

Redescription and Additional Records of *Arthurella* Albuquerque (Diptera: Muscidae: Cyrtoneurinae)

Marcia S. Couri¹ and Norman D. Penny²

¹Museu Nacional, Universidade Federal do Rio de Janeiro Quinta da Boa Vista, 20940-040, Rio de Janeiro, Brasil; Email: mcouri@attglobal.net; ²Department of Entomology, California Academy of Sciences, 875 Howard Street, San Francisco, California 94103; Email: npenny@calacademy.org

***Arthurella* (Diptera, Muscidae) is known only from a single species from Chile, *A. nudiseta* Albuquerque. The genus is rare in collections being known previously from only a few specimens. It is placed among the Cyrtoneurinae but its monophyly has not yet been established. The specimens of *A. nudiseta* found in the California Academy of Sciences collection (San Francisco, California) make possible the observation of different color patterns and sizes, as well as the expansion of the known geographical distribution. Color figures showing patterns of mesothoracic dorsum, pleurae and abdomen are given.**

The genus *Arthurella* was described by Albuquerque (1954) for *A. nudiseta*, based on males (erroneously mentioned as female at the beginning of the original description) from Chile (El Canelo and Valparaíso). The female and puparia were first described by Lopes (1985), based on material reared from fungi (Agaricaceae) and were later redescribed by Araujo and Couri (1992), who also described the proboscis. Although further mention of the genus or species has been restricted to catalogs (Pont 1972; Carvalho et al. 1993; Carvalho et al. 2005) and notes on the type (Lopes et al. 1997), in 2002, Couri and Carvalho did present a brief diagnosis of the genus with comments on its systematic position.

Since the original description no other species have been added to *Arthurella*. It was originally placed in the subfamily Phaoninae, but now it is referred to the Cyrtoneurinae (Carvalho et al. 2005), a subfamily not currently considered monophyletic.

Specimens of the genus are rare in collections, especially males, being known previously from only three specimens. According to the original description, the holotype male and two paratype males were sent back to the collector, T. Ramires, and it seems unlikely that they were later deposited at Universidad de Chile (Santiago, Chile) (Carvalho et al. 2005). These are the only known male specimens mentioned in the literature. All other previously studied specimens are deposited in the collection of Museu Nacional, Rio de Janeiro — about 30 females from Lluta (Arica), all reared from Agaricaceae.

Recently, we had the opportunity of examining a large and hitherto unreported series in the collections of the California Academy of Sciences. Because of this, we can now report on the different color patterns and sizes, as well as additional geographic records.

As noted above, the monophyly of the genus has not yet been established. Thus, new information that is derived from these newly studied materials, and that includes both new data on morphology as well as the new localities, will be useful for future phylogenetic and biogeographical studies of the Muscidae. This should be especially true as they relate to the biogeography of southern

South America (for several recent studies see, for example, Carvalho 1999, Carvalho and Couri 2002, Couri and Carvalho 2000).

Color figures showing color patterns of mesothoracic dorsum, pleurae and abdomen are given.

MATERIALS AND METHODS

The studied material belongs to the California Academy of Sciences (CAS, San Francisco, California) collection. Three specimens will be deposited at Museu Nacional, Rio de Janeiro collection (MNRJ) as indicated in the material examined. The specimen reared from fungi, with the dry puparium pinned, belongs to the MNRJ collection.

The color photos were made using Syncroscopy/JVC Auto-Montage with Leica M 420 optical microscope.

Genus *Arthurella* Albuquerque

TYPE SPECIES: *Arthurella nudiseta* Albuquerque, 1954

DIAGNOSIS.— Eyes with sparse fine and short cilia; one pair of long ocellar setae; arista bare; prosternum, anepimeron and meron setulose; dorsocentrals 2:4; presutural acrostichals 2, intra-alars 2; katepisternals 2:2; vein R_1 with dorsal setulae on basal half (or more in some specimens); vein R_{4+5} setulose on both surfaces on basal sixth; veins R_{2+3} and R_{4+5} divergent apically; mid tibia with 4 setae on posterior surface; hind tibia with calcar; sternite 1 bare.

DISTRIBUTION.— Chile (Arica, Coquimbo, Mendonza, Santiago and Valparaiso) and Argentina (Santa Cruz).

REMARKS.— Coquimbo and Mendonza in Chile are new geographic records in this country. The genus is also recorded from Argentina for the first time.

Arthurella nudiseta Albuquerque, 1954

HOLOTYPE.— Male, deposited at (?) Universidad de Chile, Santiago, Chile, labeled as “El Canelo. 1-XII-1944, T. Ramires col.”

MALE.— Length. Body: 5.2–7.5 mm; wing: 4.5–6.0 mm.

GENERAL COLORATION.— Frons dark brown, lunule dark brown or reddish in female; fronto-orbital plate and gena dark brown, silver pollinose. Palpus yellow; antenna with pedicelum reddish and flagellum brown, reddish at base in some specimens. Dorsum of mesonotum dark or pale brown with grayish pollinosity, with four shiny black vittae; scutellum yellow on apical two thirds (Figs 1–2); pleura dark or pale brown with gray pollinosity; post-pronotum concolorous with mesonotum or yellowish; anterior spiracle yellow (Figs. 3–4); calypters whitish hyaline, and halter yellow. Wing hyaline. Legs with fore femur brown, except at apex; mid and hind femora brown on basal half; the brown areas of femora can be more extensively yellow, especially on females; all tibia and tarsi yellow. Abdomen yellow, brown laterally, with median dorsal brown vitta, posterior margins of tergites 1+2–4 brown; tergite 5 in male brown, with yellow apex (Fig. 5); abdomen in female with median brown vitta varying in width, but usually thinner than in male; sternite 5 yellow, with a brown median vitta (Fig. 6); abdomen can be more extensively yellow in female (Fig. 7).

HEAD.— Holoptic; antero-internal facets developed. Frontal row with 6 pairs of setae. Inner vertical pair of setae a little longer than outer pair. Antennae inserted at medium level of eyes; flagellomere short, measuring about 1.3–1.5 times length of the pedicelum. Palpi slightly clavate.

THORAX.— Dorsocentrals 2:4; presutural acrostichals 2; 3 postpronotals; 1 presutural; 2 intralars; 2 supralares; 2 postsupralares. Notopleuron with two setae, similar in size. Scutellum with

thin basal and pre-apical pairs of setae and strong sub-basal, pre-apical lateral, and apical ones. Anepisternum with a series of 6–8 strong setae; 1 fine and long and 2–3 shorter and thinner setae on anterior angle. Katepisternals 2:2. Anepimeron setulose on its posterior half. Katepimeron with 2–3 fine setae. Prosternum setulose. Inferior calypter about 1.8–2.0 the length of the superior. Vein R_1 with dorsal setulae on basal half (or more in some specimens); vein R_{4+5} setulose on both surfaces on basal sixth of vein R_{4+5} and M_{1+2} a little divergent to apex. Fore femur with rows of dorsal, ventral and posterodorsal setae; fore tibia with 3 short anterodorsal setae on basal two-thirds; one preapical seta on dorsal surface and one posteroventral seta. Mid femur with 4–5 posteroventral short setae on basal third; one preapical dorsal and 3 posterior to posterodorsal; mid tibia with 4 posterior setae and apical setae on anterodorsal, dorsal, and ventral surfaces. Hind femur with a complete anterodorsal row of setae; anteroventral surface with 3–5 setae on apical third; hind tibia with 3 short setae on middle third of anteroventral and anterodorsal surfaces; posterodorsal surface with a strong calcar, pre-apical anterodorsal seta present.

TERMINALIA.— As in Albuquerque (1954).

FEMALE.— Length. Body: 5.0–6.5 mm; wing: 4.5–6.0 mm

Differs from male as follows: interocular space about one third of head width; interfrontal cruciate setae present; fore tibia also with 1 median and 1 submedian posterodorsal setae, the ones on anterodorsal surface more developed than in male

OVIPOSITOR.— As in Araujo and Couri (1992).

PUPARIUM.— All covered by sand grains (Fig. 8). Description as in Araujo and Couri (1992).

MATERIAL EXAMINED.— ARGENTINA: **Santa Cruz:** 5 km NW Piedra-Buena; low dunes, 130 m, M.E. Irwin and E.I. Schlinger, 10 December 1966 (2 males); 55.6 km S Perito Moreno, 690 m, E.I. Schlinger and M.E. Irwin, 24 November 1966 (5 males, 1 female, 1 male, MNRJ). CHILE: **Arica:** Lluta, Km 30, ex Agaricaceae on 10 June 1976 [with puparium pinned], H. Vargas and A Matta, 18 May 1976, (1 female, MNRJ); **Coquimbo:** Hacienda Illapel, Rio Illapel, 600–900 m, E.I. Schlinger and M.E. Irwin, October 1966 (1 male); **Santiago:** Quebrada de la Plata Fundo,, Rinconada, Maipu, Malaise, 33°31'S 70°47'W, 510 m, M.E. Irwin, 4 August 1966 (1 female); 23 March 1966 (1 male, MNRJ); 24 March 1966 (1 male); 27 March 1966 (2 males, 1 female); 3 April 1966 (1 female); 33°30'S 70°55'W, near Maipu, 510 m, M.E. Irwin, 2 February 1966 (1 male), 10 February 1966 (1 female); 21 February 1966 (1 male); 9 March 1966 (1 female); 24 March 1966 (1 female); 550 m, 24 March 1966 (1 male); 33°34'S 71°14'W, W. Maiz N. Hichins, 20 February 1966 (1 male); 10 March 1966 (1 male, 1 female); 450 m, Malaise-corn, N. Hichins and M.E. Irwin 16 March 1966 (1 male, 1 female); El Canelo, 33°35'S 70°27'W, M.E. Irwin, 9 January 1967 (1 male, 1 female); **Valpariso:** Mendoza: Aconcagua: 4 km S Zappalar, coastal slope, 32°33'S 71°28'W, E.I. Schlinger and M.E. Irwin, 17 July 1966 (1 female, MNRJ)

ACKNOWLEDGMENTS

We gratefully acknowledge Dr. Valeria Cid Maia (Museu Nacional, UFRJ) for the information on specimens in the MNRJ collection, April Nobile and Nick Olgeirson for the assistance with the auto-montage equipment, Darrel Ubick and Diana Silva D'Avila for the facilities in the "Wet Lab," Larry Currie for assistance in the library, and Christine Arata for the every day help. MSC is grateful to Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES, process 3123-04-9), an agency of the Brazilian Federal Government fostering scientific and technological development, for her post-doctoral grant.

LITERATURE CITED

ALBUQUERQUE, D. DE O. 1954. Sobre um gênero novo de Phaoninae do Chile e notas sobre *Steinella fuscinervis* (Macquart) (Diptera, Muscidae). *Revista Brasileira de Entomologia* 1:151–18.

- ARAÚJO, P.F., AND M.S. COURI. 1992. Redescrção de *Arthurella* com considerações sobre sua posição sistemática e redescrção do pupário de *A. nudiseta* Albuquerque (Diptera, Muscidae). *Revista Brasileira de Zoologia* 9:277–281.
- CARVALHO, C.J.B. DE. 1999. Revision, cladistics and biogeography of the Neotropical genus *Souzalopesmyia* Albuquerque (Diptera, Muscidae). *Proceedings of the Entomological Society of Washington* 101:123–137.
- CARVALHO, C.J.B. DE, AND M.S. COURI. 2002. Cladistic and biogeographic analyses of *Apsil* Malloch and *Reynoldsia* Malloch (Diptera: Muscidae) of southern South America. *Proceedings of the Entomological Society of Washington* 104:309–317.
- CARVALHO, C.J.B. DE, M.S. COURI, A.C., PONT, D. PAMPLONA, AND S.M. LOPES. 1993. A Catalogue of the Fanniidae and Muscidae (Diptera) of the Neotropical Region. *Sociedade Brasileira de Entomologia, São Paulo, Brasil*. 201 pp.
- CARVALHO, C.J.B. DE, M.S. COURI, A.C., PONT, D. PAMPLONA, AND S.M. LOPES. 2005. A Catalogue of the Muscidae (Diptera) of the Neotropical Region. *Zootaxa* 860:1–282.
- COURI, M.S., AND C.J.B. DE CARVALHO. 2000. Recent advances on the Phylogeny and Biogeography of Muscidae (Diptera). Page 925 in *Abstracts of the International Congress of Entomology*, Book II, Foz do Iguaçu.
- COURI, M.S., AND C.J.B. DE CARVALHO. 2002. Part II. Apical groups. Pages 133–287 in C.J.B. de Carvalho, ed., *Muscidae (Diptera) of the Neotropical Region: Taxonomy*. Curitiba, Editora Universidade Federal do Paraná, Brasil.
- LOPES, S.M. 1985. Descrição da fêmea de *Arthurella nudiseta* Albuquerque (Diptera, Muscidae, Cyrtoneuriniinae) coletada em Agaricaceae (Fungi). *Revista Brasileira de Biologia* 44:335–337.
- LOPES, S.M., M.S. COURI, D. PAMPLONA, AND C.J.B. DE CARVALHO. 1997. Notes on Neotropical types of Diptera described by Albuquerque (Anthomyidae [*sic*], Fanniidae, Muscidae, Piophilidae, Psilidae, Sapromyzidae, Scatophagidae e Stratiomyidae). *Publicações Avulsas do Museu Nacional* 69:1–33.
- PONT, A.C. 1972. Family Muscidae. In: *A Catalogue of the Diptera of the Americas South of the United States*, vol. 97. Museu de Zoologia, Universidade de São Paulo, Brasil. 111 pp.

FIGURES 1–8 (right). *Arthurella nudiseta* Albuquerque, 1854. (1) Mesothorax, dorsal view, female; (2) Mesothorax, dorsal view, male; (3) Mesothorax, lateral view, female; (4) Mesothorax, lateral view, male; (5) Abdomen, dorsal view, male; (6) Abdomen, dorsal view, female; (7) Abdomen, dorsal view, female; (8) Puparium

