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New records and distributional data of Sarcophaginae (Diptera: Sarcophagidae) from Colombia

Nuevos registros y datos de distribución de Sarcophaginae (Diptera: Sarcophagidae) de Colombia

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Abstract: Sarcophagidae is one of the largest families of Oestroidea. The family is classified into three subfamilies, Miltogramminae, Paramacronychiinae, and Sarcophaginae. The number of species of Sarcophaginae occurring in Colombia, as well as their geographical distributions, are still poorly documented. Here, six species are recorded for the first time in the country: *Argoravinia catiae* Carvalho Filho & Esposito, *Oxysarcodexia adunca* Lopes, *Oxysarcodexia carvalhoi* Lopes, *Oxysarcodexia eberti* Lopes & Tibana, *Peckia .Euboettcheria. epimelia* (Lopes), and *Peckia .Sarcodexia. chirotheca* (Hall). The occurrence of 16 species previously registered in Colombia is expanded to the Departments of Amazonas, Antioquia, Chocó, Magdalena, and Meta. As a result, the number of known Sarcophaginae species for Colombia is updated to 109.

Keywords: Calyptrate, Flesh flies, Geographic distribution, Neotropics, Sarcophagids.

Resumen: Sarcophagidae es una de las familias más grandes de Oestroidea. La familia se clasifica en tres subfamilias, Miltogramminae, Paramacronychiinae, y Sarcophaginae. El número de especies de Sarcophaginae reportadas para Colombia, así como su distribución geográfica, aún están pobremente documentadas. Aquí se registran seis especies por primera vez para el país: *Argoravinia catiae* Carvalho Filho & Esposito, *Oxysarcodexia adunca* Lopes, *Oxysarcodexia carvalhoi* Lopes, *Oxysarcodexia eberti* Lopes & Tibana, *Peckia .Euboettcheria. epimelia* (Lopes), and *Peckia .Sarcodexia. chirotheca* (Hall). Se amplía la ocurrencia de 16 especies previamente registradas en Colombia para los Departamentos de Amazonas, Antioquia, Chocó, Magdalena y Meta. Como resultado, el número de especies conocidas de Sarcophaginae para Colombia se actualiza a 109.

Palabras clave: Calyptratae, Distribución geográfica, Moscas de la carne, Neotrópico, Sarcófagidos.

Sarcophagidae is a worldwide distributed flesh-fly family that encompasses about 3000 named species (Pape et al., 2011), being the second most species-rich family within the superfamily Oestroidea, and is usually classified into three subfamilies: Miltogramminae, Paramacronychiinae, and Sarcophaginae (Pape, 1996; Pape et al., 2011). The latter subfamily, with about 2300 species in 46 genera (Buenaventura & Pape, 2018), has its highest richness in the Neotropical Region and is generally more diverse in life habits and morphology of the male terminalia than the other two subfamilies (Buenaventura et al., 2018).

The study of the sarcophagid fauna in Colombia has been focused on flies collected near the main cities attracted with carrion (Wolff et al., 2001; Pérez et al., 2005; Martínez et al., 2007; Buenaventura et al., 2009; Barrios & Wolff, 2011; Ramírez-Mora et al., 2012; Amat et al., 2013; Yepes-Gaurisas et al., 2013; Ramos-Pastrana et al., 2014; Valverde Castro et al., 2017). To date, there are 109 recorded Sarcophagidae species for Colombia (Pape, 1996; Pape et al., 2004; Ramírez-Mora et al., 2012; Buenaventura & Pape, 2013; Yepes-Gaurisas et al., 2013; Mello-Patiu, 2016; Souza & Buenaventura, 2016; Valverde-Castro et al., 2017, Souza et al., 2020), of which 103 belong to the subfamily Sarcophaginae. In this study, we aimed to contribute to the knowledge of the Sarcophaginae species recorded for the first time in localities from Colombia and to extend the geographical distribution of previously known species.

A total of 485 male specimens were examined from 31 localities (Fig. 1), collection data are summarized in Table I.

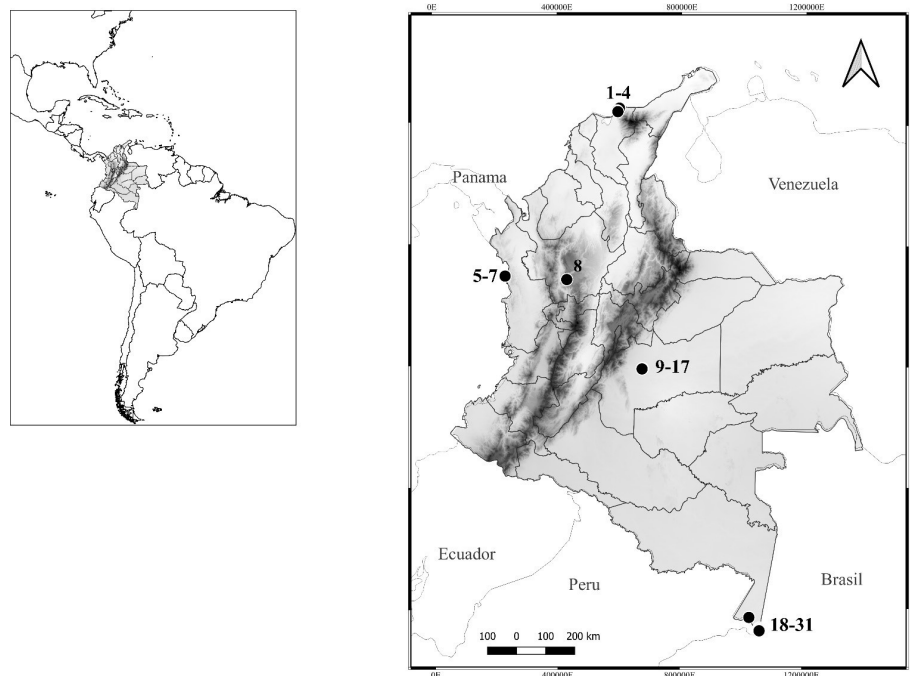


Fig. 1.

Map with collection localities in Colombia. The numbers correspond to those in the column “Site number” in Table I.

Site number	Department	Municipality	Location site	Geographical coordinate	Collection date	Altitude
1	Magdalena	Santa Marta	Vereda Las Tinajas	11°14'54.5"N 74°4'3"W	1—3.III.2013	337
2	Santa Marta	Vereda Vira Vira		11°14'9.8"N 74°4'17"W	1—3.III.2013	222
3	Santa Marta	Minca, entrada Las Cabañas		11°9'22.3"N 74°8'7.8"W	1—2.III.2013	420
4	Santa Marta	Minca, Via Arimaca		11°07'57.2"N 74°07'07.8"W	1—2.III.2013	420
5	Chocó	Bahía Solano	Playa Huina	6°16'25.2"N 77°27'36.1"W	23—25.IX.2013	53
6	Bahía Solano	Playa Huina		6°16'18.3"N 77°27'33.6"W	23—25.IX.2013	53
7	Bahía Solano	Playa Huina		6°16'13.2"N 77°27'27.5"W	23—25.IX.2013	56
8	Antioquia	Itagüí	Campus Tecnológico de Antioquia	6°10'6.2"N 75°37'56.1"W	18.X.2019	1634
9	Meta	San Martín	Reserva Natural Rey Zamuro	3°32'11.2"N 73°23'59.7"W	4—6.VI.2013	262
10	San Martín	Reserva Natural Rey Zamuro		3°32'10.6"N 73°23'52.5"W	4—6.VI.2013	273
11	San Martín	Reserva Natural Rey Zamuro		3°32'9.1"N 73°23'27.6"W	4—6.VI.2013	456
12	San Martín	Reserva Natural Rey Zamuro		3°32'5.9"N 73°23'30.6"W	4—6.VI.2013	270
13	San Martín	Reserva Natural Rey Zamuro		3°32'1.4"N 73°23'21.7"W	4—6.VI.2013	259
14	San Martín	Reserva Natural Rey Zamuro		3°31'59.8"N 73°23'59"W	4—6.VI.2013	270
15	San Martín	Reserva Natural Rey Zamuro		3°31'55.1"N 73°23'18.1"W	4—6.VI.2013	257
16	San Martín	Reserva Natural Rey Zamuro		3°31'36.5"N 73°24'16.3"W	4—6.VI.2013	266
17	San Martín	Reserva Natural Rey Zamuro		3°31'30.3"N 73°24'17.4"W	4—6.VI.2013	267
18	Amazonas	Leticia	Mocagua	3°49'6.8"S 70°14'30.2"W	23—27.XI.2013	88
19	Leticia	Mocagua		3°49'12.1"S 70°14'30.2"W	23—25.XI.2013	100
20	Leticia	Mocagua		3°49'20.9"S 70°14'30.5"W	23—25.XI.2013	100
21	Leticia	Mocagua		3°49'24.7"S 70°14'37.2"W	23—25.XI.2013	105
22	Leticia	Carretera los kms, km7		4°8'13.7"S 69°56'18.5"W	20—24.XI.2013	87
23	Leticia	Carretera los kms, km7		4°8'15.7"S 69°56'18.2"W	20—24.XI.2013	114
24	Leticia	Carretera los kms, km7		4°8'19.5"S 69°56'23.8"W	20—24.XI.2013	82
25	Leticia	Carretera los kms, km7		4°10'4.3"S 69°56'39.1"W	20—22.XI.2013	82
26	Leticia	Carretera los kms, km5		4°11'35"S 69°56'6.2"W	20—22.XI.2013	93
27	Leticia	Carretera los kms, km5		4°12'0.1"S 69°56'8.2"W	20—24.XI.2013	83
28	Leticia	Leticia		4°12'32.2"S 69°56'38.7"W	22—26.XI.2013	79
29	Leticia	Leticia		4°12'40.1"S 69°56'32.8"W	22—24.XI.2013	79
30	Leticia	Leticia		4°13'1.4"S 69°56'28.1"W	20—27.XI.2013	79
31	Leticia	Leticia		4°13'5.3"S 69°56'28.3"W	20—22.XI.2013	79

Table I.
Collection localities in Colombia.

The material is deposited at the Colección Entomológica Tecnológico de Antioquia (CETdeA, number 204 in the Colombian National Record). Specimens were attracted using Van Someren Rydon traps baited with decomposing fish and chicken, traps were left in the field between 12-24 hrs. Male specimens were examined and identified using the reference collection previously identified by Dr. Eliana Buenaventura hosted at CETdeA, and the following taxonomic keys, descriptions, and redescriptions: Guimarães (2004), Pape & Mello-Patiu (2006), Carvalho & Mello-Patiu (2008), Vairo et al. (2011), Carvalho Filho & Esposito (2012), Buenaventura & Pape (2013), Vairo et al. (2014), Souza et al. (2020). Previous distributional records at country level for the Neotropical Region were obtained from Pape et al. (2004), Ramírez-Mora et al. (2012), Mello-Patiu (2016), Valverde-Castro et al. (2017), Dufek et al. (2020), and the references used for the taxonomic identification.

As a result, 22 species of Sarcophaginae were identified, six of which are recorded for the first time for Colombia: *Argoravinia catiae* Carvalho Filho & Esposito, 2012, *Oxysarcodexia adunca* Lopes, 1975, *Oxysarcodexia carvalhoi* Lopes, 1946, *Oxysarcodexia eberti* Lopes & Tibana, 1987, *Peckia .Euboettcheria. epimelia* (Lopes, 1938), and *Peckia (Sarcodexia) chirotheca* (Hall, 1933). The distribution of 16 species already known from Colombia is also updated, with new records for the departments of Amazonas, Antioquia, Chocó, Magdalena, and Meta (Table II).

Subfamily Sarcophaginae

Argoravinia catiae Carvalho Filho & Esposito, 2012

Material examined: 4 males, sites 11, 12 (Table I).

Distribution. Neotropical: Brazil, Colombia (Table II).

Engelimyia inops Walker, 1849

- Material examined*: 2 males, site 17 (Table I).
Distribution. Neotropical: Bolivia, Brazil, Colombia (Table II), Ecuador, Guyana, Peru, Trinidad & Tobago.
Oxysarcodexia adunca **Lopes, 1975**
Material examined: 4 males, site 18 (Table I).
Distribution. Neotropical: Brazil, Colombia (Table II), Ecuador.
Oxysarcodexia amorosa (**Schiner, 1868**)
Material examined: 45 males, sites 18, 20, 22-24, 27-31 (Table I).
Distribution. Neotropical: Brazil, Colombia (Table II), Costa Rica, Ecuador, Guyana, Mexico, Panama, Peru.
Oxysarcodexia angrensis **Lopes, 1933**
Material examined: 1 male, site 25 (Table I).
Distribution. Neotropical: Brazil, Colombia (Table II), Costa Rica, Ecuador, Guyana, Panama, Peru, Trinidad & Tobago, Venezuela.
Oxysarcodexia avuncula **Lopes, 1933**
Material examined: 2 males, sites 1, 2 (Table I).
Distribution. Neotropical: Argentina, Bolivia, Brazil, Colombia (Table II), Ecuador, Mexico, Paraguay, Peru, Trinidad & Tobago.
Oxysarcodexia carvalhoi **Lopes, 1946**
Material examined: 7 males, sites 5, 11, 15 (Table I).
Distribution. Neotropical: Brazil, Colombia (Table II), Ecuador, Guyana.
Oxysarcodexia conclausa **Walker, 1861**
Material examined: 92 males, sites 9, 11, 12, 14—16, 26, 28—31 (Table I).
Distribution. Nearctic: Canada, USA; Neotropical: Chile, Colombia (Table II), Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Panama, Peru, Trinidad & Tobago, Venezuela.
Oxysarcodexia eberti **Lopes & Tibana, 1987**
Material examined: 10 males, site 8 (Table I).
Distribution. Neotropical: Brazil, Colombia (Table II).
Oxysarcodexia fluminensis **Lopes, 1946**
Material examined: 40 males, sites 28, 30 (Table I).
Distribution. Neotropical: Argentina, Brazil, Colombia (Table II).
Oxysarcodexia fringidea **Curran & Walley, 1934**
Material examined: 246 males, sites 9, 11, 14-16 (Table I).
Distribution. Neotropical: Bolivia, Brazil, Colombia (Table II), Guyana, Peru, Venezuela.
Oxysarcodexia sarcinata **Lopes, 1953**
Material examined: 1 male, site 7 (Table I).
Distribution. Neotropical: Colombia (Table II), Costa Rica, Mexico, Panama, Trinidad & Tobago.

Species	AMA	ANT	ATL	BOL	BOY	CES	CHO	COR	CUN	GUA	MAG	MET	PUT	QUI	SAN	SUC	VLL	VAU
<i>Argorhina caliae</i> *												NR						
<i>Engelmyia inops</i>	PR											NR						PR
<i>Oxysarcodexia adunca</i> *	NR																	
<i>Oxysarcodexia amorosa</i>	NR	PR	PR			PR		PR		PR	PR						PR	
<i>Oxysarcodexia angrensis</i>	NR	PR		PR		PR		PR										
<i>Oxysarcodexia avuncula</i>		PR				PR						PR						
<i>Oxysarcodexia carvalhoi</i> *							NR					NR						
<i>Oxysarcodexia conchosa</i>	NR	PR	PR	PR		PR	PR	PR		PR	PR	NR					PR	
<i>Oxysarcodexia eberti</i> *		NR																
<i>Oxysarcodexia fluminensis</i>	NR	PR																
<i>Oxysarcodexia fringidea</i>	NR								PR			NR						
<i>Oxysarcodexia sarchnata</i>		PR	PR			PR	NR	PR									PR	PR
<i>Peckia (Euboettcheria) anguilla</i>	PR	PR			PR	PR					NR	PR				PR		
<i>Peckia (Euboettcheria) collusor</i>	NR	PR				PR								PR	PR			
<i>Peckia (Euboettcheria) epimelia</i> *	NR																	
<i>Peckia (Patonella) intermutans</i>	PR	PR			PR	PR		PR				NR						
<i>Peckia (Peckia) pexata</i>		PR		PR		PR		PR		PR	PR	NR					PR	
<i>Peckia (Sarcodexia) aequata</i>		PR			PR							NR						
<i>Peckia (Sarcodexia) chirotheca</i> *							NR											
<i>Peckia (Sarcodexia) lambens</i>	PR	PR	PR	PR		PR	PR	PR		PR	PR	NR	PR				PR	
<i>Bavinia effrenata</i>		PR	PR	PR		PR		PR		PR	PR	NR					PR	
<i>Tricharaea (Sarcophagula) canuta</i>	PR	PR										NR						

Table II.

List of Sarcophagidae species with new records for Colombia and departments in the country, and their known distribution.

Colombian departments are abbreviated as follow: AMA: Amazonas; ANT: Antioquia; ATL: Atlántico; BOL: Bolívar; BOY: Boyacá; CAL: Caldas; CES: Cesar; CHO: Chocó; COR: Córdoba; CUN: Cundinamarca; GUA: La Guajira; MAG: Magdalena; MET: Meta; PUT: Putumayo; QUI: Quindío; SAN: Santander; SUC: Sucre; TOL: Tolima; VLL: Valle del Cauca; VAU: Vaupés. References = * species recorded for the first time for Colombia; NR: new records; PR: previous record.

Peckia (Euboettcheria) Anguilla (Curran & Walley, 1934)

Material examined: 1 male, site 3 (Table I).

Distribution. Neotropical: Argentina, Bolivia, Brazil, Colombia (Table II), Costa Rica, Guyana, Mexico, Nicaragua, Panama, Peru, Trinidad & Tobago.

Peckia (Euboettcheria) collusor (Curran & Walley, 1934)

Material examined: 8 males, sites 22-24, 26, 28, 30 (Table I).

Distribution. Neotropical: Argentina, Bolivia, Brazil, Colombia (Table II), Costa Rica, Ecuador, Guyana, Panama, Peru, Trinidad & Tobago, Venezuela.

Peckia (Euboettcheria) epimelia (Lopes, 1938)

Material examined: 1 male, site 21 (Table I).

Distribution. Neotropical: Brazil, Colombia (Table II), Ecuador.

Peckia (Patonella) intermutans (Walker, 1861)

Material examined: 4 males, sites 13, 15, 16 (Table I).

Distribution. Neotropical: Argentina, Belize, Brazil, Colombia (Table II), Costa Rica, Ecuador, Guatemala, Guyana, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, St. Lucia, Trinidad & Tobago, Venezuela.

Peckia (Peckia) pexata (Wulp, 1895)

Material examined: 7 males, sites 10, 12 (Table I).

Distribution. Nearctic: USA; Neotropical: Argentina, Barbados, Brazil, Colombia (Table II), Costa Rica, Ecuador, El Salvador, Guatemala, Mexico, Nicaragua, St. Lucia, St. Vincent and the Grenadines, Trinidad & Tobago, Venezuela.

Peckia (Sarcodexia) aequata (Wulp, 1895)

Material examined: 1 male, site 4 (Table I).

Distribution. Neotropical: Bolivia, Brazil, Colombia (Table II), Ecuador, Mexico, Panama, Peru, Venezuela.

Peckia (Sarcodexia) chirotheca (Hall, 1933)

Material examined: 1 male, site 6 (Table I).

Distribution. Neotropical: Belize, Colombia (Table II), Costa Rica, Panama, Venezuela.

Peckia (Sarcodexia) lambens (Wiedemann, 1830)

Material examined: 3 males, sites 9, 11, 12 (Table I).

Distribution. Nearctic: USA; Neotropical: Argentina, Bahamas, Bolivia, Brazil, Cayman Is., Chile, Colombia (Table II), Costa Rica, Cuba, Ecuador, El Salvador, Guadeloupe, Guyana, Haiti, Honduras, Jamaica, Mexico, Panama, Paraguay, Peru, Puerto Rico, St. Vincent and the Grenadines, Trinidad & Tobago, Venezuela; Australasian/Oceanian: Cook Is., French Polynesia.

Ravinia effrenata (Walker, 1861)

Material examined: 1 male, site 10 (Table I).

Distribution. Nearctic: USA; Neotropical: Bahamas, Colombia (Table II), Costa Rica, Cuba, Dominica, El Salvador, Guatemala, Jamaica, Panama, Peru.

Tricharaea (Sarcophagula) canuta (Wulp, 1896)

Material examined: 4 males, sites 10, 11, 14 (Table I).

Distribution. Nearctic: USA; Neotropical: Brazil, Colombia (Table II), Costa Rica, Cuba, Dominica, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Paraguay.

This study provides 22 new geographic records of Sarcophaginae in Colombia, South America, including species recorded for the first time for the country, and advances towards the knowledge of flesh fly diversity from Colombia. In particular, it increases the knowledge of the sarcophagid fauna in unexplored regions far from large urban centers such as Chocó and Meta departments. As a result, the number of known species of Colombian Sarcophaginae increased to 109. The most diverse genera registered in the country were *Oxysarcodexia* (31 species) and *Peckia* (27 species). These genera are common in the Neotropical Region and are represented by a large number of species.

Colombia is a country having various geographical regions and climates with diverse environments. Therefore, the actual number of sarcophagid species should be substantially higher than the one mentioned here.

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