

***Strongygaster triangulifera* (Diptera: Tachinidae) as a Parasitoid of Adults of the Invasive *Megacopta cribraria* (Heteroptera: Plataspidae) in Alabama¹**Julian R. Golec, Xing Ping Hu², Charles Ray, and Norman E. Woodley³

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The bean plataspid, *Megacopta cribraria* (F.) (Heteroptera: Plataspidae), also known as the kudzu bug, is native to Asia. Before its initial detection in the U.S. in October 2009 (Eger et al. 2010, *Insecta Mundi* 121:1 - 11), species of the family Plataspidae were not known in the Western Hemisphere. In its native range, *M. cribraria* is not regarded as a significant pest (Ruberson et al. 2013, *Appl. Entomol. Zool* 48:3 - 13). However, in the U.S., its rapid dispersal, explosive population growth, and severe damage to soybean and other legume crops, as well as its offensive odor, has elevated its status from an urban nuisance to a serious legume crop pest throughout the Southeast. Adults and nymphs extract plant nutrients from the vascular tissues of host plants. Whereas kudzu, *Pueraria montana* Lour. (Merr.) variety *lobata* (Willd.), and soybeans, *Glycine max* (L.) Merr., are its preferred hosts, adults have been collected from numerous legume and nonlegume plants (Gardner et al. 2013, *J. Entomol. Sci.* 48:118 - 127). This can be largely attributed to its adaptability, high mobility, the relative lack of natural enemies, availability of reproductive host plants and feeding hosts, as well as a lack of fully-developed and tested management strategies. As of 19 August 2013, it was confirmed in 11 states and all 67 counties in Alabama (unpubl. data, W.A. Gardner, <http://www.kudzubug.org>).

On 10, 13, and 18 July 2013, the authors collected via beat sampling a total of approx. 300 *M. cribraria* adults from early-planted (01 April 2013 planting date) soybeans on the campus of Auburn Univ., Auburn (Lee Co.), AL (32°35'23.34 N 85°29'19.01 W). These overwintered adults were collected to determine female reproductive development; however, dissections of the collected adults under a stereomicroscope (Meiji EMZ-TR, Meiji Techno, Japan) revealed a solitary endoparasitoid dipteran larva. The authors observed dipteran larvae at various developmental stages (1st to 3rd instar) in

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the abdomen near the reproductive structures. Larvae appeared to affect oocyte development in *M. cribraria* females, and both males and females showed tissue damage proximate to the reproductive structures. Feeding also resulted in damage to the adult's circulatory system evident by hemolymph inside the abdominal cavity.

In total, 214 (107 F; 107 M) adult *M. cribraria* were dissected. The overall rate of parasitism was 5.14% regardless of gender, with the parasitism rate in females of 9.34%, which was 10X greater than the parasitism rate (0.93%) in males. The size of the various larval instars observed ranged from 0.7 mm to 3.5 mm in length, with the 3.5 mm length being the oldest stage (3rd instar) (Fig. 1).

The remainder of the collection ($n = 86$) was maintained at room temperature (25°C, 65% RH) in glass jars and provided with tender soybean stems and leaves. The transparent glass jars allowed for observation of the 3rd - instar larvae exiting the host body to pupate on the bottom of the jars or attached to the underside of soybean leaves. Adult tachinid flies emerged 10 d after pupation and ranged from 4.3 - 5.0 mm (mean: 4.66, SE: 0.09; $n = 7$) in body length (Fig. 2).

Adults were identified as *Strongygaster* (= *Hyalomyodes*) *triangulifera* (Loew) 1863 (Diptera: Tachinidae: Tachininae: Strongygastrini). Specimens were deposited in the Insect Museum of Auburn University (voucher #116 - 2013) and ARS museum (voucher # USNM ENT 00,039,875).

Strongygaster triangulifera is a small parasitic fly that is widely distributed in North America (Reeves and O'Hara 2004. Can. Entomol. 136: 661 - 662). This New World fly typically parasitizes only adult insects, with a few reports of larval parasitism viewed as abnormal occurrences (Thompson 1954. Can. Entomol. 86: 137 - 144). It is most frequently reported as a parasitoid of adult Coleoptera with host species in more than 10 families (Guimarães 1978. Can. Entomol. 130: 905 - 906; Gerding and Figueroa 1989. Ag. Tecnia 49: 69 - 70; Purrinton et al. 1990. The Great Lakes Entomol. 23: 171 - 172; Reeves and O'Hara 2004. Can. Entomol. 136: 661 - 662), but it is also reported as having a broad host range including representatives of Dermaptera, Hemiptera, Lepidoptera, Orthoptera (Arnaud 1978. USDA Misc. Publ No. 1319; Kevan et al. 1988,

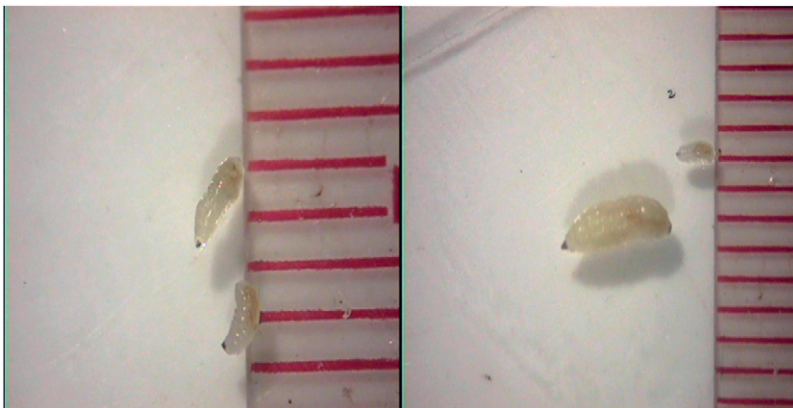


Fig. 1. *Strongygaster triangulifera* larval instars removed from *M. cribraria* adults (graduations on scale = 1 mm).



Fig. 2. *Strongygaster triangulifera* adult reared from *M. cribraria* adult.

Entomol. Rec. 100: 55 - 57), Hymenoptera (Shima 1999. Makunagi/Acta Dipterologica Sup.1: 1 - 108), and Pentatomidae of Heteroptera (McPherson et al. 1982. J. Econ. Entomol. 75: 783 - 786).

This is the second report of parasitism by an indigenous North American tachinid fly species of *M. cribraria* adults in its expanded U.S. range. Ruberson et al. (2013, Appl. Entomol. Zool. 48:3 - 13) reported recovery of the tachinid *Phasia robertsonii* (Townsend) from a single adult in 2012 in Tift Co., GA. *Strongygaster triangulifera* has several characteristics as a generalist parasitoid that warrant further evaluation for its utilization as a naturally-occurring or augmented biocontrol agent in a management program of *M. cribraria* in the southeastern U.S.

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