



First report of *Chrysodeixis includens* (Walker, [1858]) (Lepidoptera: Noctuidae) Injurious to Pineapple (*Ananas comosus* L.) (Bromeliaceae) in Brazil

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(With 1 figure)

The pineapple plant (*Ananas comosus* L.) (Bromeliaceae) is an important fruit crop of Brazil, which is the second largest pineapple producer in the world, with an estimated annual production of 3.3 million tons in 2014, generating approximately a million dollars in exports (Reetz et al., 2015). The crop is well adapted to the subtropical climate of the warmer regions of Paraná state. The most significant of the several pests and diseases that attack the pineapple crop in the state are the scale insect *Dysmicoccus brevipes* (Cockerell, 1893) (Pseudococcidae) and fusariosis caused by *Fusarium subglutinans* (Wollenweber & Reinking, 1983) (Nectriaceae), as well as the fruit borer *Strymon megarus* (Godart, [1824]) (Lycaenidae) and the nematodes *Pratylenchus brachyurus* (Godfrey, 1929) (Pratylenchidae), and *Meloidogyne* spp. (Heteroderidae) (Carvalho et al., 2015).

The occurrence of lepidopterans, which causes significant harm and limits pineapple production, is well known. The most important lepidopterans to affect pineapple production are *Castnia icarus* (Cramer, 1775) (Castniidae), *Elaphria agrotina* (Guenée, 1852) (Noctuidae), and *S. megarus* (Gallo et al., 2002), with the last one being able to cause production losses varying from 47 to 80%, depending on the pineapple variety (Faria et al., 2009; Sanches, 2005).

The lepidopteran *Chrysodeixis includens* (Walker, [1858]) (Noctuidae) is a widely distributed pest in the Americas, occurring from the north of the United States to the south of South America (Moscardi et al., 2012). In Brazil, populations of this lepidopteran are found in the entire soybean producing region, extending from the state of Roraima, in the extreme north of the country, to the state of Rio Grande do Sul, in the extreme south (Marsaro Junior et al., 2010).

Although soybean crops are apparently the preferred hosts for the development of *C. includens*, there are 73 other host plants in Brazil, the majority of them being economic importance (Bernardi, 2012). This demonstrates

the polyphagous capacity of the lepidopteran that allows its adaptation to diverse environments. The present study reports the occurrence of *C. includens* for the first time in a pineapple crop.

The presence of *C. includens* caterpillars was observed in pineapple plants (cv. Smooth Cayenne) during March 2015 at the Experimental Station of the Agronomic Institute of Paraná, in the municipality of Santa Helena, Parana state (latitude 24°51'37" S, longitude 54°19'58" W, and elevation 172 m.a.s.l.). The infested plants were 20 months old (in full bloom), growing in an area of approximately 0.6 ha adjacent to a final-stage soybean crop (see Figure 1A). The caterpillars had a light green color with longitudinal white stripes interspersed with black dots along the body (see Figure 1B, C, and D). Specimens of fourth and fifth instar larvae were collected from the plants and sent to the Entomology Laboratory of Agronomic Institute of Paraná, where they were kept under ambient conditions and fed soybean leaves until the emergence of the adults for confirmation of their identity.

The lesions caused by *C. includens* were observed as soon as the fruits were formed. Initially, the caterpillars were observed feeding on the floral remains of the pineapple plant (see Figure 1C and D), causing holes in the fruit (see Figure 1E) and reaching their pulp (see Figure 1F). Up to six caterpillars per fruit were found. Furthermore, damage was also observed on the leaves, which progressed to necrosis (see Figure 1B).

In contrast to other crops, such as soybean, which can tolerate 33% loss of leaves (Bueno et al., 2010), lesions are not tolerated in pineapple fruits without further processing (sold *in natura*), due to “aesthetic damage”. Overall 95% of the fruits produced in the crop area presented damages that reached its pulp, making it unviable for the *in natura* trade. Thus way it is estimated that 95% of the production is lost, which is greater than the 80% loss reported for infestation with *S. megarus*, the main lepidopteran pest affecting the crop (Sanches, 2005). Moreover, it was

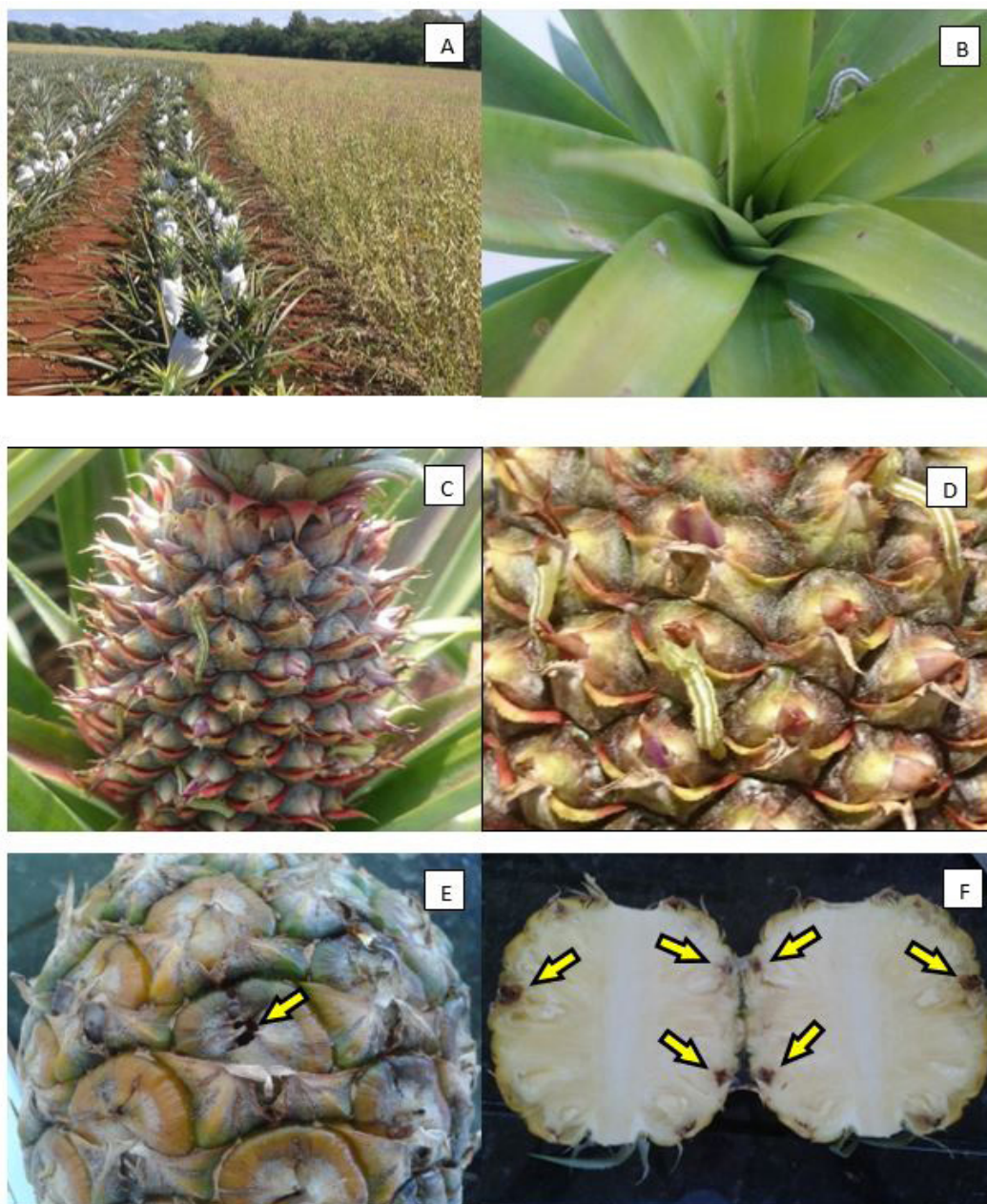


Figure 1. Pineapple plantation near a soybean crop (A). Presence of caterpillars and damage caused to pineapple leaves (B). Caterpillars consuming flower remains (C and D). External (E) and internal damage (F) to the fruit (see arrows). Photos: Alessandra Maria Detoni and Michele Alessandra Hartmann Schmidt.

observed that *C. includens* ate the leaves of all the affected plants, a habit rarely noted in *S. megarus* (Matos et al., 2007), revealing the potential harm that *C. includens* can cause to a crop.

In the United States, *C. includens* is considered to be migratory (Harding, 1976), with greater populations occurring near cotton and soybean crops (Burleigh, 1972). It is possible that composition of the agricultural landscape (with adjacent soybean crops in their final stage), combined with the polyphagous habit of the pest, might have favored

its occurrence in the pineapple crops. Owing to the selection pressure exerted by the environment, a polyphagous pest must be considered a “production system pest” rather than a “crop pest” as reported for other lepidopteran pests (McCaffery, 1998; Ventura et al., 2015).

The changes related to the landscape composition and increase in the population density of insects are factors that might explain not only the attack of *C. includens* on pineapple plants in the western region of the Parana state, but also of many other insect pests on different agricultural

crops. Several recent studies have reported the occurrence of new pests on agricultural crops in Brazil. These include incidences of *Heliothis virescens* (Fabricius, 1781) (Lepidoptera: Noctuidae) causing damage in vineyards (Ventura et al., 2015), *Cyclocephala flavipennis* Arrow, 1914 (Coleoptera: Melolonthidae) occurring on blueberries (Diez-Rodríguez et al., 2015), *Euphoria lurida* (Fabricius, 1775) (Coleoptera: Scarabaeidae) attacking safflower (Androcioli et al., 2017), and *Naupactus cinerosus* (Boheman, 1833) (Coleoptera: Curculionidae) causing damage to cassava plants (Barbosa et al., 2012).

Considering the conditions observed in the agrosystem involving pineapple cultivation, it is recommended that pineapple crops planted adjacent to soybean plantations are monitored periodically to identify and prevent possible infestations that may lead to significant production losses.

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