


Scientific Note

First Record of the Flower Bud Fly *Dasiops inedulis* Steyskal, 1980 (Diptera: Lonchaeidae) in Northeastern Brazil

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Abstract. Passion fruit cultivation in Northeastern Brazil stands out in terms of both production and productivity when compared to other regions of the country. However, the incidence of arthropod pests during crop management poses a significant challenge. Among the various pest species, the presence of dipterans commonly known as flower bud flies, belonging to the genera *Dasiops* Rondani (1856) and *Neosilba* McAlpine (1962) (Diptera: Lonchaeidae), is particularly noteworthy. Both genera have been reported on plants in the Passifloraceae, with species from the genus *Dasiops* being primarily associated with the abscission of reproductive structures, which represents the main limiting factor in achieving high yields. In this context, the aim of this study was to identify the main species of flower bud fly present in passion fruit plantations in producing regions of the state of Ceará. To this end, five collections of infested flower buds were carried out. In Brazil, the species *Dasiops inedulis* Steyskal, 1980 has already been recorded in six states; this study represents the first record of the species in the state of Ceará.

Keywords: *Passiflora*, flower pest, passion fruit.

With its center of origin in South America, the yellow passion fruit (*Passiflora edulis* f. *flavicarpa* Deg.) is present in approximately 90% of Brazilian orchards due to its favorable agronomic traits, such as fruit quality, broad adaptability, and, depending on the variety, dual-purpose suitability for both the fresh fruit market and agro-industrial processing (Faleiro et al. 2017). The state of Bahia stands out as the country's leading producer of the fruit, with an estimated production of 253 thousand tons in 2023, followed by the state of Ceará, which recorded a production of 154 thousand tons (IBGE 2023).

During the flowering stage, *Dasiops inedulis* Steyskal, 1980 and *Neosilba pendula* (Bezzi, 1919) (Diptera: Lonchaeidae) infest flower buds, causing severe abscission of reproductive structures due to the internal feeding of larvae, which hinders fruit formation (Aguiar-Menezes et al. 2004; Lorenzi et al. 2023).

The family Lonchaeidae includes the main species of fruit flies associated with passion fruit (*Passiflora*) crops (Oliveira & Frizzas 2014). In general, the larval stage of these insects is considered necrophagous, although some species are capable of infesting living plant tissues (Norrbon & Korytkowski 2010). *Dasiops* Rondani (1856) and *Neosilba* McAlpine (1962) are the principal genera exhibiting this phytophagous behavior and have thus been the focus of several studies (Rodrigues & González 2022; Santos et al. 2025). *D. inedulis* and *N. pendula* stand out as the main species of economic importance in passion fruit cultivation. These species have been reported as pests of passion fruit crops in countries such as Colombia, Peru, and Brazil (Peñaranda et al. 1986; Salazar-Mendonza et al. 2019).

The first record of *D. inedulis* associated with passion (*Passifloraceae*) was reported by Uchôa-Fernandes et al. (2002), who, upon analyzing the biodiversity of fruit flies in hosts from the Cerrado biome, confirmed the association of lonchaeids with plants of this family. Subsequently, Aguiar-Menezes et al. (2004) investigated the diversity of Tephritoidea associated with passionfruits species in southeastern Brazil, as well as the parasitoids involved. A high infestation of *D. inedulis* was observed in sour passion fruit (*Passiflora edulis* f. *flavicarpa*), in contrast with a high infestation of *Neosilba* sp. in sweet passion fruit (*Passiflora alata*).

In a detailed study on the main pests affecting passion fruit orchards in the region of Belém, Pará, Lunz et al. (2006) described the main

characteristics of the damage caused by *D. inedulis* to the crop, including symptomatology and possible control measures. Also, in the northern region of Brazil, Jesus-Barros et al. (2015) reported severe *D. inedulis* attacks in experimental areas intended for the genetic improvement of passion fruit. Significant impacts are being observed on passion fruit farming in Ceará, making it crucial to understand the main pest species involved, which, based on biology and control methodologies already published worldwide, allow analyze the best field management phases and control intervals accurately and sustainably. Therefore, the objective of this study was to accurately identify the main fly species causing premature flower bud drop in Ceará, Brazil.

Flower bud samples were collected in the municipality of São Benedito, in three distinct areas: 4°07'22.64" S; 40°52'27.42" W (area 01), 4°08'27.9" S; 40°52'47.2" W (area 02), and 4°08'53.7" S; 40°51'42.2" W (area 03); and in the municipality of Guaraciaba do Norte, 4°12'18.5" S; 40°50'06.6" W (area 04), both located in the mountainous region of the Ibiapaba Plateau – CE; as well as in the coastal municipality of Beberibe, 4°11'57.1" S; 38°04'43.6" W (area 05) (Fig. 1).

The varieties planted in areas 01, 02, and 03 were derived from seedlings grown from seeds of high-quality ripe fruits obtained from other orchards. In areas 04 and 05, the BRS Gigante Amarelo and BRS Sol do Cerrado varieties were cultivated. The collection was conducted by walking through the entire production area, searching for signs of fly damage. Upon identifying regions with higher incidence, all flower buds showing characteristic damage caused by the pest were collected and placed in containers.

The collected buds were stored in plastic containers filled with local soil and transported to the Laboratory of Mite and Insect Management (LAMAI) at the Universidade Federal do Ceará, Fortaleza - CE. Upon arrival at the laboratory, all buds were divided into plastic trays (35 x 25 x 10 cm) and covered with voile fabric, inserting enough buds to cover the surface of the paper towel. At the same time, the already formed pupae were separated and placed in Petri dishes, while the larvae were placed in specific containers. The separation of the immature stages and the buds were discarded within a maximum of three days, as by then, all the buds had already become necrotic.

After the pupae were separated and the adults emerged from the

flower buds, the adult samples were stored in microtubes containing 70% ethanol and sent to the Entomology Laboratory of the Institute of Biodiversity and Forests (IBEF/UFOPA) at the Universidade Federal do Oeste do Pará. Species-level identification, conducted by Prof. Dr. Laura J. Gislotti, was based on the morphological keys for Lonchaeidae proposed by McAlpine (1987).

In all four collected samples, only the species *D. inedulius* was found (Fig. 1). The larvae (Fig. 2A), which are apodous and whitish, go through three larval instars, lasting from 4 to 9 days (Peñaranda et al. 1986). In the final instar, the larvae exit the flower buds in search of more favorable conditions in the soil profile for pupation (Quintero et al. 2012).

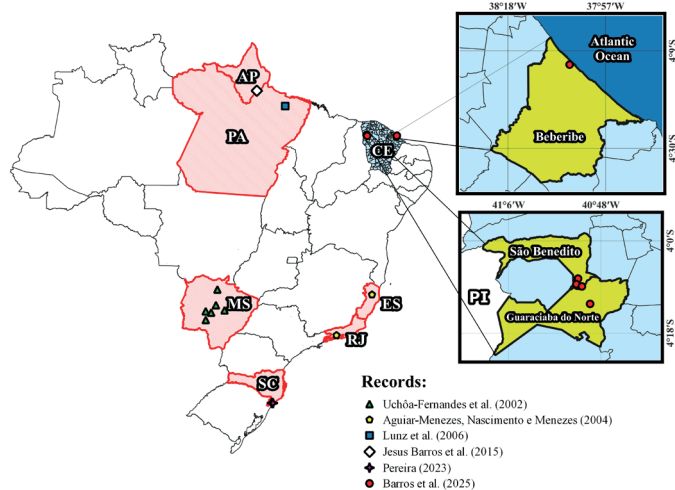


Figure 1. Records of *Dasiops inedulius* Steyskal, 1980 (Diptera: Lonchaeidae) in Brazil. Points marked with red circles indicate new records from this study, along with detailed locations of the collection sites for infested *Passiflora edulis* f. *flavicarpa* flower buds used to identify the flower bud fly.

The puparium (Fig. 2B), brown in color, lasts about 12 days (Peñaranda et al. 1986). Adult flies (Fig. 2C) measure approximately 5 mm in length and exhibit a metallic black coloration with a shiny appearance under sunlight, along with transparent wings and yellow basitarsi (Peñaranda et al. 1986). Another important characteristic is the ovipositor, whose tip is sclerotized—possibly an adaptation to pierce the protective barriers of the host's target organ (Peñaranda et al. 1986). Adults may survive for up to six days, which is sufficient time for females to lay approximately 22 eggs (Peñaranda et al. 1986).

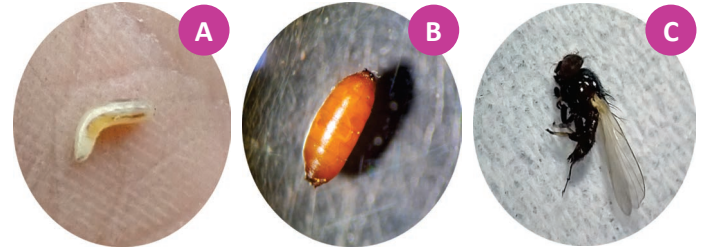


Figure 2. Developmental stages of *Dasiops inedulius* Steyskal, 1980 (Diptera: Lonchaeidae). A) Larva; B) Puparium; C) Adult.

The flower bud emerges between 120 and 150 days after transplanting the seedlings (Queiroga et al. 2024) and is externally protected by the bract (Fig. 3A). A flower bud infested by the flower bud fly shows initial discoloration of the bracts and the bud itself (Fig. 3B), along with increased ease of detachment of the protective structures from the floral receptacles (Fig. 3C). Larvae may be found both in closed buds and open flowers (Figs. 3D and 3E), and depending on environmental conditions, they may pupate inside the bud (Fig. 3F).

The floral bud fly is the main species associated with premature floral bud drop in passion fruit plants. In the state of Ceará, fruit abortion has been increasingly reported in recent years. In this study, *D. inedulius* was identified as the only species present in all sampled areas, confirming its occurrence in Ceará and, consequently, its distribution

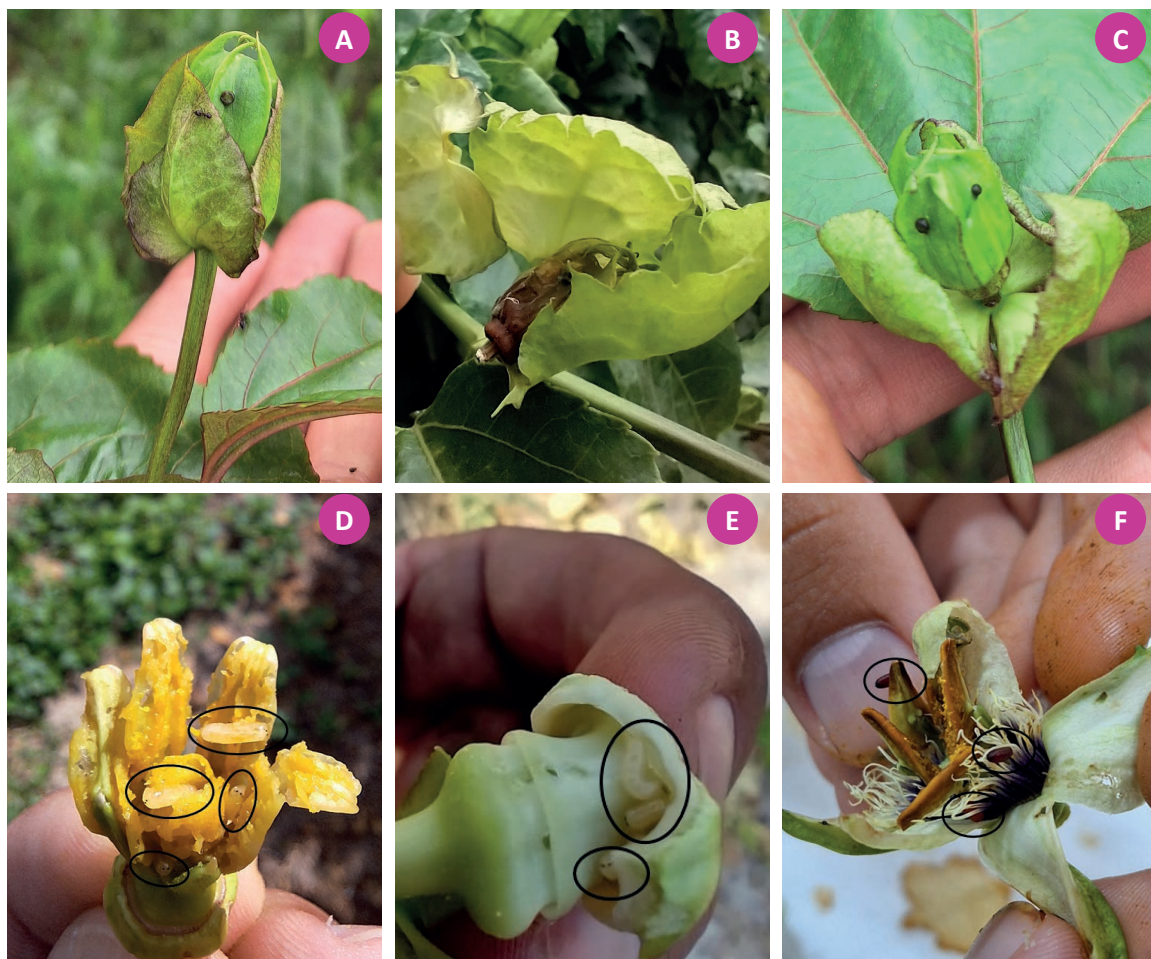


Figure 3. Description of infestation symptoms on *Passiflora edulis* f. *flavicarpa* flower buds by *Dasiops inedulius* Steyskal, 1980 (Diptera: Lonchaeidae). A) Healthy bud; B) Bract detachment; C) Bract discoloration; D and E) Presence of larvae inside the flower bud; F) Presence of puparium inside the flower bud.

throughout all regions of Brazil. Accurate species identification is essential for establishing more effective management strategies that take into account its biology and behavior. The consistent detection of larvae and pupae in different floral structures, along with the uniform symptomatology observed across the evaluated areas, reinforces the economic importance of *D. inedulius* in the region. Given its high incidence and its ability to interfere with the early reproductive stages of the crop, *D. inedulius* should be formally incorporated into local pest monitoring and control programs. Future strategies should align intervention timing with the species' phenology, promoting more sustainable passion fruit production in northeastern Brazil.

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Authors' Contributions

GRB: Investigation, Methodology, Writing – original draft; LJG: Writing – Writing – review & editing; FLCs: Investigation; ÉCC: Supervision, Formal analysis, Writing – review & editing.

Conflict of Interest Statement

The authors declare that there is no conflict of interest.

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