

## *Jadera haematoloma*, Another Insect on its Way North (Heteroptera: Rhopalidae)

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### ABSTRACT

Recent collection records for the Red-shouldered Bug (or Soapberry Bug), *Jadera haematoloma*, in eastern United States indicate northward dispersal of this nominally subtropical species as far as Maryland since about the mid-1980s. Perhaps utilization of the Golden Raintree, *Koelreuteria paniculata* (and other *Koelreuteria* species), an important host plant now extensively planted as an ornamental, has been facilitated by warmer climatic regimes during the past several decades.

*Key words:* dispersal, eastern United States, Golden Raintree, *Jadera haematoloma*, Red-shouldered Bug.

While it is well known that biotas ebb and flow geographically in response to fluctuating climatic regimes, an increasing body of evidence suggests that insects in several orders have extended their ranges northward within the past few decades. Aside from their sudden appearance in well-collected regions, the movement of such species can often be traced by information on the pin labels of museum specimens. The range expansion of a large fulgorid, *Calyptoproctus marmoratus* Spinola, was recently documented from such information (Hoffman, 2005).

We now record another instance of rapid northward dispersal by the rhopalid bug *Jadera haematoloma* (Herrich-Schaeffer). While similar in size and body form to the common Box Elder Bug (*Boisea trivittata*), this insect is uniformly dull black except for the eyes, ocelli, pronotal margins, and apical abdominal segments, which are crimson or scarlet. The specific name refers to the broad “blood-red sides” of the pronotum (the alternative name “Soapberry Bug” denotes a common host plant, *Sapindus saponaria* L.).

Historically, knowledge of the species’ natural distribution has been only slowly accumulated. Van Duzee’s catalog (1917) listed only six states: Florida,

Kansas, Colorado, Texas, Arizona, and California. A few years later, Blatchley (1926) added Alabama and Illinois, the latter based on a specimen considered to be adventive, from a city park in Chicago. Subsequent records have been sparse. Brimley (1938) cited Biltmore, near Asheville, North Carolina, and Froeschner (1942) added Missouri to the mid-continental area, while considering *J. haematoloma* to be “apparently very scarce.” Records from Colorado and Iowa were added by Slater & Baranowski (1978) with the note that “nothing seems to be known of its habits.” It has been reported as a household nuisance in Oklahoma and Texas (Wheeler, 1982). Recent Tennessee records have been reported (Vail et al., 2002).

Existing locality records therefore define a basically Neotropical distribution along the southern tier of states (Florida to Arizona) and south through Central America and the West Indies to Colombia and Venezuela (Henry, 1988), but also northward in the interior of the continent as far as Colorado, Iowa, and Illinois. Early documentation suggests that the species is endemic in austral North America while providing no information on its host plants.

The first comprehensive account of the biology and host plants of *J. haematoloma* appeared only 18 years ago (Carroll & Loye, 1987). These authors conducted extensive field investigations on the host preferences of five members of this genus, and established a close affinity of *J. haematoloma* with plants in the family Sapindaceae, both the native species *Sapindus saponaria* var. *drummondi* (Hooker & Arnott) (Soapberry, southwestern U. S.; also known as China Tree, Chinaberry, False Dogwood, Jaboncillo), and *Cardiospermum corindum* (L.) (Balloon Vine, Florida), as well as Golden Raintree, *Koelreuteria paniculata* Laxmann, an Asiatic species extensively cultivated in this country. A second species of Golden Raintree, *Koelreuteria elegans* Seem., introduced in Florida, was the new host studied by Carroll et al. (2003). The distribution map compiled by Carroll & Loye (which did not include published records) revealed the close correspondence of records for the bug with the ranges of the two native plants, but included some undocumented records as far north as Lake Superior and eastern Virginia (unspecified as to host plant but which could have been *Koelreuteria* or possibly *Cardiospermum halicacabum* (L.), another balloon vine species planted and escaped widely in eastern North America). Observations of the bug "feeding on seeds of goldenrain tree" [*Koelreuteria* sp.] were noted in Tennessee (Vail et al., 2002). We take this occasion to document recently compiled information about the northward spread of *J. haematoloma* in the Atlantic Coast states.

#### Georgia

There are not, to our knowledge, any published locality records for the species in Georgia. Dr. Cecil L. Smith kindly provided the following information on specimens in the University of Georgia (UGA) Museum of Natural History: *Clarke Co.*: 1978, 1979, 1980, 1981, 1982, 1989; *Lamar Co.*: 1982; *Richmond Co.*: 1974, 1985; *Troup Co.*: 1986. The lack of records earlier than 1974 may be real rather than apparent, as it is highly improbable that *J. haematoloma* was overlooked by P. W. Fattig during his intensive insect collecting throughout Georgia during the period 1926-1953. Student collectors at the University of Georgia would surely have taken such a conspicuous insect were it present around Athens (Clarke Co.) prior to 1978.

#### South Carolina

We are not aware of published records for this species in South Carolina. Dr. A. G. Wheeler consulted the Clemson University Arthropod Collection (CUAC)

to obtain the following records for that state: *Darlington Co.*: 1989; *McCormick Co.*: 1987; *Pickens Co.*: 1986. These dates are consistent with data for Georgia and North Carolina, and the lack of captures prior to 1986 around Clemson University is *prima facie* evidence for its recent arrival there.

#### North Carolina

Brimley (1938) provided an early record for the vicinity of Asheville, North Carolina, which appears unlikely as part of a natural lowland range. The capture of *J. haematoloma* there, at the extensively landscaped Biltmore Estate in 1933, suggests recovery of anthropogenic migrants brought in on nursery stock. One specimen in the UGA collection was taken in Asheville in 1953, suggesting the possibility of a surviving population from the initial introduction. The species has been found more recently in eastern North Carolina: specimens in the North Carolina State University collection were taken at Raleigh (Wake County) from 1987 through 1993, and an unspecified site in Bladen County in 2000. Robert L. Blinn (pers. comm.) states that the species now occurs commonly on Golden Raintree around Raleigh.

#### Virginia

The distribution map in Carroll & Loye (1987) includes a locality in extreme southeastern Virginia, but without reference to its basis. Inquiry made to Dr. Randall Schuh at the American Museum of Natural History (one of the two museums mentioned by those authors) disclosed that no specimens from Virginia are in that collection, nor do any exist in the National Museum of Natural History (NMNH). However, *Jadera* does occur at Norfolk, as attested by a photograph taken at the Norfolk Botanical Garden by Leonard Johnson on 29 November 2001, showing a cluster of adults and nymphs.

A specimen in the Virginia Museum of Natural History (VMNH) substantiates the earliest known capture of this bug in Virginia, made in Bedford County at the Lynchburg water treatment plant on the James River, 6 km NNE of Boonsboro, 17 August 1980, by J. Peyton Moore. Field notes state that this insect was collected "...below light, on wall above settling tanks."

Additional Virginia specimens of *J. haematoloma* (VMNH 2) are labeled only "Mathews Co. / Sept. 17, 1999 / McClanahan." A label on each specified "raintree, boxwood, spirea, japonica" as plants at the capture site. Mathews County is beside the Chesapeake Bay at the end of the Middle Peninsula of Virginia, about 270 km due east of the Lynchburg site and 600

km northeast of Asheville.

Farther north, a more recent association of *J. haematoloma* with *Koelreuteria* spp. was made in suburban Alexandria, Virginia, where a thriving colony of the bugs was observed and sampled by Robert B. Faden, of the Department of Botany, Smithsonian Institution. Eleven adults and series of eggs and nymphs of all instars (USNM) are labeled "VIRGINIA: Alexandria, Del Ray, 25 September 2002, R. B. & A. Faden" and eight more adults have the same data except the date of collection, "16 December 2002." He reported "hundreds and more likely thousands of these insects...not just an introduction but an invasion" in his yard and garden, where *K. bipinnata* and *K. paniculata* trees had been planted for more than ten years, and were producing many seeds, which germinate readily. Adults survived winter, some by moving into the house as well as outdoors in window wells and other protected spots, and mating pairs were seen in mid-April 2003. If the feeding of the bugs kills seeds, it could be of value in control of this potentially invasive plant, but the nuisance aspect of the insect may outweigh the benefit.

The most recent capture of a single specimen by S. M. & P. A. Roble on 14 October 2005 was at Lewis Ginter Botanical Garden, Henrico County. The bug (VMNH) was walking on an asphalt path near exotic plants.

#### Maryland

During the same time period, two records of *J. haematoloma* from Maryland also came to our attention. An adult was collected by Ed Cohen (Maryland Entomological Society) on a brick walk area in front of the Waverley Mansion, Marriottsville, Howard County, on 24 September 2002. Identification of this specimen (and the VA series above) was confirmed by Dr. T. J. Henry, Systematic Entomology Laboratory, USDA. On 8 November 2002, at least 21 specimens were taken by Gaye Williams, Maryland Department of Agriculture (MDA; specimens in that collection) near Parole, Queen Annes County, on *Buddleia* and *Viburnum* shrubs that were about 12 m from a planting of six *Koelreuteria paniculata* trees. Examination of leaf and seed pod litter around these trees on 7 February 2005 did not yield additional specimens, indicating that the relatively cold winter freezes in the years following 2002 may have eliminated this colony.

#### DISCUSSION

The new host associations of *J. haematoloma* on

*Koelreuteria* species has become so frequent and conspicuous that the common name "Golden Rain Tree Bug" also spelled as "Golden Raintree Bug" or "Goldenrain Tree Bug" has come into usage (Keith & Wong, 2003; Cranshaw, 2004; Santana, 2005) in addition to "Red-shouldered Bug," "Soapberry Bug" and, using the genus name, "Jadera Bug." Color images of *J. haematoloma* are provided in the above references. A near-obligate association with the Golden Raintree may have facilitated recent dispersal of the bug with nursery stock of this popular ornamental shrub in the central Atlantic States, reflecting the pervasive eastward spread of the related *Boisea trivittata* in the early 1900s, following the widespread introduction of Box Elder (*Acer negundo* L.) as an ornamental tree in hundreds of urban situations (Slater & Schaefer, 1963; Hoffman, 1975). Progressively milder climate in this region during the past several decades must surely have facilitated northward migration of *J. haematoloma*. This species has also been shown to undergo rapid cryptic host-race development upon moving to the introduced plants (Carroll et al., 2003); the establishment of northern colonies will likely result in additional unique populations.

It is interesting that despite their close relationship and shared ability to disperse rapidly, *J. haematoloma* has spread northward by adapting to one or more different, cultivated host plants ("neophagy"), whereas *B. trivittata* has remained a strict monophage following the eastward introduction of its original host plant. Perhaps *B. trivittata* has the potential to adapt, under different conditions, to a related species of *Acer*.

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