

**New records of *Culicoides* Latreille (Diptera: Ceratopogonidae) from Peruvian Amazonian region**

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**Abstract:** Ten species of *Culicoides* Latreille are reported for the first time from Peruvian Departments of Amazonas, Cajamarca, Loreto, Madre de Dios, Piura and San Martín. The synonymy and distribution of the species in the New World are given.

**Keywords:** *Ceratopogonidae*, *neotropical bloodsucking midges*, *Culicoides*, *new records*, *Peru*.

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**Resumo:** Dez espécies de *Culicoides* Latreille são reportadas pela primeira vez para os departamentos peruanos de Amazonas, Cajamarca, Loreto, Madre de Dios, Piura e San Martín. A sinonímia e a distribuição das espécies para o novo mundo são fornecidas.

**Palavras-chave:** *Ceratopogonidae*, *maruins neotropicais*, *Culicoides*, *novos registros*, *Peru*.

## Introduction

The genus *Culicoides* Latreille presently contains 266 Neotropical species (Borkent & Spinelli 2007). It is poorly known in Peru with 5 species originally described and only 16 more subsequently reported. In the Atlas of wing photographs of Neotropical species of *Culicoides* (Wirth et al. 1988) and in the catalog of the New World biting midges south of the United States of America (Borkent & Spinelli 2000), *C. efferus* Fox and *C. hitchcocki* Spinelli & Wirth are cited as originally described from Peru. Wirth & Blanton (1968) reported two species of the *hylas* species group, *C. hylas* Macfie and *C. palpalis* Macfie, from Peruvian Amazon region. Elliot et al. (1993) and Spinelli et al. (1993) recorded, respectively, *C. venezuelensis* Ortiz & Mirsa and *C. pseudodiabolicus* Fox. Spinelli et al. (1996) reported 10 others species, as follows: *C. belemensis* Wirth & Blanton, *C. carpenteri* Wirth & Blanton, *C. daviesi* Wirth & Blanton, *C. eublepharus* Macfie, *C. fieldi* Wirth & Blanton, *C. gabaldoni* Ortiz, *C. insignis* Lutz, *C. insinuatus* Ortiz & Leon, *C. paucienfuscatus* Barbosa and *C. quasiparaensis* Clastrier. Mercer et al. (2003) founded *C. fluviatilis* (Lutz) in Department of Loreto, Peru. *C. paraensis* (Goeldi) was previously mentioned by Barbosa (1947) and Wirth & Felippe-Bauer (1989) from Iquitos and San Antonio, Department of Loreto. Its distribution in the New World and the description of more two species from Peru, belonging to *Culicoides paraensis* group, *C. diversus* and *C. peruvianus*, are made by Felippe-Bauer et al. (2003). Recently, Felippe-Bauer et al. (2005) described *Culicoides (Diphaomyia) jurbergi* from Departments of Amazonas, Cajamarca and Madre de Dios from Peruvian Amazon.

The purpose of this work is to provide the first records of 10 species of *Culicoides* from Peruvian Amazon Region.

## Material and Methods

During an entomological survey in Peruvian Departments of Amazonas, Cajamarca, Loreto, Madre de Dios, Piura and San Martín, specimens of *Culicoides* are collected by CDC light trap or biting human. The specimens were mounted on microscope slides using the technique described by Wirth & Marston (1968). For identification we used the taxonomic literatures cited for each species. The species listed below are included in subgeneric classification and species group according to Borkent & Spinelli (2007). Specimens were deposited in Ceratopogonidae Collection's of Laboratory of Diptera, Instituto Oswaldo Cruz, Rio de Janeiro, as voucher material.

## Results and Discussion

### 1. New records from Peruvian Amazon region

#### 1. *Culicoides (Avaritia) pusillus* Lutz, 1913

*Culicoides pusillus* Lutz, 1913: 52 (male, female; Rio de Janeiro, Brazil; fig. wing); Macfie, 1938: 165 (redescript.; Trinidad and Tobago; fig. male genitalia); Floch & Abonnenc, 1942b: 2 (Guyana records); Barbosa, 1947: 25 (Jamaica, Panama records); Macfie, 1948: 79 (Mexico records); Ortiz & Mirsa, 1951: 603 (redescript.; Venezuela; figs. antenna, eyes, palpus, spermathecae, male genitalia, thorax); Ortiz & Leon, 1955: 570 (Ecuador records); Wirth, 1955: 110 (Guatemala records); Forattini, 1957: 284 (redescript.; figs.); Forattini et al. 1958: 26 (larval habits; São Paulo, Brazil); Wirth & Blanton, 1959: 292 (redescript.; figs.;

Panama distrib.); Williams, 1964: 463 (larval habits; Trinidad and Tobago); Tikasingh, 1972: 447 (habits; Trinidad and Tobago); Wirth & Blanton, 1973: 446 (Amazon records, Brazil); Aitken et al. 1975: 138 (Trinidad and Tobago records; wing photo); Winder & Silva, 1972: 653 (larval habits; Brazil); Winder, 1977: 60 (larval habits; Brazil); Wirth et al. 1988: 15 (in Atlas; wing photo; distrib.); Borkent & Wirth, 1997: 80 (in catalog); Ronderos & Spinelli, 1998: 82 (Argentina records); Borkent & Spinelli, 2000: 28 (in catalog); Mellor et al. 2000: 313 (epidemiology); Silva et al. 2001: 353 (records for Rio de Janeiro, Brazil); Soria et al. 2002: 320 (records for Pará, Brazil); Ronderos et al. 2003: 22 (record for the Yacyreta Dan lake area); Spinelli et al. 2005: 138 (in key, Argentina); Borkent & Spinelli, 2007: 63 (in catalog).

Distribution: USA (Florida) to Central and South America to northeastern Argentina.

New records: PERU, Cajamarca, Provincia de San Ignacio, Distrito de La Coipa, Papayal Bajo, 13.II.2002, 1 female, biting human; Loreto, Provincia de Maynas, Distrito de Iquitos, 18/19. II.2001, 17/18.V.2001, 53 females, CDC light trap; Madre de Dios, Provincia de Tombopata, Distrito de Laberinto, Santa Rosa, 7/8.VIII.2002, 1 male, CDC light trap.

#### 2. *Culicoides (Culicoides) hondurensis* Spinelli & Borkent, 2004

*Culicoides hondurensis* Spinelli & Borkent, 2004: 369 (female, male; El Salvador, Honduras; figs.); Borkent & Spinelli, 2007: 64 (in catalog).

Distribution: El Salvador, Honduras, Peru.

New records: PERU, Cajamarca, Provincia San Ignacio: Distrito La Coipa, Papayal Bajo, 13.II.2002, 1 female, biting human; Distrito San Ignacio, Marizagua, IV.2000, 1 female, CDC light trap; Piura, Provincia Huancabamba, Distrito Huancabamba, VI.2000, 1 female, CDC light trap.

#### 3. *Culicoides (Haematomyidium) debilipalpis* Lutz, 1913

*Culicoides debilipalpis* Lutz, 1913: 60 (female; Brazil; fig. wing); Macfie, 1937: 7 (female; redescript.; Trinidad and Tobago); Floch & Abonnenc, 1942a: 3 (Guyana; figs. wing, palpus); Barbosa, 1952: 12 (Argentina, Brazil; fig. palpus); Forattini, 1957: 383 (in part.; redescript.; figs. eyes separation, antenna, palpus, wing, male genitalia; distrib.); Wirth & Blanton, 1959: 442 (redescript.; figs.; Panama); Franca-Rodriguez, 1963: 67 (Uruguay); Messersmith, 1964: 339 (Virginia; breeding site); Smith & Varnell, 1967: 520 (Florida; tree holes); Wirth & Blanton, 1971a: 34 (redescript.; distrib.); Wirth & Blanton, 1971b: 75 (*khalafi* as syn.; notes); Aitken et al. 1975: 119 (Trinidad and Tobago records); Blanton & Wirth, 1979: 78 (redescript.; figs. eyes separation, antenna, palpus, wing, hind leg, spermathecae, male genitalia; distrib.); Vitale et al. 1981: 149 (notes; Panama); Borkent & Wirth, 1997: 72 (in catalog, syn. *lahillei*); Spinelli & Ronderos 1997: 304 (revalidation); Borkent & Spinelli, 2000: 32 (in catalog); Ronderos et al. 2003: 22 (record for the Yacyreta Dan lake area); Spinelli et al. 2005: 141 (in key, Argentina); Trindade & Gorayeb, 2005: 67 (records for Pará, Brazil); Borkent & Spinelli, 2007: 66 (in catalog).

*Culicoides ichesi* Ronderos & Spinelli, 1995: 77 (female; Argentina, Paraguay, Uruguay; figs. eyes separation, antenna, palpus, legs, spermathecae); Ronderos & Spinelli, 1998: 81 (in key; record for the Yacyreta Dan lake area).

*Culicoides khalafi* Beck, 1957: 104 (male, female; Florida; fig. male genitalia).

*Culicoides lahillei* Spinelli & Wirth, 1986: 62 (misident., in part., syn. *debilipalpis*); Wirth et al. 1988: 48 (in Atlas; wing photo; distrib.); Spinelli et al. 1989: 735 (in list; diurnal activity); Spinelli & Ronderos, 1991: 91 (record for the Salto Grande Dan

lake area); Spinelli & Martinez, 1991: 171 (in key; Uruguay); Waller et al. 1990: 352 (redescript.; Guyana; wing photo).

Distribution: Widely distributed, from southeastern United States south to 35° S in the province of Buenos Aires, Argentina.

New records: PERU, Amazonas, Provincia de Utcubamba: Distrito de Cajaruro, El Aliso, 6.I.2002, 7 females, biting human; San Antonio, 22.IV.2001, 12.V.2001, 13.V.2001, 13.X.2001, 10.XI.2001, 11.XI.2001, 8.XII.2001, 7.I.2002, 24.II.2002, 15.III.2002, 17.III.2002, A.Gonzales-Perez, 77 females, biting human; Distrito de Jamalca, El Aserradero, 1.V.2001, 5.VI.2001, A.Gonzales-Perez, 6 females, biting human; Distrito Lonya Grande, El Rejo, 13.IV.2001, 4 females, biting human; Cajamarca, Provincia de San Ignacio: Distrito La Coipa, Papayal Bajo, 13.II.2002, 15 females, biting human; Distrito San Ignacio, Marizagua, IV.2000, 2 females, CDC light trap; Loreto, Provincia de Maynas, Distrito de Iquitos, 18/19.II.2001, 5 females, CDC light trap; Madre de Dios, Provincia Tombopata, Distrito Laberinto, Santa Rosa, 7/8.VIII.2002, 3 females, CDC light trap.

#### 4. *Culicoides (Haematomyidium) lahillei* (Iches, 1906)

*Ceratopogon lahillei* Iches, 1906: 264 (female; Argentina, Chaco; figs., female, antenna, palpus, proboscis); Cavalieri & Chiossone, 1966: 147 (sp. Inquir.); Spinelli & Wirth, 1986: 62 (in key; syn. *debilipalpis*; wing photo erroneous); Wirth et al. 1988: 48 (in Atlas; syn. *debilipalpis*; wing photo erroneous, distrib.); Ronderos & Spinelli, 1995: 80 (female redescript.; figs. eyes separation, antenna, palpus, wing); Borkent & Wirth, 1997: 72 (in catalog; *debilipalpis* as syn.); Spinelli & Ronderos, 1997: 305 (male description); Ronderos & Spinelli, 1998: 81 (in key; Argentina, Paraguay); Borkent & Spinelli, 2000: 32 (in catalog); Soria et al. 2002: 320 (records for Pará, Brazil); Ronderos et al. 2003: 22 (record for the Yacyreta Dan lake area); Spinelli et al. 2005: 5 (in key; Argentina); Borkent & Spinelli, 2007: 67 (in catalog).

*Culicoides debilipalpis* Costa Lima, 1937: 415 (in key; fig. palpus); Forattini, 1957: 383 (in part, at least specimens from Chaco, Argentina).

Distribution: Argentina (Chaco, Corrientes, Jujuy, Misiones), Peru, southeastern Brazil, Paraguay (Encarnacion, Capitan Meza).

New records: PERU, Amazonas, Provincia de Utcubamba: Distrito de Jamalca, El Aserradero, 21.X.2001, 6 females, biting human.

#### 5. *Culicoides (Hoffmania) foxi* Ortiz, 1950

*Culicoides foxi* Ortiz, 1950a: 461 (male; Puerto Rico; figs.); Ortiz, 1951b: 4 (male, female; Venezuela; figs.); Fox, 1953: 888 (notes; Puerto Rico); Wirth & Blanton, 1956: 309 (male, female; figs; distrib.); Forattini, 1957: 205 (redescrib.; figs; Brazil distrib.); Wirth & Blanton, 1959: 283 (redescrib.; figs.; Panama distrib.); Fox & Garcia-Moll, 1961: 120 (notes; Puerto Rico); Williams, 1964: 463 (larval habitats; Trinidad and Tobago); Aitken et al. 1968: 265 (habits; Trinidad and Tobago); Tikasingh, 1972: 447 (habits); Wirth, 1974: 24 (catalog); Wirth & Blanton, 1973: 434 (Amazon records, Brazil); Aitken et al. 1975: 124 (Trinidad and Tobago records; wing photo); Ramirez Perez, 1984: 62 (Venezuela records); Greiner et al. 1984: 389 (Caribbean records); Spinelli & Wirth, 1986: 51 (in key); Greiner & Rawlins, 1987: 153 (Jamaica records); Lien & Lu, 1987: 93 (redescript.; Bolivia; wing photo); Wirth et al. 1988: 16 (in Atlas; wing photo; distrib.); Greiner et al. 1989: 101 (Trinidad and Tobago records); Waller et al. 1990: 357 (notes; Guyana; wing photo); Spinelli & Ronderos, 1991: 88 (notes; Argentina records); Spinelli et al. 1993: 41 (diagnosis; distrib.; figs.); Borkent

& Wirth, 1997: 68 (in catalog); Borkent & Spinelli, 2000: 34 (in catalog); Silva et al. 2001: 353 (records for Rio de Janeiro, Brazil); Soria et al. 2002: 320 (records for Pará, Brazil; Prov. Leoncio Prado, Peru); Ronderos et al. 2003: 22 (record for the Yacyreta Dan lake area); Laender et al. 2004: 145 (records for Minas Gerais, Brazil); Spinelli et al. 2005: 139 (in key, Argentina); Borkent & Spinelli, 2007: 68 (in catalog).

*Culicoides diabolicus* Hoffman, 1925, of author, misident., in partim; Floch & Abonnenc, 1942a: 2 (notes; Guyana; figs.).

*Culicoides guttatus* (Coquillett, 1904), of author, misident., in partim; Fox, 1948: 23 (female; Venezuela); Fox, 1949: 31 (male, female; Puerto Rico); Fox & Kohler, 1950: 342 (biology; Puerto Rico).

Distribution: Mexico to Central and South America to Bolivia and Argentina; West Indies.

New records: PERU, Amazonas, Provincia de Utcubamba: Distrito de Cumba, Pitiana, 30/31.I.2001, A.G. Cáceres, 1 female, CDC light trap; Distrito de Lonya Grande, San Isidro, 14.IV.2001, 1 male (CDC light trap), 2 females (biting human); Loreto, Provincia de Maynas, Distrito de Iquitos, 16.VI.2000, 2 females, biting human; Madre de Dios, Provincia de Tombopata, Distrito de Laberinto, Santa Rosa, 7/8.VIII.2002, 2,891 females, CDC light trap; San Martin, Provincia de San Martin, Distrito de Juan Guerra, El Porvenir, 24.II.2001, 2 females, CDC light trap.

#### 6. *Culicoides (Hoffmania) ocumarensis* Ortiz, 1950b

*Culicoides ocumarensis* Ortiz, 1950b: 455 (male, female; Venezuela; figs); Ortiz & Leon, 1955: 571 (notes; Ecuador; figs.); Wirth, 1974: 25 (in catalog); Lien & Lu, 1987: 93 (notes; Bolivia; wing photo); Wirth et al. 1988: 18 (in Atlas; wing photo; distrib.); Spinelli et al. 1993: 63 (diagnosis; distrib.; figs.); Borkent & Wirth, 1997: 77 (in catalog); Borkent & Spinelli, 2000: 34 (in catalog); Borkent & Spinelli, 2007: 69 (in catalog).

*Culicoides diabolicus* Hoffman, of authors, misident., in partim; Macfie, 1932: 488 (notes; Colombia record; habits); Wirth & Blanton, 1956: 316 (syn. *ocumarensis*); Wirth & Blanton, 1959: 280 (syn. *ocumarensis*).

*Culicoides lutz* Costa Lima, of authors, misident., in partim; Forattini, 1957: 238 (syn. *ocumarensis*).

*Culicoides insignis* Lutz, of authors, misident., in partim; Floch & Abonnenc, 1942b: 2 (male; Guyana; figs.); Barbosa, 1944: 259 (male, female; Pernambuco, Brazil; figs.).

*Culicoides recifei* Barbosa, 1947: 25 (Pernambuco, Brazil; n. sp. for insignis Lutz of Barbosa, 1944); Barbosa, 1952: 20 (validation).

*Culicoides filariferus* Hoffman, of authors, misident., in partim; Aitken et al. 1975: 121 (syn. *ocumarensis*; Trinidad and Tobago records; wing photo).

Distribution: Widely distributed, from Florida to 35° S in Argentina.

New records: PERU, Madre de Dios, Provincia de Tombopata, Distrito de Laberinto, Santa Rosa, 7/8.VIII.2002, 17 females, CDC light trap; San Martin, Provincia de San Martin, Distrito de Juan Guerra, El Porvenir, 24.II.2001, 13 females, CDC light trap (12 females), biting sheep (1 female).

#### 7. *Culicoides (Hoffmania) paraignacioi* Spinelli, 1993

*Culicoides paraignacioi* Spinelli, in Spinelli, Greiner & Wirth, 1993: 66 (male, female; Belize, Costa Rica, Guyana, Colombia, Brazil; figs.); Borkent & Wirth, 1997: 78 (in catalog); Borkent & Spinelli, 2000: 34 (in catalog); Borkent & Spinelli, 2007: 69 (in catalog).

Distribution: Belize, Costa Rica, Guyana, Colombia, Brazil, Peru.

New records: PERU, Madre de Dios, Provincia de Tombopata, Distrito de Laberinto, Santa Rosa, 7/8.VIII.2002, 1 female, CDC light trap.

#### 8. *Culicoides (Hoffmania) plaumanni* Spinelli, 1993

*Culicoides plaumanni* Spinelli, in Spinelli, Greiner & Wirth, 1993: 69 (female; Argentina, Bolivia, Brazil; figs.); Borkent & Wirth, 1997: 79 (in catalog); Borkent & Spinelli, 2000: 34 (in catalog); Spinelli et al. 2005: 139 (in key; Argentina); Borkent & Spinelli, 2007: 69 (in catalog).

Distribution: Brazil, Peru, Bolivia, Argentina.

New records: PERU, Loreto, Provincia de Maynas, Distrito de Iquitos, 14.VI.2001, 2 females, biting human; Madre de Dios, Provincia de Tombopata, Distrito de Laberinto, Santa Rosa, 7/8.VIII.2002, 139 females, CDC light trap.

#### 9. *Culicoides (Mataemyia) bricenoi* Ortiz, 1951

*Culicoides bricenoi* Ortiz, 1951a: 445 (male; Venezuela; figs. male genitalia, wing); Ortiz, 1951b: 10 (in key); Fox, 1955: 223, 230 (in catalog); Ortiz & Leon, 1955: 567, 570 (in key; female; Ecuador); Forattini, 1957: 348 (redescript.; figs. male genitalia, wing); Wirth & Blanton, 1973: 428 (Amazon records, Brazil; figs. antenna, eye separation, legs, palpus, spermathecae, tibial comb, wing); Wirth et al. 1988: 36 (in Atlas; wing photo; distrib.); Borkent & Wirth, 1997: 63 (in catalog); Borkent & Spinelli, 2000: 35 (in catalog); Borkent & Spinelli, 2007: 70 (in catalog).

Distribution: Venezuela, Ecuador, Brazil, Peru, Bolivia.

New records: PERU, Madre de Dios, Provincia de Tombopata, Distrito de Laberinto, Santa Rosa, 7/8.VIII.2002, 1 female, CDC light trap.

#### 10. *Culicoides leopoldoi* Ortiz, 1951c, from *fluviatilis* species group

*Culicoides leopoldoi* Ortiz, 1951c: 579 (female; Venezuela; figs. antenna, palpus, thorax, wing); Ortiz & Mirsa, 1951: 596 (male; Venezuela; figs. palpus, wing, genitalia); Ortiz & Mirsa, 1952: 127 (redescript.; Venezuela, Panama records; figs. antenna, spermatheca, palpus, wing); Forattini, 1957: 409 (redescript.; records for Pernambuco and Rio de Janeiro, Brazil; figs.); Wirth & Blanton, 1959: 418 (redescript.; Panama distrib.; figs.); Breeland, 1960: 165 (larval habitats; Panama); Williams, 1964: 463 (larval habitats; Trinidad and Tobago); Aitken et al. 1968: 265 (habits); Wirth & Blanton, 1973: 441 (Amazon records, Brazil); Aitken et al. 1975: 131 (Trinidad and Tobago records; wing photo); Wirth et al. 1988: 45 (in Atlas; wing photo; distrib.); Borkent & Wirth, 1997: 73 (in catalog); Ronderos & Spinelli, 1998: 80 (in key; Argentina, Paraguay); Borkent & Spinelli, 2000: 39 (in catalog); Silva et al. 2001: 353 (records for Rio de Janeiro, Brazil); Ronderos et al. 2003: 22 (record for the Yacyreta Dan lake area); Laender et al. 2004: 376 (records for Minas Gerais, Brazil); Spinelli et al. 2005: 140 (in key; Argentina); Borkent & Spinelli, 2007: 72 (in catalog).

Distribution: Guatemala, Belize, Trinidad and Tobago to Bolivia and northeastern Argentina.

New records: PERU, San Martin, Provincia de San Martin, Distrito de Juan Guerra, El Porvenir, 24.II.2001, 1 male, CDC light trap.

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