



First Record of the Sweet Potato Pest *Bedellia somnulentella* (Lepidoptera: Bedelliidae) in Brazil

Authors: Santos, Marinalva Martins dos, Soares, Marcus Alvarenga, Silva, Isabel Moreira da, Fontes, Paulo Cezar Rezende, and Zanuncio, José Cola

Source: Florida Entomologist, 101(2) : 315-316

Published By: Florida Entomological Society

URL: <https://doi.org/10.1653/024.101.0224>

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Complete content is strictly limited to personal, educational, and non - commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

First record of the sweet potato pest *Bedellia somnulentella* (Lepidoptera: Bedelliidae) in Brazil

Marinalva Martins dos Santos¹, Marcus Alvarenga Soares¹, Isabel Moreira da Silva^{1,*}, Paulo Cezar Rezende Fontes², José Cola Zanuncio³

The sweet potato, *Ipomoea batatas* (L.) (Solanales: Convolvulaceae), is native to South and Central America and distributed worldwide, especially in underdeveloped countries (França & Ritschel 2002; Reddy 2015). Young leaves and shoots, as well as the tuberous roots of this species, are edible and have additional uses such as animal feed and biofuel production (Ziska et al. 2009). The sweet potato leafminer, *Bedellia somnulentella* (Zeller) (Lepidoptera: Bedelliidae) is a major pest of sweet potato in United States, including Puerto Rico, Africa, Asia, Europe, and Oceania where temperatures $\leq 29.4^{\circ}\text{C}$ occur (Clemens 1862; Tawfik et al. 1976; Parrella & Kok 1977; Seven 2006; Fatah et al. 2014). This species is considered a specialist pest of Convolvulaceae (Solanales) and has been reported to infest *Convolvulus arvensis* (L.) and *Calystegia sepium* (L.) R. Br. (both Solanales: Convolvulaceae).

Individuals of *B. somnulentella* were observed and collected on *I. batatas* specimens in Sep 2013 at the germplasm bank of the Olericultura sector of the Universidade Federal dos Vales do Jequitinhonha e Mucuri (UFVJM) in Diamantina, Minas Gerais State, Brazil (18.1666°S, 43.5000°W and 1,387 masl) but it was not identified at that time. In Mar 2017, a new infestation of this species was found in *I. batatas* fields which represents a regular occurrence of this pest in Brazil. This is the first report of *B. somnulentella* damaging *I. batatas* in the municipality of Diamantina (average temperature of 19°C) shows that this pest has now required its integration into sweet potato pest monitoring programs.

Bedellia somnulentella has 5 larval instars. The first and second instars are yellow-green with a characteristic greenish-white line evident in the intestines. The remaining instars are characteristically dark green with dorsal pinkish spots on the thoracic and abdominal segments (Fig. 1A). Larvae have retractable prognathic heads and the prothorax is highly projected during feeding (Shorey & Anderson 1960). Recently formed pupae are green to red but gradually change to dark brown when nearing adult emergence (Shorey & Anderson 1960). The anterior and posterior extremities of pre-pupae and pupae feature a network of crossed horizontal silk strands (Figs. 1B, 1C). Adults possess filiform antennae and are yellow-bronze moths with an approximate wingspan of 4.0 mm with fringed posterior wings. The anterior wings cover the posterior ones when resting (Fig. 1D). Adults usually remain perched at the end of the abaxial leaves of the plant (Fig. 2A).

Generally, damage of *I. batatas* by *B. somnulentella* occurs when larvae mine young and mature leaves. Initially, mines are serpentine then later become translucent with yellowish-brown spots (Fig. 2B). Mined leaves also exhibit a brown, wrinkled appearance that become

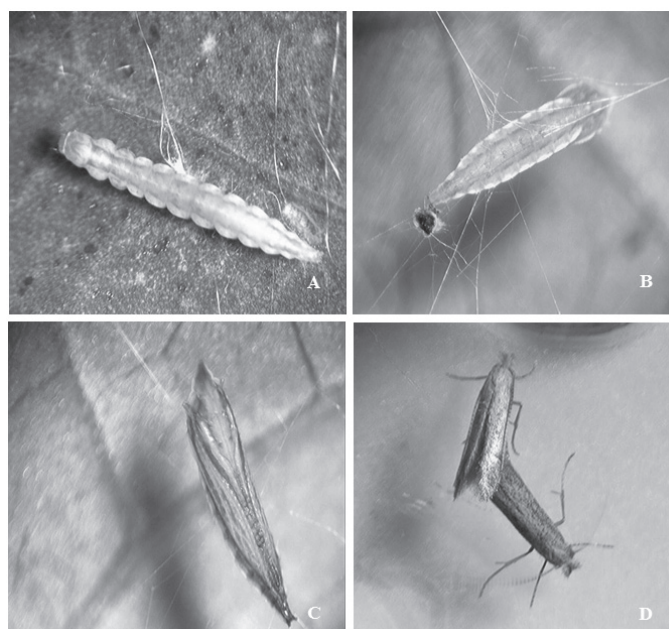


Fig. 1. Larvae (A); pre-pupae (B); pupae (C); and adults (male and female) (D) of *Bedellia somnulentella* (Lepidoptera: Bedelliidae).

chlorotic and may result in subsequent reduction of the photosynthetic condition of the affected area, especially when 1 or more larvae are present per leaf. Damage is produced when caterpillars consume the foliar mesophyll (including the associated palisade and lacunic parenchyma as well as conducting vessels), thereby reducing the production and conduction of photoassimilates. Reduced vessel flow leads to pronounced release of ethylene causing premature leaf fall that reduces nutrient translocation to roots reducing yield and productivity (Souza et al. 1998; Lenis et al. 2006). Also, larvae usually deposit droppings outside the entry hole of the mine during feeding (Fig. 2C) where accumulation of excreta may result in fungal growth (Tawfik et al. 1976).

We thank "Conselho Nacional de Desenvolvimento Científico e Tecnológico," "Coordenação de Aperfeiçoamento de Pessoal de Nível Superior," and "Fundação de Amparo à Pesquisa do Estado de Minas Gerais" for financial support. We also thank Vitor Osmar Becker (Department of Zoology, University of Brasília) for identification confirma-

¹Programa de Pós-Graduação em Produção Vegetal, Universidade Federal dos Vales Jequitinhonha e Mucuri (UFVJM), 39100-000, Diamantina, Minas Gerais, Brazil; E-mail: marinalvabio10@yahoo.com.br (M. M. S.); marcusasosares@yahoo.com.br (M. A. S.); ibelmoreira@yahoo.com.br (I. M. S.)

²Departamento de Fitotecnia, Universidade Federal de Viçosa (UFV), 36570-900 Viçosa, Minas Gerais, Brazil; E-mail: pacerefo@ufv.br (P. C. R. F.)

³Departamento de Entomologia/BIOAGRO, Universidade Federal de Viçosa (UFV), 36570-900 Viçosa, Minas Gerais, Brazil; E-mail: zanuncio@ufv.br (J. C. Z.)

*Corresponding author: ibelmoreira@yahoo.com.br



Fig. 2. *Bedellia somnulentella* (Lepidoptera: Bedelliidae) adult perched on the abaxial end of an *Ipomoea batatas* leaf (A); larval damage on *I. batatas* leaves (B); caterpillar with excreta deposited outside a mine (C).

tion of *B. somnulentella* collected on *I. batatas* plants in the germplasm bank of the Olericultura sector of the Universidade Federal dos Vales do Jequitinhonha e Mucuri. Dr. Phillip John Villani (The University of Melbourne, Australia) revised and corrected the English language used in this manuscript.

Summary

Bedellia somnulentella (Zeller) (Lepidoptera: Bedelliidae) is a specialist Convolvulaceae pest. Its larvae damage host plants by mining young and mature leaves. This is the first report of *B. somnulentella* in the Brazilian territory. This pest was observed on young and mature *Ipomoea batatas* (L.) (Solanales: Convolvulaceae) leaves in Diamantina, Minas Gerais State, Brazil. This insect alters the leaf appearance due to its mines, changing the leaf color to yellowish-brown, which reduces the photosynthetic area. The presence of *B. somnulentella* in Brazil makes it necessary to include this insect in pest monitoring programs in sweet potato plantations.

Key Words: Bedelliidae; damage; Convolvulaceae; Lepidoptera; sweet potato

Sumario

Bedellia somnulentella (Zeller) (Lepidoptera: Bedelliidae) es una plaga especialista de Convolvulaceae. Los daños a las plantas hospede-

ras ocurren durante la fase larval, minando hojas jóvenes y maduras. Este artículo, es el primer reporte de *B. somnulentella* en territorio brasileño. Esta plaga fue observada en hojas jóvenes y maduras de *Ipomoea batatas* (L.) (Solanales: Convolvulaceae) en Diamantina, Minas Gerais, Brasil. El insecto transforma las hojas con la presencia de minas que mudan el color de la hoja a marrón amarillenta, reduciendo el área fotosintética. La presencia de *B. somnulentella* en Brasil hace necesaria su inclusión en programas de monitoreo de plagas en cultivos de papa dulce.

Palabras Clave: Bedelliidae; Daños; Convolvulaceae; Lepidoptera; patata dulce

References Cited

- Clemens B. 1862. North American microlepidoptera. Proceedings of the Entomological Society of Philadelphia 1: 147–151.
- Fatah F, Jamialahmadi M, Asadi G, Moodi S. 2014. First report of *Bedellia somnulentella* (Lep.: Bedelliidae) from Iran. Journal of Entomological Society of Iran 34: 13–14.
- França FH, Ritschel PS. 2002. Avaliação de acessos de batata-doce para resistência à broca-da-raiz, crisomelídeos e elaterídeos. Horticultura Brasileira 20: 79–85.
- Lenis JJ, Calle F, Jaramillo G, Perez JC, Ceballos H, Cock JH. 2006. Leaf retention and cassava productivity. Field Crops Research 95: 126–134.
- Parrella MP, Kok LT. 1977. The development and reproduction of *Bedellia somnulentella* on hedge bindweed and sweet potato. Annals of the Entomological Society of America 70: 925–928.
- Reddy PP. 2015. Plant Protection in Tropical Root and Tuber Crops. Springer, New Delhi, India.
- Seven S. 2006. Lyonetiidae of Turkey with notes on their distribution and zoogeography (Lepidoptera). Zootaxa 1245: 53–58.
- Shorey HH, Anderson LD. 1960. Biology and control of the morning-glory leaf miner, *Bedellia somnulentella*, on sweet potatoes. Journal of Economic Entomology 53: 1119–1122.
- Souza JC, Reis PR, Rigitano RL. 1998. O bicho mineiro do cafeeiro: biologia, danos e manejo integrado. EPAMIG, Belo Horizonte, Minas Gerais, Brazil. (Boletim Técnico 54).
- Tawfik MFS, Awadallah KT, Shalaby FF. 1976. The life history of *Bedellia somnulentella* Zell. (Lepidoptera: Lyonetiidae). Bulletin of the Entomological Society of Egypt 60: 25–33.
- Ziska LH, Runion GB, Tomecek M, Prior SA, Torbet HA, Sicher R. 2009. An evaluation of cassava, sweet potato and field corn as potential carbohydrate sources for bioethanol production in Alabama and Maryland. Biomass and Bioenergy 33: 1503–1508.