

SHORT COMMUNICATION

New record of *Cepa apeca* (Diptera, Syrphidae, Eristalinae, Merodontini) in the Andean-Amazonian region of Colombia and expansion of its geographic range

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ABSTRACT

Flower flies of the genus *Cepa* are endemic to the Neotropical region and *Cepa apeca* is currently known only from Costa Rica. Here we report the first record of *C. apeca* in Colombia based on a single female collected using a canopy trap in a dense secondary forest in a mountainous ecosystem in the locality of Vereda San Francisco, municipality of Florencia-Caquetá, at an altitude of 643 m.a.s.l. This finding constitutes the first record of the genus *Cepa* in Colombia and expands the geographic range of *Cepa apeca* by approximately 1,500 km (straight line) southwards to South America. Our finding represents the southernmost occurrence of the species and contributes to the incipient knowledge on the Diptera diversity in the Colombian Andean-Amazonian region.

KEYWORDS: Amazon foothills, flower flies, geographical records, Neotropical

Nuevo registro de *Cepa apeca* (Diptera, Syrphidae, Eristalinae, Merodontini) en la región Andino-Amazónica de Colombia, con expansión de su rango geográfico

RESUMEN

Las moscas de las flores del género *Cepa* son endémicas de la región Neotropical y *Cepa apeca* solo se conoce actualmente en Costa Rica. Aquí reportamos el primer registro de *C. apeca* en Colombia, basado en una sola hembra recolectada usando una trampa de dosel en un bosque denso secundario en un ecosistema montañoso en la localidad de Vereda San Francisco, municipio de Florencia-Caquetá, a una altitud de 643 m.s.n.m. Este hallazgo constituye el primer registro del género *Cepa* en Colombia y amplía el rango geográfico de *Cepa apeca* en aproximadamente 1.500 km (en línea recta) hacia el sur en Sudamérica. Nuestro hallazgo representa la ocurrencia más austral de la especie y contribuye al conocimiento incipiente sobre la diversidad de dípteros en la región Andino-Amazónica colombiana.

PALABRAS CLAVE: moscas de las flores, Neotropical, piedemonte amazónico, registro geográfico

Syrphidae, also known as flower flies, occur in all biogeographic regions except Antarctica (Thompson *et al.* 2010). The family includes about 6,100 species distributed in 210 genera (Thompson *et al.* 2010; Miranda *et al.* 2020). The highest species richness is found in the Neotropics, with approximately 1,560 species (120 genera), but this number could be considerably higher due to the lack of studies in various areas of South America (Thompson *et al.* 2010). The Colombian Syrphidae fauna is currently composed of

337 species belonging to 57 genera (Montoya *et al.* 2012; Montoya 2016).

Larvae of the subfamily Eristalinae are mainly saprophagous, playing a key role in the decomposition and recycling of organic matter, thus providing ecosystem services in different links of the trophic chain (Thompson *et al.* 2010). Adults are important pollinators of a great variety of floral species in natural and agricultural habitats (Branquart and Hemptinne 2000; Ssymanck *et al.* 2008). Due to their specific ecological functions associated with habitats and food resources for

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larval development, as well as tolerance to specific degrees of anthropic disturbance, these flies are considered as indicators of environmental quality (Sommaggio 1999; Thompson 1999).

Cepa Thompson & Vockeroth, 1999 (Eristalinae: Merodontini) is an endemic Neotropical genus of small and robust flies of around 6 mm in length, with a distinctly metallic coloration and punctuated body pattern, concave face, a not greatly pronounced frontal prominence (see Figure 2 in Thompson 2007), with an elongated basoflagellomere that is more than twice as long as the scape and pedicel together, a short scape and the vein M_1 directed towards the apex of the wing (Thompson 1999; 2007; Thompson *et al.* 2010; Miranda 2017). *Cepa* is very rare in collections, with nine known specimens belonging to four described species, exclusively known from female specimens: *Cepa alex* Thompson, 1999 (Brazil and Paraguay); *Cepa apeca* Thompson, 2007 (Costa Rica); *Cepa margarita* Thompson, 1999 (Brazil) and *Cepa simonettii* Barahona-Segovia, 2019 (Chile) (Thompson 2007; Barahona-Segovia and Barceló 2019). The knowledge of the biology and ecology of adults and immatures is still incipient. Individuals of *Cepa* were collected in lowland areas of tropical and subtropical forests, as well as temperate forests (Thompson 1999; 2007; Thompson *et al.* 2010; Barahona-Segovia and Barceló 2019).

Cepa apeca is presently known from one adult female collected in Costa Rica (Thompson 2007). Here we report the species from a mountainous ecosystem in Colombia, thus

representing the first record of *C. apeca* for the country and South America. One specimen was recorded during a study conducted in the municipality of Florencia, Caquetá, located in the Colombian Andean-Amazonian region (1°37'03"N, 75°37'03"W). The area is characterized by a mean annual rainfall of 3,840 mm, with a dry season from September to February, and a rainy period from March to August (IGAC 2010).

Continuous samplings were carried out for six months, from October to December 2016, and from January to March 2017 in the 16 municipalities of Caquetá, in different types of habitats using Malaise and canopy traps (Rafael and Gorayeb 1982), mainly in secondary forests at ground and canopy level.

All collected specimens were brought to the Entomology Laboratory of Universidad de la Amazonía, where the specimen of *C. apeca* was sorted, sexed, and identified to genus level using the keys proposed by Thompson (2007), Thompson *et al.* (2010), and Miranda (2017). The species was identified with the keys of Thompson (2007) and Barahona-Segovia and Barceló (2019). Morphological characteristics were observed with an Olympus SZ2-ILST stereomicroscope. Terminology follows Cumming and Wood (2017). The specimen of *Cepa apeca* was deposited in the Entomological Collection of Universidad de la Amazonía (LEUA) in Florencia, Caquetá, Colombia.

The specimen was photographed (Figure 1) using a camera LEICA DFC450 attached to a stereomicroscope Leica M205A. The photographs were created from a series of

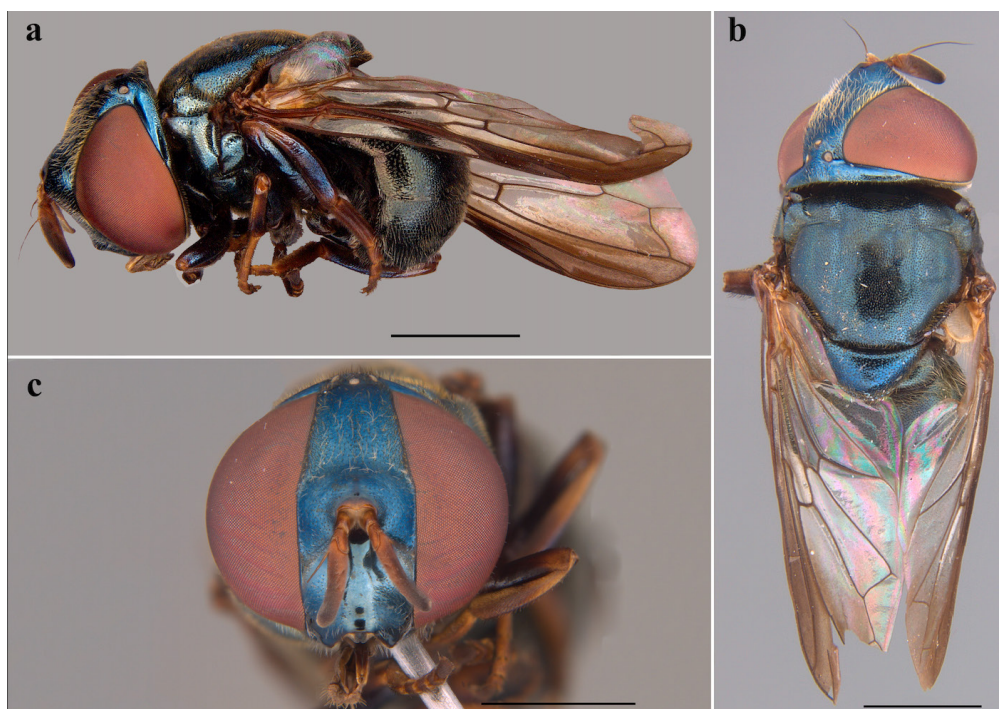


Figure 1. Adult female of *Cepa apeca* (LEUA-1148). A – left lateral view; B – dorsal view; C – frontal view. Scale bar = 2 mm. This figure is in color in the electronic version.

images taken at different focal depths and assembled using the HeliconFocus Pro (version 6.7.1) stacking software. The distribution map (Figure 2) was composed using Shorthouse (2010).

Cepa apeca Thompson, 2007

New distributional record. Colombia, Caquetá, Florencia, Vereda San Francisco, 643 m.a.s.l., 1♀, 15-iii-2017 – 29-iii-2017, Y. Ramos-Pastrana, Trampa suspensa (LEUA-1148).

Diagnosis. Female. Length. Body: 8.7 mm (Figure 1a); Wing: 6.2 mm (Figure 1b). Head dull greenish-blue black, shiny except brownish-white pollinose on ventral 2/3 of occiput; face, gena, frons except medially, and ventral 1/2 of occiput white pilose; rest of head black pilose; antenna brownish-orange except basoflagellomere brown on dorsoapical 3/4, black pilose (Figure 1c). Thorax subshiny, greenish-blue black, black pilose except for some white pile along the apicoposterior corner of anterior flattened anepisternum and anepimeron; katepimeron golden pilose; halter black, plumule brown; calypter white (Figure 1a, b). Legs black, black pilose, femora brown with bluish metallic reflections, tibia, and tarsi brownish, coxae and trochanters brown, golden pilose (Figure 1a). Wing hyaline except bare on cell C, anterior 1/2 cell R, basal 1/3 cell R₂₊₃, basal 1/4 cell R₄₊₅, cell BM, basal 1/5 cell CuI, anterobasal 3/4 cell CuP, anterior to vein A₂ on the anal lobe, basomedial 1/3 of alula; crossvein r-m basal to end of vein sc; 3rd and 4th costal sections equal length (Figure 1a, b). black to dark greenish-blue, subshiny, except brownish-black pollinose on 1st and basomedial 1/3 of 2nd tergum; 1st tergum white pilose; 2nd tergum black pilose except white pilose basolateral and narrowly along the anterior margin to medial 1/4; 3rd tergum black pilose except white

pilose laterally and narrowly along apical margin; 4th and 5th terga white pilose (Figure 1a). Sternites black, with short greyish pile, in addition to two lines of golden pile running throughout the middle from base to the apex of the abdomen.

Geographical distribution. The species *Cepa apeca* is known from Central America, in the Costa Rican seasonal moist forest ecoregion at 49 m.a.s.l. (Guanacaste, Parque Nacional Guanacaste, Los Almendros) (Thompson 2007). The new distributional record for the species is in the Napo moist forest ecoregion at 647 m.a.s.l. on the Colombian Amazon foothills in South America (Caquetá, Florencia, Vereda San Francisco; Figure 2). The species *Cepa alex* is known from the Alto Paraná Atlantic forests and humid chaco ecoregions at 76 and 479 m.a.s.l. in Brazil and Paraguay, respectively. *Cepa margarita* is present in the Serra do Mar coastal forests ecoregion at 768 m.a.s.l. in Brazil, while *Cepa simonettii* is known from the Valdivian temperate forests ecoregion in Chile at 47 m.a.s.l., and it has been restricted to the Valdivian evergreen forest hotspot, an ecosystem with *Nothofagus* trees and hygrophilous vegetation (Barahona-Segovia and Barceló 2019).

Cepa apeca is readily distinguished from other related species by its distinctive overall metallic dark greenish-blue coloration, dark brown antenna (except orange basoventral 1/3), pilose apicoposterior corner of anterior flattened anepisternum and katepimeron, hyaline wing (except for the brownish antero-apical 1/4), wing cells c, r and bm without microtrichia, crossvein r-m at the end level of the subcostal cell, and the 3rd and 4th costal sections equal in length (Thompson 2007).

The expansion of the geographic distribution of *Cepa apeca* by approximately 1,500 km (in a straight line) to the southeast, represents its southernmost known point of occurrence in South America, in the Andean-Amazonian region of Colombia. From this perspective, it seems to be that *Cepa* is a widely distributed yet uncommon genus in the lowland Neotropical group, which is now extended to the mountain foothills habitat by our record.

The diversity of Syrphidae in Colombia and the Andean Amazon is largely unknown and understudied (Montoya 2016), mainly due to limitations in infrastructure and the political instability in the region (Montoya *et al.* 2012). Our record increases the known Colombian Syrphid-fauna to 58 genera and 338 species, highlighting the need to explore new areas with huge potential to find rare groups such as *Cepa*. Further surveys are likely to reveal a wider distribution and abundance of this species in the Colombian mountainous ecosystems.

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Figure 2. Geographical distribution of *Cepa apeca*. This figure is in color in the electronic version.

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