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This contribution is published to honor Dr. Amnon Freidberg, a scientist, a colleague and a friend, on the occasion of his 75th birthday.

A new species of *Anastrephoides* Hendel (Diptera: Tephritidae) from Colombia, the first record of the subtribe Trypetina from South America

Allen L. Norrbom[1] & Pedro Alexander Rodriguez Clavijo[2]

[1]*Systematic Entomology Laboratory, USDA, ARS, PSI, c/o National Museum of Natural History, P. O. Box 37012, Washington, DC 20013-7012, USA. E-mail: allen.norrbom@usda.gov*
[2]*Instituto Colombiano Agropecuario (ICA), Laboratorio Moscas de la Fruta, C.I. Tibaitatá km 14 vía Bogotá-Mosquera, Colombia*

ABSTRACT

Anastrephoides colombiana, a new species of fruit fly from Colombia, is described and illustrated. It represents the first record of the genus *Anastrephoides* Hendel from the New World and the first species of the subtribe Trypetina from South America.

KEYWORDS: Tephritidae, Trypetina, fruit flies, Neotropical Region, distribution, new species, taxonomy.

RESUMEN

Anastrephoides colombiana, una especie nueva de mosca de fruta de Colombia, es descrita y ilustrada. Representa el primer registro del género *Anastrephoides* Hendel del Mundo Nuevo y la primera especie del subtribu Trypetina de America del Sur.

PALABRAS CLAVE: Mosca de fruta, Región Neotropical, distribución, nueva especie, taxonomía.

INTRODUCTION

The senior author has been fortunate to have had many extensive and stimulating conversations with Amnon Freidberg concerning the systematics and biology of Tephritidae. One topic of interest was the unusual disjunct distributions of some taxa, such as *Dioxyna* Frey, *Ensina* Robineau-Desvoidy, and *Carpomya* Costa, and how they may have arisen. In this paper, we document another taxon with a surprisingly disjunct distribution.

The subtribe Trypetina (Trypetinae: Trypetini) is a large clade of nearly 400 known species in 40 genera. Host relationships are poorly known, but the larvae of the majority of species whose biology is known are leaf or stem miners, although some feed in fruits. The greatest diversity of the Trypetina is in the paleotropics, particularly in the Oriental and northern Australasian regions, and the eastern

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Palearctic Region (Han 1999; Norrbom *et al.* 1999). Several genera extend into North America (*Euleia* Walker) or even the northern Neotropical Region (*Trypeta* Meigen), and one genus (*Strauzia* Robineau-Desvoidy) is endemic to the Nearctic Region. The genus *Anastrephoides* Hendel to date has been known only from two Palearctic species (Korneyev 1998). The discovery, reported here, of a new species from Colombia is the first record of the genus from the New World, and the first record of the Trypetina from South America. How its disjunct distribution came about presents another interesting biogeographic puzzle for Amnon, to whom this paper is dedicated, and other students of Tephritidae to solve.

MATERIALS AND METHODS

Morphological terminology follows White *et al.* (1999), except for the wing venation, which follows that of Cumming and Wood (2017). The illustrations are digital photographs taken with a Visionary Digital system, enhanced using Photoshop CS2 to adjust the exposure and make minor corrections.

TAXONOMY

Genus *Anastrephoides* Hendel, 1927

Anastrephoides Hendel, 1927: 105 (type species: *A. gerckei* Hendel, by original designation); Ito 1984: 118; Korneyev 1998: 9; Wang 1998: 144; Han 1999: 279.

Anastrephoides includes two species from Asia: *A. matsumurai* Shiraki, from eastern Russia (Primorskiy Krai, Sakhalin), northeastern China (Heilongjiang, Jilin), Korea, and Japan (Hokkaido, Honshu); and the type species, *A. gerckei* Hendel, described from Astrakhan, Russia, but likely based on a mislabeled type specimen and also possibly from eastern Asia (see Korneyev 1998). The discovery of the following species from Colombia, the first record from the New World, is a considerable range extension for the genus.

Anastrephoides colombiana n. sp.

(Figs 1–10)

LSID: urn:lsid:zoobank.org:act:515B7836-9501-4DF2-8195-B3288AB30D0B.

Etymology: The name of this species is derived from the country of origin of the type series.

Diagnosis: In the key to genera of Trypetini of Han (1999), this species runs to *Anastrephoides*. Its wing pattern is very similar to that of *A. matsumurai* Shiraki (Shiraki 1933, pl. VIII, fig. 4; Ito 1984, fig. 176), but the apex of the marginal hyaline mark in cell r_1 touches the anterior end of crossvein r–m (it is proximal to r–m in the other two species), the anterior apical band extends to the apex of vein M_1, and the posterior apical band is more proximal and well separated from the apex of M_1 (in the other two species the posterior apical band ends on the apex of M_1). This species further differs from *A. gerckei* Hendel (Hendel 1927, pl. VI, fig. 3) in

having a large hyaline spot in cell br between crossveins r–m and dm–m, and from both species in having shorter terminalia.

Description: Body length 4.8 mm (male), 5.0 mm (female). Mesonotum length 2.2 mm (male), 2.1 mm (female). Wing length 5.9 mm (male), 6.1 mm (female). Setae dark brown.

Head (Figs 1, 2). Orange except for brown ocellar tubercle. Frons without lobes or ridges, with 4 or 5 normally developed frontal setae and 2 reclinate orbital setae. Ocellar seta moderately developed, about as long as posterior orbital seta. Antenna orange; first flagellomere short, only slightly longer than wide (measured on medial side); arista brownish, very short pubescent on proximal half.

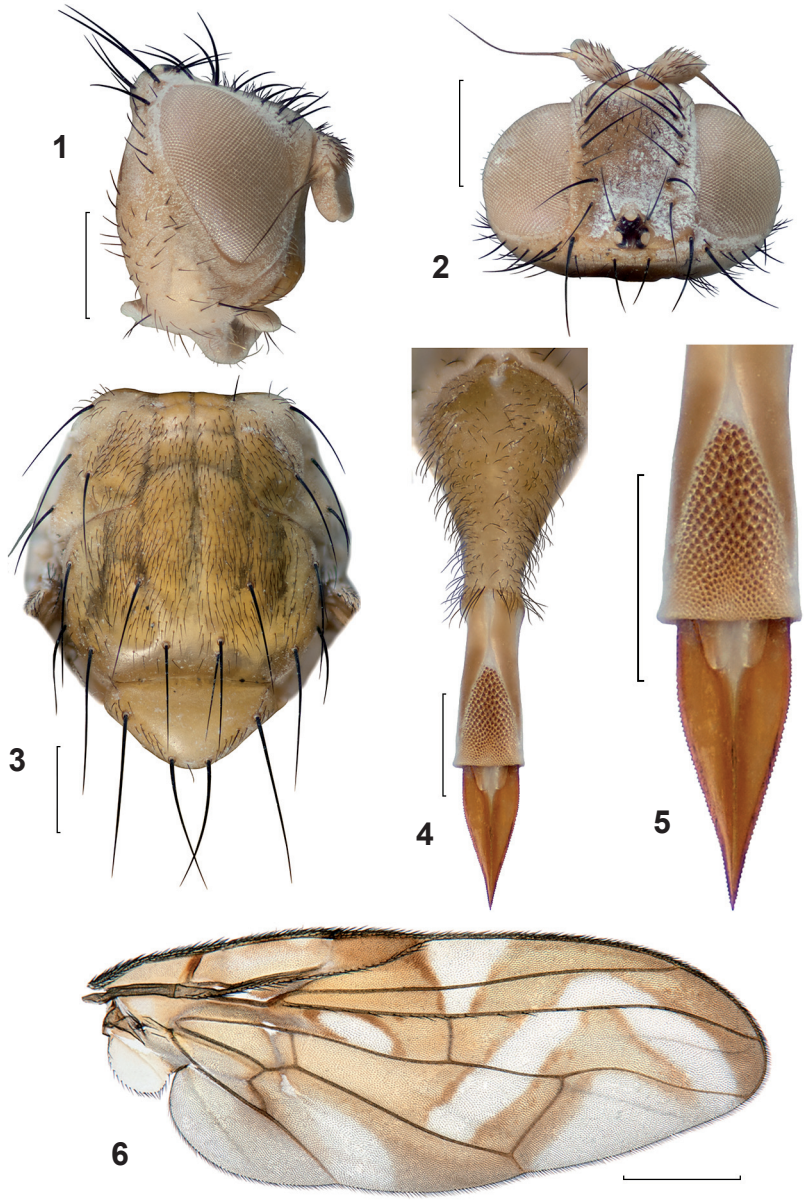
Thorax (Fig. 3). Mostly orange, without brown markings. Postpronotal lobe and dorsal margin of anepisternum white. Chaetotaxy: 1 postpronotal, 2 notopleural, 1 acrostichal, 1 dorsocentral (aligned closer to postsutural supra-alar setae than to postalar setae), 1 intra-alar, 1 presutural and 1 postsutural supra-alar, 1 postalar, basal and apical scutellar, 1 anepisternal (secondary setae weak and less than half length of dorsal seta), 1 katepisternal, and 1 anepimeral setae well developed. Scutum setulose, but nonmicrotrichose except postsutural lateral margin; notopleuron microtrichose; scutellum setulose only on margin, entirely microtrichose.

Legs. Entirely orange.

Wing (Fig. 6). With extensive orange pattern. Base mostly orange proximal to crossvein bm–m, including cell bc, c (except small subapical marginal hyaline spot), base of br, bm, and cua. Posterior two-thirds of wing with broad orange bands. Discal band covering all of pterostigma, extending to middle of cell m_4 where connected to band extended from base of cell m_4 to posterior wing margin; these bands also connected to oblique band extended to anterior wing margin in middle of cell r_1, where it connects to anterior apical band; subapical band broadly connected to basal bands in cell m_4, covering crossvein dm–m, and extending anteriorly to vein M_1, where connected to posterior apical band to form inverted V-shaped mark; posterior apical band fading posterior to vein M_1, well separated from apex of vein M_1; anterior apical band extended to apex of vein M_1, without marginal hyaline marks; cell br with large hyaline spot between crossveins bm–m and r–m; cells r_1 and r_{2+3} with triangular hyaline mark aligned with crossvein r–m; hyaline area between oblique band and subapical band and between anterior and posterior apical bands about as broad as those bands. Vein R_{4+5} setulose dorsally beyond level of dm–m. Crossvein r–m at 0.58–0.66 distance from bm–m to dm–m. Cell cua with posteroapical lobe almost as long as width of cell. Cell dm with anteroapical corner forming angle of 60–80°, less acute in male than in female (Fig. 6).

Abdomen. Entirely orange. Dark brown setulose.

Male terminalia (Figs 7–10). Surstyli elongate, longer than epandrium height; medial surstylus with 2 small, subequal prensisetae apically; lateral surstylus with anterior lobe larger than posterior lobe, both stout and triangular. Proctiger large, slightly bilobed, more or less evenly setulose. Glans stout, mostly sclerotized, with distinct granulation on median sclerite (see Han 1999, character 8).



Figs 1–6: *Anastrephoides colombiana* n. sp.: (1) head, lateral (male, USNMENT00677235); (2) head, dorsal (male, USNMENT00677235); (3) thorax, dorsal (male, USNMENT00677235); (4, 5) female terminalia, ventral and aculeus (USNMENT00677236); (6) wing (female, USNMENT00677236). Scale bars 0.5 mm in Figs 1–5 and 1.0 mm in Fig.6.

Female terminalia (Figs 4, 5). Oviscape entirely orange, 1.3 mm long ventrally; dorsoapically without outstanding setae (with a few setulae no longer than more proximal setulae on oviscape), ventroapically with 2–3 submedial pairs of setae 1.5–2.0× as long as other setulae. Eversible membrane with denticles triangular; dor-

Figs 7–10: *Anastrephoides colombiana* n. sp.: (7, 8), male terminalia, lateral and posterior views (USNMENT00677235); (9, 10) glans, lateral and dorsal views (USNMENT00677235). Scale bars 0.10 mm.

sally with denticles relatively small, decreasing in size posteriorly, slightly smaller along midline; ventrally with denticles in subovoid pattern, largest medially and towards anterior, decreasing in size posteriorly. Aculeus tip 0.62 mm long, elongate triangular, entirely finely serrate.

Holotype: ♀ **Colombia:** Risaralda, Pereira, 4.716°N 75.716°W, 2067 m, Trap 8, 29.v.2014, ICA (Javerian Museum of Natural History, Bogota, Colombia; USNMENT00677236).

Paratype: 1♂ **Colombia:** Risaralda, Pereira, 4.716°N 75.716°W, 2067 m, Trap 8, 30.i.2014, ICA (National Museum of Natural History, Smithsonian Institution, Washington, DC, USA; USNMENT00677235).

Distribution: This species is known only from the type locality, which is a forest remnant on the lower western slope of the Cordillera Central in Very Humid Sub-Tropical Forest characterized by having average temperature of 18–24 °C with average annual rainfall of 2000–4000 mm.

Biology: The host plants and biology of this species are unknown.

Comments: Unfortunately, our attempts to extract DNA from one leg of each of the type specimens were unsuccessful. Our classification of this species in *Anastrephoides* is based therefore on the morphological key and phylogeny of Han (1999). It relied to some extent on chaetotaxy and wing pattern, which are sometimes subject to homoplasy in Tephritidae, thus it could be possible that *A. colombiana* represents a distant branch of Trypetina that has converged with *Anastrephoides* in these characters. In wing pattern, *A. colombiana* also resembles some species of the Nearctic genus *Strauzia*. Without other evidence, however, it is most reasonable to hypothesize that *A. colombiana* is a widely disjunct member of *Anastrephoides*. The lateral prensiseta on the medial surstylus is not reduced in *A. colombiana* (the prensisetae are subequal), which Han (1999) considered a synapomorphy for the *Trypeta* group, thus this species does not appear to belong in *Trypeta*, the only other genus of Trypetina recorded from the Neotropical Region (from Mexico and Central America). Whatever its relationships, it has a remarkably disjunct distribution, as no other species of Trypetina is known from South America, and only *Trypeta* occurs in the northern Neotropical Region.

In the phylogeny of Han (1999), *Anastrephoides* is among the unresolved basal polychotomy within the Trypetina. It is thus possible that *Anastrephoides* is a basal lineage within the group. As noted by Han (1999), *Parastenopa* Hendel, the basal taxon within the Chetostomatina, the sister group of the Trypetina, is the only essentially Neotropical member of that taxon.

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