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

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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-

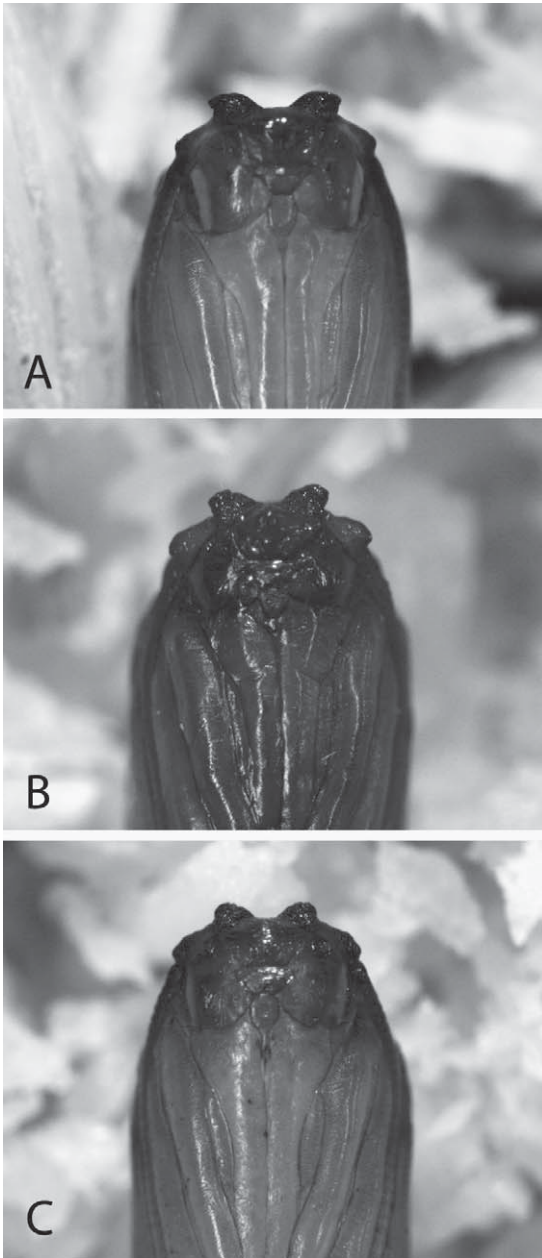


Fig. 1. Pupa: frontal view, A) *Diatraea saccharalis*, B) *D. indigenella* and C) *D. tabernella*. The cephalic horns in the pupa of *D. saccharalis* are pointed at the end (ridge-like) (Fig. 1A), in *D. indigenella* they are dull and rounded at the end (Fig. 1B), whereas in *D. tabernella* they are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

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