

## THE PREDOMINANCE OF *DIATRAEA FLAVIPENNELLA* (LEPIDOPTERA: CRAMBIDAE) IN SUGAR CANE FIELDS IN THE STATE OF ALAGOAS, BRAZIL

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Brazil, the third largest producer of cane sugar in the world, is responsible for approximately 330,000 tons per year or 25% of the total world production (IBGE, 2004). While the state of Alagoas, in north-eastern Brazil, ranks as number three in terms of agricultural and industrial productivity of sugar cane in the country, the potential yield is diminished through damage by pests, mainly insects of the genus *Diatraea* (Lepidoptera: Crambidae). Two species of *Diatraea* predominate in Brazil, namely, *D. saccharalis* Fabricius 1974 and *D. flavipennella* Box 1931. The former is widespread throughout the country while the second is restricted to Alagoas and a few other states in the north-eastern region (Guagliumi, 1972/73). Studies carried out in Alagoas during the 1970s and 1980s (Risco et al. 1975) indicated that *D. saccharalis* prevailed (70.12%) over *D. flavipennella* (29.88%). According to a survey conducted in 1985 by the Entomology Sector of PLANALSUCAR (PLANALSUCAR 1985), however, an inversion of this situation commenced in some areas of the state and *D. flavipennella* (89.80%) showed preponderance over *D. saccharalis* (10.20%).

Knowledge of the frequencies of occurrence of these two species is of considerable importance to the sugar cane industry because the damage caused by these pests leads to significant loss of yield. Thus, a 1% change in the level of infestation by *D. saccharalis* gives rise to a reduction of 2.5 kg of sugar per ton of cane collected (Gallo et al.

2002). Because the data regarding the prevalence of the two pests are dated, we have conducted a new survey of the incidence of *Diatraea* species in the sugar cane plantations of Alagoas. Eight different edaphic and climatic areas in Alagoas were selected for assessment, encompassing the agricultural estates belonging to the sugar cane factories Cachoeira, Cansanção de Sinimbu, Marituba, Santo Antônio, Seresta, Sumaúma, Terra Nova, and Triunfo (Fig. 1). The study was conducted between Sep 2003 and Feb 2004 during the initial phase of sugar cane cultivation and subsequent growth of the culture. Larvae of *Diatraea* species were collected from severely infested sugarcane plants found in the 8 locations mentioned. The plants were selected on the basis of observable damage to the apical buds and infiltration of larvae into the culms, both of which may lead to the penetration of phytopathogenic micro-organisms and subsequent disease provoking sucrose breakdown. Identification of the species collected was performed on the basis of the morphological characteristics of the larvae as described previously by Guagliumi (1972/73) and Mendonça (1996).

The total number of larvae collected from all sampling areas was 3341, of which 78 specimens (2.33%) were *D. saccharalis* and 3263 (97.67%) were *D. flavipennella* (Table 1). In all 8 locations studied, the number of specimens of *D. flavipennella* randomly collected was far greater than that of *D. saccharalis*, the latter being completely absent in 3 areas. The results clearly demon-



Fig. 1. The location sites of specimens of *Diatraea* spp. in sugar cane fields in Alagoas, Brazil: A—Marituba; B—Seresta; C—Cansanção de Sinimbu; D—Triunfo; E—Sumaúma; F—Terra Nova; G—Cachoeira and H—São Luís do Quitunde.

TABLE 1. NUMBER OF SPECIMENS OF *DIATRAEA* SPP. COLLECTED IN 8 SUGAR CANE FIELDS IN THE STATE OF ALAGOAS, BRAZIL, DURING THE PERIOD OF SEP 2003 AND FEB 2004.

Sampling sites (estates associated with sugar cane factories)	Number of specimens identified (% of total)	
	<i>D. saccharalis</i>	<i>D. flavipennella</i>
Cachoeira	0 (0)	57 (100)
Cansanção de Sinimbu	33 (3.82)	831 (96.18)
Marituba	3 (1.95)	151 (98.05)
Santo Antônio	19 (7.51)	234 (92.49)
Seresta	16 (6.11)	246 (93.89)
Sumaúma	7 (0.47)	1475 (99.53)
Terra Nova	0 (0)	141 (100)
Triunfo	0 (0)	128 (100)
Totals: Specimens studied—3341	78 (2.33)	3263 (97.67)

strate that there has been an inversion in the prevalence of the 2 insect species during the last 30 years in Alagoas. Thus, whereas Risco et al. (1975) reported that *D. saccharalis* was the predominant (93.56%) species present in the fields belonging to the Seresta factory during the 1970s, our investigation shows that this species currently comprises only 6.11% of the population and that *D. flavipennella* predominates. Moreover, during the period 1975/1976, *D. saccharalis* constituted 10.69% of the larvae population present in the fields belonging to the Triunfo factory (Risco et al. 1975), whereas the present results show that the larval population consists exclusively of *D. flavipennella*. The inversion of species dominance may be associated with the fact that the methods adopted for the biological control of *D. saccharalis*, i.e., integrated pest management (IPM) involving the manual collection of larvae, introduction of resistant varieties of sugarcane, and the use of the larval parasitoid, *Cotesia flavipes* (Hymenoptera: Braconidae) (Arencibia et al. 1997; Setamou et al. 2002; Baker et al. 1992), were not efficient in reducing the infestation level of *D. flavipennella* in the field. Furthermore, the increase in intensity and irregularity of the rainy season experienced in the last decade may favor *D. flavipennella* over *D. saccharalis*.

#### SUMMARY

The occurrence of insects of the genus *Diatraea* (Lepidoptera: Crambidae) in sugar cane fields was investigated in 8 different edaphic and climatic areas of the state of Alagoas, Brazil, during the period of Sep 2003 and Feb 2004. The randomly sampled insect population consisted of *D. saccharalis* (2.33%) and *D. flavipennella* (97.67%), indicating that there has been an inversion in the prevalence of the 2 insect species during the last 30 years in the state of Alagoas. These results will serve as a basis for further studies concerning the establishment of appropriate methods for the control of

*D. flavipennella*, perhaps by using its natural predator *Cotesia flavipes* (Hymenoptera: Braconidae) or through the entrapment of females by using the specific female sex pheromone.

#### REFERENCES CITED

- ARENCEBIA, A., R. I. VAZQUEZ, D. PRIETO, P. TELLEZ, E. R. CARMONA, A. COEGO, L. HERNANDEZ, G. A. DELARIVA, AND G. SELMANHOUSEIN. 1997. Transgenic sugarcane plants resistant to stem borer attack. *Molecular Breeding* 3: 247-255.
- BAKER, P. S., A. KHAN, A. I. MOHYUDDIN, AND J. K. WAAGE. 1992. Overview of biological-control of Lepidoptera in the Caribbean. *Florida Entomol.* 75: 477-483.
- GALLO, D., O. NAKANO, S. SILVEIRA NETO, R. P. L. CARVALHO, G. C. BATISTA, E. BERTI FILHO, J. R. P. PARRA, R. A. ZUCCHI, S. B. ALVES, J. D. VENDRAMIN, L. C. MARCHINI, J. R. S. LOPES, AND C. OMOTO. 2002. *Entomologia Agrícola* 2nd Edn., Ed. FEALQ, Piracicaba, 1-920.
- GUAGLIUMI, P. 1972/73. *Pragas da Cana-de-açúcar* (Nordeste do Brasil). Instituto do Açúcar e do Alcool, Rio de Janeiro, 1-622.
- IBGE. 2004. *Levantamento Sistemático da Produção Agrícola*. Instituto Brasileiro de Geografia e Estatística. <http://www.ibge.gov.br> (08/08/2005).
- MENDONÇA, A. F. [ed.]. 1996. *Pragas da Cana-de-açúcar*. Insetos & Cia, Maceió, 1-239.
- PLANALSUCAR. 1985. *Relatório Técnico do Instituto do Açúcar e do Alcool*, Maceió.
- RISCO, S. H., C. E. FERREIRA, A. F. MENDONÇA, J. M. BRANDÃO, S. M. SOBRAL, AND H. D. SOUZA. (1975). *Observaciones en Relacion a la Distribucion poblacional de Diatraea spp. en la Region Cañavelera Del Nordeste de Brasil: Relatório Técnico do Programa Nacional de Melhoramento da Cana-de-açúcar* (PLANALSUCAR), Maceió, Alagoas.
- SETAMOU, M., J. S. BERNAL, J. C. LEGASPI, AND T. E. MIRKOV. 2002. Effects of snowdrop lectin (*Galanthus nivalis* agglutinin) expressed in transgenic sugarcane fitness of *Cotesia flavipes* (Hymenoptera: Braconidae), a parasitoid of the nontarget pest *Diatraea saccharalis* (Lepidoptera: Crambidae). *Ann. Entomol. Soc. Am.* 95: 75-83.