UF UNIVERSITY of FLORIDA
IFAS Extension

EENY527

Bean Plataspid: *Megacopta cribraria* (Fabricius) (Insecta: Hemiptera: Heteroptera: Plataspidae)[1]

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Introduction

The bean plataspid, *Megacopta cribraria* (Fabricius), also known as the kudzu bug, lablab bug, and globular stink bug, is native to Asia. The bean plataspid was first reported in the United States in October 2009 (Eger et al. 2010). Prior to its detection, species of the family Plataspidae were not known to be in the Western Hemisphere. Aggregations were first detected on the outside of houses and surrounding vegetation in Georgia. Currently, the distribution of the bean plataspid in the U.S. includes six southeastern states.

DNA data confirmed that the introduction of the bean plataspid to the United States occurred from a single female lineage originating in Japan (Jenkins and Eaton 2011). DNA from two endosymbionts (organisms that live within another organism) found in bean plataspids in the United States also confirms that the same endosymbionts found in *Megacopta* sp. in Japan. The two endysombionts are *Candidatus Ishikawaella capsulata* (gamma-proteobacterium in *Enterobacteriales*) and *Wolbachia* (alpha-proteobacterium in *Rickettsiales*) (Jenkins and Eaton 2011).

In Japan, there are two similar species of *Megacopta - M. punctatissima* and *M. cribraria*. Older literature suggested that *M. punctatissima* was a variety of *M. cribraria*, but they are now recognized as two different species (Eger et al. 2010). *Megacopta punctatissima* is a pest of soybean found in mainland Japan. However, *Megacopta cribraria* is found on Japanese islands and is not known to be an agricultural pest. These two species have the same morphological characteristics. Though *M. punctatissima* and *M. cribraria* do not possess the same gut symbiotic bacteria. The symbiotic bacteria of *M. punctatissima* allows for digestion of legumes whereas the symbiotic bacteria of *M. cribraria* does not. In the United States, bean plataspid populations possess a gut symbiotic bacteria capable of breaking down legumes and are a pest of soybean and other legumes. Despite differences in behaviors and symbiotic bacteria, the identification of *M. cribraria* in the United States is confirmed by molecular characteristics previously reported in native regions.

Synonymy

Cimex cribraria Fabricius 1798

Tetyra cribraria Fabricius 1803

Thyreocoris cribrarius [sic] Burmeister 1835

Coptosoma cribrarius Fabricius 1843

Coptosoma xanthochlora Walker 1867

Megacopta cribraria Hsiao and Ren 1977

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Distribution

Before the introduction of the bean plataspid to the United States, species of the family Plataspidae were confined to the Old World - those parts of the world consisting of Europe, Africa, and Asia. The native distribution of the bean plataspid includes Australia, China, India, Indonesia, Japan, Korea, Malaysia, Myanmar, New Caledonia, Pakistan, Sri Lanka, Taiwan, Thailand, and Vietnam (Eger et al. 2010).

During October 2009, specimens and photos of the bean plataspid from infested homes were submitted from various locations across northeast Georgia . The specimens and photos were identified by morphological characteristics and molecular, DNA-based diagnosis. After the initial discovery, the bean plataspid was reported from a total of nine counties in northeast Georgia (Suiter et al. 2010b). By the following year, the bean plataspid was reported from 80 counties in Georgia and 16 counties from South Carolina (Jenkins and Eaton 2011). Currently, the bean plataspid is reported in the following states: Alabama, northern Florida, Georgia, South Carolina, North Carolina, and southern Virginia.

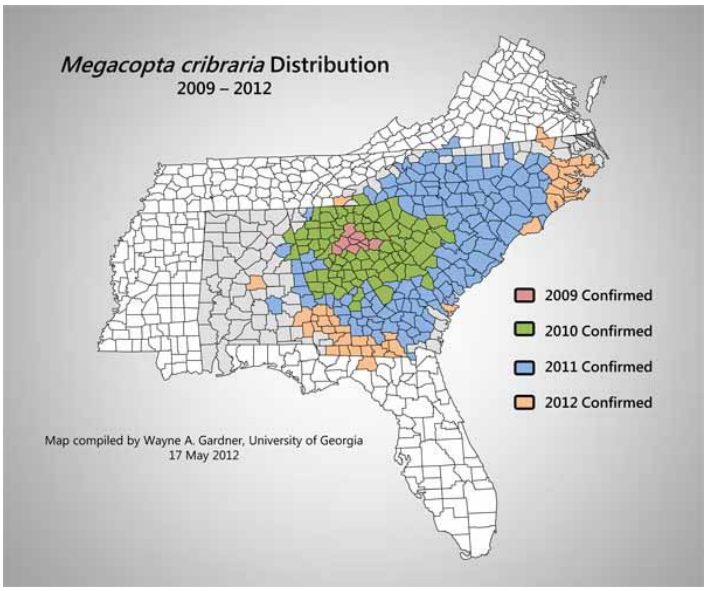

Figure 1. The current distribution of the bean plataspid, *Megacopta cribraria* (Fabricius), in the United States as of 17 May 2012.
Credits: Wayne A. Gardner, University of Georgia

Description

Adults: The adults are small (3.5 - 6 mm) with a rounded oblong shape and live 23 to 77 days. The dorsal side of the insect is covered in numerous dark punctations and is typically light brown to olive green in color. The scutellum (posterior plate along the dorsal side of the thorax) is enlarged and covers the forewings and most of the abdomen—this is characteristic of plataspids, as well as scutellerids (shield-back bugs) and thyreocorids. More common stink bugs tend to have a triangular shaped scutellum. The scutellum is also truncated with a flattened posterior end, a characteristic unique to this species when compared to other stink bugs in North America. The most distinguishing characteristics of the bean plataspid include its size, two-segmented tarsi, and enlarged, truncated scutellum (Eger et al. 2010).

Figure 2. Adult bean plataspids, *Megacopta cribraria* (Fabricius), on a building in Georgia, USA. Notice the enlarged, truncated scutellum covering the wings.
Credits: Daniel R. Suiter, University of Georgia, http://www.bugwood.org

Eggs: Each egg mass has 26 to 274 eggs. The eggs tend to be a pale salmon color with dark bands intermediately spaced in a horizontal direction. The eggs are elongate and have a truncated ring of rugged projections at one end. Along with the eggs, females also deposit dark capsules underneath the eggs. These dark capsules are filled with endosymbionts (bacteria) that immature insects consume for nutritional development.

Nymphs: This species has five nymphal instars. Each nymphal instar takes two to 56 days to develop. Nymphs tend to have a hairy appearance and vary in color but tend to be pale orange, olive green, or light brown.

Life Cycle

In its native habitat, there are up to three generations of the bean plataspid per year (Eger et al. 2010, Halbert and Eger 2010). The insect colonizes from April to July, forming large mating aggregations, and continues to be present until October. However, the bean plataspid may be active all year in warmer climates (Eger et al. 2010). As they go through reproductive diapause, adults overwinter

Figure 3. Egg mass of the bean plataspid, *Megacopta cribraria* (Fabricius), in a laboratory setting. Note the dark regions in the middle where the two rows of eggs meet—these dark regions are filled with endosymbionts.

Figure 4. Multiple early instar nymphs of the bean plataspid, *Megacopta cribraria* (Fabricius), on kudzu, *Pueraria Montana* var. *lobata* (Willd.) Maesen & S. Almeida.
Credits: John Ruberson, University of Georgia, http://www.bugwood.org

on nearby buildings and structures, leaf litter, or under the bark of trees to keep warm.

Hosts

The primary hosts of *M. cribraria* in its native regions are legumes (Fabaceae): mainly soybean, *Glycine max* Merrill; kudzu, *Pueraria montana* var. lobata (Willd.) Ohwi; and lablab bean, *Lablab purpureus* (Linnaeus) Sweet. *Megacopta cribraria* is reported to develop only on soybean and kudzu in the United States. The adults and nymphs feed on the leaves, stem, flower, and pod of the host plant (Eger et al. 2010, Jenkins and Eaton 2011).

The following table is a compiled list of observed hosts of *Megacopta* spp. from past literature. Although additional plants other than legumes are listed, it is not confirmed if these plants are used as developmental hosts or if individual adults were observed simply perched on these plants.

Economic Importance

In its native regions, *M. cribraria* is not an agricultural pest. However in the United States, the bean plataspid is reported to be a pest of soybean in Georgia and South Carolina. The nymphs and adults congregate in high numbers and feed on the underside of leaves and the stem of the plant. Feeding damage results in abnormal pod development and necrotic areas on the plant.

Figure 5. Infestation of adult bean plataspids, *Megacopta cribraria* (Fabricius), on soybeans, Glycine max (L.) Merr., in Georgia, USA.
Credits: Philip Roberts, University of Georgia, http://www.bugwood.org

Adults from established bean plataspid populations within the United States are reported to overwinter on light colored structures, in leaf litter, and underneath the bark of trees. These insects are attracted to light colored surfaces, predominately white and yellow (Horn and Hanula 2011). Also, like stink bugs, adults tend to excrete an odor as a defense mechanism when disturbed. The defense chemical these insects secrete may stain the surface of the house, building or vehicle where aggregation occurs.

Figure 6. Infestation of adult bean plataspids, *Megacopta cribraria* (Fabricius), on corn, *Zea mays* L., near Athens, Georgia, USA. A grasshopper is in the upper right corner.
Credits: Jeremy Greene, Clemson University, http://www.bugwood.org

Figure 7. Infestation of adult bean plataspids, *Megacopta cribraria* (Fabricius), on a local house in Georgia, USA. *Megacopta cribraria* have an overwintering stage during their life cycle and tend to swarm to nearby buildings during the overwintering period.
Credits: Daniel R. Suiter, University of Georgia, http://www.bugwood.org

Survey and Management

Horn and Hanula (2011) are developing monitoring traps using light colors (i.e. white or yellow) to attract adult specimens. These monitoring traps may be a good tool to survey for bean plataspid. Sweep netting and hand-picking, although time consuming, are also good methods for surveying. For more information about surveying in your area, contact your local county Cooperative Extension Service (CES) agent.

Currently, there are no insecticides for permanent control of bean plataspid. However, pyrethroids may be effective for temporary relief. Contact your local county CES agent for proper pest treatment methods.

As this insect moves from overwintering sites in search of food, the bean plataspid may become a nuisance pest in and around structures. Homeowners should ensure screening is placed over possible entries points of insects and that windows and doors are tightly sealed.

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Table 1. Hosts of *Megacopta* spp. (Eger et al. 2010)

Family	Common Name	Scientific Name
Acanthaceae	firecracker plant	*Crossandra infundibuliformis* (Linnaeus) Nees
Convolvulaceae	sweet potato	*Ipomoea batatas* (Linnaeus) Lamarck
Fabaceae	agathi	Sesbania grandiflora (Linnaeus) Pers.
Fabaceae	azuki bean	*Vigna angularis* (Willd.) Ohwi and Ohashi
Fabaceae	bean	*Phaseolus* spp.
Fabaceae	broad bean	*Vicia faba* Linnaeus
Fabaceae	Chinese milk vetch	*Astragalus sinicus* Linnaeus
Fabaceae	cluster bean	*Cyamopsis tetragonoloba* (Linnaeus) Taubert
Fabaceae	Indian beech tree	*Millettia pinnata* (Linnaeus) Pierre
Fabaceae	indigo	*Indigofera* sp.
Fabaceae	kidney bean	*Phaseolus vulgaris* Linnaeus
Fabaceae	kudzu	*Pueraria montana*var.*lobata* (Willd.) Ohwi
Fabaceae	lablab bean	*Lablab purpureus* (Linnaeus) Sweet
Fabaceae	lespedeza	*Lespedeza cyrtobotra* Miquel
Fabaceae	lima bean	*Phaseolus lunatus* Linnaeus
Fabaceae	mung bean	*Vigna radiata* (Linnaeus)
Fabaceae	pigeon pea	*Cajanus indicus* Spreng
Fabaceae	soybean	*Glycine max* Merrill
Fabaceae	urd-bean	*Vigna mungo* (Linnaeus) Hepper
Fabaceae	velvet bean	*Mucuna pruriens* (Linnaeus)
Fabaceae	vetch	*Vicia angustifolia* Linnaeus
Fabaceae	wisteria	*Wisteria brachybotrys* Siebold et Zuccarini
Hydrangeaceae	deutzia	*Deutzia crenata* Siebold and Zuccarini
Malvaceae	cotton	*Gossypium hirsutum* Linnaeus
Malvaceae	jute	*Corchorus capsularis* Linnaeus
Moraceae	white mulberry	*Morus alba* Linnaeus
Oleaceae	Chinese privet	*Ligustrum sinense* Loureiro
Poaceae	rice	*Oryza sativa* Linnaeus
Poaceae	sugarcane	*Saccharum officinarum* Linnaeus
Poaceae	wheat	*Triticum aestivum* Linnaeus
Rutaceae	citrus	*Citrus*
Solanaceae	horsenettle	*Solanum carolinense* Linnaeus
Solanaceae	potato	*Solanum tuberosum* Linnaeus