

## Scientific Note

# First report of *Delia sanctijacobi* (Bigot, 1885) (Diptera: Anthomyiidae) in soybean in Brazil

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**Abstract.** The root maggot fly, *Delia sanctijacobi* (Bigot, 1885) (Diptera: Anthomyiidae) is an important pest of several commercial crops. In this note we report for the first time the occurrence of *D. sanctijacobi* damaging soybean (*Glycine max* (L.)) crops in Brazil. The specimens were collected from commercial soybean fields in Saldanha Marinho and Cruz Alta, both in Rio Grande do Sul state, Brazil. The attacked soybean plants showed damaged roots, bored stem and reduced plant stand. The species was confirmed by morphological traits and DNA sequencing. The first detection of *D. sanctijacobi* on soybean in Brazil raises an alert to growers and highlights the need for development of efficient and sustainable management strategies for this emergent pest.

**Keywords:** root maggot fly, *Glycine max* (L.), molecular identification.

The root maggot fly, *Delia sanctijacobi* (Bigot, 1885) (Diptera: Anthomyiidae) is a polyphagous pest species that feeds on the seeds, roots and seedlings of several plants, including important agricultural crops such as corn, beans, melon, pumpkin, wheat, flax, onion, garlic, eggplant, alfalfa, sunflower, and cauliflower (Quintanilla 1969; Darvas & Szappanos 2003; Meraz-Álvarez et al. 2020). The damage is caused by the larvae, which are commonly known as "seedcorn maggot", have white-yellowish color and measure about 6-8 mm (Castilhos et al. 2024). After damaging the plant roots, which characterizes the initial stage of the infestation, the larvae open galleries inside other vegetative structures, such as bulbs and stems of seedlings (Geremias et al. 2022; Gomes et al. 2023). This damage can lead to wilting and death of seedlings, with consequent reduction of plant stand in the field, as observed in tomato crops (Castilhos et al. 2024). The species is native to South America and more commonly found in cold regions of the continent, including Argentina, Chile, Peru, and Uruguay. The first occurrence of *D. sanctijacobi* in Brazil was reported by Gomes et al. (2022) damaging broccoli (*Brassica oleracea* L. var. *italica*) in the southern region of the country, followed by the first record in tomato crops (*Solanum lycopersicum* L.) (Castilhos et al. 2024). However, there was no record to date of this species damaging soybean plants (*Glycine max* (L.)) in the country. Therefore, this study aimed to report the first occurrence of *D. sanctijacobi* in soybean crops in Brazil.

Symptoms resembling root maggot damage were identified in several commercial soybean fields across Rio Grande do Sul state, Brazil, in the beginning of the 2025/2026 summer cropping season (Tab. 1). No difference in damage was observed between Bt and

non-Bt fields. The damage was characterized by consumption of the cotyledons during soybean emergence (Fig. 1), resulting in reduced plant stand (Fig. 2). Species identification was based on larvae collected from soybean plants in Saldanha Marinho and Cruz Alta. The soybean fields in these two localities were sowed between October 9<sup>th</sup> and 11<sup>th</sup>, succeeding oat (*Avena strigosa* Schreb.) and vetch (*Vicia sativa* L.) crops, and showed around 30% of plant stand reduction due to damage by the larvae. The collected specimens were kept in 96% ethanol until identification and DNA extraction. Morphological identification was carried out based on the keys provided by Gomes et al. (2022). DNA extraction and sequencing were carried out by Agronomica Laboratory of Phytosanitary Diagnosis (Porto Alegre, RS, Brazil). The primers used were LCO-1490f: 5' GGT CAA CAA ATC ATA AAG ATA TTG G 3', and HCO-2198r: 5' TAA ACT TCA GGG TGA CCA AAA AAT CA 3', with PCR amplification conditions as described: 95 °C for 1 min, 40 °C for 1 min, and 72 °C for 1.5 min (35 cycles), followed by final extension at 72 °C for 7 min (Folmer 1994). Two nucleotide sequences were successfully obtained from the larvae specimens and compared to the NCBI database via BLAST 2.17.0, confirming the species as *D. sanctijacobi* (>99.82%). The sequences from Saldanha Marinho and Cruz Alta were submitted to GenBank and are available under the accession numbers PX963737 and PX963848, respectively.

*Delia* Robineau-Desvoidy, 1830 is a diverse and unclear genus with a wide host range (Griffiths 1986) and cosmopolitan distribution (Valenciano et al. 2004). Phylogenetic analyses using COI sequences indicated that *D. sanctijacobi* is closely related to *Delia florilega* (Zetterstedt, 1845) and *Delia platura* (Meigen, 1826) (Diptera:

**Table 1.** Location, host plant, sampling date and geographical coordinates of the sites where suspected *Delia sanctijacobi* (Bigot, 1885) (Diptera: Anthomyiidae) symptoms were observed during 2025/26 summer cropping season. All municipalities located in Rio Grande do Sul state, Brazil.

Location	Host	Sample date <sup>1</sup>	Soybean cultivar	Coordinates	
Passo Fundo	Soybean	03/11/2025	BMX Torque	-28.20414	-52.49641
Carazinho	Soybean	22/10/2025	BMX Fibra	-28.31105	-52.81544
Saldanha Marinho <sup>2</sup>	Soybean	23/10/2025	BMX Zeus	-28.40842	-53.12802
Cruz Alta <sup>2</sup>	Soybean	06/11/2025	NA 5909	-28.61396	-53.66233
Santa Maria	Watermelon	06/10/2025	—	-29.73224	-53.55778

<sup>1</sup>dd/mm/yyyy; <sup>2</sup>Larvae samples collected for molecular confirmation (n=2)

Anthomyiidae) (Gomes et al. 2022). *Delia* species are morphologically similar (Hamity & Roman 1987) and examination of genital characters is required to make a correct identification (Griffiths 1993). Morphological differentiation of *Delia* species is overall very difficult due to lack of diagnostic features for females and immature specimens (Savage et al. 2016). Although only recently reported in Brazil, *D. sanctijacobi* has occurred in the country for at least five decades (Gomes et al. 2022), being probably an endemic neotropical species of *Delia* often misidentified as *D. platura*. The correct identification of *D. sanctijacobi* using molecular markers will help improve the detection and management of this economically important pest species.



**Figure 1.** *Delia sanctijacobi* (Bigot, 1885) (Diptera: Anthomyiidae) larvae found damaging cotyledons of soybean seedlings in Saldanha Marinho, Rio Grande do Sul, Brazil, in 2025. Photo: Glauber R. Stürmer.



**Figure 2.** Reduced plant stand due to *Delia sanctijacobi* (Bigot, 1885) (Diptera: Anthomyiidae) damage during soybean emergence. Saldanha Marinho, Rio Grande do Sul, Brazil, in 2025. Photo: Glauber R. Stürmer.

As with other dipteran pests recently detected in soybean (e.g. *Melanagromyza sojae* Zehntner, 1900), the management of *D. sanctijacobi* is very challenging due to the species' biology and behavior. After feeding on the soybean roots and/or cotyledons, the larvae bore into the plant stem, becoming unreachable by most insecticide sprays. Although 192 active ingredients and 2,032 commercial insecticides are currently registered for use in soybean in Brazil, none of them are specifically recommended for *D. sanctijacobi* control (Agrofit 2025). Neonicotinoids, pyrethroids, carbamates and organophosphates commonly used by growers against primary soybean pests probably have an effect upon *D. sanctijacobi* as well, especially when the spray reaches the plant stem basis; but further research is needed to assess

control efficacy. The use of entomopathogenic nematodes has also been described as a control alternative for *Delia* species (Chen et al. 2003; Nielsen 2003; Jaramillo et al. 2013). Cultural practices, such as varying the time of tillage, can also affect the size of the infesting population (Hammond 1995). The first detection of *D. sanctijacobi* on soybean in Brazil raises an alert to growers and highlights the need for development of efficient and sustainable management strategies for this emergent pest.

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## Authors' Contributions

GRS: Conceptualization, Investigation, Methodology, Supervision; DBS: Data curation, Formal analysis; NSF: Data curation, Formal analysis; HP: Writing – original draft, Writing – review & editing; JAA: Writing – review & editing.

## Conflict of Interest Statement

The authors declare no conflict of interest.

## Ethical Approval

Not applicable.

## Data Availability

The data that support the findings of this study are publicly available on GenBank (<https://www.ncbi.nlm.nih.gov/genbank/>) under the accession numbers PX963737 and PX963848.

## Generative AI Statement

No generative artificial intelligence (AI) tool was used in the writing of this work.

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