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Recent documentation of the tropical bed bug (Hemiptera: Cimicidae) in Florida since the common bed bug resurgence

Brittany E. Campbell*, Philip G. Koehler, Lyle J. Buss, and Rebecca W. Baldwin

Two bed bug species use human hosts for a blood meal: the common bed bug, *Cimex lectularius* L., and the tropical bed bug, *Cimex hemipterus* (F.) (Hemiptera: Cimicidae). The common bed bug is prevalent in the United States and is found throughout the entire country. This species has a worldwide distribution and is considered to be a pest in more temperate climates. In the United States, the common bed bug occurred only at low levels in the 50 years before the 1990s, mostly due to the widespread use of DDT and other chemical insecticides (Potter 2011). A resurgence of common bed bugs occurred in the 1990s in the United States and has been considered to be a result of multiple factors, including insecticide resistance, sale of second hand furniture, increased international travel, and changes in pest control practices.

Compared with *C. lectularius*, the tropical bed bug has a more subtropical and tropical distribution, specifically remaining within 30° latitudinally north and south of the equator (Usinger 1966). More recently, *C. hemipterus* was collected in Tanzania in 1995–1996 (Myamba et al. 2002), for the first time in Australia in 1998 (Bundaberg in 1998), again in 2003 cohabitating with *C. lectularius* (Doggett et al. 2003), in Sri Lanka in 2001–2003 (Karunaratne et al. 2007), Brazil in 2005 (Araujo et al. 2009), Malaysia and Singapore in 2006 (How & Lee 2010), Bangladesh in 2007 (Khan & Rahman 2012), Rwanda in 2011 (Angelakis et al. 2013), and several provinces in Thailand in 2011 (Tawatsin et al. 2011). This list is indicative of the worldwide range of *C. hemipterus* and suggests that the geographic range of *C. hemipterus* remains within the 30° latitude lines north and south.

Consistent with the expected distribution of *C. hemipterus* in tropical and subtropical regions, this species has previously been documented in the state of Florida, USA. *Cimex hemipterus* was first documented in Gainesville, Florida, in 1938 with several other reports of this species across the state occurring in the 1930s and early 1940s, including in Alachua, Pinellas, Polk, and Sarasota counties (Hixson 1943). However, there has been no recent published documentation of this species in the state of Florida since the resurgence of common bed bugs in the United States in the late 1990s.

Recently, a bed bug sample from a home in Brevard County (28° latitude north) was sent to the Insect Identification Laboratory at the University of Florida and was identified as *C. hemipterus* using the taxonomic key in Usinger (1966), specifically the pronotum width-to-length ratio. This ratio is less than 2.5 in *C. hemipterus*, and greater than 2.5 in *C. lectularius* (Usinger 1966). Also, *C. lectularius* has a more upturned lateral margin as compared with *C. hemipterus* (Ghuri 1973). The

differential comparisons between the pronotum lateral margin of *C. lectularius* and *C. hemipterus* are pictured in Figs. 1 and 2.

We contacted the homeowners in Brevard County and visited the home in October 2015 to collect additional bed bug specimens for positive identification. Further pronotal measurements of *C. hemipterus* males and females were taken using a stereomicroscope system (Leica MZ12.5) and Auto-Montage Pro software (version 5.02, Syncroscopy, Frederick, Maryland). Mean ratios \pm SE (pronotum width/pronotum length) of *C. hemipterus* for both male and female bed bugs combined were below 2.5 (2.30 ± 0.08 , $n = 10$), confirming that they were tropical bed bugs. Mean (\pm SE) measurements of the *C. hemipterus* pronotum were 0.56 ± 0.02 mm for the length and 1.29 ± 0.04 mm for the width.

According to the homeowners, they believed a family member had unknowingly brought the bed bugs into the house and indicated that no one residing in the house had traveled outside of the state of Florida. Although the origin of the bed bug infestation could not be determined, the absence of international and national travel by the residents suggests that tropical bed bugs were present elsewhere in the state. Further studies are needed to determine the presence, establishment, and possible distribution of this species throughout the state.

Interestingly, one other recent instance of *C. hemipterus* has occurred in Florida, although this documentation has not been published. The Florida State Collection of Arthropods, housed in the Florida Department of Agriculture and Consumer Services, Division of Plant Industry, Gainesville, Florida, has 2 adult female specimens of *C. hemipterus* (pronotum measurements: length = 0.52 mm, width = 1.07 mm, ratio = 2.08; length = 0.60 mm, width = 1.27 mm, ratio = 2.13) in their collection. The label identifier states that they were collected in Orange County, Florida, on 11 Jun 1989 by T. Nguyen in bedding, and the database records state that the specimens were collected in a hotel in downtown Orlando. Whether this species has been present in Florida and never disappeared, or has been re-introduced and remains in small populations, is currently not known.

The recent discovery of *C. hemipterus* in Florida generates questions about the impact this species could potentially have compared with *C. lectularius*. Most people would have a difficult time distinguishing the difference between *C. lectularius* and *C. hemipterus*, and many people most likely will not attempt to differentiate between the species once they positively identify a bed bug infestation.

Although *C. hemipterus* is biologically and behaviorally similar to *C. lectularius*, there is currently a dearth of knowledge pertaining to ecol-

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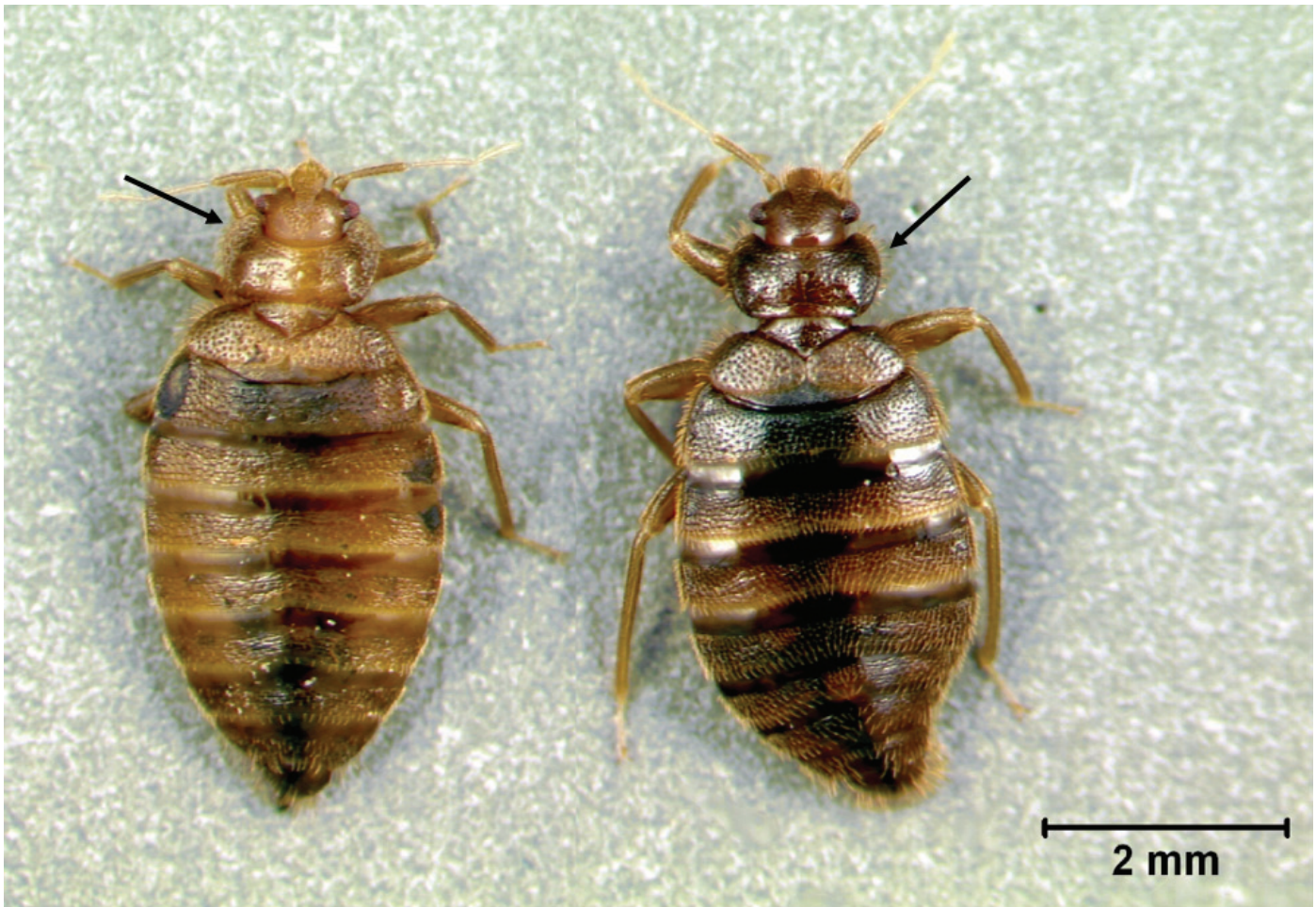


Fig. 1. Auto-Montage photograph of an adult *Cimex hemipterus* male collected from Brevard County on the right and an adult *Cimex lectularius* male on the left. Arrows are pointing to the lateral pronotum margin on both species.

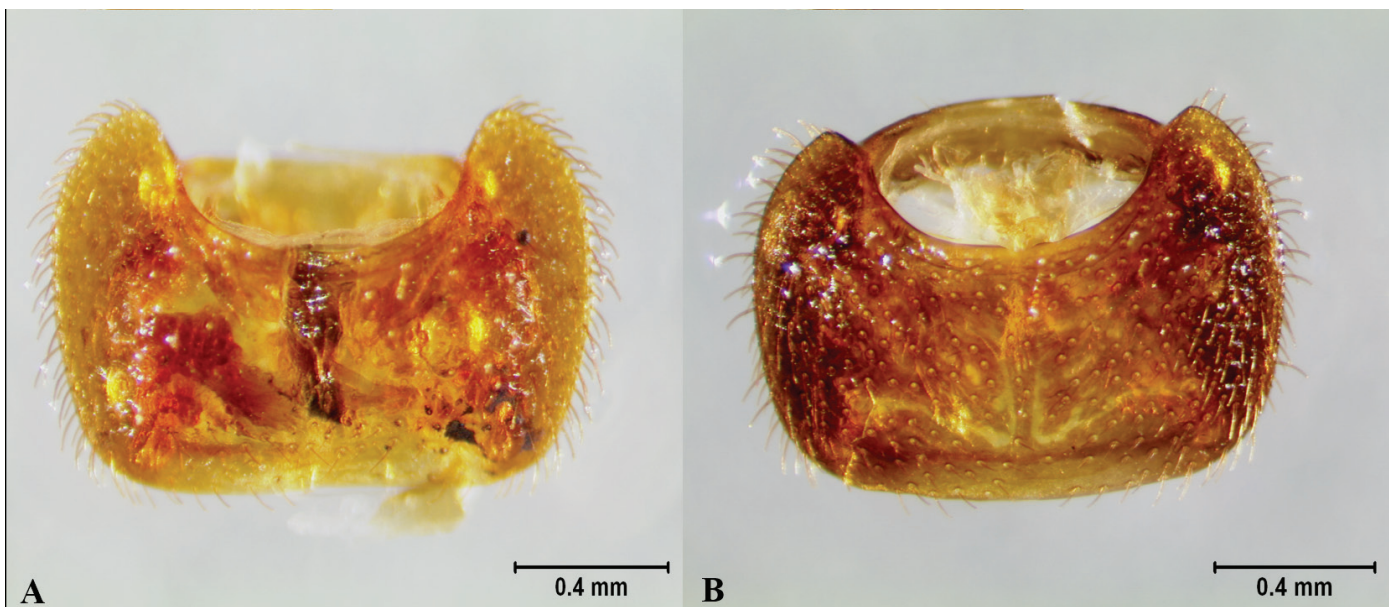


Fig. 2. Auto-Montage photograph of a dissected pronotum from *Cimex lectularius* (A) and *Cimex hemipterus* (B).

ogy, biology, and insecticide resistance of this species. Ecological and physiological differences between the species of bed bugs may require different management strategies for *C. hemipterus* than *C. lectularius*.

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Summary

This is the first report of the tropical bed bug in Florida in over 6 decades. The tropical bed bug had previously been documented in Florida in the 1930s and 1940s.

Key Words: resurgence; *Cimex hemipterus*; *Cimex lectularius*

Sumario

Este es el primer informe de la chinche de cama tropical en la Florida en más de 6 décadas. La chinche de cama tropical ya había sido documentada en la Florida en los años 1930 y 1940.

Palabras Clave: resurgimiento; *Cimex hemipterus*; *Cimex lectularius*

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