

NOTE

Preliminary Genetic Analysis of a Recently-Discovered Invasive True Bug (Hemiptera: Heteroptera: Plataspidae) and Its Bacterial Endosymbiont in Georgia, USA¹

Tracie M. Jenkins,² Tyler D. Eaton, Daniel R. Suiter, Joseph E. Eger, Jr.,³
Lisa M. Ames and G. David Buntin

Department of Entomology, University of Georgia, Griffin Campus, Griffin, Georgia 30223-1797 USA

J. Entomol. Sci. 45(1): 1-2 (January 2010)

Key Words bean plataspid, stinkbug, invasive species *Megacopta cribraria*, endosymbiont, γ -Proteobacterium, *Candidatus Ishikawaella capsulate*

A true bug (Hemiptera: Heteroptera: Plataspidae), previously known only in the Old World from India and Pakistan to China, Korea, Japan and Malaysia to Australia, was discovered in mid-October 2009 in several northeastern counties in Georgia (USA). Specimens of the stinkbug were submitted by professional pest control operators and county agents following homeowner complaints of the large number of insects migrating from kudzu killed by recent frosts. The insect was identified using morphological characters as the bean plataspid, *Megacopta cribraria* (F.) (Hemiptera: Plataspidae), by J.E. Eger, Jr. (Dow AgroSciences, Tampa, FL). The identification was confirmed by entomologists at North Dakota State University and the USDA-ARS Systematics Laboratory (Washington, DC).

Genomic DNA was extracted using methods of Jenkins et al. (2009, Ann. Entomol. Soc. Am. 102: 380 - 395) from 3 specimens collected in northeast Georgia. The cytochrome oxidase subunit I (COI) gene fragment was then amplified and sequenced according to Jenkins et al. (2009). The COI sequences from all 3 specimens were identical, indicating a single female lineage. When these sequences were subjected to a GenBank Blast search (Altschul et al.1990. J. Mol. Evol. 215: 403 - 410), *M. cribraria* (GenBank # AY627332) was the closest match (11 base differences out of 789 total bases or 98.6% identity).

A γ -Proteobacterium, *Candidatus Ishikawaella capsulata* (Hosokawa et al. 2006. PLOS Biol. 4: e337. DOI: 10.1371/journal.pbio.0040337), reportedly lives in the posterior midgut of plataspid stinkbugs and appears to be necessary for normal growth and development. It also has been implicated in increased fecundity (Fukatsu and Hosokawa. 2002, Appl. Environ. Microbiol. 68: 389 - 396). The female bean plataspid,

¹Received 22 December 2009; accepted for publication 23 December 2009.

²Address inquiries (email: jenkest@uga.edu).

³Dow AgroSciences, Tampa, FL 33629.

prior to laying her egg mass, will first deposit small bacteria-filled capsules on which nymphs will feed following eclosion (Gross 2006, PLOS Biol. 4: e331: DOI: 10.1371/journal.pbio.0040357). Pest status for *M. cribraria* appears to be linked to this endosymbiont (Hosokawa et al. 2006). Thus, using *Candidatus Ishikawaella capsulata*-specific primers 16SA1 and 16SB1 (Hosokawa et al. 2006), the bacterial-specific 16S rRNA gene was amplified and sequenced (Jenkins et al. 2009). A GenBank Blast search (Altschul et al. 1990) matched *Candidatus Ishikawaella capsulata* (AB067723) (100%), and all 3 *M. cribraria* specimens contained the endosymbiont.

The Old World invasive plataspid stinkbug has been identified as *M. cribraria* from morphological and COI sequence characters. Three individuals from northeast Georgia have the same COI sequence indicating a single maternal line. Each individual contained the endosymbiont, *Candidatus Ishikawaella capsulata*, which has been linked to normal growth and development as well as increased fecundity and pest status. Furthermore, *M. cribraria* is known to be a pest of soybeans and other legumes in Asia. It, therefore, must be monitored in its expanded New World range. Genetic studies are ongoing to determine its country of origin as well as to determine a population genetics baseline for the invasive against which future studies can be compared. Additional efforts have been initiated to characterize its distribution in Georgia and other areas.

AUTHOR QUERIES

DATE 07/01/2010

JOB NAME ENTO

ARTICLE ento 0950

QUERIES FOR AUTHORS Tracie M. Jenkins

This query form must be returned with all proofs for Corrections

PLEASE ANSWER THE AUTHOR QUERIES WHERE THEY APPEAR IN THE
TEXT.

THERE ARE NO QUERIES