Dasiops luzestelae: a new species of the genus *Dasiops* Rondani (Diptera: Lonchaeidae) associated with passion fruit crops in Colombia

Dasiops luzestelae: una especie nueva del género *Dasiops* Rondani (Diptera: Lonchaeidae) asociada a cultivos de pasifloras en Colombia

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ABSTRACT

Dasiops luzestelae n. sp. (Diptera: Lonchaeidae) is a species that previously was not described formally and is regarded as an undetermined pest affecting buds of *Passiflora edulis* f. *flavicarpa* Degener. This study evaluated material collected in 10 departments of Colombia where passion fruit crops constitute an important economic income. Data of geographical distribution and passion fruit crops associated with *Dasiops luzestelae* n. sp. are presented.

Key words: crop protection, McPhail traps, pest management, taxonomy.

RESUMEN

Se describe a *Dasiops luzestelae* n. sp. (Diptera: Lonchaeidae), especie previamente no descrita formalmente y registrada como plaga que afecta los botones florales de *Passiflora edulis* f. *flavicarpa* Degener. Este trabajo comprendió el estudio de material proveniente de 10 departamentos de Colombia donde los cultivos de pasifloras constituyen ingresos económicos importantes. Se presenta información sobre la distribución geográfica y cultivos de pasifloras asociados con *Dasiops luzestelae* n. sp.

Palabras clave: protección de cultivos, trampas McPhail, manejo de plagas, taxonomía.

Introduction

In Colombia, passion fruit crops have been increasing and diversifying through several species, such as: *Passiflora ligularis* Juss 1805; *Passiflora edulis* f. *edulis* Sims 1818; *Passiflora edulis* f. *flavicarpa* Degener 1932; *Pasiflora tripartita* var. *mollissima* Nielsen & Jorgensen 1988 and *P. tarminiana* Coppens & Barney 2001. Commercial production is mainly affected by flower bud or fruit infestation by flies belonging to the *Dasiops* genus: *D. curubae* Steyskal, *D. caustonae* Norrbom and McAlpine, *D. inedulis* Steyskal (Steyskal, 1980; Umaña, 2005; Chacón and Rojas, 1984; Ambrecht *et al.,* 1986); *D. gracilis* Norrbom & McAlpine, *D. yepezi* Norrbom & McAlpine, *D. plumeus* McAlpine and *D. saltans* (Townsend) (Yepez and Velez, 1989; McAlpine, 1964; Norrbom and McAlpine, 1996). *Dasiops luzestelae* n. sp. is associated with passiflora agricultural systems, albeit without an official description. We reviewed specimens collected in the Valle del Cauca department associated with the passion fruit pest and previously determined as *Dasiops* sp. (Figueroa, 1977; Posada 1989). For this study thirteen specimens collected in McPhail traps baited with hydrolyzed corn protein enriched with borax placed in passiflora crops in several locations in Colombia were included. The description of *D. luzestelae* n. sp. will contribute to integrated pest management strategies in passion fruit crops and allow for the association of biological and ecological aspects for this species in future studies.

Materials and methods

Biological material was collected from June 2010 until February 2011. We visited orchard fields of at least 1 ha. Species of passion fruit included were: *Passiflora ligularis* (sweet passion fruit/granadilla), *P. edulis* f. *edulis* (purple passion fruit/gulupa), *P. edulis* f. *flavicarpa* (yellow passion fruit/maracuyá), *P. tripartita* var. *mollissima* and *P. tarminiana* (banana passion fruit/curuba). Orchards were selected by local growers and represented 10 departments of Colombia: Cundinamarca, Boyaca, Meta, Huila, Tolima, Antioquia, Caldas, Quindío, Risaralda and Valle del Cauca.

According to the codification of the Departamento Administrativo Nacional de Estadística (DANE), we assigned one code per orchard and recorded their location and altitude using a handheld GPS unit (Garmin HC Etrex Summit, Garmin International, Olathe, KS). We drew a sketch that defined the location of the McPhail traps and lines

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for each crop. This allowed us to define the specific location and the code for each bud or fruit crop harvested per department. Entomological material was recovered from the crops' flower buds, fruits and McPhail traps. Vegetative organs were placed in paper bags, labeled with field data and taken to Laboratorio Nacional de Diagnostico Fitosanitario, ICA, Tibaitatá, Mosquera (Colombia). The fruits and flower buds were placed individually in plastic boxes containing sterile river sand and maintained under controlled conditions (20±5°C, relative humidity of 60%, and photoperiod of 12:12 light/darkness). After 10 d, all specimens were recovered and preserved in 70% ethanol.

The description was based on morphological characteristics according to Korytkowski and Ojeda (1971), Korytkowski (1989), and Norrbom and McAlpine (1996). For the female genitalia, the folIowing terms are used for the ovipositor structure: tubular structure formed by the fusion of tergite and sternite of segment 7 for syntergosternite 7 and segment 8 plus the cerci for aculeus. Several measurements and ratios were used: mesonotum length measured in the pleural view (length of scutum + scutellum); aculeus/mesonotum ratio as aculeus length/mesonotum length; and aculeus width at mid-length. All these characteristics were measured with 80x magnification.

The description included specimens attacking flowers buds on passion fruit crops collected in March 1973 in Ginebra, Valle del Cauca (type material); specimens recovered from vegetative organs in the field and specimens from McPhail traps collected in this study.

Results and discussion

We collected 9146 wild females of *Dasiops* Rondani and thirteen specimens of *Dasiops luzestelae* n. sp were recovered from McPhail traps baited with hydrolyzed corn protein enriched with borax located at three localities: Tolima, Quindio and Cundinamarca. We did not find *Dasiops luzestelae* n. sp. attacking bud flowers or fruits on several *Passiflora* species sampled in all ten departments. Because the McPhail traps were placed in commercial orchards, we do not rule out the possibility that this species may be playing an important role as a pest of passion fruit crops.

Dasiops luzestelae n. sp Korytkowski & Castro

Diagnosis

Small flies, species with metallic blue front, moderately rugose; hyaline wings; aculeus: short, completely sclerotized, acute and smooth, with an expansion at its base near the eversible membrane (Fig. 1); aculeus length from 0.61 to 0.67 mm.

Female description

Head: the front is wider than higher (0.51-0.56 mm wide and 0.42-0.54 mm high); slightly rugous in 2/3 of the ventral (Figs. 1A and 2A), and somewhat depressed bellow the ocellar triangle, with a short pocked depression on each side at the same level of the lateral angles of the lunula (uppermost part of parafaciae); sides slightly expanded between eyes; reddish-brown orbits, no setulae in the orbital plates. Lunula: brownish, wider than higher, protruded in both sides and in the low ridge between them, with only four slender marginal setulae. A facia with wide and tiny carina at the middle dorsal. Parafaciae: moderately broad. Antennal segment wider, straight but expanded below into the genae. Genae slender, less than $^{1}/_{4}$-$^{1}/_{5}$ of the eye height and with only two vibrissal setae. Third antennal segment ovoid; nearly two times as long as it is wide. Antennal arista relatively long-pubescent and with basal third yellowish. Eyes naked.

Thorax: mesonotum with the usual chaetotaxy, black with dark-blue brightness; length 1.25-1.58 mm; presents 1 *Pstg* setulae and 2 *pp* setulae. Anaepisternum with 3 setulae anterior and 4 marginal posterior *ane* (dorsal, one longer than others). Katepisternum with 1 *ktpl*. Prosternum without setulae. Legs: two basal segments of tarsi, yellowish. Wings: completely hyaline; vein CuP+1A enlarged ½ the distance to wing posterior margin. Callypterae: whitish margins and cilia; marginal cilia uniform in length and silky.

Post-abdomen: Seventh syntergosternite 0.37-0.45 mm long. Eversible membrane with complete dorsal and ventral taeniae, 0.41-0.53 mm in length. Aculeus, short, 0.61-0.67 mm (Fig. 1B); aculeus/mesonotum ratio 0.414-0.488; aculeus length/width ratio 0.046-0.075; completely sclerotized, expanded in its basis close to the eversible membrane; cerci (0.11-0.158 mm in length) fused to aculeus; apex acute (Figs. 1C and 2B).

Type material

Holotype 1 ♀ (PMENT 142-2011). Colombia. Ginebra, Valle del Cauca, March 1973, Luz Stella Cobos coll (UNPRG 49-73). The specimen was mounted on a pin, and deposited at the Laboratorio de Entomología, Universidad de Panamá, Panama city. *Paratypes* 13 ♀: same data as holotype. Eight specimens were fixed in 90% ethanol and five specimens were mounted on a pin. The specimens were deposited at the Instituto de Ciencias Naturales, Universidad Nacional de Colombia (code ICN 054966) and Laboratorio de

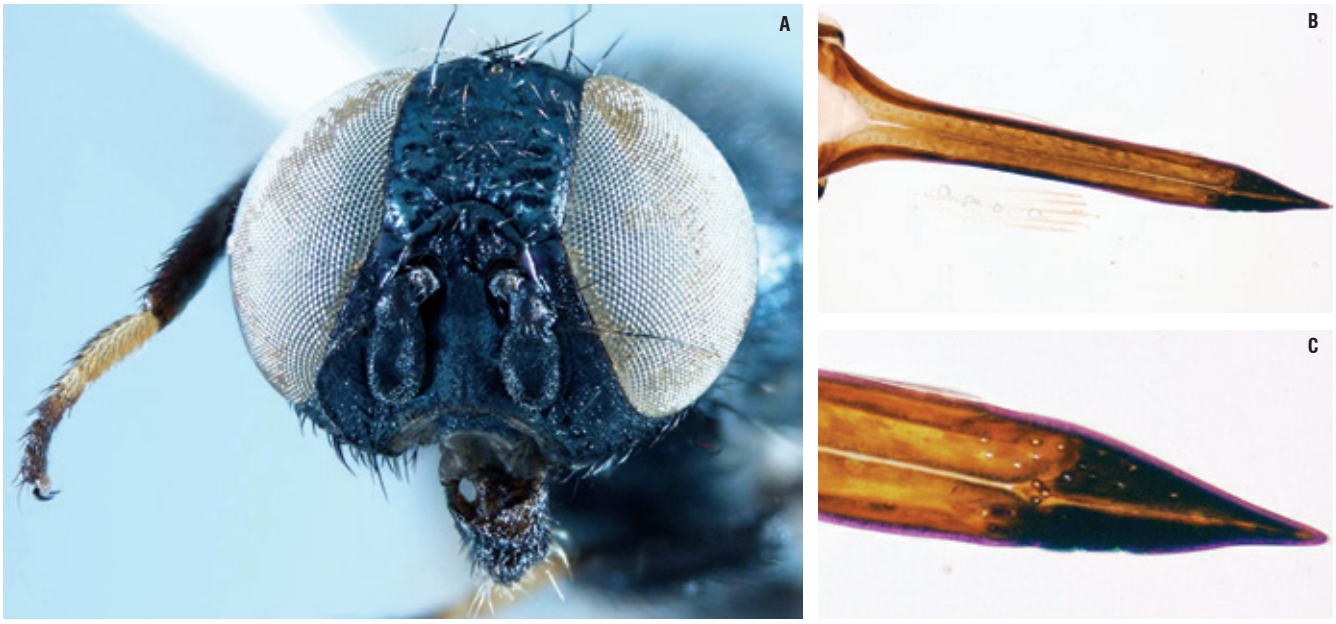

FIGURE 1. *Dasiops luzestelae* n. sp. A. Overview head; B. Aculeus. C. Apex of aculeus.

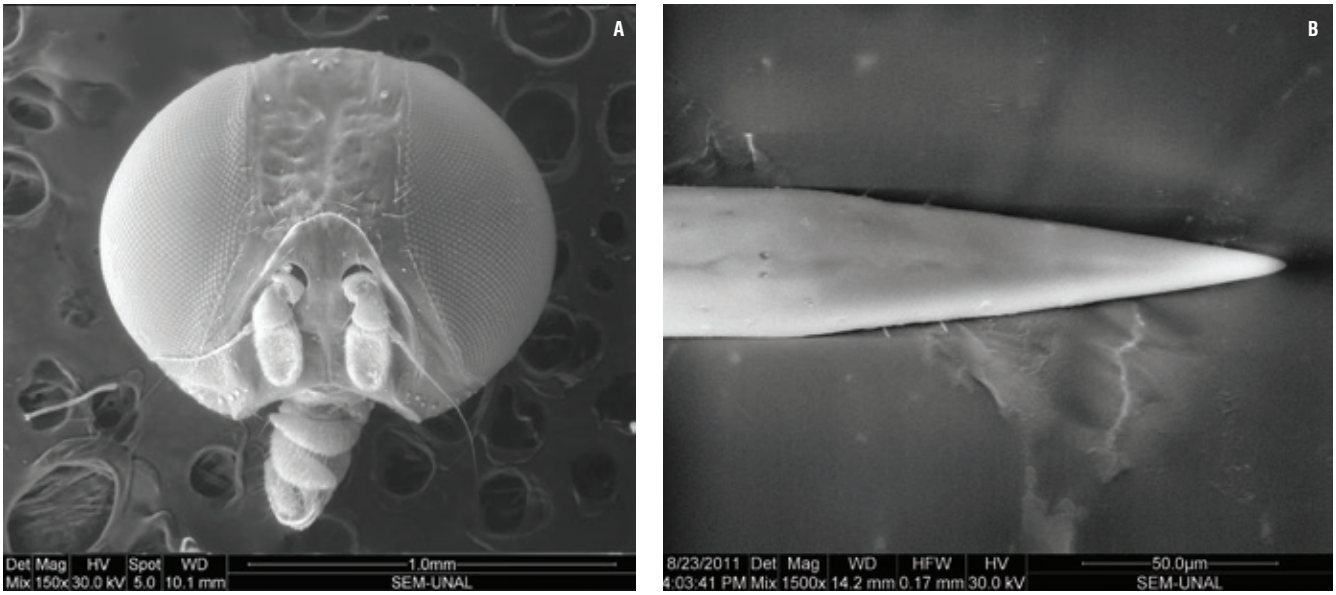

FIGURE 2. SEM of *Dasiops luzestelae* n. sp. A. Overview head. B. Dorsal view of apex of aculeus.

Diagnóstico Fitosanitario, Instituto Colombiano Agropecuario – ICA; Mosquera (Colombia).

Material examined. Colombia. 8♀ Tolima, Villa Rica, 3°56'17"N 74°33'29"W, 1708 masl, 02-Sep-2010; 10-Sep-2010; 2-Dec-2010; 24-Feb-2011. Purple passion fruit/*gulupa* (*Passiflora edulis* f. *edulis* Sims), Salamanca, J. and Martínez, O.; coll (ICN 054966); 2♀ Quindio, Montenegro, 4°18'11" N, 75°28'16" W, 1295 m a.s.l., 9-Dec-2010. Sepúlveda, A.; coll.; 3♀ Cundinamarca, La Mesa, 4°40'1" N, 74°31'26" W, 845 m a.s.l., 22-Dec-2010, Yellow passion fruit/*Maracuyá* (*Passiflora edulis* f. *flavicarpa* Degener), Cubides, M.; coll.

The *D. luzestelae* n. sp material was collected in a lower montane moist forest and warm transitional montane moist forest according to the Holdridge life zones (1967), where McPhail traps were located. The original material was collected for the first time in 1973 from flower buds of the yellow passion fruit (*Passiflora edulis* f. *flavicarpa*) and associated as a pest for this crop (Figueroa, 1977; Posada 1989). However, after one year of sampling, this fly was

collected only in McPhail traps placed in passion fruit crops. Currently, the host association for *D. luzestelae* n. sp. is unclear. According to the aculeus structure, it is possible that this species infested flower buds as well as pollinated flowers in purple and yellow passion fruits. The description of *D. luzestelae* n. sp. will contribute to integrated pest management strategies in passiflora crops and allow for the association of biological and ecological aspects for this species in future studies.

Etymology

The species is named after Luz Stella Cobos, who was the first to collect specimens of this species. The name was used in some Colombian literature although it was never officially described.

Acknowledgments

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Literature cited

Ambrecht, I., M. Rojas, and P. Chacón. 1986. Biología de la mosca de los botones florales del maracuyá *Dasiops inedulis* (Diptera: Lonchaeidae), en el Valle Del Cauca. Rev. Colomb. Entomol. 12(1), 16-22.

Chacón, P. and M. Rojas. 1984. Entomofauna asociada a *Passiflora mollisima, P. edulis* f. *flavicarpa, P. quadrangularis* en el departamento del Valle del Cauca. Turrialba 34(3), 297-311.

Figueroa, A. 1977. Insectos y acarinos de Colombia. Faculty of Agricultural Sciences, Universidad Nacional de Colombia. Palmira, Colombia.

Korytkowski, C.A. and D. Ojeda. 1971. Revisión de las especies de la familia Lonchaeidae en el Perú (Diptera: Acalyptratae). Rev. Peru. Entomol. 14 (1), 87-116.

Korytkowski, C.A. 1989. Clave para especies Neotropicales del género *Dasiops* Rondani (Diptera: Lonchaeidae). Programa de Postgrado en Entomología, Vicerrectoría de Investigación y Postgrado, Universidad de Panamá, Panama.

McAlpine, J.F. 1964. Descriptions of new Lonchaeidae (Diptera). Can. Entomol. 96, 661-700.

Norrbom, A. and J.F. McAlpine. 1996. A revision of Neotropical species of *Dasiops Rondani* (Diptera: Lonchaeidae) attacking pasiflora (Passifloraceae). pp. 189-211. In: Memoir Entomological Society, Washington D.C.

Posada, L. 1989. Lista de insectos dañinos y otras plagas en Colombia. Technical Bulletin No. 43. División de Disciplinas Agrícolas, Sección Entomología, ICA; Ministerio de Agricultura, Bogota. pp. 485-493.

Steyskal, G. 1980. Two winged flies of genus *Dasiops* (Diptera: Lonchaeidae) attacking flowers of *Passiflora* (Passion fruit, Granadilla, Curuba). Proc. Entomol. Soc. Wash. 32(2), 166-170.

Umaña, M. 2005. Moscas de la fruta del género *Dasiops* (Diptera: Lonchaeidae) asociadas a la curuba y recomendaciones generals para su manejo agroecológico en la vereda Cañón, municipio de Sutamarchán – Boyacá. Rev. Colomb. Entomol. 31(1), 59-65.

Yepes, R. and R. Vélez. 1989. Contribución al conocimiento de las moscas de la fruta (Tephritidae) y sus parasitoides en el departamento de Antioquia. Rev. Fac. Agron. Medellín 42(2), 73-96.