

## **A Novel Songbird Nest Predator: The Greater Arid-Land Katydid**

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## Notes and Discussion

### A Novel Songbird Nest Predator: The Greater Arid-Land Katydid

**ABSTRACT.**—We describe the removal (predation) of a black-capped vireo (*Vireo atricapilla*) nestling by a female greater arid-land katydid (*Neobarrettia spinosa*) in southwest Texas. The event was captured with a nest camera during night in Jun. 2010. *Neobarrettia* species are known to be aggressive and carnivorous, but this is the first report of a katydid depredate a songbird nest.

#### INTRODUCTION

Species within the genus *Neobarrettia* are large, nocturnal, predaceous katydids that occur in Texas and northern Mexico as well as localized distributions in Kansas, Oklahoma, and New Mexico (Cohn, 1965). Habitat of *Neobarrettia* is characterized by thorn scrub, particularly mesquite (*Prosopis* spp.) and catclaw (*Acacia* spp.; Tinkham, 1944; Cohn, 1965), as well as oak-juniper (*Quercus-Juniperus*) woodland (Cohn, 1965). *Neobarrettia* mature in mid-summer, are active into Nov., and spend the majority of their life in shrubs and trees (Tinkham, 1944). This genus is distinctly aggressive and is known to be cannibalistic (Tinkham, 1944) and almost exclusively carnivorous (Cohn, 1965). According to Cohn (1957), *Neobarrettia* captures its prey by pouncing onto it suddenly and then sitting on it. Most other katydids are omnivorous, feeding on vegetation, seeds and occasionally prey, primarily other insects (Gwynne and Morris, 2002).

The black-capped vireo (*Vireo atricapilla*) is a federally endangered songbird (Ratzlaff, 1987) whose current breeding range extends from Oklahoma through central and southwest Texas and south to central Mexico (Graber, 1961). The decline in number of black-capped vireos is primarily due to habitat loss, habitat fragmentation, and parasitism by brown-headed cowbirds (*Molothrus ater*; Grzybowski, 1995; Kostecke *et al.*, 2005). Black-capped vireos use vegetation cover up to 2 m tall, and typically place their small cup nests within this zone. (Graber, 1961; Grzybowski, 1995). Studies of black-capped vireo nest predators have been limited to central Texas, where predators include Texas rat snakes (*Elaphe obsoleta lindheimeri*), ants, and brown-headed cowbirds (Stake and Cimprich, 2003; Campomizzi *et al.*, 2009; Conkling, 2010).

#### STUDY AREA AND METHODS

Our study area was located at Devil's River State Natural Area (SNA) and Dolan Falls Preserve in Val Verde County, Texas (29.916483, -100.98379). Devil's River SNA is an 8090 ha property managed by Texas Parks and Wildlife Department and is adjacent to Dolan Falls Preserve, a 1942 ha property owned by The Nature Conservancy. The natural plant communities at Devil's River SNA and Dolan Falls Preserve exhibit elements of the mesquite-chaparral of the South Texas Plains, the oak-cedar (*Quercus-Juniperus*) of the central Edwards Plateau to the east and the sotol-lechuguilla (*Dasyllirion-Agave*) of the Trans-Pecos to the west (Hedges and Poole, 1999).

We located and monitored black-capped vireo nests in 2010 by using behavioral cues and systematic search techniques (Ralph *et al.*, 1991; Martin and Geupel, 1993). We marked nests with flagging at least 15 m away from nest and did visual nest checks every 2 to 7 d until all nestlings fledged, contents were removed by a predator, or the nest was abandoned. We used Rainbow Weatherproof IR Bullet cameras (Costa Mesa, CA) and DD Digital Event Recorders [(DVR), Detection Dynamics, Austin, TX] with high capacity SD cards to continuously monitor black-capped vireo nests 24 h a day. We used a 15 m cable to connect the bullet camera to the camera box containing the DVR with SD card and battery. The bullet camera was attached to vegetation  $\geq 1$  m from the nest as soon as possible after egg laying but after the initiation of incubation to avoid forced abandonment by the adults. After we placed the camera, we observed the nest until the adults returned to normal behavior and removed the camera if the adults did not return to normal behavior within 30 min. We evenly distributed cameras between study sites and vegetation communities within the study sites. We defined predation as the removal of eggs or nestlings whether or not we observed them being consumed. As soon as a nest was known to have fledged or failed, we moved the camera to a new nest.



FIG. 1.—Female greater arid-land katydid (indicated with arrow) on nest substrate minutes before attacking black-capped vireo nestling in nest (circled on left). (Video image capture)

#### RESULTS AND DISCUSSION

We located and monitored 38 nests, 26 of which were monitored with cameras. Of these, 10 were depredated and we identified nest predators for six of those nests. We identified one of those nest predators as a female greater arid-land katydid (*Neobarrettia spinosa*; Fig. 1); sex was determined by the long sword-like ovipositor characteristic of females of this species (Cohn, 1965). The nest depredated by the katydid was located in a 2 m tall Texas mountain laurel (*Sophora secundiflora*) in a riparian area adjacent to a small dry creek. The nest was located 1 m off of the ground and contained one black-capped vireo egg, one brown-headed cowbird egg, and one 5 d old black-capped vireo nestling at the time of the katydid appearance.

At 2300 on 10 Jun. 2010, the greater arid-land katydid entered the view of the camera and proceeded to crawl onto the shrub containing the nest. The adult female black-capped vireo fled the nest at 2302, and the nestling was noticeably moving around in the nest at 2306. The katydid moved around on the Texas mountain laurel until 2308, at which time it stood motionless on the nest limb. At 2310, the katydid jumped onto the nest and pulled out the nestling. The katydid and the nestling then fell off the limb and out of the view of the camera. Because the katydid and nestling fell out of the frame of view of the camera, it is not known whether the katydid actually consumed the nestling. The adults returned to the nest briefly the following morning at sunrise. The nest was not checked until 12 Jun. 2010 at which point we did not detect any remains of the nestling in the area.

We have identified a potentially new and unlikely songbird nest predator. We could not find any accounts of an insect, other than ant spp. (Stake and Cimprich, 2003; Campomizzi *et al.*, 2009; Conkling, 2010), predated songbird nests. It is unlikely that this predation would have been observed diurnally because of the nocturnal hunting habits of greater arid-land katydids and the defense of the nest by the black-capped vireo adults. The female black-capped vireo was flushed off the nest, likely because of the movements of the katydid, leaving the nestling vulnerable to attack. There is a wide variety of predators that depredate black-capped vireo nests, including rat snakes (*Elaphe* spp.), fire ants (*Solenopsis invicta*), greater road-runner (*Geococcyx californianus*), gray fox (*Urocyon cinereoargenteus*), and

brown-headed cowbirds (Stake and Cimprich, 2003; Conkling, 2010). The potential influence of the occasional nest depredation by greater arid-land katydids is likely small; however, it adds another negative factor that could reduce the number of successful nest attempts of black-capped vireos.

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