



A new species of the South American genus *Arthurella* Albuquerque (Diptera: Muscidae), with a key to species and new records

LUCIANO DAMIÁN PATITUCCI^{1,2}, JUAN CARLOS MARILUIS^{1,2} & FERNANDO HERNÁN ABALLAY^{1,3}

¹Consejo Nacional de Investigaciones Científicas y Técnicas, Buenos Aires, Argentina.

²ANLIS “Dr. Carlos G. Malbrán”, Departamento Vectores-CeNDIE. Av. Vélez Sarsfield 563, 1281, Buenos Aires, Argentina.
E-mail: lpatitu@yahoo.com.ar; jcmartiluis@yahoo.com.ar

³Consejo Nacional de Investigaciones Científicas y Técnicas, Mendoza, Argentina. Laboratorio de Entomología, Instituto Argentino de Investigaciones de las Zonas Áridas (IADIZA, CCT CONICET Mendoza), Argentina. E-mail: faballay@mendoza-conicet.gov.ar

Abstract

The monotypic genus *Arthurella* Albuquerque, 1954 was originally described for *A. nudiseta* with a distribution restricted to Chile and Argentina. We add one new species, *Arthurella choelensis* sp. nov., from the central part of Argentina, and new distribution records for *A. nudiseta*. Biological and distributional information is given for both species. An identification key to the species of the genus is provided.

Key words: *Arthurella*, new species, Argentina, Muscidae

Resumen

El género monotípico *Arthurella* Albuquerque, 1954 fue descrito originalmente para *A. nudiseta* con una distribución restringida a Chile y Argentina. Añadimos una nueva especie, *Arthurella choelensis* sp. nov., de la parte central de la Argentina, y nuevos registros de distribución para *A. nudiseta*. Se comenta la información sobre la biológica y la distribución de las especies. Se proporciona una clave de identificación para las especies del género.

Palabras clave: *Arthurella*, nueva especie, Argentina, Muscidae

Introduction

The Neotropical genus *Arthurella* Albuquerque, 1954 is known only from *Arthurella nudiseta* Albuquerque, 1954 (Carvalho *et al.* 2005; Couri & Penny 2007). The species was originally described by Albuquerque (1954) based on male specimens from Chile. The female and puparium were originally described by Lopes (1985) and later redescribed by Araújo & Couri (1993). Recently, Couri & Penny (2007) redescribed the male based on several specimens found in the collection of the California Academy of Sciences (San Francisco, California, USA), including color variation, morphological variation, and new distribution records.

The subfamily placement of *Arthurella* has not yet been established and currently the genus is placed in the Cyrtoneurinae (Couri & Penny 2007), a subfamily not currently considered monophyletic. Many genera previously placed in the Cyrtoneurinae have been transferred to other subfamilies (Carvalho *et al.* 2005; Schuehli *et al.* 2007).

The adult habits of *Arthurella* are poorly known. Some female specimens were reared from saprophytic fungi (Agaricaceae) found on wood (Lopes 1985) and some of the specimens included in this study were collected from Malaise traps placed over pig carrion. Information about the immature stages is scarce, and the larva and the egg are still undescribed.

We present here the description of a new species of *Arthurella* and an updated generic diagnosis. An identification key to the species and additional geographic distribution information are also provided.

Material and methods

All the specimens studied belong to the following institutions (acronyms in parentheses): Administración Nacional de Laboratorios e Institutos de Salud “Dr. Carlos G Malbrán”, Departamento Vectores, Buenos Aires, Argentina (ANLIS); Instituto Argentino de Investigaciones de las Zonas Áridas, Mendoza, Argentina (IADIZA); Museo Argentino de Ciencias Naturales “Bernardino Rivadavia” (MACN).

The identification of the specimens was conducted using the original descriptions (Albuquerque 1954; Lopes 1985) and redescrptions of the species (Couri & Penny 2007). To study the terminalia morphology, abdomens of selected specimens were detached and transferred to 90 % lactic acid for two weeks. After clearing, the genital structures were removed and temporarily mounted on concave glass slides in glycerine. After the study, the dissected parts were placed in a plastic microvial with glycerine and pinned under the specimen. The terminology used for the external morphology follows McAlpine (1981), Hockett & Vockeroth (1987), and Stuckenberg (1999) with the exception of the traditional terms prealar seta (for the first postsutural supra-alar setae), humeral callus (for postpronotal lobe), humeral seta (for postpronotal seta), and calcar (for the developed seta on the apical third of the posterodorsal surface of the hind tibia) (Carvalho 1989).

Results

Arthurella Albuquerque, 1954

Arthurella Albuquerque, 1954:151. Type-species: *Arthurella nudiseta* Albuquerque, 1954, by original designation.

Diagnosis (modified from Couri & Penny 2007). Eye with sparse short cilia. Arista bare; one pair of long strong ocellar setae; prosternum, anepimeron and meron setulose; dorsocentral setae 2+3-4; intra-alars 2; katapisternals 2+2; vein R_1 setulose on dorsal surface; vein R_{4+5} setulose on both surfaces; vein R_{4+5} and M diverging slightly to apex; hind tibia with calcar present; sternite 1 bare.

Arthurella can be easily distinguished from other Neotropical taxa by the presence of 2+2 katapisternal setae. A few genera of Muscidae (e.g., *Neurotrixa* Shannon & Del Ponte and *Lispoidea* Malloch) also have the same configuration of katapisternal setae (Costacurta & Carvalho 2005).

Key to the species of *Arthurella*

1. Dorsocentral setae 2+4; vein R_1 dorsally setulose in the basal two-thirds. *A. nudiseta* Albuquerque
- Dorsocentral setae 2+3; vein R_1 dorsally setulose with setulae almost reaching the costal vein
- *A. choelensis* Patitucci & Mariluis, **sp. nov.**

Arthurella choelensis Patitucci & Mariluis, **sp. nov.**

(Figs. 1–9)

Diagnosis. This species is easily differentiated by the presence of dorsocentral setae 2+ 3, acrostichal setae 3+1, vein R_1 dorsally setulose, with the setulae almost reaching the costal vein, and tergite 4 black with silver pollinose spots.

Description. Male. Length. Body: 5.58–6.96 mm, Wing: 5.33–6.60 mm.

Head. Holoptic, anterointernal ommatidia smaller than anteroexternal. 6-8 pairs of frontal setae distributed evenly between the lunule and the base of the ocellar triangle, the upper three shorter. Frontal vitta black; lunule pale brown; fronto-orbital plate, parafacial, gena, postgena, and occiput black with silver pollinosity. Postocular setae divergent; inner vertical setae convergent and outer vertical setae divergent. Antenna with scape, pedicel and base of the postpedicel orange, its distal part brown; in lateral view inserted at the mid-level of the eye; arista bare. Palpus orange-yellow, slightly clavate.

Thorax. Scutum dark-brown with five silver pollinose vittae; scutellum yellow on apical two thirds; anepisternum, anepimeron, katepimeron, katepisternum, proepisternum, proepimeron and meron dark-brown with silver pollinosity; humeral callus yellow with silver pollinosity; anterior spiracle yellow; posterior spiracle brown. Chaetotaxy: acrostichal setae 3+1; dorsocentral setae 2+3; humeral setae 3; intra-alar setae 1+2; supra-alar setae 1+2; notopleural setae 2, of similar size, notopleuron with few ground-setulae. Prealar seta weak and short. Scutellum with basal, subapical, apical, and discal pairs of setae. Anepisternum with a series of 6 strong setae; katepisternals 2+2; anepimeron setulose on the posterior portion; katepimeron bare; meron with one short but strong setula; proepisternals 4; proepimerals 3. Prosternum setulose.

Wing. Hyaline; vein R_1 setulose dorsally and almost reaching the costal vein; R_s node and base of vein R_{4+5} setulose dorsally and ventrally; vein R_{4+5} and vein M slightly diverging towards apex. Both calypters hyaline with white margins; lower calypter glossiform; halter yellow.

Legs. All femora brown with yellow apices; and trochanters, tibiae and tarsi yellowish-brown. Fore femur with rows of dorsal, anterior, posterodorsal, and posteroventral setae; fore tibia with 3-4 short anterodorsal setae on basal half, one preapical dorsal seta, and one posteroventral apical seta. Mid femur with 4-5 setae in the basal two-thirds on posteroventral surface; and 3 preapical setae on anterodorsal to posterior surface; mid tibia with 3-4 posterodorsal setae and 4 apical setae (anterodorsal, posteroventral, ventral, and anteroventral). Hind femur with anterodorsal, anteroventral, and posteroventral rows of setae; hind tibia with 2 short setae on medial third of anterodorsal surface and 3 short setae on medial third of anteroventral surface; calcar strong, longer than tibial width.

Abdomen. Black, syntergites 1+2 and tergite 3 with lateral yellow spots and with silver pollinosity over the spots and on the middle line; tergite 4 black with lateral silver pollinose spots; tergite 5 black with silver pollinosity on anterior half and yellow on posterior half. Sternite 1 bare. Sternite 5 with setae, the posterior margin with 2 terminal projections, and anterior margin straight (Fig. 3).

Terminalia. Cercal plate with an upper incision at the anterior margin and with setae on posterior half of dorsal surface (Fig. 4). Aedeagus with aedeagal apodeme straight and strongly sclerotized; paramere and gonopod with 3-6 short setulae; aedeagus more strongly sclerotized on posterior surface (Fig. 5).

Female. Length. Body: 4.96–6.58 mm, Wing: 4.72–5.87 mm.

Differs from male as follows: interocular space about one-third of head width at level of anterior ocellus; interfrontal cruciate setae present; fronto-orbital plate setulose with 2 reclinate orbital seta. Prealar seta strong and short. Fore tibia with 2 suprmedian posterodorsal setae closer to the apex. Abdomen black, tergites 1+2-4 with silver pollinosity laterally and on the middle line.

Terminalia. Intersegmental membrane with microtrichiae. Tergites 6 and 7 divided into 2 enlarged parallel sclerotized plates; tergite 8 divided into 2 short plates, each with setulae on distal margin; epiproct triangular with setulae on distal margin, cercus digitiform (Fig. 7). Sternites 6 and 7 undivided; sternite 7 enlarged posteriorly; sternite 8 divided into 2 sclerotized plates, each with setulae on distal margin; hypoproct rounded, weakly sclerotized and setulose (Fig. 8). Three spermathecae (Fig. 9).

Type material. Holotype male: "Argentina R. Negro / Choele-Choel / 18-I-1977 / Mariluis col." (MACN). Paratypes: three males and one female, same label data as holotype (MACN).

Other specimens studied. ARGENTINA: CÓRDOBA: 1 male Guanaco Muerto, II-1975, Mariluis leg. (ANLIS); 1 female Capilla del Monte, 1000 m, 31-I-2002, Mariluis leg. (ANLIS). LA PAMPA: 1 female Santa Rosa, 2-VIII-2008, Di Iorio leg. (ANLIS). MENDOZA: 1 female, 1 male, Dpto Capital: 32°53'55.87"S, 68°52'23.17"W, 24-V-2007, Aballay leg. (IADIZA); 5 females, 1 male, 32°53'58.55"S, 68°52'23.82"W, 09-IV-2008, 1 male, 03-IV-2008, 1 male, 17-IV-2008, 1 female, 8 males, 06-IV-2008, 1 female 04-IV-2008, Aballay Leg. (IADIZA); 1 female, 32°53'53.41"S, 68°52'26.29"W, 10-IV-2008, Aballay leg. (IADIZA); 2 females, 32°53'52.13"S, 68°52'22.48"W, 31-X-2008, 1 female, 01-XI-2008, 1 female, 02-XI-2008, 1 male, 04-XI-2008, 1 female, 1 male, 05-XI-2008, 1 female, 1 male, 06-XI-2008, 1 female, 3 males, 07-XI-2008, 3 females, 1 male, 08-XI-2008, 2 females, 2 males, 09-XI-2008, 1 female, 11-XI-2008, 1 female 12-XI-2008, 1 female, 14-XI-2008, 1 female, 2 males, 18-XI-2008, 1 female, 1 male, 20-XI-2008, 1 male, 29-XI-2008, Aballay leg. (IADIZA); 1 female, 32°53'57.34"S–68°52'28.85"W, 01-XI-2008, 1 female, 01-XI-2008, 2 females, 05-XI-2008, 2 females, 06-XI-2008, 1 female, 07-XI-2008, 1 male, 08-XI-2008, 1 male, 13-XI-2008, 2 females, 1 male, 14-XI-2008, 1 female, 15-XI-2008, 1 male, 17-XI-2008, Aballay leg. (IADIZA). RÍO NEGRO: 7 females, 17 males Choele-Choel, 19-I-1977. Mariluis leg. (ANLIS); 1 male San Antonio Oeste, 14-I-1977, Mariluis leg. (ANLIS).

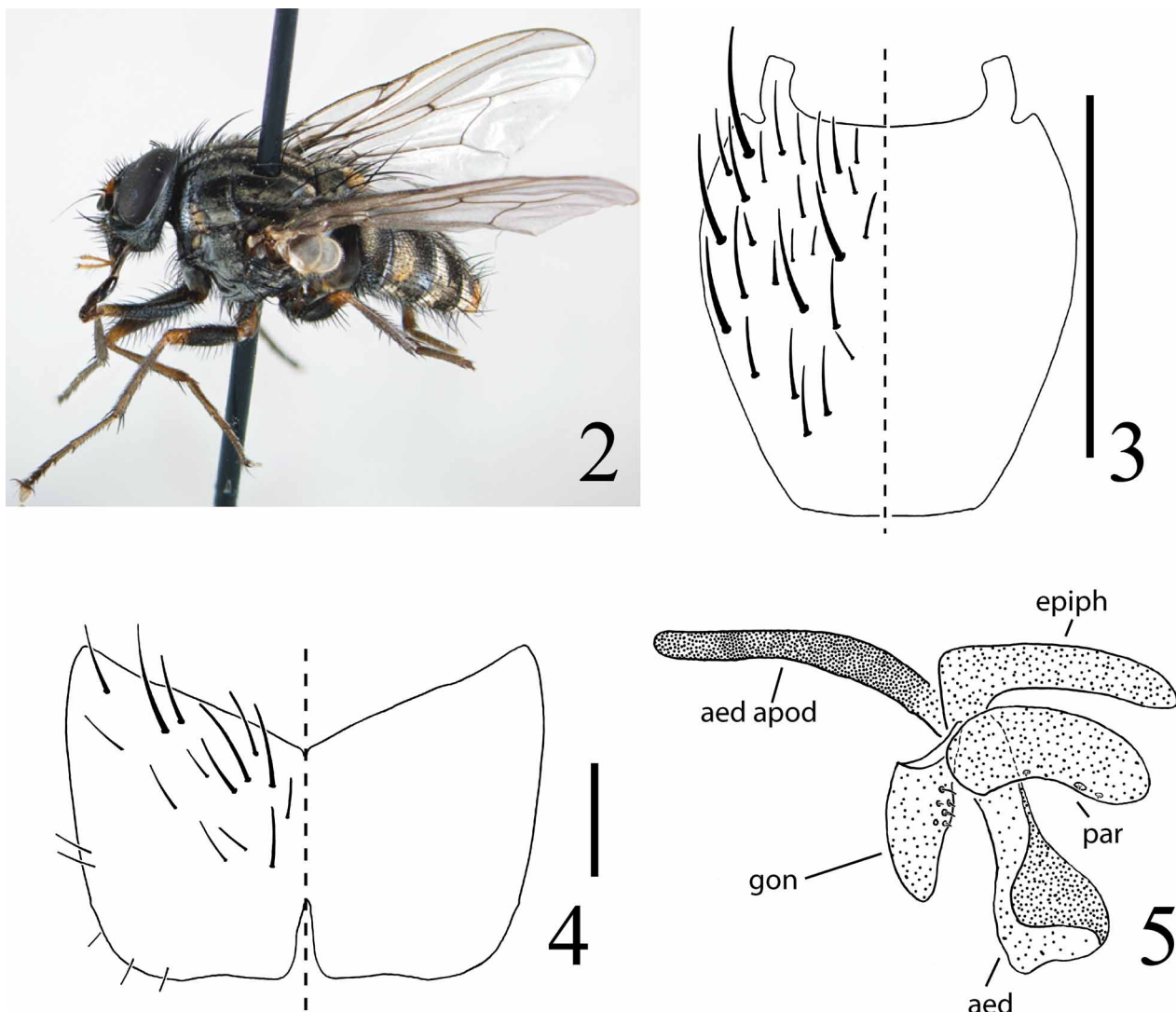
Distribution (Fig. 1). ARGENTINA: Córdoba, Mendoza, La Pampa, Río Negro.



FIGURE 1. Geographic distribution of *Arthurella* species in South America. Black dots: distribution of *A. choelensis* **sp. nov.**; gray squares: previous distribution of *A. nudiseta*; gray stars: new records of *A. nudiseta*.

Comments. *Arthurella choelensis* **sp. nov.** has been recorded on rotten cow meat in Río Negro and Córdoba provinces (JCM). Also, the specimen collected in La Pampa province was found in the nest of “Leñatero” (*Anumbius annumbi* (Vieillot, 1817), Furnariidae) (Osvaldo Di Iorio, pers. comm.). In Mendoza province, *A. choelensis* **sp. nov.** was captured in the proximity of decomposing pig carcasses in the spring (November) and autumn (April–May) (FHA). The immature stages of this species are unknown.

Etymology. The name refers to the type locality.



FIGURES 2–5. *A. choelensis* sp. nov., male. 2: Lateral habitus. 3: Sternite 5 (scale bar: 0.5 mm). 4: Cercal plate, dorsal view. 5: Aedeagus, lateral view (scale bar: 0.1 mm). Abbreviations: aed, aedeagus; aed apod, aedeagal apodeme; epiph, epiphallus; gon, gonopod; pm, paramere.

Arthurella nudiseta Albuquerque, 1954

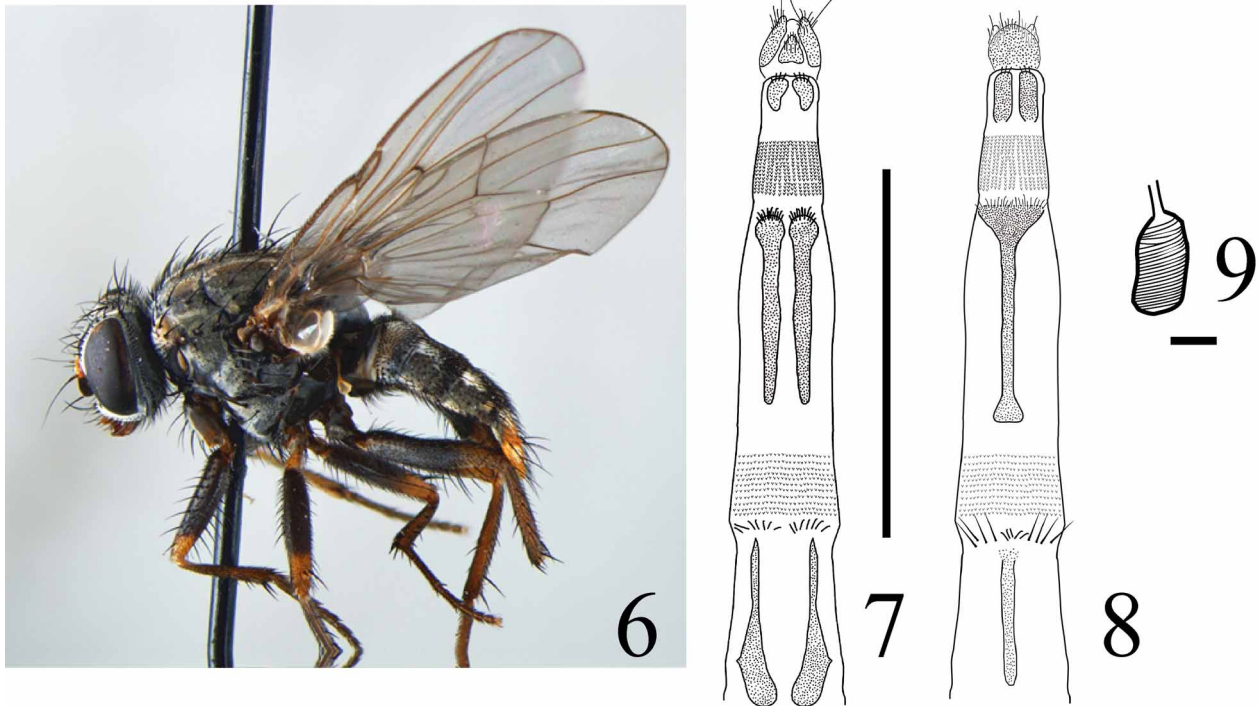
Arthurella nudiseta Albuquerque, 1954: 151, figs. 1–8. Holotype male and two male paratypes in Museu Nacional, Universidade do Rio Janeiro, Rio de Janeiro, Brazil. Type-locality: Chile, El Canelo.

For a complete list of references, see the catalog by Carvalho *et al.* (2005).

Information subsequent to this catalog: Couri & Penny 2007: 100 (Argentina, Chile, redescription of male and female).

Material studied. ARGENTINA: CHUBUT: 2 females, Esquel XII-1993, Mariluis leg. (ANLIS). SANTA CRUZ: 3 females, Gobernador Gregores, XII-2006, Mariluis leg. (ANLIS); 4 females, Puerto Santa Cruz, II-1998, Mariluis leg. (ANLIS); 1 female, same data except I-1998; 1 female, same data except XII-1997; 1 female, El Calafate, XI-1994, Mariluis leg. (ANLIS); 3 males, El Calafate III-1995, Mariluis leg. (ANLIS); 4 males, Hipólito Yrigoyen I-2006, Mariluis leg. (ANLIS); 1 female, Estancia La Matilda II-1978, Daciuk leg. (ANLIS).

Distribution (Fig. 1). ARGENTINA: Chubut (new record), Santa Cruz. CHILE: I Region de Tarapaca (Arica), IV Region de Coquimbo, Region Metropolitana (Santiago), V Region de Valparaiso.



FIGURES 6–9. *A. choelensis* sp. nov., female. 6: Lateral habitus. 7: terminalia, dorsal view. 8: terminalia, ventral view (scale bar 1 mm). 9: Spermathecae (scale bar 0.05 mm).

Comments. This species was recently redescribed by Couri & Penny (2007), and the specimens studied here agree with their description. The biological information on this species is poorly known (see Introduction). The specimens studied here were captured with a hand net on rotten cow meat.

Geographic distribution. The distributions of both species are restricted to Chile and Argentina. *Arthurella nudiseta* was originally recorded from El Canelo, Santiago, Region Metropolitana, and Algarrobo, Valparaiso, V Region de Valparaiso (Albuquerque 1954). Later, Lopes (1985) added the northern-most known occurrence in Lluta, Arica, I Region de Tarapaca. More recently, Couri & Penny (2007) registered the first record for Argentina in Piedra Buena and Perito Moreno, Santa Cruz province, and included new records of Hacienda Illapel, Coquimbo, IV Region de Coquimbo, Chile.

The distribution of *A. nudiseta* includes several locations, all in the Andean Region. On the other hand, *A. choelensis* was collected in the South American Transition Zone (Monte province) and in the Neotropical Region (Chaco and Pampa provinces) (Morrone 2006). With this distribution, we could hypothesize that these species are allopatric.

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References

- Albuquerque, D.O. (1954) Sobre um gênero novo de Phaoniinae do Chile e notas sobre *Steinella fuscinervis* (Macquart) (Diptera, Muscidae). *Revista Brasileira de Entomologia*, 1, 151–158.
- Araújo, P.F. & Couri, M.S. (1993) Redescricao de *Arthurella* Albuquerque com considerações sobre sua posição sistemática e redescricao do pupário de *A. nudiseta* Albuquerque (Diptera, Muscidae). *Revista Brasileira de Zoologia*, 9, 277–281.
- Carvalho, C.J.B. de (1989) Classificação de Muscidae (Diptera): uma proposta através da análise cladística. *Revista Brasileira de Zoologia*, 6, 627–648.
- Carvalho, C.J.B. de, Couri, M.S., Pont, A.C., Pamplona, D. & Lopes, S.M. (2005) A catalogue of the Muscidae (Diptera) of the Neotropical region. *Zootaxa*, 860, 1–282.
- Costacurta, N.C. & Carvalho, C.J.B. de (2005) Taxonomy of *Neurotrixa* Shannon & Del Ponte (Diptera: Muscidae) with description of new species from Southern Brazil. *Neotropical Entomology*, 34, 927–932.
- Couri, M.S. & Penny, N.D. (2007) Redescription and additional records of *Arthurella* Albuquerque (Diptera: Muscidae: Cyrtoneurinae). *Proceedings of the California Academy of Sciences*, 58, 99–103.
- Huckett, H.C. & Vockeroth, J.R. (1987) Muscidae. In: McAlpine, J.F., Peterson, B.V., Shewell, G.E., Teskey, H.J., Vockeroth, J.R. & Wood, D.M. (Eds.), *Manual of Nearctic Diptera*, Vol. 2. Monograph 28, Research Branch Agriculture Canada, Ottawa, pp. 1115–1131.
- Lopes, S.M. (1985) Descrição da fêmea de *Arthurella nudiseta* Albuquerque, 1954 (Diptera-Muscidae- Cyrtoneurinae) coletada em Agaricaceae (Fungi). *Revista Brasileira de Biologia*, 44, 335–337.
- McAlpine, J.F. (1981) Morphology and terminology adults. In: McAlpine, J.F., Peterson, B.V., Shewell, G.E., Teskey, H.J., Vockeroth, J.R. & Wood, D.M. (Eds.), *Manual of Nearctic Diptera*. Vol. 1. Monograph 27, Research Branch Agriculture Canada, Ottawa, pp. 9–63.
- Morrone, J.J. (2006) Biogeographic areas and transition zones of Latin America and the Caribbean Islands, based on panbiogeographic and cladistic analyses of the entomofauna. *Annual Review of Entomology*, 51, 467–494.
- Schuehli, G.S., Carvalho, C.J.B. de & Wiegmann, B.M. (2007) Molecular phylogenetics of the Muscidae (Diptera: Calyptratae): new ideas in a congruence context. *Invertebrate Systematics*, 21, 263–278.
- Stuckenberg, B.R. (1999) Antennal evolution in the Brachycera (Diptera), with a reassessment of terminology relating to the flagellum. *Studia dipterologica*, 6, 33–48.