

Scientific Essay
(*Ensayo*)

CATALOG OF THE FAMILY CALLIPHORIDAE (DIPTERA: OESTROIDEA) OF MEXICO

CATÁLOGO DE LA FAMILIA CALLIPHORIDAE (DIPTERA: OESTROIDEA) DE MÉXICO

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ABSTRACT. Calliphoridae is a worldwide distributed family of flies with over 1,500 described species. There are approximately 100 species in the Nearctic region and 130 in the Neotropical region, but in the Mexican territory only few species have been recorded. There is not a previous catalog of Mexican calliphorids. This catalog summarizes taxonomic actualized information of 30 species of 11 genera and three subfamilies of Calliphoridae known up to date in Mexico.

Key words: blow flies; taxonomy; species list

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RESUMEN. La familia Calliphoridae está presente en casi todo el mundo con más de 1,500 especies descritas. Existen aproximadamente 100 especies en la región Neártica y 130 en la región Neotropical, pero en el territorio mexicano solo pocas especies se han registrado. No existe un catálogo previo de califóridos de México. Este catálogo recopila la información taxonómica básica y actualizada de las 30 especies de 11 géneros y tres subfamilias de Calliphoridae conocidos hasta el momento en México.

Palabras clave: moscas metálicas; taxonomía; lista de especies

INTRODUCTION

Flies of the family Calliphoridae are commonly known in English as blow flies, green bottles or blue bottles, and in Spanish “moscas metálicas” or “moscas panteoneras”, with some species very familiar to people around the world (Prado e Castro *et al.*, 2016). It has a great diversity within calyprate Diptera with about 1,500 described species belonging to 150 genera present in all biogeographic regions (Rognes, 1991).



Blow flies are medium-size Diptera (4–16 mm) some with a beautiful metallic color (iridescence) ranging from green, blue to purplish and violet, while some others have duller coloration, but all with some degree of metallic reflections. Males are usually holoptic and females dichoptic with chaetotaxy similar in both sexes (Prado e Castro *et al.*, 2016; Wolff & Kosmann, 2016). Adult Calliphoridae are found in wide variety of habits; some species feed on nectar and are pollinators, other species are parasites of worms, bird nestlings and snails, a few have medical and veterinary importance causing myiasis or mechanical transmission of pathogens, but the bulk of species are associated with decaying animal and vegetable matter and feces (Norris, 1966; Rognes, 1998; Zumpt, 1965; Prado e Castro *et al.*, 2016). Immature stages feed on a wide variety of substrates including carcasses and healthy/necrotic tissues of vertebrates, and some feed on amphibians, birds or mammals' blood (Wolff & Kosmann, 2016). These habits allow the family to play an important ecological key role as decomposers, being a useful tool in forensic entomology studies for that reason (Byrd & Castner, 2010). Blow fly species show different levels of synanthropy (association with human habitats), some associated with high disturbed habitats as urban environments and human settlements (eusynanthropy), modify ecosystems for agricultural, pastoral and forestry practices (hemisynanthropy) or natural pristine ecosystems (asynanthropy) (Povolný, 1971).

Phylogeny of Calliphoridae is still debatable and some authors believe it is not a monophyletic group (Rognes, 1997; Kutty *et al.*, 2010). Some subfamilies of Calliphoridae have been recently elevated to the family status based in morphological and molecular data, such as Mesembrinellidae and Rhiniidae (Kutty *et al.*, 2010; Marinho *et al.*, 2012, 2017; Cerretti *et al.*, 2017), changes that we follow in this work. Some authors have contributed since 1960's with a variety of studies regarding the blow fly fauna in the Neotropical region (James, 1955, 1966, 1970, 1971; Mello, 1961, 1962, 1965, 1967, 1968, 1969a, 1969b, 1972a, 1972b, 1974, 1978, 1996, 2003; Whitworth, 2014; Wolff, 2013) and some others to the Nearctic region fauna (e.g. Hall, 1948; Tantawi & Whitworth, 2014; Tantawi *et al.*, 2017; Whitworth, 2006).

The number of species distributed in America is significantly smaller as compared to the rest of the world (Wolff & Kosmann, 2016), as there are nearly 100 species in the Nearctic region (Pape *et al.*, 2009) and 130 species in the Neotropical region (Pape *et al.*, 2011). Considering that Mexico belongs to the biogeographic transition zone between Nearctic and Neotropical areas (Halfpeter, 2003), with a variety of ecosystems, the number of species expected in Mexico should be higher than the number known to date. This is probably consequence of the scarcity of faunistic studies on this group.

There are few catalogs of American Calliphoridae and no one specific for Mexico. The Catalog of the Diptera of America North of Mexico (Hall, 1965), presented species distributed in North America with few records in Mexico which unfortunately is not updated taxonomically, whereas the Catalogue of the Diptera of the Americas south of the United States (James, 1970) do not include all the Mexican species known today, also in a non-updated classification. Some South and Central America catalogs have been published recently in different countries such as Chile (Mac-Lean & González, 2006), Nicaragua (Maes *et al.*, 1994), Colombia (Wolff & Kosmann, 2016), and Systema Dipteroorum available online, with records on nomenclature and references of several worldwide species (Pape & Evenhuis, 2019), and for Mexico there is one catalog of Diptera available online at CONABIO (Ibáñez-Bernal, 2017), which includes Mesembrinellidae as subfamily and other species as valid that now are synonyms.

In the particular case of Mexico, studies regarding this family are few and disperse, some are focused on the entomological succession on corpses (Byrd & Castner, 2010; Flores, 2009; García-Espinoza *et al.*, 2012; Mañas-Jordá *et al.*, 2017; Stanford-Camargo *et al.*, 2017; Valdés-Perezgasga *et al.*, 2012). Nevertheless, scarcity of systematized and periodic studies in nearly all the Mexican territory makes difficult to present a complete list of Mexican species, moreover, to trace the geographic distribution of species.

In this work an up-to-date catalog of Calliphoridae (Diptera) for Mexico based on an extensive literature review is presented. It includes 30 species, in 11 genera and three subfamilies (Table 1), with their



synonyms and early name combinations and references. Information is presented by category starting with family, genus and species, followed by the author (s) and year of publication of the original description. The original reference, type species for supraspecific taxa and type locality for species are also presented. A chronological list of synonyms for each taxon, with the author (s), year of publication, starting page of mention and type specimens for supraspecific taxa and type locality for species, are provided. For each species the known distribution by country is given and in the case of Mexican records the states in which the species are known are presented between parentheses. For some species we present notes or additional useful references that we consider to be complementary information regarding taxonomical notes or further discussions.

Table 1. Calliphoridae species recorded in Mexico.

Subfamily	Genus	Species	Author
Calliphorinae	<i>Calliphora</i>	<i>coloradensis</i>	Hough, 1889
		<i>grahami</i>	Aldrich, 1930
		<i>irazuana</i>	Townsend, 1908
		<i>latifrons</i>	Hough, 1889
		<i>triseta</i>	Whitworth, 2012
		<i>vicina</i>	Robineau-Desvoidy, 1830
	<i>Cynomya</i>	<i>cadaverina</i>	Robineau-Desvoidy, 1830
	<i>Protocalliphora</i>	<i>asiovora</i>	Shannon & Dobroscky, 1924
		<i>beameri</i>	Sabrosky, Bennett & Whitworth, 1989
		<i>sialia</i>	Shannon & Dobroscky, 1924
Lucilinae	<i>Lucilia</i>	<i>cluvia</i>	(Walker, 1849)
		<i>cuprina</i>	(Wiedemann, 1830)
		<i>eximia</i>	(Wiedemann, 1830)
		<i>illustris</i>	(Meigen, 1826)
		<i>mexicana</i>	Macquart, 1843
		<i>purpurascens</i>	(Walker, 1836)
		<i>sericata</i>	(Meigen, 1826)
<i>silvarum</i>	(Meigen, 1826)		
Chrysomyinae	<i>Cochliomyia</i>	<i>hominivorax</i>	(Coquerel, 1858)
		<i>macellaria</i>	(Fabricius, 1775)
	<i>Compsomyiops</i>	<i>callipes</i>	(Bigot, 1877)
		<i>fulvicrura</i>	(Robineau-Desvoidy, 1830)
	<i>Chloroprocta</i>	<i>melloi</i>	Dear, 1985
		<i>idioidea</i>	(Robineau-Desvoidy, 1830)
	<i>Chrysomya</i>	<i>megacephala</i>	(Fabricius, 1794)
		<i>rufifacies</i>	(Macquart, 1843)
	<i>Hemilucilia</i>	<i>segmentaria</i>	(Fabricius, 1805)
		<i>semidiaphana</i>	(Rondani, 1850)
<i>Paralucilia</i>	<i>fulvinota</i>	(Bigot, 1877)	
<i>Phormia</i>	<i>regina</i>	(Meigen, 1826)	

Family Calliphoridae Brauer & Bergenstamm, 1889

Calliphorinae Brauer & Bergenstamm, 1889: 85. Type: *Calliphora* Robineau-Desvoidy.

Additional references: Sabrosky, 1999: 85.

Subfamily Calliphorinae Brauer & Bergenstamm, 1889

Genus *Calliphora* Robineau-Desvoidy, 1830

Calliphora Robineau-Desvoidy, 1830: 433. Type species: *Musca vomitoria* Linnaeus, 1758: 595.

Steringomyia Pokorny, 1889: 568. Type species: *Steringomyia stylifera* Pokorny, 1889: 569.

Abonesia Villeneuve, 1927: 357. Type species: *Musca genarum* Zetterstedt, 1838: 658.

Acrophaga Brauer & Bergenstamm, 1891: 367. Type species: *Acrophaga stelviana* Brauer & Bergenstamm, 1891: 367; Brauer, 1893: 500.

Eucalliphora Townsend, 1908: 118. Type species: *Calliphora latifrons* Hough, 1899a: 286.

Aldrichiella Rohdendorf, 1931: 177. Type species: *Calliphora grahami* Aldrich, 1930: 1. Junior homonym of *Aldrichiella* Vaughan, 1903: 101, and *Aldrichiella* Hendel, 1911: 37.

Stobbeola Enderlein, 1933: 126. Type species: *Stobbeola norwegica* Enderlein, 1933: 126.

Aldrichina Townsend, 1934a: 111. Type species: *Calliphora grahami* Aldrich, 1930: 1, replacement name for *Aldrichiella* Rohdendorf, 1931: 177.

Acronesia Hall, 1948: 272. Type species: *Steringomyia aldrichia* Shannon, 1923: 112.

***Calliphora coloradensis* Hough, 1899**

Calliphora coloradensis Hough, 1899a: 286. Type locality: USA, Colorado.

Additional references: Shannon, 1923: 109, 1926: 135; Hall, 1948: 294; James, 1953: 143; Poole, 1996: 77; Whitworth, 2006: 699; Tantawi *et al.*, 2017: 314.

Distribution: Canada, United States of America. Mexico (Durango, Morelos, Puebla) (Tantawi *et al.*, 2017).

***Calliphora grahami* Aldrich, 1930**

Calliphora grahami Aldrich, 1930: 1. Type locality: China, Sichuan Province.

Aldrichina grahami (Aldrich): Hall, 1948: 290.

Additional references: Thomas, 1951: 181; James, 1953: 144, 1955: 10; Hall, 1965: 929; Poole, 1996: 77; Whitworth, 2006: 699; Tantawi *et al.*, 2017: 316.

Distribution: Mexico (Ciudad de México, Durango, Hidalgo) (Tantawi *et al.*, 2017). This species is indigenous to the west Palearctic and Oriental regions but was introduced to Hawaii and Western of United States of America (Whitworth, 2006) and then to Mexico.

***Calliphora irazuana* Townsend, 1908**

Calliphora irazuana Townsend, 1908: 118. Type locality: Costa Rica, Irazú.

Distribution: Costa Rica, El Salvador, Guatemala. Mexico (Chiapas, Ciudad de México, Durango, Estado de México, Guerrero, Puebla, Veracruz) (Whitworth, 2012).



***Calliphora latifrons* Hough, 1899**

Calliphora latifrons Hough, 1899a: 286. Type locality: USA, Idaho, Moscow.

Eucalliphora latifrons (Hough): Townsend, 1908: 118.

Eucalliphora arta Hall, 1948: 287. Type locality: Mexico, San Luis Potosí.

Calliphora arta (Hall): Whitworth, 2006: 698.

Calliphora bezzi Zumpt, 1956: 16. Type locality: Ruta, Italy.

Additional references: Shannon, 1923: 109; James, 1970: 12; Whitworth, 2006: 703; Rognes, 2016: 195; Tantawi *et al.*, 2017: 326.

Distribution: Canada, United States of America. Mexico (Baja California, Chiapas, Ciudad de México, Durango, Puebla, Tabasco) (Tantawi *et al.*, 2017). Tantawi *et al.* (2017) presented this species as indigenous of North America, but Rognes (2016) reported this species in China and Italy as *Calliphora bezzi* Zumpt, and he stated that apparently this species was dispersed by human activity, as it has only been found at international ports, leading to believe that the species has not established outside North America, but it can become a established population in the future.

***Calliphora triseta* Whitworth, 2012**

Calliphora triseta Whitworth, 2012: 18. Type locality: Costa Rica, San Jose Province.

Additional references: Whitworth, 2012: 18.

Distribution: Costa Rica, El Salvador. Mexico (Chiapas, Oaxaca) (Whitworth, 2012). Its distribution overlaps with *Calliphora irazuana*, but Whitworth (2012) makes a clear difference to recognize both species, stating that this species may distribute in high altitudes of mountain areas thorough Central America.

***Calliphora vicina* Robineau-Desvoidy, 1830**

Calliphora vicina Robineau-Desvoidy, 1830: 435. Type locality: USA, Philadelphia.

Musca carnivora Fabricius, 1794: 313. Name suppressed, see International Commission on Zoological Nomenclature (1992 [Opinion 1670]: 90).

Musca erythrocephala Meigen, 1826: 62. Junior primary homonym of *Musca erythrocephala* De Geer, 1776. Name suppressed, see International Commission on Zoological Nomenclature (1992 [Opinion 1670]: 90).

Calliphora littoralis Robineau-Desvoidy, 1830: 435. Type locality: Not specified.

Calliphora spitzbergensis Robineau-Desvoidy, 1830: 435. Type locality: Norway, Spitzbergen.

Calliphora monspeliaca Robineau-Desvoidy, 1830: 436. Type locality: France, Montpellier.

Calliphora musca Robineau-Desvoidy, 1830: 436. Type locality: Not specified.

Calliphora nana Robineau-Desvoidy, 1830: 436. Type locality: France, Paris.

Calliphora scutellata Macquart, 1834: 161. Type locality: France, Lille.

Musca thuscia Walker, 1849: 897. Type locality: USA, New York.

Calliphora rufifacies Macquart, 1851: 216. Type locality: USA, New York.

Musca aucta Walker, 1853: 334. Type locality: India, Madras or Calcutta.

Calliphora insidiosa Robineau-Desvoidy, 1853: 334. Type locality: France, Paris.

Calliphora turanica Rohdendorf, 1926: 90. Type locality: Not specified.

Additional references: Rognes, 1991: 63; Tantawi *et al.*, 2017: 339.

Distribution. This species is widespread around the world, mainly in large cities. In America it is present from Canada through Central and South America (Whitworth, 2006, 2012; Tantawi *et al.*, 2017). In Mexico it has been recorded in Ciudad de México, but it is possible to be found in other states of Mexico. For detailed information see Rognes (1991).

Genus *Cynomya* Robineau-Desvoidy, 1830

Cynomya Robineau-Desvoidy, 1830: 363. Type species: *Musca mortuorum* Linnaeus, 1761: 452 (Macquart, 1834: 176).

Cynophaga Lioy, 1864: 890. Type species: *Musca mortuorum* Linnaeus.

Carcinomyia Townsend, 1915b: 21. Type species: *Cynomya hirta* Hough, 1898a: 166 (= *Musca mortuorum*).

Cynomyopsis Townsend, 1915c: 118. Type species: *Cynomya cadaverina* Robineau-Desvoidy, 1830: 365.

***Cynomya cadaverina* Robineau-Desvoidy, 1830**

Cynomya cadaverina Robineau-Desvoidy, 1830: 365. Type locality: USA, Carolina.

Calliphora myoidea Robineau-Desvoidy, 1830: 436. Type locality: USA, Pennsylvania.

Calliphora aurulans Robineau-Desvoidy, 1830: 437. Type locality: USA, Carolina.

Calliphora compressa Robineau-Desvoidy, 1830: 438. Type locality: USA, Carolina.

Musca mortisequa Kirby, 1837: 316. Type locality: USA, Alaska.

Musca ilerda Walker, 1849: 895. Type locality: Canada, Ontario.

Cynomyia americana Hough, 1898b: 105. Type locality: USA, Louisiana.

Calliphora texensis Townsend, 1908: 116. Type locality: USA, Texas.

Cynomyopsis cadaverina (Robineau-Desvoidy): Townsend, 1915a: 118.

Distribution: Alaska, Canada, Denmark, United States of America. Mexico (Aguascalientes) (Whitworth, 2006; Martínez-Ruvalcaba *et al.*, 2009). Rognes (1991) mentioned this species to be widespread in the Nearctic and Palearctic regions, Hall (1948) mentioned it is a common species in United States of America and Canada, whereas Whitworth (2006) mentioned that he rarely found it in the southern United States. Martínez-Ruvalcaba *et al.* (2009) reported some specimens in the state of Aguascalientes, Mexico.

Genus *Protocalliphora* Hough, 1899

Protocalliphora Hough, 1899b: 65–66. Type species: *Musca azurea* Fallén, 1817: 245.

Avihospita Hendel, 1901: 29. Type species: *Musca azurea* Fallén, 1817: 245. Aldrich, 1901: 68; Aldrich, 1905: 523.

Apaulina Hall, 1948: 179. Type species: *Protocalliphora avium* Shannon & Dobrosky, 1924: 249. Hamerstrom & Hamerstrom, 1954: 5; James, 1955: 24; Zumpt, 1956: 94.

Trypocalliphora Peus, 1960: 199. Type species: *Avihospita braueri* Hendel, 1901: 30.

Additional references: Rognes, 1985: 371–382 (revision of *Trypocalliphora*); Shewell, in McAlpine *et al.*, 1987: 1134–5, 1140, 1143; Sabrosky *et al.*, 1989: 44.

***Protocalliphora (P.) asiovora* Shannon & Dobrosky, 1924**

Protocalliphora avium var. *asiovora* Shannon & Dobrosky, 1924: 249. Type locality: USA, Washington, McElroy Lake.

Apaulina avium (Shannon & Dobrosky): Hall, 1948: 186.

Apaulina basingeri Hall, 1948: 190. Type Locality: USA, California, San Diego.

Protocalliphora asiovora (Shannon & Dobrosky): Hall, 1965: 926.



Distribution: Canada, United States of America. Mexico (Baja California) (Sabrosky *et al.*, 1989).

***Protocalliphora beameri* Sabrosky, Bennett & Whitworth, 1989**

Protocalliphora beameri Sabrosky, Bennett & Whitworth, 1989: 113. Type locality: USA, Arizona, Cave Creek Canyon.

Protocalliphora n. sp. B of Horning & Barr, 1970: 73.

Additional references: Sabrosky *et al.*, 1989: 113.

Distribution: United States of America. Mexico (Baja California) (Sabrosky *et al.*, 1989).

***Protocalliphora sialia* Shannon & Dobrosky, 1924**

Protocalliphora splendida var. *sialia* Shannon & Dobrosky, 1924: 249. Lectotype locality: USA, Pennsylvania, Delaware River.

Protocalliphora chrysorrhoea (Meigen): Henshaw, 1908: 87. Type series: destroyed (Rognes, 1991).

Phormia chrysorrhoea (Meigen): Lloyd, 1922: 116.

Apaulina sialia (Shannon & Dobrosky): Hall, 1948: 201.

Additional references: Sabrosky *et al.*, 1989: 208 (lectotype designation).

Distribution: Alaska, Canada, United States of America. Mexico (Durango, Puebla) (Sabrosky *et al.*, 1989).

Subfamily Luciliinae Shannon, 1923

Lucilini Shannon, 1923: 103, elevated to subfamily by Brues *et al.*, 1954: 356.

Genus *Lucilia* Robineau-Desvoidy, 1830

Lucilia Robineau-Desvoidy, 1830: 452. Type species: *Musca caesar* Linnaeus, 1758. Subsequent designation of Macquart, 1834: 162.

Phaenicia Robineau-Desvoidy, 1863: 750. Type species: *Phaenicia concinna* Robineau-Desvoidy, 1863: 778 (Townsend, 1916b: 8). Some Authors in North America continued to use this as a subgenus or genus until Rognes (1991) and Stevens and Wall (1996) discussed their phylogenetic relationships.

BufoLucilia Townsend, 1919: 542. Type species: *Lucilia bufonivora* Moniez, 1876: 25.

Francilia Shannon, 1924: 74. Type species: *Francilia alaskensis* Shannon, 1924: 74.

Viridinsula Shannon, 1926: 131. Shannon used this name as a subgenus of *Lucilia* but Curran (1934) elevated the subgenus to genus, James (1966) degraded it again to subgenus, and posteriorly Rognes (1991) did not recognize any subgenera and listed *Viridinsula* as a synonym of *Lucilia* (See Whitworth, 2014).

***Lucilia cluvia* (Walker, 1849)**

Musca cluvia Walker, 1849: 855. Type locality: West Indies.

Lucilia pilatei Hough, 1899a: 287. Type locality: USA, Georgia, Tifton. See Whitworth (2014) for further discussion on synonymy.

Lucilia cluvia (Walker): Shannon, 1926: 133.

Phaenicia cluvia (Walker): Hall, 1948: 236.

Distribution: Widespread in North and Central America. Mexico (Chiapas, Veracruz, Oaxaca, Campeche, Nayarit) (Whitworth, 2014).

***Lucilia cuprina* (Wiedemann, 1830)**

Musca cuprina Wiedemann, 1830: 654. Type locality: China.

Lucilia dorsalis Robineau-Desvoidy, 1830: 453. Type locality: Cape of Good Hope.

Lucilia amica Robineau-Desvoidy, 1830: 453. Type locality: Indonesia, Timor.

Lucilia elegans Robineau-Desvoidy, 1830: 458. Type locality: France, Ile de France.

Lucilia argyricephala Macquart, 1846: 326. Type locality: Cape of Good Hope (see Waterhouse & Paramonov, 1950 as *Lucilia argyrocephala* Macquart).

Musca fucina Walker, 1849: 883. Type locality: South Africa.

Musca serenissima Walker, 1852: 340. Type locality: West Indies.

Musca temperata Walker, 1852: 340. Type locality: East Indies.

Lucilia leucodes Frauenfeld, 1867: 453. Type locality: “Im Chinesischen Meer”.

Somomya pallifrons Bigot, 1877a: 257. Type locality: Australia.

Strongyloneura nigricornis Senior-White, 1924: 115. Type locality: India, North West Frontier Post, Cherat.

Lucilia pallescens Shannon, 1924: 78. Type locality: USA, North Carolina, Wilmington.

Lucilia cuprina (Wiedemann): Shannon, 1926: 131.

Additional references: Waterhouse & Paramonov, 1950.

Distribution. This species has an almost worldwide distribution; in America it has established from southern United States through Central America to Northern Argentina and Peru. Mexico (Veracruz) (Whitworth, 2014).

***Lucilia eximia* (Wiedemann, 1819)**

Musca eximia Wiedemann, 1819: 53. Type locality: Brazil.

Lucilia smaragdula Robineau-Desvoidy, 1830: 462. Type locality: Brazil.

Lucilia punctipennis Macquart, 1848: 216. Type locality: Brazil.

Lucilia subrectineuris Macquart, 1851: 223. Type locality: Brazil, Minas Gerais.

Musca insularis Walker, 1853: 340. Type locality: West Indies.

Somomya amazona Bigot, 1877a: 255. Type locality: Brazil.

Somomyia mutabilis Bigot, 1877a: 248. Type locality: “Mexicus”.

Somomyia pueblensis Bigot, 1877a: 250. Type locality: “Mexicus”.

Somoyia sylphida Bigot, 1877b: 45. Type locality: USA, New Orleans.

Lucilia hirtiforceps Shannon, 1926: 133. Type locality: Panama, Canal Zone.

Lucilia mera Shannon & Del Ponte, 1926: 586. Type locality: Argentina, San Pedro de Jujuy.

Lucilia primaveris Shannon & Del Ponte, 1926: 586. Type locality: Argentina, Buenos Aires, San Isidro.

Lucilia eximia (Wiedemann): Aubertin, 1933: 423.

Lucilia littoralis Blanchard, 1938: 380. Type locality: Argentina (see Whitworth, 2014).

Phaenicia eximia (Wiedemann): Hall, 1948: 239.

Additional references: Hall, 1948: 239; James, 1970: 10; Whitworth, 2014: 26.

Distribution: Widespread from southern United States through Central and South America. Mexico (Campeche, Chiapas, Guerrero, Jalisco, Estado de México, Michoacán, Morelos, Nuevo León, Oaxaca, Quintana Roo, San Luis Potosí, Sinaloa, Sonora, Tamaulipas, Veracruz) (Whitworth, 2014).



***Lucilia illustris* (Meigen, 1826)**

- Musca illustris* Meigen, 1826: 54. Type locality: Germany.
Musca parvula Meigen, 1826: 55. Type locality: Europe.
Musca equestris Meigen, 1826: 57. Type locality: Europe.
Lucilia fraterna Macquart, 1848: 217. Type locality: “America septentrionale”.
Lucilia consobrina Macquart, 1848: 217. Type locality: “America septentrionale”.
Musca muralis Walker, 1849: 888. Type locality: Canada, Hudson’s Bay, Albany River.
Calliphora simulatrix Pandelle, 1896: 218. Type locality: France.
Lucilia purpurea Townsend, 1908: 122. Type locality: USA, Alaska, Fort Wrangel (see Hall, 1948).
Lucilia ilustris (Meigen): Collin, 1926: 258.

Distribution: Holarctic, from Canada to Northern Mexico (Hall, 1948; James, 1970; Whitworth, 2014).

***Lucilia mexicana* Macquart, 1843**

- Lucilia mexicana* Macquart, 1843: 300. Type locality: Mexico.
Lucilia unicolor Townsend, 1908: 121. Type locality: USA, New Mexico.
Lucilia infuscata Townsend, 1908: 123. Type locality: USA, New Mexico.
Phaenicia mexicana (Macquart): Hall, 1948: 243.

Distribution: Southwestern United States of America to Honduras. Mexico (Baja California, Chiapas, Chihuahua, Coahuila, Durango, Jalisco, Michoacán, Morelos, Nuevo León, Oaxaca, Puebla, Zacatecas) (Whitworth, 2014).

***Lucilia purpurascens* (Walker, 1836)**

- Musca purpurascens* Walker, 1836: 355. Type locality: Brazil, Santa Catarina.
Lucilia brunnicornis Macquart, 1843: 299. Type locality: “Mexique”.
Lucilia violacea Macquart, 1847: 99. Type locality: “Mexique”.
Lucilia ocularis Shannon, 1926: 132. Type locality: Costa Rica, San Mateo. There is a misspelling as “*Lucilia oculatis*” (see Whitworth (2014) for explanation).
Lucilia purpurascens (Walker): Aubertin, 1933: 426.
Phaenicia purpurescens (Walker): Hall, 1948: 254. Misspelling and subsequent authors mistake (see Whitworth, 2014).

Distribution: Mainly Neotropical from Mexico to northern Argentina. Mexico (Chiapas, Veracruz, Morelos, Tamaulipas, Ciudad de México) (Whitworth, 2014).

***Lucilia sericata* (Meigen, 1826)**

- Musca sericata* Meigen, 1826: 53. Type locality: Germany.
Musca nobilis Meigen, 1826: 56. Type locality: Europe.
Chrsomya capensis Robineau-Desvoidy, 1830: 451. Type locality: Africa.
Lucilia basalis Macquart, 1842: 305. Type locality: Not specified.
Lucilia flavidipennis Macquart, 1843: 296. Type locality: Ceylon (Sri Lanka).
Musca lagyra Walker, 1849: 885. Type locality: Fayal.
Lucilia latifrons Schiner, 1862: 590. Type locality: Not specified.
Lucilia sayi Jaenicke, 1867: 375. Type locality: USA, Illinois.
Lucilia giralti Townsend, 1908: 121. Type locality: France, Paris.
Lucilia barberi Townsend, 1908: 121. Type locality: USA, Arizona, Williams.

Lucilia frontalis Brauer & Bergenstamm, 1891: 116 (*nomen nudum*). Aubertin, 1933: 411. Type locality: Egypt.

Lucilia sericata (Meigen): Townsend, 1908: 120.

Additional references: Mello, 1961: 261; James, 1970 for synonymy and discussion, and Whitworth (2012), for description and distribution.

Distribution: From southern Canada to Argentina. It is commonly stated that the species has a widespread distribution in the Americas, but it is doubtful (Hall, 1948; Mello, 1961; Whitworth, 2014). Mexico (Coahuila, San Luis Potosí) (Valdés-Perezgasga & García-Espinoza, 2014).

***Lucilia silvarum* (Meigen, 1826)**

Musca silvarum Meigen, 1826: 53. Type locality: Not specified.

Lucilia brunica Robineau-Desvoidy, 1830: 459. Type locality: North America.

Lucilia nigripalpis Townsend, 1908: 120. Type locality: USA, Ohio.

BufoLucilia lucilioides Wulp, 1896: 288. Enderlein, 1933: 120 (as *Xerophilophaga*). Type locality: Mexico, Mexico City.

BufoLucilia silvarum (Meigen): Townsend, 1919: 542; Hall, 1948: 219.

Lucilia silvarum (Meigen): Rognes, 1991: 181.

Additional references: Hall, 1948: 219; Tantawi & Whitworth, 2014: 104 (Key).

Distribution: Holarctic: Europe, Asia, North Africa (Rognes, 1991); Nearctic: Canada, United States of America. Mexico (Ciudad de México, Coahuila) (Hall, 1948, 1965; James, 1970; Valdés-Perezgasga & García-Espinoza, 2014).

Subfamily Chrysomyinae Shannon, 1923

Chrysomyini Shannon, 1923: 103, elevated to subfamily by Malloch, 1927: 299, 300, 324.

Genus *Cochliomyia* Townsend, 1915

Callitroga Brauer, 1883: 74. Type species: *Musca macellaria* Fabricius, 1775: 776. Type locality: West Indies (see Melville, 1984, name suppression).

Cochliomyia Townsend, 1915c: 646. Type species: *Musca macellaria* Fabricius.

***Cochliomyia hominivorax* (Coquerel, 1858)**

Lucilia hominivorax Coquerel, 1858: 173. Type locality: French Guiana, Cayenne.

Compsomyia homicida Brauer, 1899: 525, misspelling of *hominivorax* Coquerel.

Calliphora infesta Philippi, 1861: 513. Type locality: Chile, Santiago.

Calliphora anthropophaga Conil, 1878: 71. Type locality: Argentina, Córdoba.

Somomyia fulvobarbata Bigot, 1888: 598. Type locality: Uruguay, Montevideo.

Cochliomyia americana Cushing & Patton, 1933: 539. Type locality: USA, Texas, Menard.

Cochliomyia hominivorax (Coquerel): Dear, 1985: 138.

Additional references: Dear, 1985: 138. (taxonomy discussion).



Distribution: Argentina, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, French Guyana, Greater Antilles, Guatemala, Jamaica, Nicaragua, Panama, Peru, Puerto Rico, Trinidad and Tobago, Uruguay. Mexico (Veracruz, Tamaulipas, Yucatán, Chiapas) (Dear, 1985; Wolff & Kossman, 2016).

***Cochliomyia macellaria* (Fabricius, 1775)**

- Musca macellaria* Fabricius, 1775: 776. Type locality: “America”.
- Musca laniaria* Wiedemann, 1830: 683. Type locality: Brazil.
- Chrysomya viridula* Robineau-Desvoidy, 1830: 445. Type locality: Brazil.
- Chrysomya affinis* Robineau-Desvoidy, 1830: 445. Type locality: Brazil.
- Chrysomya tibialis* Robineau-Desvoidy, 1830: 446. Type locality: Jamaica, Pour-Au-Prince.
- Chrysomya lherminieri* Robineau-Desvoidy, 1830: 446. Type locality: USA, Carolina.
- Chrysomya alia* Robineau-Desvoidy, 1830: 447. Type locality: Brazil.
- Chrysomya socia* Robineau-Desvoidy, 1830: 447. Type locality: Brazil.
- Chrysomya decora* Robineau-Desvoidy, 1830: 448. Type locality: “Antilles”.
- Chrysomya plaei* Robineau-Desvoidy, 1830: 448. Type locality: “Antilles”.
- Chrysomya lepida* Robineau-Desvoidy, 1830: 448. Type locality: Brazil.
- Calliphora violacea* Macquart, 1843: 285. Type locality: Africa, probably a mistake. Dear (1985) states that it is from Chile.
- Lucilia vittata* Macquart, 1843: 298. Type locality: Australia, New-Holland. Dear (1985) mentioned a locality mistake, because it is a species from the New World.
- Lucilia durvillei* Macquart, 1843: 299. Type locality: Peru, Payta.
- Musca certima* Walker, 1849: 873. Type locality: USA, Florida.
- Musca phauda* Walker, 1849: 896. Type locality: Galapagos Islands.
- Pyrellia cyanicolor* Rondani, 1850: 178, unjustified name for *Calliphora violacea* Macquart.
- Calliphora tristriata* Verhuell, 1850: 273. Type locality: Surinam, Paramaribo, Paramaribo.
- Calliphora tibialis* Macquart, 1851: 215. Type locality: Brazil, Rio de Janeiro.
- Lucilia rubrifrons* Macquart, 1851: 223. Type locality: Argentina, Buenos Aires.
- Musca turbida* Walker, 1853: 336. Type locality: Jamaica.
- Musca fasciata* Walker, 1853: 337. Type locality: Brazil.
- Lucilia picicrus* Thomson, 1869: 543. Type locality: Panama.
- Lucilia curvipes* Thomson, 1869: 544. Type locality: Brazil, Río de Janeiro.
- Lucilia porticola* Thomson, 1869: 544. Type locality: Peru, Callao.
- Lucilia quadrisignata* Thomson, 1869: 544. Type locality: Galapagos Islands.
- Somomyia flavigena* Bigot, 1877a: 249. Type locality: Mexico.
- Somomyia aztequina* Bigot, 1877a: 252. Type locality: Mexico.
- Somomyia iridicolor* Bigot, 1888: 599. Type locality: Cuba.
- Chrysomyia lynchi* Lähille, 1915: 12. Type locality: Argentina, Chaco.
- Cochliomyia fontanai* García, 1952: 71. Type locality: Argentina, Belgrano.

Distribution: This species is common in the Nearctic and Neotropical regions. Argentina, Bahamas, Belize, Bermuda, Bolivia, Brazil, Caribbean, Chile, Costa Rica, Cuba, Dominican Republic, Ecuador, Greater Antilles, Guatemala, Guyana, Honduras, Jamaica, Nicaragua, Panama, Paraguay, Peru, Trinidad and Tobago, Uruguay, Venezuela. Mexico (Veracruz, Jalisco, Yucatán, Chiapas, Morelos, Durango) (Dear, 1985; Whitworth, 2010; Wolff & Kosmann, 2016).

Genus *Compsomyiops* Townsend, 1918

- Compsomyiops* Townsend, 1918: 153. Type species: *Calliphora fulvipes* Macquart, 1843: 289.
- Myiolucilia* Hall, 1948: 109. Type species: *Musca lyrcea* Walker, 1849: 873.

***Compsomyiops callipes* (Bigot, 1877)**

Somomya callipes Bigot, 1877a: 249. Type locality: Mexico.

Somomya calopus Bertkau, 1879: 538 (unjustified emendation of *callipes*).

Chrysomyia wheeleri Hough, 1899a: 284. Type locality: USA, California, Monterey.

Paralucilia wheeleri (Hough): Hall, 1948: 153.

Distribution: United States of America. Mexico (Ciudad de México, Guerrero, Michoacán, Morelos, Veracruz) (Dear, 1985).

***Compsomyiops fulvicrura* (Robineau-Desvoidy, 1830)**

Chrysomya fulvicrura Robineau-Desvoidy, 1830: 446. Type locality: Uruguay, Montevideo.

Calliphora fulvipes Macquart, 1843: 289. Type locality: Chile.

Musca lyrcea Walker, 1849: 873. Type locality: Montevideo, Uruguay.

Musca caruca Walker, 1849: 877. Type locality: Chile.

Musca gamelia Walker, 1849: 878. Type locality: Uruguay, Montevideo.

Calliphora annulipes Philippi, 1861: 514. Type locality: Chile, Santiago.

Lucilia taeniaria Thomson, 1869: 544. Type locality: Argentina, Buenos Aires.

Paralucilia nigripes Mello, 1968: 184. Type locality: Argentina, Buenos Aires, Boulogne.

Distribution: Argentina, Brazil, Chile, Guyana, Mexico, Uruguay (Lopes & Albuquerque, 1955; James, 1970; Guimarães *et al.*, 1983; Kosmann *et al.*, 2013). However, there is not a punctual record for Mexico, as stated above many authors use the distribution of this species as it is spread through Mexico, Central and South America. But according to Dear (1985), González-Mora *et al.* (1998) and Mariluis and Mueleri (2003), the distribution is restricted to South America (Bolivia, Guyana, Brazil, Uruguay, Argentina, Chile). Dear (1985) stated that there has been a lot of misidentifications thorough history, and confusion specially with Hall (1948) (See the discussion under *Paralucilia* in Dear, 1985), so this species is recorded for Mexico in many works, but it may or may not be present in Mexico as we could not find a punctual record, further analysis and material revision is required to confirm this.

***Compsomyiops melloi* Dear, 1985**

Compsomyiops melloi Dear, 1985: 155. Type locality: Mexico, Ciudad (de México).

Distribution: Colombia. Mexico (Ciudad de México) (Dear, 1985; Kosmann *et al.*, 2013).

Genus *Chloroprocta* Wulp, 1896

Chloroprocta Wulp, 1896: 296. Type species: *Chloroprocta semiviridis* Wulp, 1896: 296 (= *Chrysomya idiodea* Robineau-Desvoidy, 1830).

Callitrogopsis Townsend, 1935: 70. Type species: *Callitrogopsis costalis* Townsend, 1935: 70 (= *Chrysomya idiodea* Robineau-Desvoidy, 1830).

***Chloroprocta idiodea* (Robineau-Desvoidy, 1830)**

Chrysomya idiodea Robineau-Desvoidy, 1830: 445. Type locality: Brazil.

Musca violacea Fabricius, 1805: 228. Type locality: “America Meridionalis”.

Lucilia fuscipennis Macquart, 1851: 223. Type locality: Brazil.

Musca purpurea Walker, 1853: 337. Type locality: South America.

Chloroprocta semiviridis Wulp, 1896: 296. Type locality: Mexico, Yucatán (Type designation of Townsend, 1937: 123).



Strongyloneura flavifacies Engel, 1931: 138. Type locality: Bolivia.

Callitrogopsis costalis Townsend, 1935: 71. Type locality: Brazil (type designation of Townsend, 1937: 123).

Additional references: James, 1970: 5; Dear, 1985: 113; Pape *et al.*, 2004: 203; Amat, 2009: 700; Amat, 2010: 399; Kosmann *et al.*, 2013: 76; Wolff & Kosmann, 2016: 859.

Distribution: Bahamas, Brazil, Colombia, Cuba, El Salvador, Guyana, Nicaragua, Panama, Paraguay, Peru, Trinidad, United States of America, Venezuela (Kosmann *et al.*, 2013). México (Colima, Yucatán) (Dear, 1985; Kosmann *et al.*, 2013).

Genus *Chrysomya* Robineau-Desvoidy, 1830

Chrysomya Robineau-Desvoidy, 1830: 444. Type species: *Chrysomya regalis* Robineau-Desvoidy, 1830: 444, by designation of Coquillett, 1910: 523.

Compsomyia Rondani, 1875: 425. Type Species: *Musca dux* Eschscholtz.

Pycnosoma Brauer & Bergenstamm, 1894: 623. Type species: *Musca marginalis* Wiedemann.

Paracompsomyia Hough, 1898c: 184. Type species: *Paracompsomyia nigripennis* Hough.

Psilostoma Surcouf, 1919: 58. Type species: *Ochromyia incisuralis* Macquart.

Microcalliphora Townsend, 1916a, 618. Type species: *Lucilia varipes* Macquart.

Cyaneosomyia Séguy, 1928: 112. Type species: *Cyaneosomyia phaonis* Seguy.

Pycnosomops Townsend, 1934b: 277. Type species: *Musca putoria* Wiedemann.

Additional references: Dear, 1985: 112; Zumpt, 1956: 178 (taxonomic review of the genus).

Chrysomya megacephala (Fabricius, 1794)

Musca megacephala Fabricius, 1794: 317. Type locality: India, Teshi, Gahna.

Musca dux Eschscholtz, 1822: 114. Type locality: Guam.

Chrysomya duvaucelii Robineau-Desvoidy, 1830: 451. Type locality: India, West Bengai.

Chrysomya gratiosa Robineau-Desvoidy, 1830: 451. Type locality: "Oriental Region".

Lucilia flaviceps Macquart, 1843: 302. Type locality: India.

Musca remuria Walker, 1849: 871. Type locality: China.

Musca bata Walker, 1849: 875. Type locality: Not specified.

Musca combrea Walker, 1849: 876. Type locality: Not specified.

Pollenia basalis Smith, 1876: 449. Type locality: Indic ocean, Isla Rodrigues.

Somomyia pfefferi Bigot, 1877a: 257. Type locality: Mauritius.

Somomyia cyanocincta Bigot, 1888: 604. Type locality: Indonesia, Java.

Somomyia dives Bigot, 1888: 600. Type locality: India, Calcutta.

Chrysomya megacephala (Fabricius): Malloch, 1930: 233.

Additional references: Senior-White *et al.*, 1940: 138 (taxonomic review and keys); Kurahashi, 1991: 713; Zumpt, 1965: 97.

Distribution: From North to South America (Dear, 1985). Mexico (Baja California Sur, Chiapas, Estado de México, Michoacán, Morelos, Veracruz, Yucatán) (Castañeda-Vildózola *et al.*, 1999; Pérez-Balam *et al.*, 2012).

Chrysomya rufifacies (Macquart, 1843)

Lucilia rufifacies Macquart, 1843: 303. Type locality: Australia, New Holland.

Lucilia orientalis Macquart, 1843: 302. Type locality: India, Pondicherry.

Lucilia pavonina Schiner, 1868: 305. Type locality: Kar Nicobar and Tellschong (Andaman and Nicobar Islands).

Somomyia barbata Bigot, 1877b: 30. Type locality: India.

Chrysomya cordieri Séguy, 1925: 303. Type locality: Indonesia, Java, Sockaboemi.

Chrysomya rufifacies (Macquart) Bezzi, 1927: 235.

Additional references: Holdaway, 1933: 553; Senior-White *et al.*, 1940: 141; Zumpt, 1965: 92 (taxonomic review and history); Kurahashi, 1991: 713.

Distribution: Established in almost all the Americas (Dear, 1985). Mexico (Chiapas to Durango) (Gagné, 1981; Baumgartner & Greenberg, 1984).

Genus *Hemilucilia* Brauer, 1895

Hemilucilia Brauer, 1895: 598. Type species: *Musca segmentaria* Fabricius, 1805: 292.

Mya Rondani, 1850: 175, primary homonym.

Additional references: Dear, 1985: 124 (species review).

***Hemilucilia segmentaria* (Fabricius, 1805)**

Musca segmentaria Fabricius, 1805: 292. Type locality “America Meridionalis”. Additional references: Dear (1985); Kosmann *et al.* (2013) (taxonomic review and keys).

Lucilia nubipennis Rondani, 1848: 77. New name for “*segmentaria*” of Wiedemann.

Chrysomya hyacinthina Robineau-Desvoidy, 1830: 450. Type locality: South America.

Calliphora femorata Walker, 1861: 310. Type locality: Mexico.

Hemilucilia hermanlenti Mello, 1972b: 548. Type locality: Brazil, Río de Janeiro.

Hemilucilia nubipennis occidentalis Mariluis, 1980: 86. Type locality: Ecuador.

Hemilucilia segmentaria (Fabricius): Dear, 1985: 127.

Distribution: Argentina, Bolivia, Brazil, Colombia, Costa Rica, Ecuador, El Salvador, Guyana, Mexico, Panama, Paraguay, Peru, Trinidad (Dear, 1985). Mexico (Morelos, Veracruz, personal observations).

***Hemilucilia semidiaphana* (Rondani, 1850)**

Mya semidiaphana Rondani, 1850: 177. Type locality: Brazil.

Hemilucilia hermanlenti Mello, 1972b: 548. Type locality: Brazil, Río de Janeiro.

Hemilucilia segmentaria ssp. *pacifiencis* Mariluis, 1980: 85. Type locality: Ecuador.

Hemilucilia semidiaphana (Rondani): Dear, 1985: 130.

Additional references: Dear, 1985: 130 (discussion of types and taxonomic review).

Distribution: From Argentina to Mexico (Dear, 1985). Mexico (Veracruz, personal observation).

Genus *Paralucilia* Brauer & Bergenstamm, 1891

Paralucilia Brauer & Bergenstamm, 1891: 391. Type species: *Calliphora fulvipes* Macquart, 1834: 289.

Additional references: Dear, 1985: 117 (review of species; commentaries on type species specimen).



***Paralucilia fulvinota* (Bigot, 1877)**

- Somomya fulvinota* Bigot, 1877a: 251. Type locality: Mexico.
Chrysomyia desvoidy Hough, 1900: 208. Type locality: Brazil, Chapada.
Paralucilia braueri Townsend, 1916b: 11. Type locality: Chile.
Paralucilia fulvinota (Bigot): Dear, 1985: 119.

Additional references: Dear, 1985: 119 (discussion about types and taxonomy).

Distribution: Bolivia, Brazil, Chile, Costa Rica, Colombia, Ecuador, Guyana, Peru, Venezuela. Mexico (Morelos, Veracruz) (Dear, 1985).

Genus *Phormia* Robineau-Desvoidy, 1830

- Phormia* Robineau-Desvoidy, 1830: 465. Type species: *Musca regina* Meigen, 1826: 58.
Euphormia Townsend, 1919: 542. Type species: *Musca regina* Meigen, 1826: 58.

***Phormia regina* (Meigen, 1826)**

- Musca regina* Meigen, 1826: 58. Type locality: Not specified.
Musca thalassina Meigen, 1826: 54. Type locality: Europe.
Phormia philadelphica Robineau-Desvoidy, 1830: 466. Type locality: USA, Pennsylvania.
Phormia regina (Meigen): Robineau-Desvoidy, 1830: 466.
Phormia cuprea Robineau-Desvoidy, 1830: 467. Type locality: France, Paris.
Phormia fulvifacies Robineau-Desvoidy, 1830: 467. Type locality: France, Paris.
Phormia vittata Robineau-Desvoidy, 1830: 467. Type locality: France, Yonne.
Phormia squalens Robineau-Desvoidy, 1830: 468. Type locality: France, Yonne.
Musca mollis Walker, 1849: 892. Type locality: Canada, Ontario.
Musca proxima Walker, 1853: 341. Type locality: USA, California.
Lucilia rufipalpis Jaenicke, 1867: 375. Type locality: USA, Illinois.
Lucilia stigmatalis Thomson, 1869: 544. Type locality: USA, California.
Somomya nigrina Bigot, 1877a: 247. Type locality: USA, Illinois.
Somomyia rupicola Bigot, 1888: clxxx (180). Type locality: USA, Rocky Mountains.
Somomyia rufigena Bigot, 1888: clxxxi (181). Type locality: USA, Rocky Mountains.

Distribution: Holarctic: Canada, United States of America. In Mexico as south as Mexico City (Hall, 1948), but also in Veracruz (personal observation).

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