



First Record of *Diatraea tabernella* (Lepidoptera: Crambidae) in the Cauca River Valley of Colombia

Authors: Vargas, Germán, Lastra, Luz A., and Solís, M. Alma

Source: Florida Entomologist, 96(3) : 1198-1201

Published By: Florida Entomological Society

URL: <https://doi.org/10.1653/024.096.0367>

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 *DIATRAEA TABERNELLA* (LEPIDOPTERA: CRAMBIDAE) IN THE CAUCA RIVER VALLEY OF COLOMBIA

GERMÁN VARGAS^{1,*}, LUZ A. LASTRA¹ AND M. ALMA SOLÍS²

¹Colombian Sugarcane Research Center (CENICAÑA), Calle 58 Norte No. 3BN-110, Cali, Colombia

²Systematic Entomology Laboratory, USDA, National Museum of Natural History, P.O. Box 37012, MRC 168, Washington, DC 20013-7012, USA

*Corresponding author; E-mail: gavargas@cenicana.org

Diatraea spp. borers are considered among the most damaging of sugarcane (*Saccharum* spp. L; Poales: Poaceae) pests in the Americas (White et al. 2001). Under the conditions of the Cauca River Valley of Colombia, the economic losses caused by *Diatraea* spp. are estimated at 143 kg of sucrose per each percent of bored internodes (Gómez et al. 2009). In Colombia there are 6 species of *Diatraea*, e.g., *D. lineolata* (Walker), *D. tabernella* (Dyar), *D. saccharalis* (F), *D. indigenella* (Dyar & Heinrich), *D. rosa* (Heinrich) and *D. busckella* (Dyar & Heinrich) (Bleszynski 1969; Gaviria 1990). However, in the Cauca River Valley, the main sugarcane producing area of Colombia, *D. saccharalis* and *D. indigenella* are the only *Diatraea* borers that attack sugarcane (Gómez & Lastra 1995; Cadena 2008).

In 2012, growers of the northern area of the Cauca River Valley reported infestations of *Diatraea* larvae that did not match the morphological characteristics of *D. saccharalis* and *D. indigenella*. In Oct 2012 we visited an infested field on a farm near the municipality of Cartago (N 4° 43' 33.416" W 75° 57' 53.384") and observed the attack on a 2 month-old crop with a level of 'dead hearts' of < 20% infested shoots. Observations were made on larvae, pupae, and adults in the laboratory of the Colombian Sugarcane Research Center (CENICAÑA). The species was identified as *Diatraea tabernella* (Dyar), and voucher specimens were deposited in the Entomological Museum of the Universidad del Valle, Cali, Colombia, (females, 24325; males, 24326 MUSENUV).

Some effort has been made to use larval characteristics to distinguish among *Diatraea* species. For instance, Linares & Bastidas (1996) suggested the use of the dorsal meso-thoracic shield as a way to distinguish among the species of *Diatraea* in Venezuela. However, the same authors mentioned that this character is not reliable when larvae are collected from the field. Additionally, Riley & Solis (2005) highlighted the great difficulties of separating species of *Diatraea* using immatures. The pupal stage provides more elements to distinguish between some species. For instance, the cephalic horns in the pupa of *D. saccharalis* are pointed at the end (ridge-like) (Fig. 1A), in *D. indigenella* they are dull and rounded at the end (Fig. 1B), whereas in *D. tabernella* they are rounded as in *D. indigenella*, but shorter (Fig. 1C). In the adult stage, the differences are more pronounced and the hind tibia of the males of *D. tabernella* each have a large tuft of blackish hairs that are absent in *D. saccharalis*, *D. indigenella*, and all other species of *Diatraea* reported in Colombia (Bleszynski 1969). Following descriptions suggested by Bleszynski (1969), the 3 species found in the Cauca River Valley can be distinguished using the male genitalia and more specifically the lateral tegumenal lobes. In *D. saccharalis* the lateral tegumenal lobes are large and broadly rounded (Fig. 2A), in *D. indigenella*, these are proportionately narrow and tapering (Fig. 2B), whereas in *D. tabernella* these are somewhat similar to those of *D. saccharalis*, but much narrower (Fig. 2C).

THE FOLLOWING KEY BASED ON THE MALE GENITALIA MAY BE USED FOR SPECIES RECORDED THUS FAR IN THE CAUCA RIVER VALLEY OF COLOMBIA:

- 1. Lateral tegumenal lobes narrow and tapering (Fig. 2B) *D. indigenella*
- Lateral tegumenal lobes broad and rounded (Fig. 2A, C) 2
- 2. Lateral tegumenal lobes broadly rounded (Fig. 2A) *D. saccharalis*
- Lateral tegumenal lobes narrow, longer than broad (Fig. 2C) *D. tabernella*

Diatraea tabernella has been reported in Panamá, Nicaragua, Costa Rica, and Honduras (Box 1931; Bleszynski 1969). Although it has been recorded in Colombia since 1914 (Box 1931), this is

the first time it has been observed in the Cauca River Valley attacking sugarcane. According to Box (1931), the species was first reported in Colombia along the Magdalena River; however, spe-

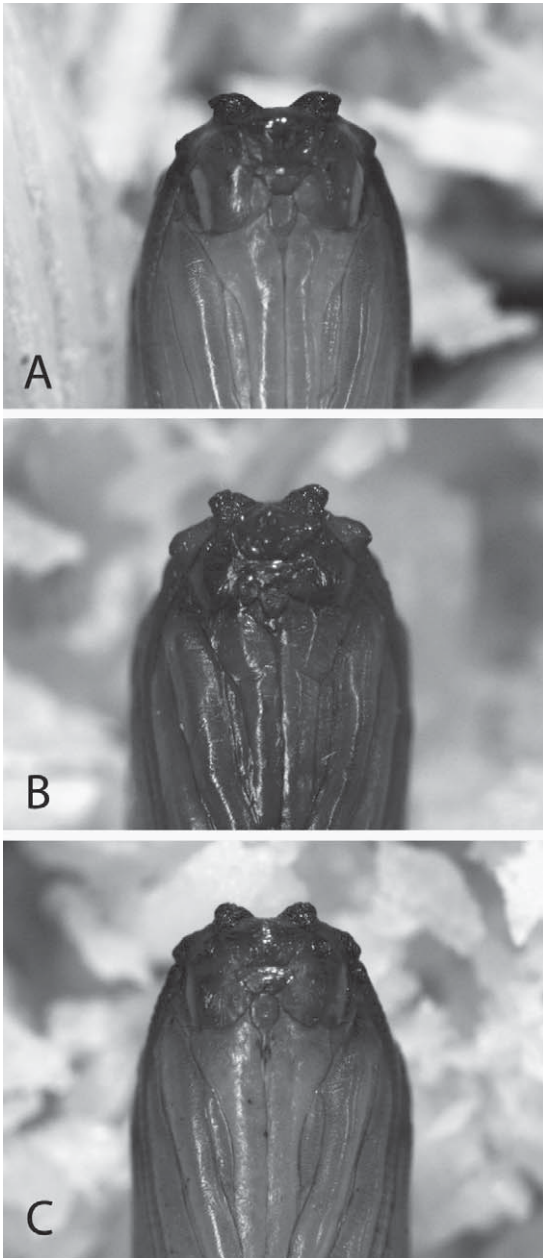


Fig. 1. Pupa: frontal view, A) *Diatraea saccharalis*, B) *D. indigenella* and C) *D. tabernella*. The cephalic horns in the pupa of *D. saccharalis* are pointed at the end (ridge-like) (Fig. 1A), in *D. indigenella* they are dull and rounded at the end (Fig. 1B), whereas in *D. tabernella* they are rounded as in *D. indigenella*, but shorter (Fig. 1C).

cifics concerning the locality were not provided. Also, *D. tabernella* was noted near the municipality of Condoto, Department of Chocó, not far from the locality where *D. tabernella* was collected in Cartago. Later, Box (1959) mentioned that *D.*

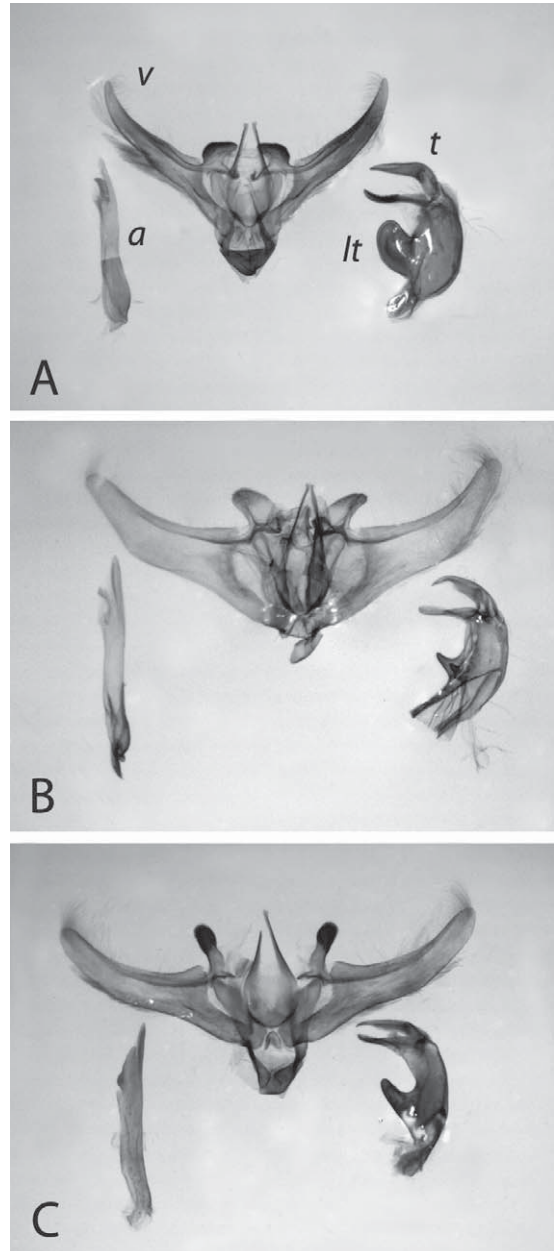


Fig. 2. Male genitalia: A) *Diatraea saccharalis*, B) *D. indigenella* and C) *D. tabernella* (a = aedeagus (= phallus); v = valvae; t = tegumen; lt = lateral tegumenal lobes).

tabernella was a major pest in Panamá, a dominant species in Costa Rica, but in Colombia its status was thus far unknown. According to Badilla (2002), *D. tabernella* is the most important and widely distributed pest of sugarcane in Costa Rica, where *D. saccharalis* and *D. guatemalaella* (Schaus) are also present (Badilla & Solís 1984). In Panamá, Bennett (1971) suggested that *D. tab-*

TABLE 1. PERCENT DISTRIBUTION AND FREQUENCY OF ENCOUNTER OF *DIATRAEA* SPECIES AND PARASITISM BY *LYDELLE MINENSE* ON LARVAE COLLECTED FROM 25 SUGARCANE FARMS IN THE NORTHERN CAUCA RIVER VALLEY OF COLOMBIA (N = 81 LARVAE).

	<i>D. tabernella</i>	<i>D. saccharalis</i>	<i>D. indigenella</i>
Percent distribution of the species (%)	76.5	22.2	1.2
Frequency of encounter (%)	80.0	52.0	4.0
Parasitism by <i>L. minense</i> (%)	5.0	22.0	4.0

ernella was economically more important than *D. saccharalis*. Rodriguez et al. (2004) mentioned that in some areas of Panamá where *D. tabernella* predominates, the damage can exceed 2.5% of bored internodes, the established nominal damage threshold.

Additional surveys for larvae from the northern area of the Cauca River Valley resulting in collecting larvae from 25 different farms located between the municipalities of Viterbo (Department of Caldas) and La Unión (Department of Valle del Cauca). Approximately 75% of the larvae collected were *D. tabernella*, and this species was present in more than 75% of the sites visited (Table 1). Additionally, the percent parasitism by *Lydella minense* (Townsend) (Diptera: Tachinidae) was smaller than that observed in *D. saccharalis* (Table 1), indicating the need to consider various pest management approaches for this new pest. In Costa Rica, the introduction of *Cotesia flavipes* (Cameron) (Hymenoptera: Braconidae) has been used effectively against *D. tabernella* (Badilla 2002). However, in Panamá the level of parasitism following massive releases of *C. flavipes* has not resulted in the reduction of the damage by *D. tabernella*, and the percent parasitism has not been greater than that of *Billaea claripalpis* (Wulp) (Diptera: Tachinidae) (Rodríguez et al. 2004). Although the potential economic importance of *D. tabernella* remains to be determined in the Cauca River Valley of Colombia, its detection in that region generates questions as to the relative economic importance in comparison to the other 2 species already present. A coordinated effort among farmers and CENICAÑA to monitor the distribution of *D. tabernella* in the whole Cauca River Valley should constitute an important first step in a series of studies on this pest and its management. Additionally, it is noteworthy that the taxonomic status of the *Diatraea* species has not been adequately updated, and it warrants further study as the sugarcane crop is expanding in Colombia in projects not only related to sucrose, but to energy, and ethanol production as well.

SUMMARY

Diatraea tabernella is recorded for the first time in the Cauca River Valley of Colombia. Even though

there has been no information on the status of *D. tabernella* in Colombia for almost a century, its recent appearance creates concern about its potential economic importance by virtue of its abundance and distribution in the northern region of the Cauca River Valley. Descriptions of the pupae and the male genitalia of *D. saccharalis*, *D. indigenella*, and *D. tabernella* are given, together with a key to aid in the identification of *Diatraea* species in the region. Also information and perspectives on biological control of *D. tabernella* are presented.

Key Words: *Cotesia flavipes*, *Lydella minense*, *Diatraea saccharalis*, *Diatraea indigenella*

RESUMEN

Se reporta por primera vez la presencia de *Diatraea tabernella* en el valle del río Cauca en Colombia. A pesar de que no ha habido información acerca de esta especie en el país durante cerca de un siglo, este registro genera preocupación acerca de su importancia económica debido a su alta abundancia y distribución en la zona norte del valle del río Cauca. Este documento presenta una descripción del estado de pupa y de la genitalia del macho de *D. saccharalis*, *D. indigenella*, y *D. tabernella*, acompañada de una clave para la identificación de las especies de *Diatraea* reportadas en la región. Adicionalmente, se presenta información y perspectivas acerca del control biológico de *D. tabernella*.

Palabras Clave: *Cotesia flavipes*, *Lydella minense*, *Diatraea saccharalis*, *Diatraea indigenella*

REFERENCES CITED

- BADILLA, F. 2002. Un programa exitoso de control biológico de insectos plaga de la caña de azúcar en Costa Rica. Manejo Integrado de Plagas y Agroecología 64: 77-87.
- BADILLA, F., AND SOLÍS, I. 1984. Programa de control biológico del taladrador de la caña de azúcar *Diatraea* spp. Dirección de Investigación y Extensión de la Caña de Azúcar. Boletín Informativo no. 18.4 p.
- BENNETT, F. D. 1971. Current status of biological control of small moth borers of sugar cane *Diatraea* spp. (Lepidoptera: Pyralidae). Entomophaga. 16: 111-124.
- BLESZYNSKI, S. 1969. The taxonomy of the Crambina moth borers of sugar cane, pp 11-59 In J. R. Williams, J. R. Metcalfe, R. W. Mungomery and R. Mathes [eds.], Pests of Sugar Cane. Elsevier, Amsterdam.

- BOX, H. E. 1931. The Crambine genera *Diatraea* and *Xanthoferne* (Lepidoptera: Pyralidae). Bull. Entomol. Res. 22: 1-50.
- BOX, H. E. 1959. The species of *Diatraea* and allied genera attacking sugar cane. Proc. Xth Congress Intl. Soc. Sugar Cane Technologists, Hawaii, 3-22 May 1959.
- CADENA, P. 2008. Caracterización morfológica y molecular de especies de *Diatraea* spp. (Lepidoptera: Crambidae). Informe final Joven Investigador, convenio COLCIENCIAS-CENICAÑA. 30 pp.
- GAVIRIA, J. 1990. El control biológico de insectos plaga de la caña de azúcar de Colombia, pp. 201-227 In Memorias I Congreso de la Asociación de Técnicos Azucareros de Latinoamérica y el Caribe, Atalac, y III Congreso de la Asociación de Técnicos de la Caña de Azúcar de Colombia, Tecnicaña, 10-14 septiembre, Cali, Colombia. Tecnicaña, Cali, Colombia.
- GÓMEZ, L. A., AND LASTRA, L. A. 1995. Insectos asociados con la caña de azúcar en Colombia. pp 237-263 In C. Cassalet, J. Torres and C. Isaacs [eds.], El cultivo de la caña en la zona azucarera de Colombia. Cenicaña, Cali.
- GÓMEZ, L. A., QUINTERO, E. M., JURADO, J. A., OBANDO, V., LARRAHONDO, J. E., AND A. GONZÁLEZ. 2009. Una versión actualizada de las pérdidas que causan los barrenadores de la caña de azúcar en el valle del río Cauca, pp. 136-143 In memorias VIII Congreso de la Asociación de Técnicos de la Caña de Azúcar de Colombia, Tecnicaña, 16-18 septiembre, Cali, Colombia. Tecnicaña, Cali, Colombia.
- LINARES, B. A., AND BASTIDAS, R. 1996. Descripción comparativa de las especies del género *Diatraea* (Lep. Pyralidae) que atacan la caña de azúcar en Venezuela. Yaracuy, Venezuela. Foniap, Serie a, No. 11. 92 pp.
- RILEY, D. R., AND SOLIS, M. A. 2005. Keys to immatures of the sugarcane borer and neotropical cornstalk borer from Tamaulipas, México, intercepted on corn in southeastern Texas. Southwestern Entomol. 30: 35-39.
- RODRÍGUEZ, L. C., GÓMEZ, I., PEÑALOZA, Y., AND TEJADA, M. 2004. Desarrollo del parasitoide *Cotesia flavipes* Cámeron, 1891 (Hymenoptera: Braconidae) en *Diatraea tabernella* Dyar y *Diatraea saccharalis* Fabricius, 1794 (Lepidoptera: Pyralidae), y su efectividad en el control de *Diatraea tabernella*. Tecnología 1: 85-94.
- WHITE, W. H., MILLER, J. D., MILLIGAN, S. B., BURNER, D. M., AND LEGENDRE, B. L. 2001. Inheritance of sugarcane borer resistance in sugar cane derived from two measures of insect damage. Crop Sci. 41: 1706-1710.