

## Ixodes brunneus (Acari: Ixodidae) from Two Bird Hosts: A New Michigan Tick

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## ***Ixodes brunneus* (Acari: Ixodidae) from Two Bird Hosts: A New Michigan Tick**

Richard S. Keith<sup>1</sup>, Brenda S. Keith<sup>2</sup>, William C. Scharf<sup>3</sup>, and Sarah A. Hamer<sup>4</sup>

### **Abstract**

The tick *Ixodes brunneus* Koch (Acari: Ixodidae) is reported for the first time in Michigan from two bird hosts at two locations in the lower peninsula. All stages of this tick exclusively feed on birds, and are primarily known from the southern U.S., although abundant records occur from northern states. The role of this species as a vector of pathogens is discussed.

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The authors regularly mist-netted and banded birds during spring and fall migration. RSK and BSK collected ticks at the Pitsfield Banding Station, 42°10' N, 85° 30' W, near Vicksburg, MI, where approximately 60,000 birds were checked for ticks during 14 of the last 18 years of spring, summer, and fall field research. WCS collected ticks at Chippewa Run Banding Station, 44° 49' N, 86° 31' W, near Empire, MI, where approximately 2,500 birds were checked for ticks over 8 seasons of spring and fall field research. Ticks were preserved in 70% ethanol and identified based on the taxonomic criteria outlined by Cooley and Kohls (1945), Keirans and Clifford (1978), and Keirans and Litwak (1989).

We collected two engorged or partially engorged adult female *Ixodes brunneus* Koch from two species of ground-level foraging migratory birds. The bird host at Pitsfield was a White-throated Sparrow, *Zonotrichia albicollis* (Gmelin) captured on 18 April 2010 (Figure 1). The bird host at Chippewa Run was a Lincoln's Sparrow, *Melospiza lincolni* (Audubon) captured on 7 May 2015 and is deposited in the U.S. National Tick Collection (Catalogue no. USNMENT00862224). Additionally, the identification of the Vicksburg tick was confirmed based on amplification and DNA sequencing of the tick 12S mitochondrial rRNA gene (Beati and Keirans 2001) from a single tick leg. The DNA sequence from the Vicksburg tick shared >99% homology with an *I. brunneus* nymph from North Carolina, and has been made available in a national database for future analyses (Genbank accession no. KT748755).

### **Discussion**

Our collections of *I. brunneus* are apparently the first reported from Michigan. Walker et al. (1998) documented 21 species of ixodid ticks (hard ticks) from Michigan in a 12-year passive survey based on tick submissions from citizens. That survey found no *I. brunneus* even though there were 12 other species in the genus *Ixodes* that were encountered. Additionally, Hamer et al. (2011,

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**Figure 1.** Infestation of a white-throated Sparrow, *Zonotrichia albicollis* (Gmelin) captured on 18 April 2010 in Vicksburg, MI, with an adult female *Ixodes brunneus* tick. Photo credit: Richard Keith.

2012) identified over 12,000 ticks removed from Michigan birds at the Pitsfield field site and found no *I. brunneus*; the majority were *I. dentatus* Marx (Acari: Ixodidae) and *Haemaphysalis leporispalustris* (Packard) (Acari: Ixodidae) with *I. scapularis* Say (Acari: Ixodidae) and *Dermacentor variabilis* Say (Acari: Ixodidae) infrequently found.

All stages of *I. brunneus* exclusively feed on birds, and are primarily known from the southern U.S. (Luttrell et al. 1996, Goddard 2013, Godard et al. 2013), although abundant records occur from northern states (Cooley and Kohls 1945, Durden and Keirans 1996). Boyd (1951) lists 64 species of birds that have been reported as hosts of this tick. Both avian hosts in this study- Lincoln's Sparrow and White-throated Sparrow- are potential long-distance migrants (Chartier et al. 2011) and the probability of them bringing this tick from a southerly location seems high considering both captures were during the spring migration. Further, both host species do not nest at the site at which they were captured, but do nest in large numbers across northern latitudes including northern Michigan.

Clifford et al. (1969) reported *Rickettsia rickettsii* Brumpt, causative organism for Rocky Mountain Spotted Fever, from one pool of *I. brunneus* from migratory birds, although the vector potential is unknown. Avian tick paralysis has been described by Luttrell (1996) and is caused by salivary neurotoxins from the female *I. brunneus* that cause paralysis of the diaphragm and respiratory failure (Mullen and Hribar 1991). This paralysis can lead to mortality in birds.

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