Scientific Note

First records of Condylostylus depressus (Aldrich, 1901) and Condylostylus electus (Walker, 1852) (Diptera, Dolichopodidae) in coconut plantations in state of Pará, Brazil

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Keywords: long-legged flies, Sciapodinae, predators, biological control.

Dolichopodidae is among the most diverse families within Diptera, containing around 8,000 species in 250 genera that occur in all zoogeographic regions, except the Antarctic (Grichanov 2017). So far, 212 species and 31 genera are known from Brazil (Capellari 2021). Adults are easily recognized by the metallic tegument, slender body, relatively long legs and reduced wing venation (Bickel 2009). Most dolichopodids are predators and frequently occur in large numbers in crop fields. They control populations of slender-bodied insects, including whiteflies, thrips, mites and aphids, considered severe and recurrent pests in Brazilian agriculture (Ulrich 2004; Bickel 2009; Harterreiten-Souza et al. 2020).

Condylostylus Bigot, 1859 currently comprises 260 valid species, from which 78 have been recorded in Brazil (Grichanov 2017; Capellari 2021; Harterreiten-Souza et al. 2020). The genus is distinguished by the following combination of characters: vertical seta inserted in a tubercle, two pairs of well-developed scutellar setae, and M1 often sharply recurved basad (Bickel 2009). Species of Condylostylus are abundant and utilized in the biological control of conventional and organic crops in Brazil (see Seffrin et al. 2006; Togni et al. 2010; Harterreiten-Souza et al. 2020).

In this study, we record for the first time two species of Condylostylus Bigot, 1859 from Pará state, Brazil. Condylostylus depressus (Aldrich, 1901) and C. electus (Walker, 1852) were found on commercial crops of Cocos nucifera L., thus pointing to a possible value for biological control. In addition, we provide diagnoses and distributional maps for both species in Brazil.

Abstract. We record for the first time two species of Condylostylus Bigot, 1859 from Pará state, Brazil. Condylostylus depressus (Aldrich, 1901) and C. electus (Walker, 1852) were found on commercial crops of Cocos nucifera L., thus pointing to a possible value for biological control. In addition, we provide diagnoses and distributional maps for both species in Brazil.

Keywords: long-legged flies, Sciapodinae, predators, biological control.

Individuals were identified and deposited in the Invertebrate Collection of the National Institute of Amazonian Research (INPA). The identification was later confirmed by Dr. Daniel Bickel, dipterist and researcher of Australian Museum, currently reviewing the genus Condylostylus. Terminology follows mainly Cumming & Wood (2017). Specimens were photographed with a Leica MC170 HD camera, attached on a Leica M165C stereomicroscope, and the multiple images were stacked and combined using Leica Application Suite V4.11. Distribution map was made using the software Qgis 2.18.28 based on data from IBGE (2019), Capellari (2021) and Harterreiten-Souza et al. (2020).

Condylostylus depressus (Aldrich, 1901)

Psilopus depressus Aldrich, 1901: 359. Type locality: Tabasco, Mexico.

(Figs. 1, 2).

Diagnosis (males). Frons with pale hairs next to vertical seta (Fig. 2B). Mesonotum metallic green with weak cookey reflections; five pairs of strong dorsocentral setae, 1 pair of pre- and 1 pair of poststatural acrostichals setae. Legs yellow, except all coxae, hind trochanter, basal 4/5 of fore and mid femora, entirely hind femur, apex of hind tibia, fore and mid tarsus from apex of basitarsus, and entirely hind tarsus brown to dark brown (Fig. 2A). Fore tarsomeres 2-4 with ventral row of short setae (Fig. 2C); mid tarsus unmodified; hind tarsomeres 4-5 dorsoventerally flattened (Fig. 2D). Wing mostly hyaline, with inverse u-shaped macula on apical half (Fig. 2A).

Examined material. Brazil, Pará, Santa Izabel do Pará, Reunidas Farm 01°13’40.2”S 48°02’54.4”W, 09-23.v.2019, adhesive trap, Penner & Silva cols. (1 male).

Distribution. Mexico, Brazil (states of Distrito Federal and Pará) (Fig. 1).

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Distribution map was made using the software Qgis 2.18.28 based on data from IBGE (2019), Capellari (2021) and Harterreiten-Souza et al. (2020).
was recorded only from its is here reported for the first time in agricultural landscapes. The family was the Diptera most abundant in coconut crops in the state of Espírito Santo, southeast Brazil (Comério & Benassi 2013). Condylostylus was the most abundant genus in Citrus orchards from Vero Beach, Florida, USA, and the individuals were observed displaying predatory activity, thus reinforcing the evidence of their natural enemy role in agroecosystems. Further, the same authors recorded 16 species of Condylostylus in greenery crops from Federal District (Midwestern Brazil), which ranked second in abundance among the Dolichopodidae genera.

Data on arthropod colonizing crop fields strengthen the development of integrated pest management, reducing significant financial losses (Weseloh & Hare 2009). In order to the preservation of natural mortality factors, biological control is frequently recommended for regulating populations of target species. In particular, predators and parasitoids represent the main natural alternatives for pest control in agroecosystems (Spennemann 2019; Dunn et al. 2020).

Studies on the arthropod fauna found in coconut palm are occasionally limited to mentioning the existence of natural enemies, and there are only rare records of the occurrence of their specific predators, whose conservation strategies are essential for keeping pest populations below the level of economic damage, reducing the need for pesticide use.

Despite the increasing number of research on Dolichopodidae from Brazilian agricultural landscapes, information on biology, morphology, ecology and population distribution of Condylostylus in Brazil are still below expectations, ratifying the need for occurrence records in agricultural crops that enable knowledge of species used in biological control against other invertebrates.

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Condylostylus electus (Walker, 1852)

Psilopus electus Walker, 1852: 207. Type locality: Brazil, Rio de Janeiro.

Diagnosis (males). Frons with numerous black hairs next to vertical seta (Fig. 3B). Mesonotum metallic dark green, with bluish reflections; five pairs of strong dorsocentral setae, four pairs of acrostichals setae, 1 pre-, 1 sutural and 2 poststernal. Brown to dark brown legs (Fig. 3A); fore tibia with posteroventral row of setae from basal 2/9 to 7/9 (Fig. 3C); mid tibia with anterior row of setae, longer than diameter of tibia (Fig. 3D); mid basitarsus with anterior row of little round bumps extending to the basal half of mid tarsomere 2 (Fig. 3E); hind tarsus unmodified. Wing mostly brown, with basal 1/3, apex of cells M1 and M2, a quadrangular portion in cell r4+5 beyond vein dm-m hyaline (Fig. 3A).

Examined material. Brazil, Pará, Santa Izabel do Pará, Reunidas Farm 01°13’40.2”S 48°02’54.4”W, 09-23.v.2019, adhesive trap, Penner & Silva cols. (2 males).

Distribution. Brazil (states of Rio de Janeiro and Pará) (Fig. 1). This is only the second occurrence record for Condylostylus depressus in Brazil. Previously, C. electus was recorded only from its type locality in the Atlantic Forest, Rio de Janeiro state (Walker 1852) and is here reported for the first time in agricultural landscapes. Condylostylus depressus was recently recorded from the Federal District in Brazil and represents the most abundant species of Condylostylus occurring in agroecosystems (Harterreiten-Souza et al. 2020). Both species are reported for the first time in the Amazon biome.

Several works have demonstrated the importance of Dolichopodidae and Condylostylus in the biological control of pest potentials in crops. Lundgreen et al. (2013) used molecular analysis to identify the main predators of the cassava whitefly (Aleurotrachelus socialis Bondar, 1923) in Colombia and demonstrated the potential as predator of Condylostylus sp. on these insects. The family was the Diptera most abundant in coconut crops in the state of Espírito Santo, southeast Brazil (Comério & Benassi 2013). Condylostylus was the most abundant genus in Citrus orchards from Vero Beach, Florida, USA, and the individuals were observed displaying predatory activity, thus reinforcing the evidence of their natural enemy role in agroecosystems. Further, the same authors recorded 16 species of Condylostylus in greenery crops from Federal District (Midwestern Brazil), which ranked second in abundance among the Dolichopodidae genera. This is only the second occurrence record for Condylostylus depressus (Aldrich) and Condylostylus electus (Walker) in Brazil. Source: Author based on data (Capellari 2021; IBGE 2019).
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Authors’ Contribution

FVP, YKRS and LFB collected the studied specimens, wrote, and edited the manuscript. MMMS made the diagnosis, and photographs of the species and wrote the manuscript. TFVB coordinated the execution of the project that enabled the collection of specimens. All authors read and approved the final version.

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