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# First report of the soybean pest *Euschistus quadrator* (Hemiptera: Pentatomidae) in Mississippi

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*Euschistus quadrator* Rolston (Hemiptera: Pentatomidae) is a polyphagous stink bug that is recognized as a pest of soybean (*Glycine max* [L.] Merrill; Fabaceae) and cotton (*Gossypium hirsutum* L; Malvaceae ) (McPherson et al. 1982; Drees & Rice 1990; Baur et al. 2000; Bundy & McPherson 2000a; Willrich et al. 2003; Esquivel et al. 2009; Ruberson et al. 2009; Temple et al. 2011, 2013; Parker 2012; Suh et al. 2013; Tillman et al. 2015). The species was first identified in 1974 with specimens collected in northern Mexico, the Yucatan Peninsula, Texas, and Louisiana (Rolston 1974). Since the initial description, the insect host range records have grown to include Honduras (Arismendi & Thomas 2003) to the south and additional states in the southeastern United States including: Alabama (Ray et al. 2012), Florida (Brennan et al. 2015), Georgia (Tillman 2008), North Carolina (Owens et al. 2013), South Carolina (Reay-Jones 2014), and Virginia (Kamminga et al. 2009). *Euschistus quadrator* is considered to be part of the lesser brown stink bug complex, which consists of *E. obscurus* (Palisot), *E. ictericus* (L.), and *E. crassus* Dallas (Hopkins et al. 2005).

In addition to cotton and soybean, *E. quadrator* is found on various other crops associated with *E. servus* (Say) including: corn (*Zea mays* L.; Poaceae) (Tillman 2010), peanuts (*Arachis hypogaea* L.; Fabaceae) (Tillman 2008), sorghum (*Sorghum bicolor* [L.] Moench; Poaceae) (Tillman 2013a), wheat (*Triticum* spp.; Poaceae) (Dees & Rice 1990; Bundy & McPherson 2000a; Tillman 2010; Reay-Jones 2014), and alfalfa (*Medicago sativa* L.; Fabaceae) (Tillman 2013b). Additional host plants mentioned in the literature include blackberry (*Rubus* spp.; Rosaceae) (Brennan et al. 2013) and tropical soda apple (*Solanum viarum* Dunal; Solanaceae) (Diaz et al. 2012).

Members of the genus *Euschistus* and the predatory stink bug *Podisus maculiventris* (Say) share physical characteristics and host ranges with *E. quadrator*, which may lead to mixtures of 2 or more of these species during field sampling (McPherson 1982; Tillman 2013b; Tillman et al. 2015). Some individuals of *E. servus* display spiny projections on the pronotum that commonly are seen in *E. quadrator* and *P. maculiventris*, and each species shares a similar brown dorsal coloring. One morphological feature for separating *P. maculiventris* from species of *Euschistus* is to compare the width of the mouthparts and antennae. A 1:1 width ratio of the mouthparts and an antenna denote a plant-feeding stink bug, whereas a 2:1 ratio would distinguish a predatory stink bug (Knutson & Ruberson 1997). Among members of the brown stink bug complex, *E. quadrator* is distinguished by a lack of pigment on the hemelytra (Esquivel et al. 2009). Eggs of *E. quadrator* have also been described alongside those of other stink bugs found in soybeans, which resulted in a useful guide for early detection of these highly mobile pests (Bundy & McPherson 2000b). Although *E. quadrator* and other members of the lesser brown stink bug complex are found on crop host plants commonly associated with *E. servus*, the population density of the lesser brown stink bug complex is typically lower than that of *E. servus* (Parker 2012; Temple et al. 2013; Tillman 2013a). South Texas is an exception, and *E. quadrator* is more abundant in cotton than all other species of *Euschistus* in that region of the state (Hopkins et al. 2005).

Plant injury occurs when *E. quadrator* inserts its stylet into the developing pod wall or boll and extracts plant fluids from the developing fruit. Stink bug feeding can result in seed discoloration, reduced seed size and weight, irregular seed, reduction in seeds per pod, lower oilseed content, increased protein, and decreased percentage of germination in soybean (Miner 1961; Daugherty et al. 1964). Cotton boll feeding of *E. quadrator* is similar to that of *E. servus* and can result in reductions in yield and fiber quality (Hopkins et al. 2009).

The 2 primary crop hosts for *E. quadrator*, soybean and cotton, were planted on approximately 2 million and 440,000 acres (809,371 and 178,062 ha), respectively, in Mississippi in 2016 (USDA-NASS 2016). In 2014, more insecticides were applied for stink bug control in soybean than for any other category of insects in Arkansas, Alabama, Louisiana, Mississippi, North Carolina, Tennessee, and Virginia (Musser et al. 2015). Effective control of *E. quadrator* in soybean and cotton has been accomplished in other states with products recommended for *E. servus* (Willrich et al. 2003; Hopkins et al. 2009).

*Euschistus quadrator* adults (Fig. 1) were first observed in Mississippi among sweep net samples from R6-stage (i.e., full seed) soybean in Washington County (33.4303°N, 90.9232°W) on 25 Aug 2016. Further in-depth surveys should be undertaken to determine the level of establishment in soybean and cotton in Mississippi. The origins of *E. quadrator* at this location are unknown at this time, but others have suggested the reduced use of insecticides in *Bacillus thuringiensis* (Berliner) corn and soybean has contributed to increased populations and range of stink bugs in the southern USA (Hopkins et al. 2005). Sustained populations of *E. quadrator* have consistently been found on soybean and cotton in Winnsboro, Louisiana, which is approximately 160 km from Washington County, Mississippi. Northeast Louisiana would be a likely source for insects

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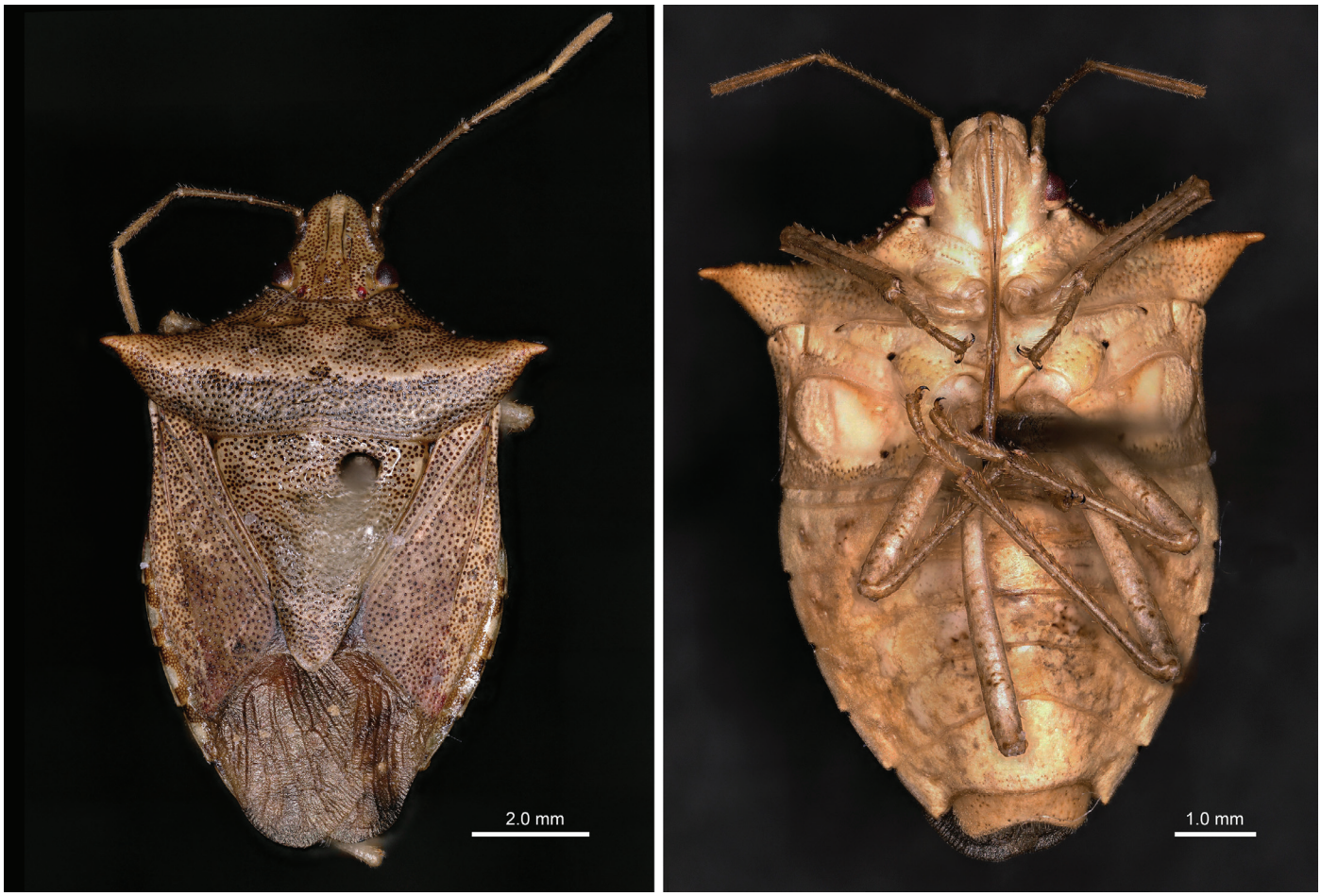



**Fig. 1.** *Euschistus quadrator* dorsal view (left) showing spines on the pronotum and ventral view (right). Specimen photographed by Michael Grodowitz and confirmed as *Euschistus quadrator* Rolston by Joseph Eger, Tampa, Florida.

transported by westerly winds across the Mississippi River. Further efforts to train growers and consultants in identification of this relatively new species will contribute to more appropriate use of insect control methods in soybean and cotton in Mississippi.

A collected specimen was deposited in the Mississippi Entomological Museum at Mississippi State University.

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## Summary

Here, we report on the first state and county record of *Euschistus quadrator* Rolston (Hemiptera: Pentatomidae) in Washington County, Mississippi. The species has been documented from Honduras to Virginia primarily on soybean, cotton, various row crops, fruit, and non-crop hosts. The local impact on agricultural crops in the area is unknown. The lack of *E. quadrator* sightings in Mississippi compared with the frequency of occurrence in literature from Louisiana is of interest. Weather patterns may have contributed to the range expansion. Future efforts to educate growers and consultants on identifying key characteristics of the various *Euschistus* species common in the southeastern United States may reveal an even larger distribution of *E. quadrator* in the state and region.

Key Words: brown stink bug; IPM; *Glycine max*; cotton

## Sumario

Aquí, informamos sobre el primer registro para el estado y el condado de *Euschistus quadrator* Rolston (Hemiptera: Pentatomidae) en el Condado de Washington, Mississippi. La especie se ha documentado de Honduras a Virginia principalmente en soja, algodón, varios cultivos en hileras, frutas y otros hospederos que no son cultivos. No se conoce el impacto local sobre los cultivos agrícolas de la zona. La falta de reportes de *E. quadrator* en Mississippi en comparación con la frecuencia de ocurrencia en la literatura de Louisiana es de interés. Los patrones climáticos pueden haber contribuido a la expansión del rango. Los esfuerzos futuros para educar a los agricultores y consultores sobre la identificación de las características clave de las diversas especies comunes de *Euschistus* en el sudeste de los Estados Unidos pueden revelar una distribución aún mayor de *E. quadrator* en el estado y la región.

Palabras Clave: chinche hedionda marrón; MIP; *Glycine max*, algodón

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