BULLETIN OF THE
OKLAHOMA ORNITHOLOGICAL SOCIETY
VOL. 37 SEPTEMBER 2004 NO. 3

BLACK-AND-WHITE WARBLER NEST IN HABITAT ALSO USED BY BLACK-CAPPED VIREOS, CLEVELAND COUNTY, OKLAHOMA

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Abstract.—While doing Black-capped Vireo *(Vireo atricapillus)* research on 22 May 2003 in Cleveland County, Oklahoma, a Black-and-white Warbler *(Mniotilta varia)* nest was found; only the third Oklahoma nest record for the species. The nest apparently held 4 Brown-headed Cowbird *(Molothrus ater)* young and ≥ 2 Black-and-white Warbler eggs, which were later collected, representing the first eggs collected for the species in Oklahoma. Nesting habitat types for 2 of the 3 Oklahoma nest records appear to be similar to those of the Black-capped Vireo.

Fig. 1. . Black-and-white Warbler nest; white arrow indicates the entrance.

During the spring and summer 2003, I spent 40 days and approximately 280 hours near the southeastern shore of Lake Stanley Draper, Cleveland County, Oklahoma, studying a small breeding population of the endangered Black-capped Vireo *(Vireo atricapillus)*. Nesting Black-capped Vireos are brood parasitized by the Brown-headed Cowbird *(Molothrus ater)*, which causes heavy losses in vireo eggs and young. My primary goal at Lake Draper was to find vireo nests and remove any cowbird eggs or young therein.

I worked on 5 ha of burned habitat, dominated by scrubby (average height = 2.5 m) post *(Quercus stellata)* and blackjack *(Q. marilandica)* oaks, along with a similar-sized area of grassland, unburned woodland, and 2 roadways. The burned area was the result of a fire estimated to have occurred 12–15 years earlier.

On 22 May 2003, I followed a male Black-capped Vireo into a small wooded ravine and began looking for its nest. After quietly standing and inspecting the surrounding trees for 2 min, I glanced toward the ground and caught sight of a female Black-and-white Warbler *(Mniotilta varia)*, 2 m from me, as she scurried along the ground for about 3 m. Realizing this was a distraction display and that she may well have just left a nest, I looked at the available cover, saw 3 clumps of little bluestem *(Schizachyrium scoparium)*, and found the nest beneath 1 of those clumps.

The nest was located 1 m east of the low point of the shallow ravine and was only 5 m inside the wooded portion of a grassland-woodland edge. Vegetation above and around the nest was rather sparse, even though denser undergrowth was available only 5–7 m away.

The nest was 20 cm from the base of a blackjack oak that was 3 m tall and 6 cm in diameter at ground level. At the base of the oak, a small limb forked off and rose over the nest, where it supported some of the little bluestem, creating an arch of vegetation above the nest (Fig. 1). The opening to the nest faced west, and the nest could only be seen, or entered, from that direction. The nest reminded me of Bachman's Sparrow *(Aimophila aestivalis)* nests that William A. Carter (1970) photographed on his ranch near Ada, Pontotoc County, in southeastern Oklahoma in 1969 and that I had seen and photographed there in 1975. It also was quite reminiscent of the arched-over nests of meadowlarks *(Sturnella spp.)*.

I became concerned that my scent might later lead a predator to the nest, so I quickly checked the contents and left. The nest contained 4 young that I estimated to be about 2–3 days old and 1 small unbroken egg. The Black-and-white Warbler "usually lays 4 or 5 eggs to a set, normally 5, seldom fewer or more" (Bent 1963:7). Subsequently, I became relatively sure the 4 young were actually cowbirds, not warblers, as I initially assumed.

On 27 May 2003 from 5 m away, I watched the nest from 1522–1606 h, often using a 7 x 35 binocular. In this time, the adult male fed the young 5 times at: 1536, 1540, 1547, 1548, and 1606 h. Invariably, when the male flew in, he landed 15–20 cm above ground level on the trunk of the nearby oak. Then head first, he would quickly run down the trunk to the ground, over to the nest, feed the young (≥ 2 on this date), and fly off. Meanwhile, the female spent most of this time giving chip calls while holding food in her bill, but she refused to approach the nest, staying at least 6–8 m away.

Two days later (29 May), I returned with camera equipment, hoping to get pictures of the active nest and the interesting nest approach by the male, but I was too late. Although both adult Black-and-white Warblers chipped and carried food about nearby, no young remained in the nest. Instead of finding only the 1 unhatched egg that I had seen on 22 May, the nest contained 2 unbroken Black-and-white Warbler eggs (both 17 x 13 mm), plus an additional one-half of an eggshell that was probably a warbler's. The eggs were apparently the first of this species to be collected and saved in Oklahoma and have been deposited in the avian collection at the Sam Noble Oklahoma Museum of Natural History (OMNH # E-2674). The eggs are creamy white with brownish-purple spots that are more numerous around the large end. Baicich and Harrison (1997:282) gave a detailed description of Black-and White Warbler eggs and their variability, but in general they stated that the species' eggs were "[W]hite or creamy-white" and speckled with "light red, reddish-brown, purplish-brown or dark brown," often concentrated around the larger end; dimensions for this species' eggs they gave as 17 x 13 mm.

Finding 2 warbler eggs in the nest on 29 May surprised me because the 4 young I had seen earlier and the 2 unbroken eggs would have made an initial total of ≥ 6 eggs in the nest, with the additional broken eggshell as a seventh egg. So many eggs suggested cowbird parasitism and this was supported when I carefully considered my previous observations of 22 and 27 May. On 22 May, the 4 young had almost completely filled the nest, even though I had estimated the nestlings to be only 2–3 days old. Upon reflection, I believe the chicks were too large to be anything but cowbird young, which are significantly bigger than warbler young at a comparable age. All 4 young had been similar in size and appearance, suggesting a single species. Further, the 2 young I saw in the nest on 27 May (using a binocular from 5 m) only 1–2 days before fledging appeared to be uniformly dark in color, as young cowbirds would have appeared, rather than the somewhat muted stripings young Black-and-white Warblers would have shown. Bent (1963:7) stated that by the time Black-and-white Warblers leave the nest "they are clearly recognizable as young black-and-white warblers, although they are slightly tinged with brownish." The abundance of adult cowbirds in the area in 2003 and the openness of the nesting area also were consistent with the possibility of cowbird parasitism. Other observations also suggested cowbird parasitism, including the fact that 2, possibly 3, warbler eggs failed to hatch, a common fate for some of the host's eggs in a cowbird parasitized nest.

Bent (1963:11) reported on a Black-and-white Warbler nest in Michigan that had 8 cowbird eggs, along with 2 eggs of the "host." Kricher (1995:11) gave this as a "record number" of cowbird eggs found in nests of the species. In Oklahoma, only 1 instance of suspected cowbird parasitism has been reported. On 14 June 1992, Carter (1992) found a black rat snake *(Elaphe obsolete)* that had eaten 2 cowbird eggs followed by a female Black-and-white Warbler; based on ingestion order, he surmised that the snake had initially taken the cowbird eggs from a Black-and-white Warbler nest and then captured and eaten the female warbler as she defended her nest (Carter also found a punctured warbler egg nearby but was unable to find a warbler nest).

Kricher (1995:1, 15) stated that Black-and-White Warbler "ecology has

been surprisingly little studied" and that the species "needs much more study, especially regarding its breeding biology." This lack of information on breeding biology is no doubt largely due to the difficulty of finding nests. According to Breeding Bird Survey (BBS) data, the Black-and-white Warbler is a species that breeds over much of the southeastern two-thirds of the main body of Oklahoma (as one moves northwestward from the southeastern corner of the state), and BBS relative abundance data suggest that this species is likely 1 of the most common breeding warblers in the state (Sauer 2003). But I could find only 2 previous records of actual nests in Oklahoma. The first was on 26 May 1954 when Graber found a "nest with 4 eggs" in Caddo County, central Oklahoma; young fledged from this nest on 4 June (Baumgartner and Baumgartner 1992). Sutton (1967:488) commented further that this nest was "under grass tussock along canyon rim." Furthermore, Graber (1957) most likely found this nest in Black-capped Vireo habitat in Caddo County, but unfortunately there is insufficient data available to determine if this particular nest is now present in the OMNH collection, along with a tag of the exact location where the nest was found. Graber (1957:132) did, however, list the Black-and-white Warbler as one of the avian species "which occupied the same habitat as the black-capped vireo in Oklahoma." The second (and last) Oklahoma nest was found 47 years ago on 12 May 1956, when G. M. Sutton (Sutton Summary 1982), J. S. Tomer, L. R. Bunch, D. H. Baepler, and C. A. Ely found several young "just leaving" a nest at the "foot of steep slope near head of Lower Spavinaw Lake" in Delaware County.

During 50 years of observing birds, I have never before seen a nest of this species, although on occasion I thought that I was near a nest or young, based on behavior of adult warblers. Reed (1965:289) noted that Black-and-white Warblers nest "on the ground in woods or swamps," placing their nests "among the leaves usually beside stones, stumps or fallen trees." Kricher (1995:10) stated the "nest is well hidden" and an incubating female "moves only if touched or approached closely (< 10 cm...)." Bent (1963:6) commented that the "nest is generally concealed among an accumulation of dead leaves which, arching over it, hides it from above." Although quite a few types of nesting sites are described in the literature, the only previous report I can find that seems totally akin to the nest I found is the nest found by Graber (Sutton 1982).

Baumgartner (1992:13), reporting on warbler ecology research he had done in the Ozark Mountains of eastern Oklahoma, noted that the Black-and-white Warbler "was more adaptable in its nesting habitat requirements" than most of the other warblers of the area, utilizing "floodplain forest..., lowland forest..., and oak-hickory forest." Sutton (1967:488) stated that in eastern Oklahoma, nesting habitat was "well-wooded hillsides with thin understory." Graber's (1957) and my data indicate that the Black-and-white Warbler in central Oklahoma also can, and will, use scrubby blackjack/post-oak habitat for nesting, some of the same habitat that attracts nesting Black-capped Vireos. The warbler nest I discovered was 25 and 35 m from the closest 2 of 5 vireo nests I found on my study area in 2003, and it was at a location entirely suitable for vireo nesting.

Additional data I gathered in 2003 also indicated that the Black-and-white

Warbler and the Black-capped Vireo use the same general habitat during the breeding season. While working in the study area between 26 April–31 July 2003, I frequently recorded all species seen or heard from one spot over a period of time. Limiting my data to when I recorded birds for a minimum of 10 min and a maximum of 45 min and also located Black-capped Vireo(s) (n = 119), I recorded both vireos and warblers 25 times (21%) and vireos alone 94 times (79%). Breaking these data down further, between 26 April–7 June, I recorded both species 24 times (30%) and vireos alone on 56 occasions (70%). But between 8 June-31 July, I recorded both species only 1 time (3%) and vireos alone 38 times (97%). Thus, both species were recorded 10 times as frequently between 26 April-7 June as between 8 June-31 July. That "quiet period" for the warblers likely occurred after most Black-and-white Warbler young in the area had fledged; perhaps fledging of young was the event that actually triggered this "quiet" behavior. On 28 April 2003, I briefly observed a female Black-and-white Warbler (probably not the 1 from the nest) gather and carry strips of grapevine bark as nesting material while she worked 5 m high in a tall oak, 1 of a scattering of tall oaks not killed by the fire that created the burn area. Within the 20 ha study area, I suspected at least 4–6 pairs of Black-and-white Warblers with territories either entirely, or partly, in the area, and after extensive spot mapping of vireo territories, I estimated 6–7 male and 2–3 female vireos there.

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Received 12 January 2004, accepted 17 May 2004

First breeding record of Spotted Towhee in Oklahoma.—On 16 May 1997, while checking nest boxes approximately 6.4 km south of Kenton, Oklahoma, a female towhee flushed from the ground, just 1–2 m in front of 2 of us (DW and DP). Rather than follow the bird, which we took to be a Spotted Towhee *(Pipilo maculatus)*, we immediately searched the area and easily located a nest with 4 eggs. The nest was a tightly woven structure of fine grasses set in a slight depression in the ground and surrounded by dead leaves. It was located about 0.5 m inside the edge of a small patch of oak *(Quercus spp.)* on a slight incline on the side of a small mesa. The eggs were pale white and spotted with light brown flecks. The nest and eggs were photographed, but the nest was not visited again. At the time, neither of us realized that we had discovered the first known nest of the Spotted Towhee in Oklahoma.

Spotted Towhees are a common winter resident in the mesa country of Cimarron County and range eastward in winter into central Oklahoma. In Cimarron County, they typically arrive in September and depart in April, but there are records of lingering individuals until early June (Sutton 1967, 1974). We (DW and DP) overlooked the importance of this record due to a number of circumstances. Spotted Towhees are a common bird in this area in late April and into early May (pers. obs.). In addition, males often sang in late April, further strengthening our assumption that they bred in the area. Nonetheless, a check of all of the relevant published literature (Nice 1931, Sutton 1967, Baumgartner 1979, Baumgartner and Baumgartner 1992) turned up no previous breeding records for Oklahoma.

During the recent Oklahoma breeding bird atlas period, Spotted Towhees were observed only in Cimarron County (Reinking, 2004), but breeding was not confirmed. The atlas records were made by SP and consisted of 2 observations, 1 in June 1996 and 1 in July 1997, of a male Spotted Towhee along the Cimarron River, north of Boise City in northcentral Cimarron County. In both cases, the behavior of the bird (e.g., calling, singing, chasing a Red-winged Blackbird) suggested local breeding.

In Colorado, the recent Breeding Bird Atlas program documented breeding Spotted Towhees just north of the Oklahoma border, in southwestern Baca County, and a substantial breeding population of Spotted Towhees further west in Las Animas County (Levad 1998). Determining the breeding status of Spotted Towhees in Kansas is problematic because recent atlas work there (Busby and Zimmerman 2001) only recognized the split of Spotted and Eastern Towhees (*P. erythropthalmus*) during the last year of the

atlas field work. Nonetheless, records of purported Spotted Towhees (or of hybrids; Busby and Zimmerman 2001) were scattered along the northwestern tier of counties, with a few records further south, including a confirmed breeding record in Grant County, Kansas (about 112 km northeast of Cimarron County, Oklahoma; Busby and Zimmerman 2001). Spotted Towhees breed widely in the northern and central parts of New Mexico. Although the exact breeding range in northeastern New Mexico is not known, there is a breeding record (Hubbard 1978) 4.8 km north of Clayton, Union County, about 40 km southwest of the Cimarron County line. In the Texas panhandle, there are no breeding records for Spotted Towhee, but a singing male was observed at Bitter Lake National Wildlife Refuge in late May, and a male was observed in July south of Amarillo (Seyffert 2001).

One potential problem with identifying towhees in the Great Plains is that there is an apparent zone of breeding overlap between Spotted and Eastern Towhees in western Nebraska and western Kansas (Rising 1983). Individuals in this region may show intermediate plumage characteristics and may also sing an intermediate song type. Although hybridization between Spotted and Eastern Towhees could occur in Oklahoma, the recent breeding bird atlas work showed the 2 species breeding in widely separated portions of the state (the far western panhandle and the extreme northeast; Revels *in press*, Reinking 2004). Thus, there appears to be little potential for hybridization among Spotted and Eastern Towhees in Oklahoma.

Spotted Towhees and Eastern Towhees are very secretive around the cryptic nest, which may explain the scarcity of confirmed nesting records for these 2 species in Oklahoma. Nevertheless, the presence of singing Spotted Towhees in May and June in the Black Mesa region, along with the close proximity of breeding populations in New Mexico and Colorado, suggests that breeding may occur in Cimarron County on a regular basis.

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Received 2 January 2004 , accepted 30 March 2004.

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The Bulletin of the Oklahoma Ornithological Society (ISSN 0474-0750) is published quarterly in March, June, September, and December in Norman, Oklahoma. Co-editors, Bryan Coppedge (to whom manuscripts should be directed), Science and Mathematics, Tulsa Community College, 7505 West 41st Street, Tulsa, OK 74107-8633 e-mail: bcoppedg@tulsacc.edu; Jeffrey F. Kelly, University of Oklahoma; and David M. Leslie, Jr., U.S. Geological Survey. Subscription is by membership in the Oklahoma Ornithological Society: $5 student, $10 regular, $15 family, $15 or more sustaining, per year; life membership, $200. Direct questions regarding subscription, replacement copies, back issues, or payment of dues to Don Glass, OOS Membership/Circulation Chair, P.O. Box 2931, Claremore, OK 74018.

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