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**EASTERN RANGE EXTENSION OF *LEPTOGLOSSUS OCCIDENTALIS* WITH A KEY TO *LEPTOGLOSSUS* SPECIES OF AMERICA NORTH OF MEXICO (HETEROPTERA: COREIDAE)**

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ABSTRACT

*Leptoglossus occidentalis* is reported for the first time from Illinois and Michigan, and confirmed for Indiana. A key to the species of *Leptoglossus* occurring in America north of Mexico is presented.

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*Leptoglossus occidentalis* was originally described in 1910 by Otto Heidemann from an adult male and female collected in Placer County, California and Utah (respectively?). He also reported examining additional "species" (specimens?) from California, Colorado, and Vancouver and stated, "the species belongs evidently to the Western fauna, and is widely distributed from Colorado to California and north to Vancouver."

Since then, additional records strongly suggest it is moving eastward. Torre-Bueno (1941, p. 49) reported it from California, Colorado, Idaho, and British Columbia. This was followed by Hussey (1953) who reported it (as *Theognis occidentalis* [Heidemann]) from Montana, and Koerber (1963, Fig. 1) who added Alberta, Washington, Oregon, Utah, Arizona, New Mexico, and Nebraska.

Schaffner (1967) (as *T. occidentalis*) added Iowa and noted that, based on its regular collection since 1956, it was now established in the state. He also reported a specimen collected by a student in July 1961 in Monroe Co., Indiana. He felt this record indicated a further eastward extension of the range but, to our knowledge, its presence in Indiana has not been reported again.

Allen (1969), in his revision of *Leptoglossus*, reported *L. occidentalis* as occurring from southern British Columbia and Alberta south to Arizona, New Mexico, and Texas, and eastward to Iowa and Kansas (p. 131–132). Katovich and Kulman (1987) added Wisconsin and Minnesota. The Henry and Froeschner (1988) heteropteran catalog lists Alabama but this is apparently in error (Froeschner, pers. comm.).

We here add Illinois and Michigan to the range of this coreid and confirm its presence in Indiana. To aid in its identification, we also include a key to the species of *Leptoglossus* in America north of Mexico. Previous keys to our species have included Gibson (1917), Torre-Bueno (1941), Hussey (1953), and Allen (1969).

Some life history information has been published for this coreid. It feeds mainly on seeds and developing tissues of cones of pines and other conifers (see host lists of

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Koerber [1963], Krugman and Koerber [1969], and Hedlin et al. [1981]). Recent host plant additions include scotch pine (*Pinus sylvestris*) (Schaffner 1967) and red pine (*Pinus resinosa*) (Katovich and Kulman 1987). Under caged conditions, it will feed on the fruits of pistachio (*Pistacia vera*) (Uyemoto et al. 1986).

*L. occidentalis* reportedly is univoltine, apparently based on observations in northern California (Koerber 1963, Krugman and Koerber 1969, Hedlin et al. 1981). Adults emerge from overwintering sites in late May or early June. Eggs are laid on needles of the host plant. First instars feed on needles and succulent tissue of cone scales. Subsequent instars feed on seeds of cones. The overwintered adults continue to feed and oviposit. By mid-August, all instars and new adults can be found on the same cone cluster. By late August, the nymphs have matured, and the resulting adults continue to feed on the ripening seed crop until cold weather. Then they seek a variety of overwintering sites. They have been collected under loose bark (Dennys 1927), from a hawk nest and a rodent nest (Hussey 1953), and inside buildings (Spencer 1942, Schaffner 1967). Schaffner (1967) incorrectly stated that Koerber (1963) reported the egg as the "regular overwintering stage."

*L. occidentalis* has been reared in the laboratory from egg to adult and the immature stages have been briefly described (Koerber 1963).

From 1983 through 1988, we found several specimens of *L. occidentalis* in Illinois and Michigan, most of which were collected in the fall. Their abundance in southern Illinois, and our knowledge of their feeding habits, encouraged us (JEM, SJT) to search for their hosts plant(s) locally. During 1989, we discovered individuals of this coreid on the Southern Illinois University campus feeding and developing on cones of Austrian pine, *Pinus nigra*, a plant introduced from Europe; and in Ann Arbor feeding on cones of white pine, *Pinus strobus*, and white spruce, *Picea glauca*. Finally, one of us (RJP) has discovered several additional specimens in the collections of the Illinois Natural History Survey (INHS), Champaign, and the Entomology collection of Purdue University (PUL), Lafayette, Indiana. These specimens (INHS, PUL), plus those now housed in the collections of Southern Illinois University, Carbondale (SIUC), and the University of Michigan Museum of Zoology (UMMZ), collectively, confirm its presence in Indiana and show that it has been present in Illinois, Michigan, and Indiana for several years (Fig. 1). Telephone calls from concerned homeowners (to MFO) who have found this distinctive coreid within their homes have increased in number in Washtenaw County, Michigan. Calls have been most common in late October and early November, when adults are seeking overwintering sites.

Label information for the above specimens is as follows; supplemental information is in parentheses: **ILLINOIS:** SIUC. JACKSON CO.: Carbondale, 22 August 1987 (1 ♂), S. Taylor, Coll.; 3 October 1987 (1 ♀), A. Cox, Coll.; 20 October 1987 (1 ♂), S. Anders, Coll.; 6 December 1987 (1 ♀), H. Rice, Coll. Carbondale, SIUCampus, 25 September 1987 (2 ♀♀), R. Lampley, Coll.; 12 October 1988 (1 ♀), H. Rice, Coll.; 18 October 1988 (1 ♂), M. Blasczyk, Coll.; 28 October 1986 (1 ♂), J. E. McPherson, Coll.; 4 November 1987 (1 ♂), R. Weck, Coll.; 14 November 1988 (1 ♀), H. Rice, Coll.; 17 November 1987 (1 ♂), R. Weck, Coll.; 3 December 1987 (1 ♂), R. Weck, Coll.; 7 December 1987 (1 ♂), S. Taylor, Coll. Carbondale, SIUCampus, in building, 12 January 1989 (1 ♀), J. E. McPherson, Coll., 8 March 1989 (1 ♀), S. Taylor, Coll. Carbondale, SIUCampus, on *Pinus nigra*, 21 June 1989 (1 ♂, 2 ♀♀), S. Taylor and J. E. McPherson, Coll. INHS. (BUREAU CO.): Tiskilwa, in house, 30 April 1980 (6 ♂♂, 3 ♀♀), A. Albrecht, Coll. (COOK CO.): Chicago, in house, 1 May 1980 (1 ♂, 2 ♀♀), W. Templeton, Coll. (McHENRY CO.): Woodstock, Sanctuary Farms, 19 October 1979 (2 ♂♂, 1 ♀), C. Krenger, Coll. ROCK ISLAND CO.: 15 October 1974 (1 ♀), J. ? Turner, Coll.; 28 October 1974 (1 ♀), K. Babich, Coll. **MICHIGAN:** UMMZ. OAKLAND CO.: 19 October 1987 (1 ♀), G. Hubbell, Coll. ST. JOSEPH CO.: Klinger Lake, U. V. Light, 30 July 1983 (1 ♂), M. & A. O'Brien, Colls. WASHTENAW CO.: Ann Arbor, 9 March 1989 (1 ♀), T. E. Moore, Coll.; 10 October 1988 (1 ♀), M. F. O'Brien, Coll.; 16 October 1984 (8 ♂♂, 5 ♀♀), T. H.

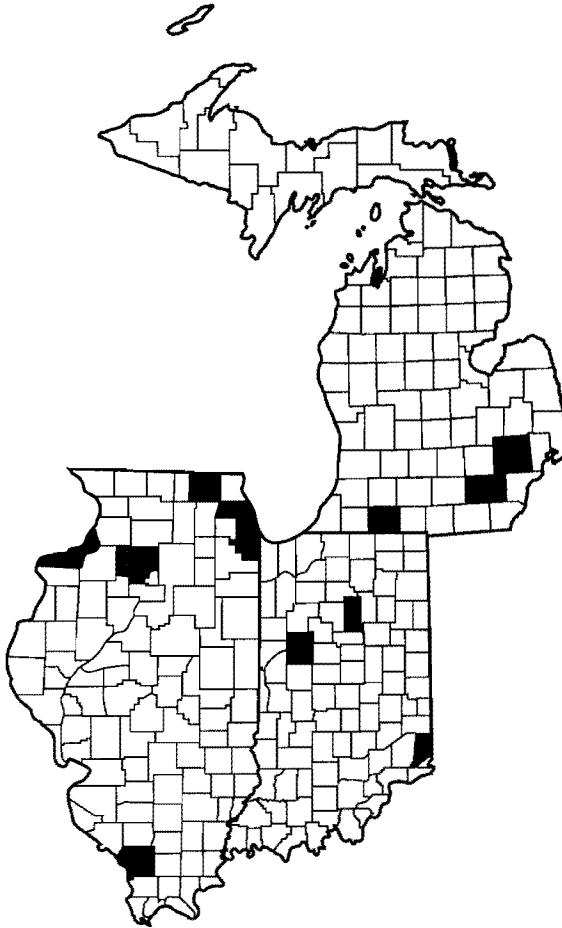


Figure 1. County records for *Leptoglossus occidentalis* in Illinois, Michigan, and Indiana.

Hubbell, Coll.; 21 November 1986 (1 ♀), T. E. Moore, Coll. (WASHTENAW CO.): Ann Arbor, 11 February 1987 (1 ♂), T. E. Moore, Coll.; in house, 27 January 1987 (1 ♂), R. W. Storer, Coll. **INDIANA:** PUL. DEAR. (BORN) CO.: Bright (town?), 8 Sept. 1984 (1 ♀). MIAMI CO.: Peru, 20 September 1984 (1 ♂), B. Warder, Coll. TIPPECANOE CO.: West Lafayette, 6 November 1984 (1 ♂), G. Edwards, Coll.; (West Lafayette?), in building, 10 November 1980 (1 ♂), B. G. Johnson, Coll.

Natural eastward dispersal of Coreoidea is not unprecedented. *Catorhintha mendica* Stål (Coreidae) (Balduf 1957) and *Boisea trivittata* (Say) (Rhopalidae) (Slater and Schaefer 1963) and, possibly, *Coriomeris humilis* (Uhler) (Coreidae) (Slater and Schaefer 1963) and *Aufeius impressicollis* Stål (Rhopalidae) (Wheeler 1984) have also shown similar range extensions; the latter two species may have expanded their ranges by adventitious introductions.

Perhaps the most thoroughly documented eastward movement of a coreoid is that

of *C. mendica*. Balduf (1957) showed that this species and its host plant, *Mirabilis nyctaginea*, were originally limited to the Great Plains. However, as food surplusses were shipped eastward by rail, this plant, included as a contaminant, became established along rail right-of-ways from seeds that fell from railroad cars. This permitted *C. mendica* to extend its range eastward to Pennsylvania (Balduf 1957), and, subsequently, to the East Coast (Hoebeke and Wheeler 1982, Slater 1983). Recently, Hoebeke and Wheeler (1982) have reported a second host plant for this bug in Iowa, *M. hirsuta*.

*L. occidentalis* does not seem to fit this pattern of eastward spread, that is, following movement of its host plant or plants. Rather, it appears an ability to feed on several species of conifers enabled it to move eastward by including *P. resinosa*, *P. strobus*, and *P. sylvestris*, all of which are eastern species; and *P. nigra*, an introduced European species, in its host range.

Certainly not all movement of coreoids has been eastward. *Leptoglossus fulvicornis* (Westwood) appears to be extending its range westward (Mitchell and Mitchell 1983).

**KEY TO SPECIES OF LEPTOGLOSSUS GUERIN, NORTH OF MEXICO**

- 1. Tylus produced anteriorly as sharp spine (central and southwest U. S., east to IA) ..... *L. clypealis* Heidemann
- 1'. Tylus not produced anteriorly as spine ..... 2
- 2. Labium not extending onto abdomen ..... 3
- 2'. Labium extending well onto abdomen. .... 5
- 3. Antennal segments black; pronotal disc black with marginal areas of pronotum widely and continuously orange-yellow; abdominal venter widely orange with a few black areas (FL, MS, AL) ..... *L. ashmeadi* Heidemann
- 3'. Antennal segments reddish brown, segment I bicolored with black; pronotal disc reddish brown with marginal areas concolorous; abdominal venter orange, but covered with numerous small black spots ..... 4
- 4. Corium with broad, straight, transverse yellow-white fascia not confined to veins; length of body usually more than 14.3 mm (NY south to FL, west to IA and KS, southwest to TX and CA) .... *L. phyllopus* (L.)
- 4'. Corium with reduced, irregular, transverse yellow-white fascia mainly confined to veins; length of body usually less than 14.3 mm (southwest U.S., AZ, CA, TX) ..... *L. brevirostris* Barber
- 5. Pronotum with narrow transverse arched yellow to red stripe extending to sharply spined humeral angles; abdominal venter with seven longitudinal yellow stripes; antennae black with yellow bands on last three segments (Gulf States, FL to TX) ..... *L. gonagra* (Fabricius)
- 5'. Pronotum without transverse stripe; humeral angles variable; abdominal venter orange with numerous small black spots; last three antennal segments usually unicolorous ..... 6
- 6. Anterolateral and posterolateral margins of pronotum serrate, humeral angles obtusely rounded and expanded laterally; corial fascia lacking; posterior margin of genital capsule with deep median notch, which encompasses acute median tooth (MA and NY south to FL, west to TX) ..... *L. fulvicornis* (Westwood)
- 6'. Anterolateral and posterolateral margins of pronotum usually entire, may be somewhat serrate; humeral angles not expanded laterally; transverse yellow-white corial fascia usually present, sometimes faint or absent; posterior margin of genital capsule variable ..... 7
- 7. Outer hind tibial dilation rounded, lacking scalloped edges ..... 8

- 7'. Outer hind tibial dilation scalloped ..... 9
- 8. Outer hind tibial dilation nearly equal in length to inner dilation; corial fascia sometimes faint or absent; posterior margin of genital capsule with median subrectangular notch (B.C. and Alberta south to CA and TX, east to IN) ..... *L. occidentalis* Heidemann
- 8'. Outer hind tibial dilation distinctly longer than inner tibial dilation; corial fascia confined to veins; posterior margin of genital capsule with median roundly V-shaped notch (NY south to FL, west to MO, southwest to TX) ..... *L. corculus* (Say)
- 9. Labium short, at most reaching first visible abdominal segment; corial fascia straight and wide (see couplet 4) ..... *L. phyllopus* (L.)
- 9'. Labium longer, reaching to at least second visible abdominal segment; corial fascia irregular or reduced ..... 10
- 10. First antennal segment unicolorous; corial fascia reduced to mark on medial vein where crossvein begins, or often including additional mark on crossvein (NY south to FL, west to MN and IA, southwest to TX and AZ) ..... *L. oppositus* (Say)
- 10'. First antennal segment bicolorous; corial fascia not reduced ..... 11
- 11. Anterior portion of pronotal disc with two *distinct* whitish yellow ovoid spots interspersed with small black spots; posterior margin of genital capsule with median notch about as wide as deep, each dorsolateral angle of notch developed into prominent tooth (lower half of CA and southwest U. S.) ..... *L. zonatus* (Dallas)<sup>4</sup>
- 11'. Anterior portion of pronotal disc without two *distinct* spots, entire disc may be yellowish; posterior margin of genital capsule with median notch much deeper than wide, each dorsolateral angle of notch rounded to angulate but not developed into tooth (FL) .... *L. concolor* (Walker)<sup>4</sup>

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<sup>4</sup>*L. balteatus* (L.), a West Indian species that may possess two ovoid yellowish spots on the pronotum (these spots sometimes coalescing), was reported from Florida by Barber (1914) and Blatchley (1926), both records apparently based on a single specimen housed in the United States National Museum (now National Museum of Natural History). However, Baranowski and Slater (1986) were unable to find any Florida specimens during their study. *L. balteatus* is easily separated from *L. concolor* and *L. zonatus* by having the transverse corial fascia distinctly straight rather than irregular.

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