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Red-bellied Woodpecker

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Documentation of Predation of a Nestling Cerulean Warbler by a Red-bellied Woodpecker

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ABSTRACT.—Red-bellied Woodpeckers (*Melanerpes carolinus*) feed primarily on arthropods and plant matter, but a growing body of evidence suggests that Red-bellied Woodpeckers may also be a common passerine nest predator. Cerulean Warblers are the fastest declining Neotropical migratory wood warbler in North America. We report our observations of a Red-bellied Woodpecker depredating a nestling Cerulean Warbler (*Setophaga cerulea*) in Indiana. Further suggesting their status as a recognized nest predator, we also report agonistic behavior of a different Cerulean Warbler pair toward a Red-bellied Woodpecker foraging near the warblers' fledglings. Red-bellied Woodpeckers may be a more common nest predator of Cerulean Warblers than currently recognized, but further research is needed. *Received 3 October 2012. Accepted 15 January 2013.*

Key words: Cerulean Warbler, *Melanerpes carolinus*, mobbing, nest predation, predator, Red-bellied Woodpecker, *Setophaga cerulea*.

The Red-bellied Woodpecker (*Melanerpes carolinus*) is a medium-sized woodpecker of the family Picidae whose range encompasses most of the eastern United States and extreme southern edge of Ontario (Shackelford et al. 2000). Populations of Red-bellied Woodpeckers, found in both mature hardwood forests as well as more urban settings, have increased across much of their range, particularly in the northeast (Sauer et al. 2011). They are known to feed mainly on plant matter and arthropods (Shackelford et al. 2000); however, there is increasing evidence that they also prey on songbird eggs and nestlings (Hazler et al. 2004). Hazler and others (2004) indicated that the woodpeckers may have a more substantial impact on the productivity of songbirds in many eastern North American forests than was previously recognized.

We report here the first detailed observations of a Red-bellied Woodpecker preying on a nestling Cerulean Warbler (*Setophaga cerulea*). Additionally, we describe agonistic behavior of a separate pair of Cerulean Warblers towards Red-bellied

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FIG. 1. (A) Nest of Cerulean Warbler (*Setophaga cerulea*). (B) Red-bellied Woodpecker (*Melanerpes carolinus*) at nest of Cerulean Warbler prior to nestling removal. (C) Red-bellied Woodpecker probing the contents of the nest of Cerulean Warbler. (D) Red-bellied Woodpecker with nestling Cerulean Warbler in its bill.

Woodpeckers foraging near the warblers' fledglings. The Cerulean Warbler is a Nearctic-Neotropical wood warbler that breeds in mature deciduous forests of eastern and central North America. Populations of Cerulean Warblers have declined dramatically during the past few decades, and they are now listed as vulnerable to extinction by BirdLife International (2012) and endangered in Indiana (IDNR 2012). Understanding the causes of these declines is an important conservation mandate. Nest predation is likely an important cause of reproductive failure for this species (Boves and Buehler 2012), as it is for most passerine birds (Ricklefs 1969). However, a comprehensive study on Cerulean Warbler predation has not been conducted, and hence little is known regarding the diversity of nest predator species.

OBSERVATIONS

From May–July 2012, we regularly observed and filmed Cerulean Warblers feeding their young as part of a nestling diet study. On 1 June 2012, we observed and filmed parent Cerulean Warblers at a nest feeding a single nestling, approximately

6 days in age, during a routine 1-hr observation session in the Yellowwood State Forest, Brown County, Indiana (39° 06' 31" N, 86° 19' 45" W). This particular nest (Fig. 1A) was located ~18 m above the ground in a 28-m-tall white oak (*Quercus alba*). The nest was placed ~1.7 m away from the tree bole and ~2.4 m from the end of the branch. We observed the nest from 1409–1510 hrs EST and filmed the feedings using a Sony Cybershot 5× zoom attached to a Nikon Prostaff RAIII 82-mm spotting scope equipped with a 20–60× eyepiece. At 1423 hrs, a male Red-bellied Woodpecker landed on the nest branch <1 m away from the nest. Immediately, a parent Cerulean Warbler of unknown sex dove at the woodpecker in an agonistic manner but did not make contact. The woodpecker stayed on the branch for <1 min and subsequently flew off out of sight. It returned <5 secs later and landed on the trunk of the tree near the nest branch. After <5 secs, the woodpecker landed on the nest branch and hopped along the branch until it was at the nest (Fig. 1B). It stuck its head into the nest (Fig. 1C), pulled out a nestling (Fig. 1D), and

immediately flew out of our sight. We were unable to follow the woodpecker and consequently do not know whether it ate the nestling. We continued to observe and film the warbler parents and could hear loud alarm calls from the adults for at least 2 mins after the predation event. We continued to observe the nest until 1510 hrs, and observed the warbler pair return to the nest several times. During most of these visits, the warblers had food in their bill upon arrival and were observed to eat the prey themselves or fly away with it. We believe that the nestling that was removed was the last nestling in the brood based on the parents' post-predation behavior, and that this incident was the final cause of nest failure. Cerulean Warblers typically lay a clutch of 3–4 eggs (Hamel 2000). We lack knowledge pertaining to this particular pair's original brood size and whether it was greater than one, because we were unable to view the nest contents prior to the predation incident. A video of the predation event is available at: kislam.iweb.bsu.edu/Cerulean%20Warbler%20Research.htm

In addition to the predation event described above, we witnessed another pair of Cerulean Warblers, 1 km away from the predation event, exhibit agonistic behavior toward a Red-bellied Woodpecker that was near their fledglings. We first discovered the three fledglings within 8 m of their nest tree positioned on the ground or perched 1–2 m high in shrubs. Based on limited feather molt and inability to fly, these fledglings likely departed the nest on the day we first observed them (22 Jun). On 22 June at 1645 hrs, we saw a Red-bellied Woodpecker fly to a nearby snag ~8 m from a fledgling. Both the male and female Cerulean Warbler followed the woodpecker closely as it foraged on the snag. During ~4 mins of pursuit, the warblers chipped loudly but did not physically attack the woodpecker. Eventually, the woodpecker flew off and only then did the warblers resume feeding their young. On 24 June, two of the fledglings were relocated and a Red-bellied Woodpecker was observed foraging in a tree ~10 m from the fledglings. This time, only the male warbler followed the woodpecker as it foraged. The warbler remained about 2 m from the woodpecker, chipping loudly until the woodpecker flew away ~10 mins later.

DISCUSSION

Buehler and others (2008) considered Blue Jays (*Cyanocitta cristata*), American Crows (*Corvus brachyrhynchos*) and squirrels (*Sciurus* spp.) as

potential nest predators of Cerulean Warblers in Indiana, Michigan, Mississippi, Tennessee, and Ontario, Canada; Boves and Buehler (2012) observed Blue Jays and eastern chipmunks (*Tamias striatus*) depredating Cerulean Warbler nests in Tennessee. However, scant research has been conducted to determine the importance of any one species or the full extent of predator diversity. Here, we provide direct evidence that Red-bellied Woodpeckers will depredate nests of Cerulean Warblers. Our observations of nestling predation, as well as agonistic behavior of parent Cerulean Warblers towards Red-bellied Woodpeckers in the vicinity of their fledglings, contribute to a growing body of evidence suggesting that Red-bellied Woodpeckers may potentially be important nest predators of many songbird species. Nestling predation of Cerulean Warblers by a Red-bellied Woodpecker has been reported on one other occasion in Tennessee (Beachy 2008). Red-bellied Woodpeckers have also been recorded depredating mostly single nests of the American Redstart (*Setophaga ruticilla*; Watt 1980), Acadian Flycatcher (*Empidonax virescens*; Trail 1991), Indigo Bunting (*Passerina cyanea*; Hazler et al. 2004), House Wren (*Troglodytes aedon*; Neill and Harper 1990), Blue-gray Gnatcatcher (*Poliophtila caerulea*; Hazler et al. 2004), House Sparrow (*Passer domesticus*; Brackbill 1969), Carolina Chickadee (*Poecile carolinensis*; Conner 1974), White-breasted Nuthatch (*Sitta carolinensis*; Dunn 1984), and Tufted Titmouse (*Baeolophus bicolor*; Brown and Poole 2006). In addition to these confirmed records of predation events, observations of agonistic behaviors of other songbird species towards Red-bellied Woodpeckers suggest that the diversity of species affected by this nest predator may be even more widespread. Hazler and others (2004) documented Eastern Wood-Pewees (*Contopus virens*), Prothonotary Warblers (*Protonotaria citrea*), Blue-gray Gnatcatchers, and Acadian Flycatchers mobbing Red-bellied Woodpeckers when in close proximity to their nests. In these cases, mobbing occurred despite the apparent lack of interest in the nest by the woodpeckers.

In addition to Red-bellied Woodpeckers, several other woodpecker species have been described preying on the eggs and nestlings of songbirds. In North America, known predators include Red-headed (*Melanerpes erythrocephalus*; Smith et al. 2000), Acorn (*Melanerpes formicivorus*; Fajer et al. 1987), and Gila woodpeckers (*Melanerpes uropygialis*; Edwards

and Schnell 2000). A study in Sweden (Nilsson 1984) showed that woodpeckers (*Dendrocopos* spp.) were responsible for 17% and 48% of nest predation of tits (*Parus* spp.) in natural and artificial cavities, respectively. In Argentina, Magellanic Woodpeckers (*Campephilus magellanicus*) have been observed feeding their nestlings the eggs and nestlings of several other songbird species (Ojeda and Chazarreta 2006). While further study is needed, these observations suggest that woodpeckers in general may play a more important role as nest predators than previously recognized.

As populations of Cerulean Warblers have declined over the past 50 years in both Indiana and across the eastern United States (Sauer et al. 2011), Red-bellied Woodpecker populations have grown. From 2000–2010, populations of Red-bellied Woodpeckers increased by 3%/year in Indiana and nearly 2%/year across North America (Sauer et al. 2011). Thus, they may represent a growing pressure for the Cerulean Warbler and other canopy-nesting songbirds. To accurately determine the importance of Red-bellied Woodpeckers as nest predators of Cerulean Warblers and other canopy-nesting species, monitoring with 24-hour cameras will be required. A thorough investigation to document predators of Cerulean Warblers would be challenging, mostly because of the nest height. Additionally, predation studies generally require the use of expensive camera equipment, further limiting their feasibility. However, knowledge of nest predator diversity would be useful to our understanding of the causes of population declines of Cerulean Warblers.

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