds was a male Bronzed Cowbird giving a head-down display with its neck ruff flared out, matching the ‘‘interspecific preening invitation display’’ described by Selander and La Rue (1961). The bird remained very still in this position for most of our 5-min observation. A female Great-tailed Grackle spent several minutes within 5–15 cm of the cowbird, lateral to and slightly below it, gently picking at the cowbird’s head about eight times. The grackle also delivered six slightly stronger pecks toward the Bronzed Cowbird, but did not cause the cowbird to move from its perch. At the end of this interaction, the cowbird shifted upward along the branch to a position about 30 cm from the grackle. We could not determine whether the grackle was obtaining food items—such as ectoparasites—from the cowbird, but its bill motion was clearly that of gentle picking rather than preening through the feathers. KCM photographed the display (a series of eight digital images) under clear conditions at 15° C with a very light breeze (Fig. 1).

It appears that head-down displays directed by cowbirds toward—and eliciting responses from—much larger grackles are not common. Selander and La Rue (1961) described interspecific preening invitation displays by Brown-headed Cowbirds in captive, mixed-species flocks and briefly mentioned a similar display performed by two captive Bronzed Cowbirds; these authors noted brief displays by Brown-headed Cowbirds toward female Great-tailed Grackles, which elicited no responses from the grackles. Selander (1964) recorded additional such displays to heterospecifics by captive Shiny (*M. bonariensis*) and Bay-winged cowbirds (*Agelaioides* [*Molothrus*] *badius*). Such preening invitation, or head-down (Rothstein 1977), displays are now well documented in wild Brown-headed Cowbirds (Selander and La Rue 1961, Dow 1968, Rothstein 1977, Lowther and Rothstein 1980, Hunter 1994) and in captive (Harrison 1963) and wild (Chapman 1928, Payne 1969) Giant Cowbirds (*M. oryzivorus*). Post and Wiley (1992) observed Shiny Cowbirds in the field directing 33 of 238 head-down displays toward Greater Antillean Grackles (*Q. niger*). Rothstein (1977) has also documented these head-down displays among conspecifics.

Discussions of the function of cowbird head-down preening solicitation initially centered on heterospecific functions that may reduce the aggressiveness of cowbird host species (Selander and La Rue 1961). However, Rothstein (1977, 1980) showed that the head-down display also occurs in an intraspecific context, usually directed toward a behaviorally subordinate individual; although he found

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FIG. 1. Male Bronzed Cowbird (*Molothrus aeneus*, left) giving a head-down (preening invitation) display to female Great-tailed Grackle (*Quiscalus mexicanus*, right), 17 December 2003, Guamuchil, Sinaloa, Mexico.

that the displays were motivated by aggression, Rothstein (1980) reported that they were responded to as if they represented appeasement, thus constituting a form of behavioral mimicry. A display directed by a male Bronzed Cowbird toward a female grackle is similar to a display directed to a subordinate individual (S. I. Rothstein pers. comm.), even though the grackle is approximately 60% larger (Dunning 1992). Our midwinter observation of this display is not consistent with Selander and La Rue's (1961) argument that the display reduces interspecific aggressiveness from potential cowbird hosts. Scott and Grumstrup-Scott (1983) hypothesized that the head-down display is ''an appeasing, agonistic behavior that reduces agonistic behaviors of the recipient toward the displaying cowbird.'' The displaying bird is generally dominant to the recipient, and preening may stimulate subsequent displaying by the preened cowbird. These authors cite possible social functions of this display relating to obtaining food, roosting energetics, and/or maintaining flock order (Scott and Grumstrup-Scott 1983).

Although previous discussions about responses to head-down displays (e.g., Selander and La Rue 1961) relate to heteropreening, none explicitly mentioned foraging by the ''preening'' bird for ectoparasites on the displaying cowbird. We could not determine whether ectoparasites were actually obtained during our observation, but the female grackle's picking motions resembled foraging behavior rather than preening. Great-tailed Grackles exhibit a wide range of foraging behaviors (Johnson and Peer 2001), including taking ectoparasites from livestock (Skutch 1954). The Common Grackle (*Q. quiscula*) also has been noted picking leeches from the legs of map turtles (*Graptemys ouachitensis*; Vogt 1979).

As Rothstein (1977) pointed out, observations of preening solicitation behaviors in captive birds may not accurately reflect the context and functions of such behaviors in the wild. Little is known of the importance of this behavior in wild cowbirds; as such, it is important to continue cataloguing the occurrence of such behavior and the identities of both the displaying bird and the recipient. Ours is among the few field observations of a head-down display performed by a Bronzed Cowbird, and it is the first report of such a display directed by a wild cowbird toward—and eliciting a response from—a Great-tailed Grackle.

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Filial Cannibalism at a House Finch Nest

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ABSTRACT.—We report on a female House Finch (*Carpodacus mexicanus*) eating one of her own eggs from a clutch of six on the 3rd day of incubation. This observation is a confirmed case of filial cannibalism in the egg stage. The reason for this behavior is unknown, but we suggest and discuss three possibilities: (1) an idiosyncratic response to human disturbance, (2) removal of a damaged egg from the nest, and (3) facultative brood reduction in the egg stage. *Received 12 January 2004, accepted 15 July 2005.*

There are relatively few records in the literature of birds eating their own eggs, and we could find reports of this behavior for only seven species. The proximate causes for ‘‘filial cannibalism’’ in the egg stage (Stanback and Koenig 1992) can be classified as adaptive or nonadaptive. Adaptive behaviors include eating one’s own infertile (presumably) eggs that remain in the nest beyond normal incubation time (Walsh 1964, Berger 1981, Stiehl 1985, Banko et al. 2002), or eating eggs that have been damaged (Trail et al. 1981). In addition, female Acorn Woodpeckers (*Melanerpes formicivorus*) occasionally participate in eating their own eggs after those eggs have been removed from shared nests as an integral part of a unique, but apparently adaptive, communal breeding system (Mumme et al. 1983). In contrast, Chardine and Morris (1983) reported a presumably nonadaptive egg-eating behavior in Herring Gulls (*Larus argentatus*) after observing two males brooding at different nests eat their own eggs (at one nest, all eggs were eaten). This apparently abnormal behavior in the two males was attributed, respectively, to a possible displacement response caused by a female gull returning late to her nest to brood, and to a possible idiosyncratic reaction to human disturbance.

Here, we report on a female House Finch (*Carpodacus mexicanus*) that ate a single egg from her clutch of six on the 3rd day of incubation. Timing of egg laying indicated that the egg was not laid by another House Finch (intraspecific brood parasitism is not known for the species; Hill 1993). We have no evidence that the eaten egg had been damaged, and it did not appear deformed, discolored, or undersized. We describe circumstances associated with the egg-eating event, and discuss possible causes for the behavior.

METHODS

Observations were made on the campus of Auburn University, Auburn, Alabama, where wooden nest platforms (12 × 13 × 8 cm) were maintained under walkways and eaves of buildings. These platforms were open at the top and on one side and were designed to accept the bottom portion of 1.9-l plastic milk or juice containers (held in place by metal clips), which served as nest boxes. House Finches readily accepted the platform design, and typically built >60 nests each year at the study site. At various stages of the breeding cycle, video cameras were placed near some of the nests, usually ≤ 2 m away. These cameras provided good-quality video sequences, viewable with a freeze-frame feature. The video camera recording the event reported here was placed ~ 1.5 m from the nest at an acute angle from vertical, thus providing an excellent view. The House Finch pair at this nest was banded with a distinct combination of color bands that were readily identifiable in the videotape.

Each day, we examined those nests in which egg laying was occurring by using a mirror on an extended pole. We marked eggs at the large end with a nontoxic marker to

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indicate laying order. While examining nests for newly laid eggs, we were able to closely examine the upper sides of all eggs; eggs removed from nests during marking were thoroughly inspected by hand. After clutches were complete, we inspected nests every 2 days using a mirror on a pole.

OBSERVATIONS

The video camera at the House Finch nest site recorded the following events at 08:35 EST on 19 April 1997, the approximate start of the 3rd day of incubation (n = 6 eggs). The resident male landed at the nest and briefly fed the resident female. Both birds then flew off for about 30 sec. The resident female, positively identified in the video by her color bands, then returned to the nest and appeared to inspect the nest contents. She then bit into one of the eggs and began to eat it. She continued eating for approximately 3 min and then perched on the edge of the nest for about 1 min with the eggshell in her beak. She then flew off, carrying the eggshell with her.

Subsequent examination showed that the egg had been the third one laid. It was 6 days old when eaten, had been incubated for 2 days, and was normal in size, shape, and color. The six eggs in the clutch were laid at 1-day intervals over 5 days. After the egg-eating event, no additional eggs were lost from the nest, and the pair hatched and fledged the remaining five young.

Six-egg clutches made up only 5.5% (12/217) of all clutches observed at the study site, whereas five-egg clutches composed 55% (119/217), four-egg clutches 29% (63/217), and three-egg clutches 5% (11/217). The male of the pair was 2 years old; the female's age was unknown. Our records do not indicate whether we had hand-inspected the eaten egg after the day it was marked, but all eggs had been viewed from above. We observed no defects in any of the six eggs from the time the final egg was laid through the time of camera installation early on 19 April; videotape recordings made before the egg-eating event also revealed no defects.

DISCUSSION

The egg-eating event we report represents a case of filial cannibalism in the egg stage (Stanback and Koenig 1992), a behavior for which there are few published records for birds. We propose three possible explanations for this behavior. First, it may have been an idiosyncratic, and presumably nonadaptive, response by the female House Finch, perhaps to human disturbance (Chardine and Morris 1983). The most likely human disturbance would have been the placement of the video camera on the morning the egg was eaten. However, video cameras had been placed near 63 other House Finch nests during the study with no apparent abnormal responses (PMN unpubl. data). Also, two other nests from which single eggs disappeared did not have cameras placed near them.

Second, the female House Finch may have eaten one of her eggs because it had been damaged, perhaps punctured, during marking. There is at least one published report of a female bird eating one of her own eggs after it was damaged (Trail et al. 1981). However, we detected no damage to the egg, and even if the female House Finch had detected damage unnoticed by us, it is uncertain that she would have removed and eaten the egg.

Third, the female House Finch may have eaten one of her own eggs to reduce the size of her clutch. Six-egg clutches in House Finches are rare (5.5% of total), whereas four- and five-egg clutches are common. Clutch sizes larger than normal could be a trigger for female House Finches to remove eggs. In fact, the proportion of single eggs disappearing from six-egg clutches (2/12; including the six-egg clutch discussed above) differed from the proportion disappearing from smaller clutches (1/205; from a five-egg clutch; Fisher exact test, $P = 0.008$; PMN unpubl. data).

When brood reduction occurs in bird nests, it usually happens during the nestling stage, and sometimes involves filial cannibalism (e.g., Ricklefs 1965, Ohmart 1973, O'Conner 1978, Mock and Parker 1986). In some *Eudyptes* penguin species, brood reduction regularly occurs in the egg stage, but it does not involve filial cannibalism (St. Clair et al. 1995). In some non-avian taxa, however, brood reduction occurs in the egg stage and involves filial cannibalism (Mock and Parker 1997).

Our observation of a House Finch eating her own egg is a confirmed case of filial cannibalism in the egg stage. However, we were unable to determine whether it was (1) an idiosyncratic, nonadaptive response, presumably due to human disturbance; (2) an adaptive response to eliminate a damaged egg; or (3) an adaptive response to reduce clutch size. Studies of House Finch responses to disturbances near active nests, deliberate egg puncturing, and artificial increases in clutch size would shed light on the causes of filial cannibalism in House Finches.

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An Observation of Foliage-bathing by an Orange-breasted Falcon (*Falco deiroleucus*) in Tikal, Guatemala

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ABSTRACT.—I observed a pair of Orange-breasted Falcons (*Falco deiroleucus*) in Tikal, Guatemala, on 30 December 2003 and 1 January 2004. I observed the birds flying through wet foliage as a means of bathing, which has not been described previously for this species. During a morning with light rain, an adult falcon took off from a perch, flew low over the forest canopy, and appeared to crash intentionally into the wet, upper foliage of emergent trees before returning to its perch. I observed three repetitions of this behavior. *Received 16 November 2004, accepted 13 July 2005.*

The Orange-breasted Falcon (*Falco deiroleucus*) is a little known and rare Neotropical falcon (Collar et al. 1994, Baker 1998, Baker et al. 2000, Thorstrom et al. 2002). Using a 10 × 42 binocular, I observed a pair of Orange-breasted Falcons in Tikal, Petén, Guatemala (17° 14′ N, 89° 37′ W) on 30 December 2003 and on 1 January 2004. This species is often confused in the field with the Bat Falcon (*Falco rufigularis*; Jenny and Cade 1986, Howell and Whittaker 1995; D. F. Whitacre in litt.). However, the bird's bulky shape, which resembles that of a Peregrine Falcon (*F. per-*

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egrinus), and its extensively orange chest allowed me to make a positive identification (photographs of one of the Orange-breasted Falcons described herein are available online at http://www.cayaya-birding.com/pubs.htm). Tikal is an ancient Mayan city, characterized today by pyramids (up to 65 m tall) surrounded by semi-deciduous lowland broadleaf forest. Ascending some of the pyramids permits a view over the forest canopy, which is ~30 m tall. Dispersed emergent trees rise 15 m above the canopy. Nesting of the Orange-breasted Falcon in the ancient Mayan buildings of Tikal has been reported by Smithe (1966), Boyce (1980), and Baker et al. (2000). The initiation of courtship in northern Petén and Belize occurs in January and February (Baker 1998).

On 30 December 2003, at 09:00 CST, I observed courtship behavior of a pair of Orange-breasted Falcons from ~30 m away in the ''Lost World'' complex of Tikal. When first observed, one falcon—perched on a branch stub in the upper part of a 40-m-tall tree—left a piece of an unidentified bird prey item before flying off. The second bird then landed on the prey and began feeding on it. I assumed the second bird was the female, because prey transfers are reported to occur from male to female (Baker 1998). I never saw both birds close enough to each other to judge size differences (females are larger than males; Howell and Whittaker 1995, Baker 1998). Because both falcons were vocalizing from tree perches ~40 m apart, the size and color pattern of both birds appeared to be similar. Prey transfers were also observed on several days in April 2004 at the entrance of the assumed nesting cavity on Temple IV, 500 m northwest of the Lost World complex (M. Córdova pers. comm.)

On 1 January 2004, at approximately 08:00, I observed foliage-bathing behavior from where I was standing at the upper landing of Temple IV in Tikal. During a light rain, one Orange-breasted Falcon perched on top of a snag, 300 m away from the temple, and a second falcon perched on the top of the temple, where I detected it by its calls; I was unable to distinguish the gender of either bird. The falcon that was perched on the snag flew off low over the canopy. It gained elevation before reaching an emergent tree and crashing into the wet upper foliage. What appeared at first to be accidental turned out to be an intentional behavior that I interpreted as bathing. The falcon continued flying and again crashed into the upper foliage of another emergent tree ~200 m away before returning to its original perch, where it shook and repeatedly ruffled its feathers. I did not observe any active preening. After several minutes, the same falcon flew off again and crashed twice more into the same group of trees. I observed this behavior three times over a period of 10 min. An obvious splashing of water drops was visible during each crash. Sometimes the falcon stretched out its legs shortly before reaching the emergent tree and grasped a twig, letting itself fall into the wet foliage before continuing the straight-line flight into the next tree.

The possibility that the observed behavior was an unusual way of capturing prey almost certainly can be excluded, because I did not see the falcon holding anything in its feet when it left the tree, nor was it eating during the flight or on the perch after landing again. Given that the observation was made at the beginning of the breeding season, the spectacular crashing was possibly part of courtship behavior. Jenny and Cade (1986) and Baker (1998) found that females spend most of their time near the nest area during courtship and incubation, and males deliver food to them. The observed bathing might have been a male's display flight—an advertisement of its fitness for obtaining prey during the nesting season. Baker (1998) described display flights as strong flapping flights in front of cliffs—with rare rolling to either side—and diving flights obviously not directed at prey.

There appear to be no published descriptions of bathing behavior in Orange-breasted Falcons, although a similar bathing behavior has been described by Meinecke (1993) for a Eurasian Hobby (*Falco subbuteo*), which was flying in circles around two solitary broadleaf trees during a light rain. That falcon repeatedly clung to the outer twigs, letting itself fall—with wings spread—into the wet foliage beneath. Grünhagen (1983) observed two juvenile Eurasian Hobbys falling into wet foliage, although it appeared that the birds fell because the small twigs on which they had perched could not support them. Barreto

(1968) reported a captive Bat Falcon bathing by rubbing against wet foliage.

Most reports of bathing falcons are based on observations of ground bathing in shallow water (Taverner 1919, Fischer 1977, Heller 1985, Christen 1986, Holthuijzen et al. 1987, Glutz von Blotzheim et al. 1989, Sodhi et al. 1993, Clum and Cade 1994, del Hoyo et al. 1994, Keddy-Hector 2000, Smallwood and Bird 2002, White et al. 2002). The few reports of other bathing strategies during flight include a Peregrine Falcon flying through mist from waterfalls (White et al. 2002) and a Eurasian Hobby and a Peregrine Falcon flying through a light rain (Fiuczynski 1988 and Fischer 1977, respectively). Ristow et al. (1980) reported juvenile Eleonora's Falcons (*F. eleonorae*) bathing in the rain while standing in their nest, and Sodhi et al. (1993) reported a Merlin (*F. columbarius*) bathing in the rain with its wings and tail extended.

Falcons (*Falco* spp.) are generally considered birds of open habitats (del Hoyo et al. 1994). Although the Orange-breasted Falcon is restricted to tropical forest (Cade 1982), it mainly uses the open space over the canopy and that along nearby rock cliffs and rivers (Jenny and Cade 1986, Whittaker 1996, Baker et al. 2000). Small pools of water occur near Tikal, but there are no larger water bodies offering open space. To my knowledge, the Orange-breasted Falcon has not been reported to enter the forest below the canopy, and it seems unlikely that the birds would bathe at small pools within the forest, entering a habitat unfamiliar to them. Therefore, it appears that bathing in rain and foliage, or in puddles on top of the Mayan ruins, are the only alternatives for Orange-breasted Falcons in Tikal.

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Bare-necked Umbrellabird (*Cephalopterus glabricollis*) Foraging at an Unusually Large Assemblage of Army Ant-following Birds

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ABSTRACT.—I observed a juvenile male Bare-necked Umbrellabird (*Cephalopterus glabricollis*) forage on arthropods flushed by a large swarm of the army ant *Eciton burchellii* in the Caribbean foothills of Costa Rica. Apparently, this is the first report of this species attending an army ant swarm. At least 60 birds of eight different species were foraging at that swarm, the largest assemblage of army ant-following birds reported in the Neotropics. *Received 13 October 2004, accepted 1 July 2005.*

The Bare-necked Umbrellabird (*Cephalopterus glabricollis*; Cotingidae) is an elevational migrant endemic to forests of the Caribbean slope of Costa Rica and western Panama (Snow 1982, Ridgely and Gwynne 1989, Stiles and Skutch 1989). Entire populations of this species spend the breeding season (February–July) in the highlands and then migrate to the lowlands, where they remain for at least 6 months (Chaves-Campos et al. 2003). The species feeds on fruit, large arthropods, and small vertebrates (Snow 1982, Ridgely and Gwynne 1989, Stiles and Skutch 1989; JC-C pers. obs.). The possibility of extinction is high because of recent destruction and/or fragmentation of lowland habitats (Benstead et al. 2004), which may severely reduce the availability of food sources for populations during the nonbreeding season; however, little is known about the diet of this species when it inhabits the lowlands (Chaves-Campos et al. 2003). Documenting food resources could promote conservation strategies designed to protect this species.

On 13 January 1999, from 08:00 to 09:15 CST, in the foothills of the Tilarán Mountains, Costa Rica, I watched a juvenile male Bare-necked Umbrellabird forage over a swarm of army ants (*Eciton burchellii*; see Bolton 1995). The site was located at 400 m above sea level, the lowest elevation where forest still remains on the Caribbean slope of the Tilarán mountain range (see Chaves-Campos et al. 2003 for a description of the site). The bird perched on tree branches 3–4 m above ground, catching large arthropods flushed by a column of ants that climbed the tree trunk above the main swarm. This swarm was particularly large (about 12 m wide) and the assemblage of ant-following birds was noteworthy. Although it was difficult to estimate the numbers of foraging birds due to

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their constant movement, I estimated at least 20 Ocellated Antbirds (*Phaenostictus mcleannani*), 10 Bicolored Antbirds (*Gymnopithys leucaspis*), 10 Spotted Antbirds (*Hylophylax naevioides*), and 10 Plain-brown Woodcreepers (*Dendrocincla fuliginosa*) attending the swarm at the same time. In addition, I recorded a few Northern Barred-Woodcreepers (*Dendrocolaptes sanctithomae*), Rufous Motmots (*Baryphthengus martii*), and White-fronted Nunbirds (*Monasa morphoeus*).

This is the largest assemblage of army ant-following birds reported for the Neotropical area, comparable only with assemblages of African birds at large swarms of *Dorylus* spp. driver ants (E. O. Willis pers. comm.). Large assemblages of army ant-following birds in the Neotropics are usually composed of no more than 20–30 individuals (Oniki 1971, Gochfeld and Tudor 1978, Dobbs and Martin 1998, Wrege et al. 2005; JC-C pers. obs.). The simultaneous presence of 10 or more obligate ant-following birds of the same species at the same swarm also constitutes an extraordinary event (see Swartz 2001, Chaves-Campos 2003, Willson 2004). The observation of a Bare-necked Umbrellabird is unusual as well.

To the best of my knowledge, this is the first report of a Bare-necked Umbrellabird foraging at a swarm of army ants. Members of the family Cotingidae rarely follow army ants, perhaps because they generally do not inhabit, or forage in, the forest understory (Willis 1983, Willis and Oniki 1992). However, Bare-necked Umbrellabirds sometimes eat fruits close to the forest floor (1–3 m above ground; JC-C pers. obs.), suggesting that they might be more inclined to take prey flushed by swarms of army ants than other cotingids (e.g., more so than cock-of-the-rock *Rupicola* spp., which occasionally forage at army ant swarms; E. O. Willis pers. comm.). Thus, the presence of the Bare-necked Umbrellabird at this swarm suggests that it might be an occasional ant follower.

The absence of previous reports regarding Bare-necked Umbrellabirds in association with swarms of army ants could be due to a number of factors: low abundance and small geographic range for this bird species, characteristic elevational migratory behavior, and/or the lack of research conducted on umbrellabirds during seasons when they inhabit the lowlands. I sampled umbrellabird abundance seven times during 1998–1999 (see Chaves-Campos et al. 2003), and this was the only occasion on which I saw army ants.

I speculate that Bare-necked Umbrellabirds may follow swarms of army ants primarily during the nonbreeding season, when the umbrellabirds are in the lowlands. Army ants seem to flush more insects in the lowlands than in the highlands (JC-C pers. obs.), probably because the abundance and size of their colonies decreases with increasing elevation (Hilty 1974, Gochfeld and Tudor 1978). In addition, they seem to flush more insects during the rainy season (Willis and Oniki 1992)—particularly on trees (Willson 2004)—when Bare-necked Umbrellabirds migrate to the lowlands (Chaves-Campos et al. 2003).

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