

Updating the distribution of mesembrinellid flies (Diptera: Mesembrinellidae) in Argentina with the first record of *Mesembrinella bicolor*

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Actualización de la distribución de mesembrinélidos (Diptera: Mesembrinellidae) en Argentina con el primer registro de *Mesembrinella bicolor*

RESUMEN. Durante muestreos llevados a cabo para evaluar la diversidad de dípteros caliptrados (Diptera: Calyptratae) en el nordeste de Argentina se detectó por primera vez a *Mesembrinella bicolor* (Fabricius, 1805). Este hallazgo representa la segunda especie de Mesembrinellidae para Argentina, luego de *Mesembrinella bellardiana* Aldrich, 1922 y el registro conocido más austral para una especie de Mesembrinellidae. Se incluye una breve diagnosis de ambas especies.

PALABRAS CLAVE. Chaco. Corrientes. Nuevo registro. Oestroidea.

ABSTRACT. During samplings carried out to evaluate the diversity of calyptrate flies (Diptera: Calyptratae) in northeastern Argentina, *Mesembrinella bicolor* (Fabricius, 1805) was first detected. This finding represents the second species of Mesembrinellidae from Argentina, after *Mesembrinella bellardiana* Aldrich, 1922 and the southernmost known record for a species of Mesembrinellidae. A brief diagnosis of both species is included.

KEYWORDS. Chaco. Corrientes. New record. Oestroidea.

Mesembrinellidae (Diptera: Oestroidea) is a family of robust and partly metallic flies native to the Neotropical Region, distributed from Southern Mexico to Northern Argentina (Guimarães, 1977; Peris & Mariluis, 1984; Cerretti et al., 2017). This group of flies has been considered repeatedly as a subfamily of Calliphoridae (e.g. Shannon, 1923; Pape et al., 2011; Kosmann et al., 2013; Wolff et al. 2014). However, Guimarães (1977) was the first to propose that the group was a monophyletic lineage separated from the remaining Calliphoridae. Since then, there is growing morphological (Rognes, 1997), molecular (Marinho et al., 2017) and fossil evidence (Cerretti et al., 2017) indicating that the mesembrinellids are a distinct Oestroidea lineage, which must be treated as a family. In a recent revision by Whitworth & Yusseff-Vanegas (2019), 53 species were considered valid, and

these were grouped in three monogeneric subfamilies: Laneellinae (*Laneella* Mello, 1967, 6 spp.), Mesembrinellinae (*Mesembrinella* Giglio-Tos, 1893, 46 spp.), and Souzalopesiellinae (*Souzalopesiella*, Guimarães, 1977, 1 sp.).

Little is known about the mesembrinellid's biology. Most species seem to have a very restricted habitat tolerance, because they are associated with preserved habitats, having only been found in primary humid forests and are absent in environments influenced by humans highlighting their potential role as bioindicators (Mariluis et al., 1990; Marinho et al., 2017; Sousa et al., 2020). Adult flies may feed on dung, fruit, and carrion, (Guimarães, 1977; Sousa et al., 2021). An unusual condition present in Mesembrinellidae is their obligate pseudo-placental

unilarviparity, in which a single larva is retained in the uterus of the female until the end of first instar when they are deposited on a feeding substrate to complete their life cycle (Meier, 1999). However, the food substrates consumed and the life cycle of species in this family are unknown.

The first species of Mesembrinellidae recorded in Argentina was *Mesembrinella bellardiana* Aldrich, 1922 by Guimarães (1977), which was subsequently cited by Peris & Mariluis (1984), Mariluis et al. (1990), and Whitworth & Yusseff-Vanegas (2019).

The authors of this research have been assessing the diversity of Calyptratae flies in Corrientes and Chaco for several years (e.g. Dufek et al., 2016, 2020). Based on the field work carried out in 2015 in Puerto Valle (Ituzaingó, Corrientes Province) and 2021 in El Impenetrable National Park (General Güemes, Chaco Province), several specimens identified as *Mesembrinella bicolor* (Fabricius, 1805) were collected. The aim of this work is to provide information on the newly recorded species, to update the distributional records of *M. bellardiana*, and to diagnose both species present in Argentina.

These specimens were collected using Van Someren-Rydon canopy traps baited with rotten bananas with yeast and rotten squid. Traps were placed in gallery forests: in Puerto Valle, the forest was close to Paraná River (27°36'12"S, 56°26'11"W), whereas in El Impenetrable National Park was close to Bermejo River (24°57'05"S, 60°57'52"W) (Fig. 1). Five traps per bait were placed in each site and were active for 48 h. The minimum distance between traps was 75 m.

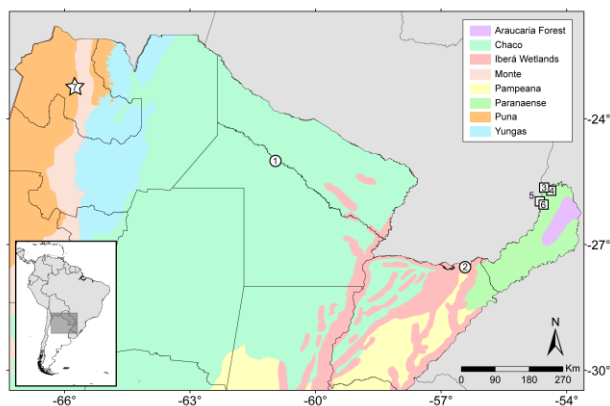


Fig. 1. Geographical distribution of *Mesembrinella bellardiana* (squares) and *Mesembrinella bicolor* (circles) in Argentina. The star indicates the doubtful location of *Mesembrinella bellardiana*. References= 1: El Impenetrable National Park, 2: Puerto Valle, 3: Puerto Iguazú, 4: Iguazú National Park, 5: Puerto Bemberg, 6: Puerto Esperanza, 7: Jujuy (doubtful record). Ecoregions adapted from Arana et al. (2021).

Flies were analyzed using a Carl Zeiss Stemi 305 stereomicroscope. The identification was based on the taxonomic key and descriptions provided by Whitworth & Yusseff-Vanegas (2019). Distribution data was compiled with all the localities cited in the available bibliography and

given on the reference label data of the examined specimens deposited in entomological collections. All specimens cited belong to the following institutions (acronyms in parentheses): Universidad Nacional del Nordeste, Corrientes, Argentina (CARTROUNNE) and Museo Argentino de Ciencias Naturales "Bernardino Rivadavia", Buenos Aires, Argentina (MACN).

***Mesembrinella bellardiana* Aldrich, 1922**

(Figs. 2; 4a, c, e, g)

Material examined. Argentina: Misiones, Puerto Iguazú, 09-XII-2020, Mulieri leg (1♀) (MACN); Misiones, Puerto Aguirre [Puerto Iguazú], no date, Hayward leg. (1♀) (MACN); Misiones, Puerto Bemberg, 1936, Hayward leg. (1♀) (MACN); Misiones, Iguazú National Park, IX, XI-1987 and I, II-1988, Mariluis leg (56♀, 10♂) (MACN); Misiones, Puerto Esperanza, XII-1976 and 2-X-1978, Mariluis leg. (56♀, 10♂) (MACN).

Distribution. Argentina, Bolivia, Brazil, Colombia, Ecuador, French Guiana, Paraguay, Peru, Suriname, and Venezuela (Whitworth & Yusseff-Vanegas, 2019).

Remark. Guimarães (1977) provided the first mention of the species in Argentina, based on a single specimen labeled from Abra Pampa, Jujuy. This locality is doubtful since it is a dry area outside the tropical montane forest belonging to the Yungas ecoregion, which seems the most probable biome for a Mesembrinellidae in the northwest of Argentina. The species has been repeatedly recorded in the Paranaense rainforests of the province of Misiones (Peris & Mariluis, 1984; Mariluis et al., 1990; Whitworth & Yusseff-Vanegas, 2019). This species was categorized as asynanthropic, occurring exclusively in non-anthropized sites near Puerto Iguazú (Mariluis et al., 1990).

***Mesembrinella bicolor* (Fabricius, 1805)**

(Figs. 3; 4 b, d, f, h)

Material examined. Argentina: Chaco, General Güemes, El Impenetrable National Park, 04-XI-2021, Dufek leg (2♀) (CARTROUNNE); Corrientes, Ituzaingó, Puerto Valle, 17-III-2015, Dufek leg (6♀, 1♂) (CARTROUNNE); Corrientes, Ituzaingó, Puerto Valle, 17-III-2015, Dufek leg (17 ♀) (MACN).

Distribution. Argentina (**new record**), Bolivia, Brazil, Costa Rica, Ecuador, El Salvador, French Guiana, Guatemala, Honduras, Mexico, Panama, Peru, Suriname, Trinidad, Venezuela (Whitworth & Yusseff-Vanegas, 2019).

Remark. The species probably has a wider distribution than *M. bellardiana* in Argentina since it was found in humid riverine forests in two different ecoregions. The presence of the species in Argentina constitutes the southernmost record for the genus in the world.

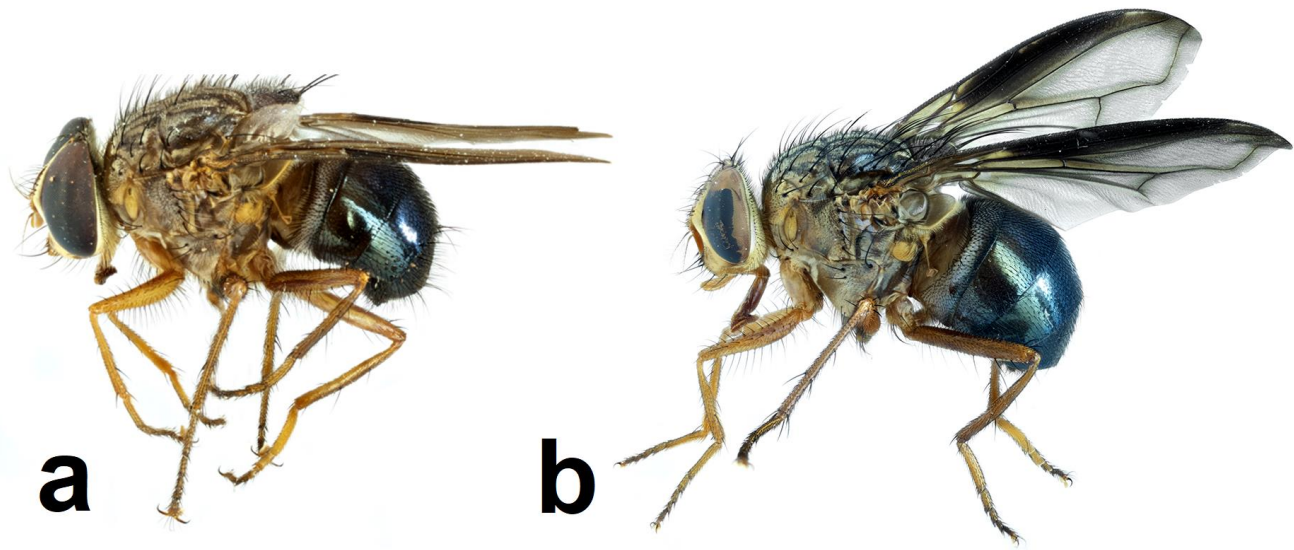


Fig. 2. *Mesembrinella bellardiana*. a. Male. b. Female.

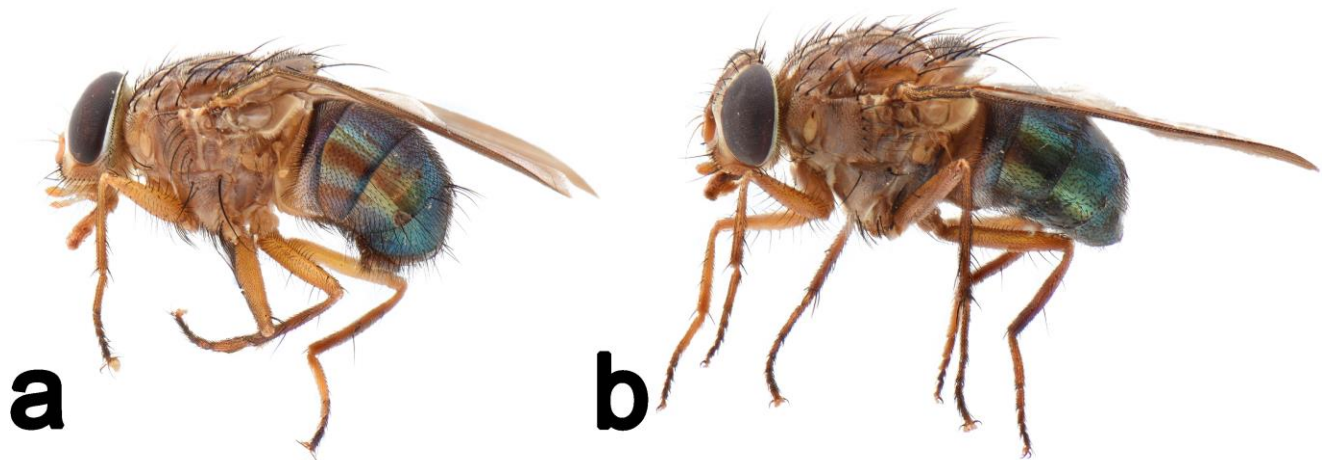


Fig. 3. *Mesembrinella bicolor*. a. Male. b. Female.

Whitworth & Yusseff-Vanegas (2019) classified the genus *Mesembrinella* into the following six species-groups: *Mesembrinella aeneiventris* (Wiedemann, 1830), *Mesembrinella anomala* (Guimarães, 1977), *M. bicolor*, *Mesembrinella bolivar* (Bonatto, 2005), *Mesembrinella latifrons* (Mello, 1967), and *Mesembrinella spicata* Aldrich, 1925. Both species recorded in Argentina, *M. bellardiana* and *M. bicolor*, belong to the *M. bicolor*-group and both species share (among other morphological characters) the postpronotal lobe with three setae (see Figure 3 in Kosmann et al., 2013). The main external morphological

differences that allow differentiating the species are summarized in Table I and Fig. 4.

According to the biogeographic scheme of Arana et al. (2021), *M. bellardiana*'s distribution in Argentina is restricted to the Paranaense ecoregion. It is possible that the species also inhabits the humid mountain forest of Yungas in Salta and Jujuy, but further studies are needed to confirm the presence of the species in such areas. Besides, *M. bicolor* has been reported in Iberá Wetlands and Chaco (Occidental or Dry) ecoregions (Fig. 1).

Table I. Differences between *Mesembrinella bellardiana* and *Mesembrinella bicolor* based on morphological characters.

Tagma	<i>Mesembrinella bellardiana</i>	<i>Mesembrinella bicolor</i>
Head	-Supravibrissal setae on facial ridge brown to reddish-brown (Fig. 4a).	-Supravibrissal setae dark brown (Fig. 4b).
Thorax	-Wing with long, dark infuscation along costa to R2+3 (Fig 4c); subcostal sclerite with long reddish setae (Fig. 4e); stem vein setose dorsally (Fig. 4g); rim of upper calypter dark with short dark setae.	-Wing with area from costa to R1 and areas along veins distinctly yellowed when observed under reflected light (Fig. 4d); subcostal sclerite bare (Fig. 4f); stem vein bare dorsally (Fig. 4h); rim of upper calypter brown with short brown setae.
Abdomen	-T1+2 yellowish -In posterior view, cerci broad, in an inverted narrow V-shape distally	-T1+2 more or less yellowish midway, metallic blue laterally. -In posterior view, base of cerci broad, evenly tapered to tips.

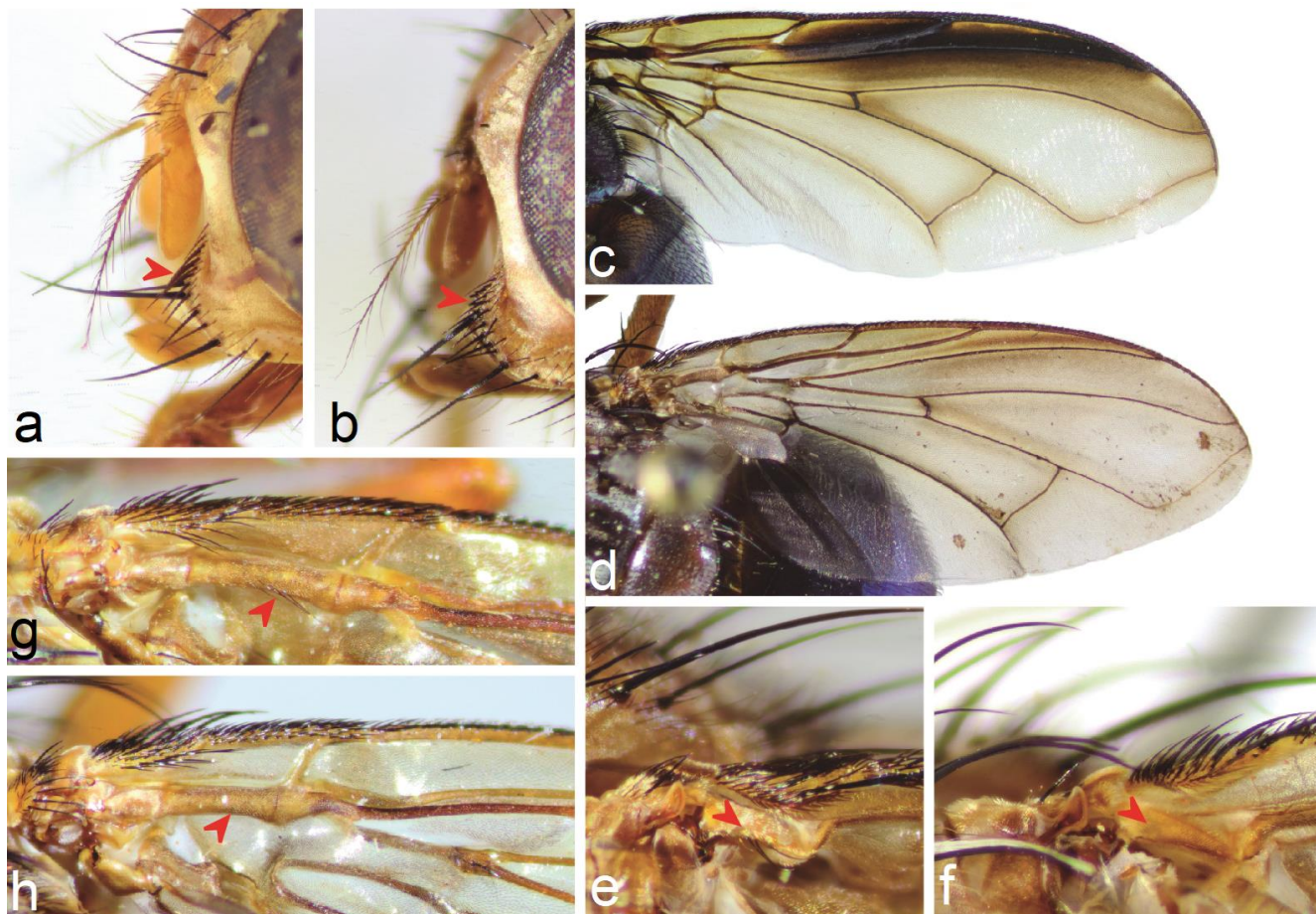


Fig. 4. *Mesembrinella bellardiana*. a. Supravibrissal setae. c. Wing. e. Subcostal sclerite. g. Stem vein. *Mesembrinella bicolor*. b. Supravibrissal setae. d. Wing. f. Subcostal sclerite. h. Stem vein.

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