Soybean Stem Fly, *Melanagromyza sojae* (Diptera: Agromyzidae), in the New World: detection of high genetic diversity from soybean fields in Brazil

J.A. Arnemann1,2, W.T. Tay2, T.K. Walsh3, H. Brier3, K. Gordon2, F. Hickmann1, G. Ugalde1 and J.V.C. Guedes1

1Departamento de Defesa Fitossanitária, Universidade Federal de Santa Maria, Camobi, Santa Maria, RS, Brasil
2CSIRO, Black Mountain Laboratories, Black Mountain, Australia
3Queensland Department of Agriculture, Fisheries, and Forestry, Kingaroy, Australia

Corresponding author: J.A. Arnemann
E-mail: jonasarnemann@gmail.com

Received March 8, 2016
Accepted April 15, 2016
Published July 12, 2016
DOI http://dx.doi.org/10.4238/gmr.15028610

**ABSTRACT.** Soybean Stem Fly (SSF), *Melanagromyza sojae* (Zehntner), belongs to the family Agromyzidae and is highly polyphagous, attacking many plant species of the family Fabaceae, including soybean and other beans. SSF is regarded as one of the most important pests in soybean fields of Asia (e.g., China, India), North East Africa (e.g., Egypt), parts of Russia, and South East Asia. Despite reports of Agromyzidae flies infesting soybean fields in Rio Grande do Sul State (Brazil) in 1983 and 2009 and periodic interceptions of SSF since the 1940s by the USA quarantine authorities, SSF has not been officially reported to have successfully established in the North and South Americas. In South America, *M. sojae* was recently confirmed using morphology and its complete mitochondrial DNA (mtDNA) was
characterized. In the present study, we surveyed the genetic diversity of *M. sojae*, collected directly from soybean host plants, using partial mtDNA cytochrome oxidase I (COI) gene, and provide evidence of multiple (>10) maternal lineages in SSF populations in South America, potentially representing multiple incursion events. However, a single incursion involving multiple-female founders could not be ruled out. We identified a haplotype that was common in the fields of two Brazilian states and the individuals collected from Australia in 2013. The implications of SSF incursions in southern Brazil are discussed in relation to the current soybean agricultural practices, highlighting an urgent need for better understanding of SSF population movements in the New World, which is necessary for developing effective management options for this significant soybean pest.

**Key words:** Soybean Stem Fly; Soybean Stalk Fly; Biosecurity; mtDNA COI; Haplotype diversity; Invasive pest