

# Short Communications

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## Nest, Egg, and Nesting Biology of the Snowy Cotinga (*Carpodectes nitidus*)

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**ABSTRACT.**—I describe the nest, egg, and nesting behavior of the Snowy Cotinga (*Carpodectes nitidus*) in La Selva Biological Station, Costa Rica. The nest was placed 7.5 m high on a fork formed by four branches of a leafless tree. The nest was a simple platform made of dry tendrils and lichens. It contained a single large egg, which took at least 27 days to hatch. The nest and chick were predated the day after hatching. Both nest and egg characteristics resemble those of other cotinga species. Received 29 January 2002, accepted 22 August 2002.

Although Neotropical cotingas are conspicuous, their breeding behavior is very poorly known. The genus *Carpodectes* is no exception (Snow 1982). The Snowy Cotinga (*Carpodectes nitidus*) is a canopy dweller inhabiting wet forest on the Caribbean lowlands of Central America, from northern Honduras to Panama (Ridgely and Gwynne 1989, Stiles and Skutch 1989). In Costa Rica, the Snowy Cotinga is considered common to rare along its geographical range, which extends from the northeastern slope of the Guanacaste mountain range to the Panama border. The scarce information concerning its nesting was obtained in March 1891, when C. F. Underwood collected a nestling from its nest in Costa Rica (Snow 1982). Another nest was found, also in Costa Rica, in April 1999 (Klebauskas and Pacheco 2000). This nest was a small cup placed in a three-pronged fork, 10–12 m up in a leafless tree. It contained at least one nestling. Here I describe the nest and the first known egg of the Snowy Cotinga, with some information on its nesting behavior, recorded from 21 April to 4 May 2001.

The nest was found by R. G. Campos at La Selva Biological Station (10° 26' N, 84° 00' W, 65 m elevation), in Sarapiquí, Heredia, Costa Rica. The nest was placed at the junction of four branches on a sandbox tree (*Hura*

*crepitans*, Euphorbiaceae) at 7.5 m above the ground. The sandbox tree is a deciduous, shade intolerant species, inhabiting tropical dry and tropical moist life zones (Hartshorn 1983). The tree was about 11 m tall with a 25-cm dbh. When the nest was built and the egg laid (late March to early April), it was completely leafless. The nest with a single egg was discovered on 7 April 2001. The area around the nest was dominated by young second growth, including pastures and scattered medium-sized trees (10–20 m): *Cecropia* spp., *Spondias mombin*, palms, and a few tall trees. The tree containing the nest was very exposed, since it was one of the tallest and it was only 10 m away from the main entrance road to the station. I first checked the nest on 21 April 2001; by then the tree had small young leaves and leaf buds. I made the observations from a ladder placed on top of a van; I was about 4 m high and 10 m from the nest.

The nest was a small cup, which barely allowed the female space upon which to sit (Fig. 1). The nest was made of small dry twigs and dry woody tendrils with some lichens. Its structure was simple, and the few materials used seemed loose, apparently held together by the branches upon which it was placed. I estimated the size of the nest and egg in relation to the female's body, using pictures taken from the nesting tree and a female specimen collected at the same location (UCR # 1567). The nest was about 7–10 cm wide at its maximum diameter and 3 cm in height. Although it was not possible to estimate the depth of the inner cup, it was shallow enough to allow observation of the egg from ground level.

I estimated the egg to be about 25.4 mm long, and about 20 mm wide (Fig. 2). Because only half of the egg was seen, it was not possible to make an accurate estimate of its width. It was possible, however, to see that its shape was oval. The color was a very light greyish-white, with

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FIG. 1. Female Snowy Cotinga (*Carpodectes nitidus*) at the nest, La Selva Biological Station, Costa Rica, 27 April 2001. Photograph by M. Saborío.

light brown blotches concentrated at the blunt end of the egg (wreathed).

I observed the nest on 25, 27, and 28 April 2001, while the female was incubating. During 17 hours of observation, she left the nest seven times; the mean length of her periods off the nest was  $32.5 \text{ min} \pm 8.8 \text{ SD}$ , 19% of the observation time. Four of these exits occurred between 8:53 and 10:00 CST. While on the nest, the female changed position frequently, rolling the egg a mean of every  $7.1 \text{ min} \pm 4.3 \text{ SD}$  ( $n = 22$ ). Usually during the hottest part of the day, the female stood on the nest shading the egg (without making contact with it), positioning her back to the sun. I did not observe any interaction with other indi-

viduals of the same or other species that flew into or near the nest tree. I observed male Snowy Cotingas within about 25 m of the nesting tree, but none of them approached the nest and I did not hear any vocalizations during the observation period.

The chick hatched on 3 May 2001 (J. Alvarado pers. comm.). The following day the nest and nestling had disappeared, probably predated. The egg took at least 27 days to hatch, a relatively long time for a passerine of this size, although similar to the incubation periods of other cotingas (Snow 1982).

The characteristics of the nest were similar to those of some other cotingas (e.g., white-winged cotingas, *Xipholena* spp.) and pihas



FIG. 2. Nest and egg of the Snowy Cotinga (*Carpodectes nitidus*), La Selva Biological Station, Costa Rica, 27 April 2001. Photograph by M. Saborío.

(*Lipaugus* spp.; Skutch 1969, Sick 1993). Similarities in nest shape and material, as well as egg shape and color patterns, between the Snowy Cotinga and Pompadour Cotinga (*X. punicea*), support the hypothesis that *Xipholena* is most closely related to *Carpodectes*, as suggested by Snow (1982).

The observations herein and the nest description of Klebauskas and Pacheco (2000) suggest that the Snowy Cotinga may prefer to nest in leafless trees located in semi-open habitats. Snow (1976) suggested that nests built in trees outside the forest, and isolated from other trees, may be less vulnerable to predation than those within the closed forest. These observations seem contrary to the general rule that nests of most cotingas are highly inconspicuous (Snow 1982).

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## Black Oystercatcher Natal Philopatry in the Queen Charlotte Islands, British Columbia

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**ABSTRACT.**—Very little demographic data is available for rocky intertidal shorebirds, including the long-lived Black Oystercatcher (*Haematopus bachmani*). In this paper we report on Black Oystercatcher chick production from 1992 to 2000, age of first breeding and natal philopatry in Laskeek Bay, Queen Charlotte Islands, British Columbia. Five percent of birds banded as half-grown chicks returned to breed in the same area. Known-age birds were 5 years old when first found breeding. This constitutes the first published evidence of natal philopatry for this species. Received 4 January 2002, accepted 5 August 2002.

Black Oystercatchers (*Haematopus bachmani*), resident rocky intertidal shorebirds found throughout the Pacific Coast of North America, are considered a species of serious conservation concern in Canada (Donaldson et al. 2000). Previous studies have examined the foraging ecology, breeding biology, and habitat requirements of the Black Oystercatcher throughout its range (see summary in Andres and Falxa 1995). However, most research has been too brief to collect demographic information on this long-lived species. Demographic information, such as dispersal or natal philopatry, is of key importance to understanding population dynamics (Hanski 2001).

In 1992, the Laskeek Bay Conservation Society initiated a long term monitoring program based on marking and subsequent resightings of Black Oystercatcher young in Laskeek Bay, Queen Charlotte Islands. In this paper, we report on Black Oystercatcher chick production, age of first breeding and natal philopatry in Laskeek Bay from 1992 to 2000.

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### METHODS

Laskeek Bay is situated on the east coast of Moresby Island, in the Queen Charlotte Islands archipelago, British Columbia (52°54' N, 131°36' W). The Laskeek Bay Conservation Society began observations of Black Oystercatcher breeding biology and banding of oystercatcher young on islands and islets in Laskeek Bay in 1992, and has conducted this work annually since then.

We surveyed all known Black Oystercatcher breeding sites and searched all islands and islets in Laskeek Bay for new breeding pairs between 20 and 30 May of each year. We used binoculars or a spotting scope to check all birds for the presence or absence of leg bands. We revisited identified breeding territories between 1 and 5 June to determine the status of the breeding attempt (eggs and/or young chicks present). One island, Kingsway Rock, was not visited during 1992, 1993, or 1995 (although it was visited in July to search for young to band), so only surveys from 1996 onward represent complete censuses of the number of breeding pairs and marked birds in the study area.

During early July, we revisited all breeding sites that had been active in June. We banded chicks >100 g with a band scheme unique for each year. Depending upon the year, we marked chicks with combinations of color darvic plastic wrap-around bands or a single alpha-numerically engraved plastic band. Because the engraved layer of the wrap-around leg bands did not remain intact, those bands appeared black (the inner layer) when resighted during later years (see Hazlitt 2001).

### RESULTS AND DISCUSSION

We located 16–35 active Black Oystercatcher territories (sites where clutches were found) each year (Table 1). We located breeding territories on nine islands or island groups, each with 1–9 breeding pairs in a given year. A mean of 29 Black Oystercatcher pairs bred in the Laskeek Bay area each year from 1996–2000 (the period with complete surveys). The number of active pairs or clutches located each year varied, likely a result of variation in timing of the initial survey. Poor weather conditions often delayed the May survey, so observers may have missed active pairs or first-laid clutches depredated early in the season.

TABLE 1. Number of clutches observed and chicks banded for Black Oystercatchers breeding in the Queen Charlotte Islands, British Columbia. Mean annual numbers of occupied breeding territories discovered are in parentheses.

Variable	Location	Year									All years
		1992	1993	1994	1995	1996	1997	1998	1999	2000	
Clutches	All locations	16	28	28	34	33	16	35	35	24	249
Chicks	East Limestone (3)	2	5	5	4	0	0	0	2	3	21
	Reef Island (7)	7	4	4	6	3	3	1	4	0	32
	South Low Island (5)	4	7	0	3	6	0	0	0	0	20
	Kingsway Rock (2)	0	0	1	2	0	3	0	0	6	12
	Lost Islands (6)	0	0	0	0	0	0	0	3	0	3
	Skedans Islands (6)	0	3	3	3	3	0	0	0	5	17
	Low Island (2)	0	4	1	4	0	0	2	1	2	14
	Total chicks banded		13	23	14	22	12	6	3	10	16

The maximum number of active breeding pairs in the Laskeek Bay area was 35 pairs. We marked 119 Black Oystercatcher chicks between 1992 and 2000, with a minimum of three chicks banded during 1998 and a maximum of 23 chicks during 1993 (Table 1).

During the summer of 1995, we sighted three nonbreeders banded as nestlings the previous year: two on East Limestone Island and one on the Skedans Islands. We also observed three more banded nonbreeders during 1997; one bird had been marked in 1994 and two others during 1995 or 1996.

During the census of breeding pairs during May and June of 1999 and 2000, we observed three and four, respectively, banded oystercatchers holding breeding territories. The marked breeding birds at South Low Island and the Skedans Islands were observed during both years and had been marked as chicks in 1994. Black Oystercatchers show strong philopatry to breeding territories (Andres and Falxa 1995, Hazlitt and Butler 2001), so we assume the banded birds observed on these territories during both years were the same individuals. The marked adult observed breeding on South Low Island was trapped while incubating in 2000 and was identified as a chick that had been banded on Kingsway Rock 7 km away. The remaining two marked birds bred on Kingsway Rock and the Lost Islands. These birds had been marked in 1995 or later. Both birds of known age were first observed breeding at 5 years. The bird sighted at the Lost Islands was  $\leq 4$  years at first breeding, while the other banded bird observed was  $\leq 5$  years at age of first breeding.

Although we banded 119 young during the study, relatively few marked birds were resighted. We sighted a maximum of only six marked nonbreeding birds, all within three years after banding. Our unequal banding effort likely influenced the probability of resighting individuals; however, most marked chicks disappeared during a similar study in southern British Columbia where banding effort was consistent (Hazlitt and Butler 2001).

We discovered four known-age breeders holding breeding territories by 2000. We observed that Black Oystercatchers in Laskeek Bay began breeding at 4–5 years of age. This finding is supported by independent observations for this and other oystercatcher species, and probably is characteristic of the genus (Harris 1967, Nol and Humphrey 1994, Andres and Falxa 1995). If we assume that no birds bred before 4 years old, then the observed local recruitment rate was  $4/84 = 5\%$  (84 chicks were banded before 1997). It is likely that many marked fledglings perished during the first winter, a pattern documented by Kersten and Brenninkmeijer (1995), who demonstrated a high mortality rate (60%) for hatch-year Eurasian Oystercatchers (*Haematopus ostralegus*). Although highly variable between years, juvenile mortality in the Eurasian species can be particularly low (10%) during years with extreme winter weather conditions. Some Black Oystercatcher chicks may have dispersed from their natal sites; however, we suggest that most perished.

Although natal philopatry has been documented in the Eurasian Oystercatcher (Harris 1967, Heppleston 1972, Kersten and Bren-

ninkmeijer 1995), there are no published records of individual American Oystercatchers (*H. palliatus*; Nol and Humphrey 1994) or previous records of individual Black Oystercatchers (Andres and Falxa 1995) breeding at natal sites. The long term nature of this project has provided the first records of age of first breeding and the first published evidence of natal philopatry for this species.

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## Ring-Necked Pheasant Parasitism of Lesser Prairie-Chicken Nests in Kansas

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**ABSTRACT.**—We report observations of Ring-necked Pheasants (*Phasianus colchicus*) parasitizing Lesser Prairie-Chicken (*Tympanuchus pallidicinctus*) nests in native sand sagebrush (*Artemisia filifolia*) rangeland in southwestern Kansas. We found low incidence of interspecific nest parasitism as only 3 of 75

prairie-chicken nests were parasitized. Two of the three parasitized clutches hatched, but no Ring-necked Pheasant chicks were known to have survived. Received 12 March 2002, accepted 30 August 2002.

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The distributions of the Ring-necked Pheasant (*Phasianus colchicus*) and the Lesser Prairie-Chicken (*Tympanuchus pallidicinctus*) overlap in Kansas (Thompson and Ely 1989). Ring-necked Pheasants (hereafter pheasants) are believed to compete for resources and disrupt the behavior of other galliform birds (Sharp 1957, Vance and Westemeier 1979, Kimmel 1988, Westerskov 1990), particularly

the Greater Prairie-Chicken (*T. cupido*; Westemeier et al. 1998). Interactions include disruption of courtship and mating behavior, displacement of birds from traditional breeding grounds, competition for food, and nest parasitism (McAtee 1945, Sharp 1957, Vance and Westemeier 1979). We are not aware of any previously published reports of pheasants laying eggs in nests of Lesser Prairie-Chickens. We report three such observations and the fates of young pheasants and prairie-chickens in the resulting mixed broods.

We monitored nesting activities of radio-marked prairie-chicken and pheasant hens in native sand sagebrush (*Artemisia filifolia*) habitat in Finney County, Kansas (37° 52' N, 100° 59' W) to investigate possible negative interspecific interactions during nesting, brooding, and rearing periods from April to August, 1997–1999. We radio marked 84 Lesser Prairie-Chicken hens; 64 of these were tracked to at least one nest, 11 left the study area, 4 died prior to nesting, 5 were not known to have nested, and 11 renested after failure of the first nest. We also radio marked 22 pheasant hens within sagebrush rangelands and in adjacent croplands during 1997 and 1998, of which 14 nested once, 4 died, 4 had transmitters fail prior to nesting, 7 renested after failure of the first nest, and 1 initiated a third nest after two failed attempts.

We inspected nests near the onset of incubation and again after hatching or nest failure. We estimated nest success as the proportion of nests hatching  $\geq 1$  egg, and hatching success as the number of eggs hatched divided by initial clutch size (Westemeier et al. 1998). We determined the occurrence of interspecific nest parasitism from the appearance of eggs within a clutch. Generally, the size and coloration of these two species' eggs were distinctive enough to differentiate them in the field. Lesser Prairie-Chicken eggs were pale yellow to ivory, and in some instances had fine speckling; pheasant eggs were glossy olive-brown to blue-gray without speckling (Baicich and Harrison 1997). We were unable to ascertain parasitism rates from egg-laying intervals (Yom-Tov 1980) because nests were visited infrequently. We flushed Lesser Prairie-Chicken broods at 10-day intervals to monitor survival of both Lesser Prairie-Chick-

en and pheasant chicks in mixed species broods (Jamison 2000).

Nest success was 8% ( $n = 25$ ), 42% ( $n = 19$ ), and 32% ( $n = 31$ ) during 1997–1999. Three (4%) of 75 Lesser Prairie-Chicken nests were parasitized by pheasants. We did not attempt to determine whether intraspecific parasitism occurred in pheasant nests, but we did not observe obvious egg dumping. Clutch sizes of the radio-marked pheasant hens (mean = 10.9, SE = 0.54, range = 8–17 eggs) was similar to the mean of 11 eggs previously reported for the species (Johnsgard 1999, Giudice and Ratti 2001).

All instances of interspecific parasitism occurred during 1998. Two of the three parasitized clutches hatched while only 18 of 72 (25%) unparasitized clutches hatched. Hatching success of parasitized and unparasitized nests was 70% and 72.5%, respectively. Based on estimated nest initiation dates and clutch sizes of Lesser Prairie-Chicken nests, we assumed the parasitized nests were the first nesting attempts of the host species. The ratio of Lesser Prairie-Chicken : Pheasant eggs in the three parasitized nests were 15:3, 10:2, and 8:1. The clutch of 8:1 eggs was depredated a few days after incubation began. The clutches of 15:3 and 10:2 eggs hatched 9:2 and 8:1 eggs, respectively. Three prairie-chickens from the mixed brood of 11 chicks survived to  $\geq 60$  days after hatching, but no pheasants were known to have survived  $>9$  days after hatching. The mixed brood of nine chicks suffered total loss  $\leq 14$  days after hatching.

## DISCUSSION

We believe the parasitism rate in our sample of 75 nests likely reflects current parasitism rates in similar habitats of southwestern Kansas. While speculative, this conclusion is supported by the absence of obvious intraspecific parasitism by pheasants. Pheasant parasitism rates (mean = 15%, range = 3–43%) on Greater Prairie-Chicken nests in Illinois were negatively correlated with egg hatching success; 85% and 63% of eggs in unparasitized and parasitized nests hatched, respectively (Westemeier et al. 1998). Apparent nest success was similar between parasitized (51%) and unparasitized (43%) nests (Westemeier et al. 1998). We were unable to assess

relationships for hatching or nest success due to the low rate of parasitism in our study.

The greatest potential for negative effects from nest parasitism occurs in the nest because of the differential incubation periods (26 days for Lesser Prairie-Chickens, 23 days for pheasants; Giesen 1998, Giudice and Ratti 2001). Partial or complete nest abandonment may occur when the brood parasite's eggs hatch prior to the host's eggs. Thus, in areas with high pheasant densities (e.g., Illinois) and limited nesting habitat, nest parasitism may negatively affect demographic rates.

Although fragmented, currently available habitat in southwestern Kansas may be extensive enough that these species can coexist with little competition for nest sites. Lesser Prairie-Chickens and pheasants occupy different niches in southwestern Kansas, large tracts of native prairie versus fragmented prairie or old fields juxtaposed to extensive agriculture, respectively (CAH unpubl. data). Bennett (1947) reported that pheasant densities were positively correlated with rates of intraspecific nest parasitism in Iowa. As nest site availability decreased (e.g., in Iowa and Illinois), rates of inter- and intraspecific nest parasitism increased (Bennett 1947, Westemeier et al. 1998). Thus, nest parasitism by pheasants appears to be density dependent. If true, further fragmentation of native habitat in southwestern Kansas may increase parasitism rates. Furthermore, our limited observations indicate that pheasant chicks may not survive well with interspecific brood hens, and we are not aware of any published reports of chick survival in wild mixed broods.

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## Turquoise-browed Motmot (*Eumomota superciliosa*) Feeds by Artificial Light

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**ABSTRACT.**—We report the Turquoise-browed Motmot (*Eumomota superciliosa*) feeding in the evening on insects attracted to artificial lights. This behavior has been observed in few diurnal bird species, and has not been reported previously for the family Motmotidae. Although more than one motmot engaged in this behavior at one site in El Salvador, and feeding success appeared favorable, we have not observed the behavior at other sites in El Salvador, suggesting that the behavior has not spread through the population. Received 14 June 2002, accepted 20 November 2002.

Despite a tremendous increase in artificial lighting at night during the last century, remarkably few bird species appear to have adapted to the rich insectivorous food sources that congregate around these lights. Individual birds that learn to feed at such lights during the night might gain fitness benefits. Any cases of individual birds using this potential feeding source could signal the beginning of an evolutionary trend.

Instances of feeding by diurnal birds around artificial light sources at night have been reported for species in the orders Falconiformes (Tryjanowski and Lorek 1998), Gruiformes (Hopkin 1985), Charadriiformes (Blackett 1970), Apodiformes (Goertz et al. 1980, Freeman 1981, Sick and Texeira 1981), and Passeriformes (King 1967, Felton 1969, Blackett 1970, King and King 1974, Bakken and Bakken 1977, Sick and Texeira 1981, Speich 1982, Frey 1993, and Bulgarini and Visentin 1997). Most of these observations were from the West Palearctic region. Here we report an instance of nocturnal feeding by the Tur-

quoise-browed Motmot (*Eumomota superciliosa*), a diurnal Neotropical species in the family Motmotidae (Coraciiformes). No species in this family previously has been reported to feed nocturnally on insects attracted to artificial lights (Snow 2001). The Turquoise-browed Motmot, although active diurnally, also is crepuscular, as we have heard them vocalizing before dawn and watched them hunt so late in the evening that they could be identified only by silhouette.

During 1975 and 1976, WAT observed Turquoise-browed Motmots hunting by the lights of electric lamps. At Las Minas de San Cristobal, Morazán Dept., El Salvador (13° 35' N, 88° 05' W; elevation 200 m), an unshaded 100-watt lamp had been suspended from a mango tree (*Mango indica*) to illuminate a residential yard. About 30 m away, a dim street lamp illuminated the entrance to this yard. Turquoise-browed Motmots came regularly to feed on insects attracted by the lamps (M. Airey pers. comm.). WAT verified these observations during the evenings of 14 May 1975 and 7 May 1976, when a single motmot arrived at the mango tree at 19:02 (CST) and departed at 19:35 the first evening, and arrived at 19:07 and departed at 19:46 the second evening. Those arrival times were 42 min and 52 min after sunset. Times of arrival and departure of the bird under the street lamp were about the same, but precise times were not recorded. The birds never returned later during the night, according to our limited observations and those of M. Airey, which were made until midnight.

A comparison of the nocturnal feeding behavior of the motmot in the mango tree with diurnal feeding suggests that nocturnal feeding may be more efficient. The night-feeding motmot sallied 15 times after flying insects during a 10-min period, 5 times with obvious success, and dropped once to the ground to seize a fluttering insect. Large prey were carried back to a

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perch and rapped against it sharply  $\leq 8$  times to prepare it for eating. If a large insect was dropped to the ground and lay quiet, it was ignored. In daylight we rarely have seen motmots sally for flying prey, although Skutch (1947) and Orejuela (1980) reported that it was not unusual. The species takes much of its prey by dropping suddenly to the ground or to low foliage from perches  $\leq 30$  m away (WAT and OK pers. obs.). The frequency of foraging attempts is relatively low (we do not have quantitative data, but suspect that the mean rate of forays is  $< 5$  per 10 min).

A single session at the artificial lamps seemed to satisfy the immediate needs of a motmot, as it would not be seen again that evening. Artificial lights and Turquoise-browed Motmots are both abundant throughout parts of El Salvador and neighboring countries, yet we have not observed nor heard of other cases of motmots learning to feed near lights during nearly 20 years of observing birds across El Salvador.

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## Fan-tailed Warbler Foraging with Nine-banded Armadillos

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**ABSTRACT.**—We report Fan-tailed Warblers (*Euthlypis lachrymosa*) foraging in association with the nine-banded armadillo (*Dasyurus novemcinctus*) in El Imposible National Park, El Salvador. Although the warbler is known to forage opportunistically at ant swarms, this is the first report of commensal feeding with a mammal. Received 5 April 2002, accepted 21 September 2002.

Commensal foraging strategies have evolved in numerous species of birds (Willis and Oniki 1978, Dean and MacDonald 1981, Roberts et al. 2000). Birds forage on prey flushed by a wide variety of animals, including ants (Willis and Oniki 1978, Roberts et al.

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2000), other birds (Baker 1980, Robbins 1981), maned wolves (*Chrysocyon brachyurus*; Silveira et al. 1997), primates (Stott 1947, Boinski and Scott 1988), cetaceans (Evans 1987), ungulates (Heatwole 1965, Dean and MacDonald 1981, Källander 1993), and humans (Skutch 1969).

Armadillos (Mammalia: Dasipodidae) disturb invertebrates by digging in and overturning leaf litter. However, we found only one report of a bird foraging in association with an armadillo; an Ovenbird (*Seiurus aurocapillus*) was observed in Florida apparently gleaning insects flushed by a nine-banded armadillo (*Dasyus novemcinctus*; Levey 1999). The Fan-tailed Warbler (*Euthlypis lachrymosa*) also is an insectivorous ground-feeding warbler (Passeriformes: Parulidae). Fan-tailed Warblers are opportunistic foragers known to follow army ant swarms (Sutton 1951; OK and CKH pers. obs.) and occasionally other birds (Robbins 1981). Here we document, for the first time, observations of Fan-tailed Warblers foraging in association with a mammal, the nine-banded armadillo.

We observed armadillos and Fan-tailed Warblers opportunistically during 23 days of field work at Parque Nacional El Imposible. This park is a 5,000-ha tropical forest (mixed semideciduous and evergreen) in southwestern El Salvador (13° 51' N, 89° 59' W). We worked in the park during December 2001, and January and February 2002. This period corresponds to the dry season.

On two occasions we observed single Fan-tailed Warblers foraging alongside single nine-banded armadillos. Each observation lasted 10 min while the animals were  $\leq 10$  m from the observer. In both cases, the warblers actively foraged  $< 1$  m from the armadillos, occasionally hopping or landing within 10 cm. The armadillos moved slowly through the forest, foraging noisily in the leaf litter. As the armadillos foraged, the warblers fanned their tails and sallied from low perches as they typically do when chasing insects. We were unable to confirm any captures. We did not detect any response by the armadillos toward the birds.

We interviewed two park guards who had observed this foraging association previously. Over 15 years, V. Campos (pers. comm.) recalled seeing Fan-tailed Warblers foraging in

close proximity to individual armadillos on four occasions, twice involving two warblers, once involving three warblers, and once involving four warblers.

Fan-tailed Warblers occasionally approached humans at our study site (OK pers. obs.). This odd behavior may be explained as part of a foraging strategy that includes following mammals, and suggests that the species may take advantage of a wide variety of disturbances in the leaf litter that provide foraging opportunities, whether caused by army ants, other birds, or mammals. Further research should investigate whether commensal foraging leads to increased fitness in the Fan-tailed Warbler.

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## Twine Causes Significant Mortality in Nestling Ospreys

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**ABSTRACT.**—Ospreys (*Pandion haliaetus*) over much of Montana incorporate large amounts of bailing twine in their nests and active nestlings sometimes become entangled and perish. We observed 12 occurrences of entanglement in 260 nests during three years of study. Disposing of the twine or cutting the twine into smaller pieces when removing it from hay bales could reduce or eliminate the problem. Received 17 June 2002, accepted 4 December 2002.

Causes of mortality for young Ospreys (*Pandion haliaetus*) include natural events such as starvation, predation, lightning, wind storms, and various accidents (Bent 1937, Leenhouts 1987, Poole 1989, Johnsgard 1990). Death occasionally occurs because of human activities (e.g., pollutants, electrocution on power lines, collision with man-made structures; Schmidt 1973, Munoz 1990). This paper documents an uncommon but important cause of death for ospreys over a wide area in Montana and presents a simple suggestion to reduce its impact.

During surveys of osprey nests in Broadwater and Lewis and Clark counties, Montana (47° 11' N, 112° 37' W; 1998 and 1999, 156 nests; PJH), and the Flathead Lake catchment basin, Lake and Flathead counties, Montana (48° 53' N, 114° 02' W; 2001, 104 nests; CRB and LBB), we visited each nest several times during each breeding season. About 45% of the nests were on electric power poles near farms

and ranches. While recording the number of nestlings and their status, we noted that birds always incorporated twine in nests near agricultural fields, especially when nests were near fields of hay or herds of livestock such as llamas, horses, and cattle. The twine was a distinctive red-orange or black and we were certain that the ospreys had obtained it from nearby fields. We collected twine from bales, fields, and nests and the materials were identical. Furthermore, we saw ospreys carrying twine.

In at least 20 instances so much twine had been collected that streamers of the material hung from the nests. On 12 occasions (260 nests) we observed nestlings entangled in it. One nestling had a large ball of twine around one foot, which held the bird down so that it could not easily stand up. Its feeding appeared to be hindered and its siblings appeared to be at an advantage when parents brought food. We (CRB, LBB) were able to free this bird and it eventually fledged. PJH observed a nestling which had a thin piece of twine around its beak and foot so that it could not lift its head or eat. This bird also was freed and it ultimately fledged. In at least five other nests the entanglement resulted in mortality. Young would sometimes fall from nests where they would hang suspended by the twine and eventually die, if not rescued. Without the assistance of humans, mortality would have occurred in 4.6% (12/260) of the successful nests.

Ospreys opportunistically add materials to their nests. Bent (1937) documented more than 50 items other than normal nest materials. Included were nets, fishing line, and pieces of rope. In our study, ospreys typically built their nests of sticks and grasses, but added other materials, including pieces of paper and

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other roadside debris. The baling twine presented two particular problems. First, the cordage was designed to be resistant to damage from weather; old, discolored pieces remained so strong that they could not be broken by hand and therefore were dangerous to nestlings for some time. Second, the twine also accumulated and draped over the sides of nests, where it sometimes crossed power lines and caused power outages in the rain (J. Lane pers. comm.).

It is our belief that local farmers and ranchers should be alerted to this possibility and asked to be careful to collect used twine, or at least cut it into smaller pieces. Modern hay bales often are circular and more than 3 m in diameter. Pieces of twine cut at only one point on such bales are several meters in length. Shorter strands would be less dangerous and possibly less attractive to ospreys.

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