

Common, but Commonly Overlooked: Red-bellied Woodpeckers as Songbird Nest Predators

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Abstract - Woodpeckers in North America are not widely recognized as nest predators. In this paper, we describe several eyewitness accounts of songbird nest predation by Red-bellied Woodpeckers (*Melanerpes carolinus*), document evidence that songbirds recognize woodpeckers as nest predators, and show that our observations are consistent with previously published notes. We believe that this species, commonly overlooked, may be an important predator of songbird nests in many eastern North American forests.

Introduction

In the ornithological literature, there is much emphasis on determinants of nesting success because this is such a fundamental component of individual fitness, population dynamics, and avian conservation (e.g., Donovan and Thompson 2001, Martin 1998, Paton 1994). From a conservation standpoint, knowledge of the nest predator community is important for predicting how landscape changes (e.g., habitat fragmentation) will affect breeding bird communities (Andren 1995). Preconceived notions about which taxa are potential nest predators are likely to affect study design and interpretation.

In discussions with researchers at ornithological conferences, we have found that woodpeckers are not generally recognized as nest predators. In a summary of nest predation studies, Paton (1994) listed various birds, mammals, and snakes as "primary predators." However, corvids were the only avian taxa listed. Gates and Gysel (1978) mentioned several species of mammals, snakes, corvids, and raptors as potential nest predators, but said nothing about woodpeckers. Among eastern North American woodpeckers, Bent (1939) included only Red-headed Woodpeckers (*Melanerpes erythrocephalus* Linnaeus) as nest predators, based on eyewitness accounts. In summarizing previous work, largely based on the accounts in Bent (1939) and Ehrlich et al. (1988),

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Hamel (1992) also listed Red-headed Woodpeckers as the only eastern woodpecker that fed on eggs and nestlings.

Shackelford et al. (2000) described the Red-bellied Woodpecker (*M. carolinus* L.) as a “generalistic and opportunistic feeder,” and cited several references showing that this species will eat bird eggs (Brackbill 1969, Rodgers 1990) and nestlings (Conner 1974, Grimes 1947, Neill and Harper 1990, Watt 1980). Through our research on the productivity of Neotropical migratory birds in bottomland hardwood forests, we have come to view the Red-bellied Woodpecker as a potentially important nest predator. The objective of this communication is to dispel the widely held notion that corvids and raptors are the only significant avian nest predators. Herein, we describe several eyewitness accounts of songbird nest predation by Red-bellied Woodpeckers, document evidence that songbirds recognize woodpeckers as nest predators, and show that our observations are consistent with previously published notes.

Study Areas and Methods

Our observations are derived from our studies of songbird nesting success in several bottomland hardwood forests in the Mississippi Alluvial Valley between 1993 and 2002. These forests include portions of Meeman-Shelby Forest State Park and Wildlife Management Area near Memphis, TN; Chickasaw National Wildlife Refuge (NWR) near Ripley, TN; White River NWR near Stuttgart, AS; Tensas River NWR near Tallulah, LA; and Delta National Forest (NF) near Vicksburg, MS. These forests are dominated, to varying degrees, by Nuttall oak (*Quercus nuttallii* Palmer), overcup oak (*Q. lyrata* Walt.), sweetgum (*Liquidambar styraciflua* L.), sugarberry (*Celtis laevigata* Willd.), and water hickory (*Carya aquatica* Nutt.). Green ash (*Fraxinus pennsylvanica* Marsh.), elms (*Ulmus* spp.), and other oaks are also common. At the Meeman-Shelby and Chickasaw sites, eastern cottonwood (*Populus deltoides* Bartr. ex Marsh.), sycamore (*Platanus occidentalis* L.), and pecan (*Carya illinoensis* (Wang) K. Koch) are also dominant canopy species.

Red-bellied Woodpeckers were abundant at our study sites (Durham et al. 1988; personal observations; unpublished data). For example, in point count surveys conducted at White River NWR, 1994–2000, we recorded a mean of 0.97 detections per count ($s = 0.9$; $n = 2119$ unlimited radius, 5 min point counts). In these surveys, Red-bellied Woodpeckers were detected almost 5 times more frequently than corvids and raptors combined.

We searched for songbird nests following standard protocols (Martin and Geupel 1993). We usually checked nests at 2–4 day intervals.

Although we found nests of most common species on the study sites, we focused our field efforts on Acadian Flycatchers (*Empidonax vireescens* Viellot), Blue-gray Gnatcatchers (*Poliophtila caerulea* L.), and Prothonotary Warblers (*Protonotaria citrea* Boddaert). Most Prothonotary Warbler nests were accessible from the ground or a canoe, but we checked higher nests with a mirror pole. When possible, we checked Acadian Flycatcher nest contents with a mirror pole, but nests were frequently too high. All Blue-gray Gnatcatcher nests were too high to check with a mirror pole. To determine if the high nests were active, we stood 10–20 m away (horizontal distance) and watched the nest for up to 30 min to see if adult birds visited the nest. This allowed us to observe several predation events and to observe anti-predatory behaviors exhibited by songbirds against woodpeckers.

Eyewitness Accounts

In the following accounts, we use the word “attack” to describe defensive behaviors involving actual physical contact between songbirds and woodpeckers, such as pecking or striking. We use the word “harass” to denote aggressive maneuvers, such as repeated close swooping, that seemed intended to drive the woodpecker away, but did not involve direct physical contact.

We observed two predation events on the Meeman-Shelby Forest site. At 10:00 CST on 11 May 1993, we saw a male Red-bellied Woodpecker at the nest of a Blue-gray Gnatcatcher, approximately 20 m high in a 25-m tall boxelder (*Acer negundo* L.). The woodpecker repeatedly stabbed his bill into the nest, then flew south with what appeared to be a nestling. The woodpecker visited the nest three more times. Each time, he stabbed into it, took what appeared to be a nestling, and flew in the same direction. During each of these trips, the female gnatcatcher attacked the woodpecker at the nest by landing on his back and pecking him, but with no apparent effect. The nest had been active for ≥ 14 days, and the gnatcatcher had been incubating or perhaps brooding nestlings on 8 May. On 13 May, we saw the female gnatcatcher dismantling and moving the nest.

On 26 June 1994, at $\approx 10:00$, we observed a Red-bellied Woodpecker consuming the eggs of an Acadian Flycatcher nest, which was 13 m high in a boxelder. The woodpecker perched on the edge of the nest while hanging upside down, then curled its head up, over, and into the nest cup. It returned to the nest twice. The adult flycatcher attacked the woodpecker, striking it several times. Later, fresh egg shell and yolk were found beneath the nest. The next day, the nest was empty, and no flycatchers were observed in the vicinity.

We witnessed a possible third nest predation event at Meeman-Shelby on 7 July 1994. We had discovered an Acadian Flycatcher nest in

the construction phase on 25 June, and the female had been incubating eggs or brooding new hatchlings on the morning of 7 July. At \approx 16:00, we observed two Red-bellied Woodpeckers within 10 m of the nest, about 6 m high in a boxelder. The flycatcher pair harassed the woodpeckers and eventually drove them away from the nest, which was empty at that point. We suspect that the nest had been depredated by the woodpeckers, but cannot confirm our suspicion. We did not find any egg shell or yolk beneath the nest, and we observed no activity around the nest the next day.

We witnessed one predation event on the Tensas River NWR. At 07:47 on 9 June 2000, we discovered a Red-bellied Woodpecker depredating an Acadian Flycatcher nest. One woodpecker perched at the nest rim, while a second woodpecker perched on a branch nearby. A third woodpecker was within 15 m. Both flycatcher parents repeatedly swooped at the woodpecker at the nest, calling continuously. However, their nest defense was ineffectual. After a few minutes, the first woodpecker flew off with an egg in its beak. The two other woodpeckers flew off as well and were never observed at the nest, although they may have taken contents prior to the observation. The flycatcher parents continued to call and flutter around the nest for at least 10 min after the woodpeckers departed. One flycatcher had disheveled breast feathers. At 11:05, we returned to check the status of the nest and found it intact, with no sign of damage. Although it was too high to view contents with a mirror, this nest was quite threadbare and appeared to be empty from below. The parents were neither seen nor heard at this time.

At White River NWR, we found the nest of an Indigo Bunting (*Passerina cyanea* L.) as it was being depredated by a Red-bellied Woodpecker at 10:25 on 23 April 1998. The woodpecker perched on the nest rim, removed one egg, then flew off with the egg in its bill. We did not detect the bunting parents during this predation event. However, within 15 min the female bunting flew to the nest two times and checked its contents. The nest was located 4.3 m high in a sugarberry, and contents were not checked with a mirror pole until the following day. At that time, the nest was empty. On 27 April, the Indigo Bunting pair initiated a second clutch in the same nest. This second nest was depredated 10–11 days into incubation, but the identity of the predator was unknown.

We have circumstantial evidence that woodpeckers have removed contents from many Prothonotary Warbler nests at White River NWR. In our experience, this secondary cavity-nester typically places its nest just below the opening of a hole in a dead trunk. Frequently, the cavity wall opposite the opening is thin, and nest contents tend to be gathered against this back wall (D.E.W. Drumtra, pers. obs.). In many instances when nest checks revealed that the contents were missing, the back wall

had a freshly excavated hole, implicating a woodpecker as the nest predator. Based on such observations from 1994–2000, we attributed 145 (17%) of 874 depredations of Prothonotary Warbler nests to woodpeckers. While we could not identify the species of woodpecker responsible, Red-bellied Woodpeckers comprised 64% of all woodpecker detections in the area (unpubl. data).

Additional behavioral observations indicate that adult birds of potential prey species recognize the Red-bellied Woodpecker as a threat. For example, on 5 and 11 June 1993, at Chickasaw NWR, adult Eastern Wood-Pewees (*Contopus virens* L.) flew from their nest, > 15 m high in a sweetgum, and harassed adult Red-bellied Woodpeckers that came within 10 m of the nest. While a Cerulean Warbler [*Dendroica cerulea* Wilson, A.] nest was 12 m higher in the same tree, we did not observe any aggressive behavior by Cerulean Warblers directed against Red-bellied Woodpeckers. On 8 May 2000 at 11:00, a pair of color-banded Prothonotary Warblers chased a Red-bellied Woodpecker near their nest at White River NWR. The nest contained four warbler eggs and two Brown-headed Cowbird (*Molothrus ater* Boddaert) eggs. On 19 May at 13:20, when the nest contained two 7-day-old cowbird nestlings, we observed the same male warbler attacking a Red-bellied Woodpecker. On 29 June at 11:50, a different banded female Prothonotary Warbler chipped and dove at a Red-bellied Woodpecker less than 5 m from her nest. When the nest was checked 2 h later, none of the 5-day-old nestlings were missing.

On 11 separate occasions, we observed Blue-gray Gnatcatchers harassing or attacking Red-bellied Woodpeckers on the Meeman-Shelby Forest site. The woodpeckers were usually within 10 m of the nest, but did not seem to be trying to prey upon its contents. In contrast, gnatcatcher parents did not interact aggressively with a Red-headed Woodpecker foraging within about 20 m of their nest, even though they were nearby.

In Delta NF, we twice witnessed Acadian Flycatchers harassing Red-bellied Woodpeckers. On 2 July 2002 at 09:04, a female flycatcher was perched 15 m from her active nest, calling. A Red-bellied Woodpecker, first heard about 25 m away, came within 15 m of the nest. The flycatcher then harassed the woodpecker until it flew away. On 25 July, a flycatcher adult and its chick were seen perched together on a branch approximately 15 m above the ground. About 7 m away, a Red-bellied Woodpecker clung to a hickory trunk 2–3 m lower than the flycatchers. The adult flycatcher repeatedly swooped at the head of the woodpecker while loudly snapping its beak. After each swoop, it returned briefly to perch with the chick. The chick appeared to be watching the proceedings. At White River NWR and Meeman-Shelby Forest, we made additional observations of aggressive behaviors directed at Red-bellied Woodpeckers by Acadian Flycatchers.

In contrast to aggressive maneuvers, Acadian Flycatchers occasionally react to the presence of woodpeckers with stealth. We observed this twice in Delta NF. At 08:23 on 6 July 2001, a female flycatcher was calling and foraging within a 15 m radius of her active nest, while the male sang nearby. After 8 min of observation, the female flew to the nest and began incubating. After a few seconds, a Red-bellied Woodpecker came within 15 m of the nest and began calling and drumming. The flycatcher immediately flew off the nest and did not interact with the woodpecker. She returned to the nest and resumed incubating after an additional 7 min had passed and the woodpecker had moved farther away. On 6 June 2002, while an Acadian Flycatcher incubated her eggs, a Red-bellied Woodpecker came within 5 m of the nest and perched in an adjacent tree. The flycatcher immediately flew off the nest in silence and appeared to watch the woodpecker from 7 m away.

Red-bellied Woodpeckers may also be a threat to other woodpeckers. On 12 May 2002 in Delta NF, we observed a Red-bellied Woodpecker investigating multiple cavities. At the time, this bird had an active nest with young nearby. The Red-bellied Woodpecker was harassed by a Downy Woodpecker (*Picoides pubescens* L.) for several minutes before finally leaving the area.

Discussion

In Europe, Nilsson (1984) found that woodpeckers (*Dendrocopos* spp.) were responsible for 48% and 17%, respectively, of the predation on tit (*Parus* sp.) nest boxes and natural nests. The author also reported several direct observations of Great Spotted Woodpeckers (*D. major* L.) robbing tit nests. Onnebrink and Curio (1991) employed models of the Great Spotted Woodpecker in experimental tests of nest defense behavior by tits, underlining the recognized importance of this nest predator.

In North America, Short (1982) listed four species of *Melanerpes* (Red-headed [*M. erythrocephalus* L.], Acorn [*M. formicivorus* Swainson], Gila [*M. uropygialis* Baird, S.F.] and Red-bellied Woodpecker) as known predators of bird eggs or nestlings. Boyd and Ellison (in review) recently added the Golden-fronted Woodpecker (*M. aurifrons* Wagler) to the list. The remaining *Melanerpes* species have not been recognized as nest predators. However, we suspect that further study of these species will reveal that nest depredation is a common behavior across the genus.

After watching a Red-bellied Woodpecker consume an Acadian Flycatcher nestling, Trail (1991) suggested that "nest predation ... by Red-bellied Woodpeckers might be one of the limiting factors in the breeding success of these small woodland birds." Red-bellied Woodpeckers have been documented as nest predators in several other published notes as well (Table 1). The frequency and extent of woodpecker

Table 1. Documented instances of nest predation by Red-bellied Woodpeckers.

Citation	State	Prey species	Nesting stage
This paper	Tennessee	Blue-gray Gnatcatcher	Nestlings
		Acadian Flycatcher	Eggs, nestlings ¹
	Louisiana	Acadian Flycatcher	Eggs
	Arkansas	Indigo Bunting	Eggs
J.A. Jackson, pers. comm.	Mississippi	Prothonotary Warbler	Nestlings ¹
		Red-cockaded Woodpecker	Nestlings
		<i>(Picooides borealis</i> Viellot)	
Trail 1991	N. Carolina	Eastern Bluebird (<i>Sialia sialis</i> L.)	Eggs
		Acadian Flycatcher	Nestlings
Neill and Harper 1990	Illinois	House Wren (<i>Troglodytes aedon</i> Viellot)	Nestlings
Rodgers 1990	S. Carolina	Domestic Fowl (<i>Gallus gallus</i> L.)	Eggs
Watt 1980	Maryland	American Redstart (<i>Setophaga ruticilla</i> L.)	Nestlings
Conner 1974	Virginia	Carolina Chickadee (<i>Poecile carolinensis</i> Audubon)	Nestlings
Brackbill 1969	Maryland	House Sparrow (<i>Passer domesticus</i> L.)	Eggs
Grimes 1947	Florida	Hairy Woodpecker (<i>Picooides villosus</i> L.)	Nestlings ¹

¹Unconfirmed, but likely, based on circumstantial evidence

predation on bird nests is unknown, and anecdotal observations are insufficient for assessing the impact of particular predators on the dynamics of songbird populations in various regions and habitat types. Nonetheless, our observations add to the growing evidence that Red-bellied Woodpeckers (and other woodpecker species) frequently consume songbird eggs and nestlings, and are potentially an important nest predator in some areas. Although our personal observations are restricted to bottomland hardwood forests in the Mississippi Alluvial Valley, the Red-bellied Woodpecker is common in a variety of forest types (Shackelford et al. 2000). We believe that this species, commonly overlooked as a predator, may be a significant factor affecting songbird nesting success in many eastern North American forests.

Acknowledgments

We thank the many field technicians who helped locate and monitor nests, especially those whose detailed field notes enabled us to write this paper.

Literature Cited

Andren, H. 1995. Effects of landscape composition on predation rates at habitat edges. Pp. 225–255, *In* L. Hansson, L. Fahrig, and G. Merriam (Eds.). Mosaic Landscapes and Ecological Processes. Chapman & Hall, New York, NY. 356 pp.

- Bent, A.C. 1939. Life histories of North American woodpeckers. U.S. National Museum Bulletin 174.
- Boyd, M., and K. Ellison. In review (Texas Bulletin of Ornithology). Golden-fronted Woodpecker consumes young Northern Mockingbird.
- Brackbill, H. 1969. Red-bellied Woodpecker taking bird's eggs. *Bird-Banding* 40:323-324.
- Conner, R.N. 1974. Red-bellied Woodpecker predation on nestling Carolina Chickadees. *Auk* 91:836.
- Donovan, T.M., and F.R. Thompson, III. 2001. Modeling the ecological trap hypothesis: A habitat and demographic analysis for migrant songbirds. *Ecological Applications* 11:871-882.
- Durham, D.B., R.K. Abernethy, D.C. Eagar, R.P. Ford, P.B. Hamel, L.J. O'Neil, and T.M. Pullen, Jr. 1988. Application of the Habitat Evaluation System to modeling bottomland hardwood forest communities in west Tennessee. Pp. 481-490, *In* R.E. McCabe (Ed.). Transactions of the 53rd North American Wildlife and Natural Resources Conference. Wildlife Management Institute, Washington, DC.
- Ehrlich, P.R., D.S. Dobkin, and D. Wheye. 1988. *The Birder's Handbook: A Field Guide to the Natural History of North American Birds*. Simon and Schuster, New York, NY. 785 pp.
- Gates, J.E., and L.W. Gysel. 1978. Avian nest dispersion and fledging success in field-forest ecotones. *Ecology* 59:871-883.
- Grimes, S.A. 1947. Birds of Duval County. *Florida Naturalist* 21:1-13.
- Hamel, P.B. 1992. *The Land Manager's Guide to the Birds of the South*. The Nature Conservancy, Chapel Hill, NC, and the US Forest Service, Southern Region, Atlanta, GA. 367 pp.
- Martin, T.E. 1998. Are microhabitat preferences of coexisting species under selection and adaptive? *Ecology* 79:656-670.
- Martin, T.E., and G.R. Geupel. 1993. Nest-monitoring plots: Methods for locating nests and monitoring success. *Journal of Field Ornithology* 64:507-519.
- Neill, A.J., and R.G. Harper. 1990. Red-bellied Woodpecker predation on nestling House Wrens. *Condor* 92:789.
- Nilsson, S.G. 1984. The evolution of nest-site selection among hole-nesting birds: The importance of nest predation and competition. *Ornis Scandinavica* 15:167-175.
- Onnebrink, H., and E. Curio. 1991. Brood defense and age of young: A test of the vulnerability hypothesis. *Behavioral Ecology and Sociobiology* 29:61-68.
- Paton, P.W.C. 1994. The effect of edge on avian nest success: How strong is the evidence? *Conservation Biology* 8:17-26.
- Rodgers, S.P., Jr. 1990. Predation of domestic fowl eggs by Red-bellied Woodpeckers. *Florida Field Naturalist* 18:57-58.
- Shackelford, C.E., R.E. Brown, and R.N. Conner. 2000. Red-bellied Woodpecker (*Melanerpes carolinus*). Pp. 1-23, *In* A. Poole and F. Gill (Eds.). *The Birds of North America*, No. 500. The Academy of Natural Sciences of Philadelphia, Philadelphia, PA.
- Short, L.L. 1982. Woodpeckers of the world. Delaware Museum of Natural History Monograph 4:1-676.
- Trail, P. 1991. Nest predation by a Red-bellied Woodpecker. *Chat* 55:6-7.
- Watt, D.J. 1980. Red-bellied Woodpecker predation on nestling American Redstarts. *Wilson Bulletin* 92:249.