

The genus *Culicoides* in Uruguay (Diptera: Ceratopogonidae)

Gustavo R. Spinelli

Instituto de Limnología "Dr. Raul A. Ringuelet"
Casilla de Correo 712, 1900 La Plata, Argentina

and

Maria E. Martinez

Universidad de la Republica, Facultad de Ciencias
Casilla de Correo 10773, Montevideo, Uruguay

Abstract

A new phytotelmic species, *Culicoides charua*, is described and illustrated from adult males and females and their pupal exuviae. New records are provided for Uruguay of *C. biestroi*, *C. chacoensis*, and *C. impusilloides*. A key is presented for the identification of the twelve species of *Culicoides* that occur in Uruguay.

Introduction

Biting midges of the genus *Culicoides* Latreille are notorious bloodsucking pests of man and animals throughout the world.

With respect to the *Culicoides* fauna from Uruguay, *C. caridei* (Brethes) was the first recorded species (Barbosa 1947), with additional records by Barbosa (1947), Wirth (1960), and Spinelli & Wirth (1985). Franca Rodriguez (1963) mentioned the presence of two anthropophilic and very abundant species: *C. bambusicola* Lutz and *C. debilipalpis* Lutz, but most probably she misidentified the specimens of *bambusicola*, which we think actually belong to *C. caridei*. Spinelli & Wirth (1984) recorded *C. flinti* Wirth, and Spinelli & Wirth (1985) pointed out that *C. debilipalpis* is a junior synonym of *C. lahillei* (Iches). Ronderos (1990) described *C. uruguayensis* from the Department of Paysandu. Finally, Spinelli & Ronderos (1991) recorded for the first time for Uruguay the following four species: *C. fernandoi* Tavares & Souza, *C. insignis* Lutz, *C. paraensis* (Goeldi), and *C. venezuelensis* Ortiz & Mirsa.

The purpose of this paper is to describe the adult and pupa of a new species, *Culicoides charua*, which breeds in the axils of *Eryngium serra* Cham. & Schlecht. (Umbelliferae), and to present

a key for the identification of the species present in Uruguay. We also record here for Uruguay, *C. biestroi* Spinelli & Ronderos, *C. impusilloides* Spinelli & Wirth, and *C. chacoensis* Spinelli & Wirth.

For an explanation of terminology for the adult stage see Wirth & Blanton (1959); for pupal terminology see Carter *et al.* (1920). The holotype of the new species is mounted on a microscope slide in Canada balsam and is deposited in the collection of the Museo de La Plata, Argentina. This is Scientific contribution #493 of the Instituto de Limnología "Dr. Raul A. Ringuelet."

Key to the *Culicoides* species of Uruguay

1. Wing with contrasting pattern of dark and pale spots; sensillar pattern various; eyes contiguous or narrowly separated 2
- 1'. Wing without such pattern (wing membrane grayish, with a faint dark area on 2nd radial cell); sensillar pattern 3, (7), 8-10, (11-12), 13-14, (15); eyes broadly separated
..... *caridei* (Bréthes)
- 2(1). Second radial cell wholly or mainly included in a pale spot 3
- 2'. Second radial cell wholly included in a dark spot 7

- 3(2). Cell M1 without pale spot on distal 1/2; small species, wing length 0.83 mm; sensillar pattern 3, 12-15; legs pale brown, knees dark brown *impusilloides* Spinelli & Wirth
- 3'. Cell M1 with pale spots on distal 1/2; large species, wing length 0.89-1.46 mm; flagellar segment 11 with sensilla coeloconica; legs dark brown, with pale bands 4
- 4(3). Cell M1 with only one pale spot distal to the double pale spot straddling vein M2 5
- 4'. Cell M1 with two pale spots distal to the double pale spot straddling vein M2 (sensillar pattern 3, 11-15; palpal pit with definite margins; not a definite black spot, only a faint line on vein R4+5 near end of 2nd radial cell; cell R5 with a subdivided distal pale spot; r-m crossvein dark; halter knob dark brown) *fernandoi* Tavares & Souza
- 5(4). Vein R4+5 blackened into adjacent distal pale area up to a point where vein turns abruptly forward to meet costa; sensillar pattern 3, 5, 7, 9, 11-15 *insignis* Lutz
- 5'. Vein R4+5 not blackened into adjacent distal pale area; sensillar pattern 3, 11-15 6
- 6(5). Eyes contiguous; antennal ratio 1.20; 13 mandibular teeth; femora dark brown (anterior femur slightly pale); distal pale spots in cells R5 and M2 not reaching wing margin; vein Cu1 dark at apex *biestroii* Spinelli & Ronderos
- 6'. Eyes forming a V-shape where they contact; 18 mandibular teeth; femora pale brown (distal 1/5 dark brown); distal pale spots in cells R5 and M2 broadly connected to wing margin; vein Cu1 pale at apex *charrua* new species
- 7(2). Vein M1 with pale spot straddling basal portion 8
- 7'. Vein M1 without pale spot straddling basal portion 10
- 8(7). Palpus with 3rd segment very prominent, with deep sensory pit; cell M1 with only one distal pale spot; cell R5 with subdivided distal pale spot; sensillar pattern 3-15; one or two functional spermathecae 9
- 8'. Palpus with 3rd segment not very prominent, with shallow sensory pit; cell M1 with 2 distal pale spots; cell R5 with 3 distal pale spots; sensillar pattern 3,11-14 (variable on 5-10); two functional spermathecae *venezuelensis* Ortiz & Mirsa
- 9(8). Distal pale spot in cell R5 large, not subdivided; two functional spermathecae *chacoensis* Spinelli & Wirth

- 9'. Distal pale spot in cell R5 subdivided in two small rounded pale spots; one functional spermatheca *uruguayensis* Ronderos
- 10(7). Cell M1 with 3 pale spots; cell R5 with 4 pale spots (the 2 poststigmatic pale spots well separated, a transverse one, and a subapical rounded or reniform one); eyes pilose *paraensis* (Goeldi)
- 10'. Cell M1 with 2 pale spots; cell R5 with 3 pale spots (subapical spot absent); eyes bare 11
- 11(10). Distal pale spot in cell M1 separated from wing margin by a distance approximately twice its diameter; sensillar pattern 3,8-10; antennal ratio 0.83; flagellar segment 11 subequal to segment 10 *lahillei* (Iches)
- 11'. Distal pale spot in cell M1 separated from wing margin by a distance approximately equal to its diameter; sensillar pattern 3,7-10; antennal ratio 1.19; flagellar segment 11 1.5 times as long as segment 10 *flinti* Wirth

Culicoides charrua Spinelli & Martinez
new species
Figures 1-9

Description: Female.- Wing length 1.73 mm; breadth 0.73 mm.

Head: Brown. Eyes bare, forming a V-shape where they contact. Antenna brown; flagellum somewhat collapsed in available specimen, lengths of flagellar segments in proportion of 15-13-13-13-14-14-15-15-19-19-20-20-28; antennal ratio 0.95; sensillar pattern 3,11-15. Palpus (Fig. 1) brown; lengths of segment in proportion of 9-28-33-11-8; palpal ratio 3.50; 3rd segment with subdivided, very shallow, sensory pit. P/H ratio 1.12. Mandible with 18 teeth.

Thorax: Brownish. Legs banded as follows: femora pale brown except distal 1/5 dark brown; tibiae brown, pale rings on fore and mid knees and base and apex of hind tibia; hind tibial comb with 7 spines, 3rd from spur longest. Wing (Fig. 2) with costa extending to 0.68 of total length; 2nd radial cell wholly included in a pale spot, with a small, faint, darkish spot just behind apex; vein R4+5 pale; r-m crossvein entirely dark; pale spot straddling midportion of vein M2; distal pale spot in cell R5 broadly connected to wing margin; only one pale spot in distal portion of cell M1; cell M2 pale at base, distal pale spot narrowly connected to wing margin; cell M4 with prominent pale lines

bordering veins M3+4 and Cu1, and a round distal pale spot narrowly separated from pale line along vein M3+4 and broadly connected to wing margin; anal cell with basal pale area and 2 distal pale spots, the distal one broadly connected to wing margin; apices of veins M1, M2, M3+4 and Cu1 with pale spots at wing margin. Macrotrichia sparse on distal 1/2 of wing and in anal cell. Halter brown.

Abdomen: Brown. Two functional spermathecae, ovoid with short necks; subequal, each measuring 0.060 x 0.045 mm; vestigial 3rd and sclerotized ring present.

Male.- Wing length 1.65 mm; breadth 0.59 mm; costal ratio 0.66. Similar to female with usual sexual differences.

Genitalia (Fig. 3): Ninth sternum with shallow caudomedian excavation; ninth tergum large, rounded distally, with small, widely-separated, apicolateral processes; cerci elongated. Basistyle with spinose setae on mesal margin, ventral and dorsal roots short; dististyle curved, apex blunt. Aedeagus 1.4 times as long as basal breadth; basal arms gently curved, lateral margins nearly straight; basal arch low, extending to 1/6 of total length; distal portion with internal, anteriorly-directed, sclerotized point, and slender apex with round terminal papilla. Parameres (Fig. 4) connected at bases by a short sclerotized loop; each with stout main body and slender, ventrally-directed filiform tip with fine fringing hairs distally.

Pupa. Length of male and female 4.0 mm.

Exuviae yellowish brown. Respiratory horn (Fig. 5) yellowish, distal 1/3 brown; 12-14 spiracular openings; proximal 2/3 slightly covered with pointed spinules. Anterodorsal tubercles of thorax (*ad*) prominent, with 2 large setae and a basal, darkly pigmented spine; dorsolateral tubercles (*dl*) subdivided, bearing one long and 2 diminutive thin setae; ventrolateral tubercles (*vl*) with one very long seta and a 2nd one diminutive; ventromedian tubercles indistinguishable. Operculum (Fig. 6) 1.2 times as long as anterior width, rounded distally; surface covered (except posterior end) by rounded spicules; 2 well-developed anteromarginal tubercles (*am*) from each of which arise a long seta, and also an inconspicuous dark spine; a low pigmented tubercles arises medially near posterior (distal) end.

Abdomen with vestiture of anterior segments as illustrated for 4th segment (Fig. 7): integument smooth except for sparse, posteriorly-projecting spinules anteriorly; 2 pairs of small pigmented spots anteriorly, and one elongated one posteriorly on midline. Tubercles not strongly developed: 2 dorsal posteromarginals (*dpm*), the outer bearing a long hair, the inner a minute spine; 2 dorsal anterosubmarginals (*dasm*), with a minute spine; 3 ventrals (*v*), the outer bearing a short spine, the middle a long hair, and the inner one a minute spine.

Female terminal segment (Fig. 8) 1.5 times as long as greatest (anterior) breadth; dorsal surface with small, posteriorly directed spinules only on a narrow anterior band and on the apicolateral processes; ventral surface with these spinules also present on each side of midline; apicolateral processes with very narrow angle of spread (about 40 degrees). Male terminal segment (Fig. 9) as in female, except for the ventral sexual processes.

Types. Holotype female, allotype male, Uruguay, Dto. San Jose, Playa Pascual, 6-x-1987, M. Martinez, in *Eryngium serra*. The specimens were collected as pupae, and the adults emerged in the laboratory.

Etymology. The species is named for the Charrua Indians, early inhabitants of the area where the specimens were collected.

Discussion. The adult of this new species is very similar to *Culicoides insignis*, from which it can be distinguished by the pale vein R4+5, and the spinose setae on the mesal margin of the basistyle. On the other hand, the pupae here described are different in many aspects from the description of *C. insignis* by Linley (1965), especially the location of the spiracular openings on the respiratory horn, the shape of the operculum, the development of the abdominal tubercles, and the position of the apicolateral processes of the terminal segment.

Culicoides charrua is also similar to *C. biestroi*. Characters for separating the two species are given in the key.

New Records

Culicoides biestroi Spinelli & Ronderos, 1991: 4 (female, male; Argentina - Corrientes, Buenos Aires; figs.).

New Record: Uruguay, Dto. Montevideo, Punta Espinillo, 6-x-1987, M. Martinez, in *Eryngium eburneum* Dec. (Umbelliferae), 1 female.

Culicoides chacoensis Spinelli & Wirth, 1984: 174 (female, male; Argentina, Bolivia); Spinelli & Wirth, 1985: 53 (in key; wing photo); Wirth *et al.*, 1988: 26 (in Atlas; wing photo).

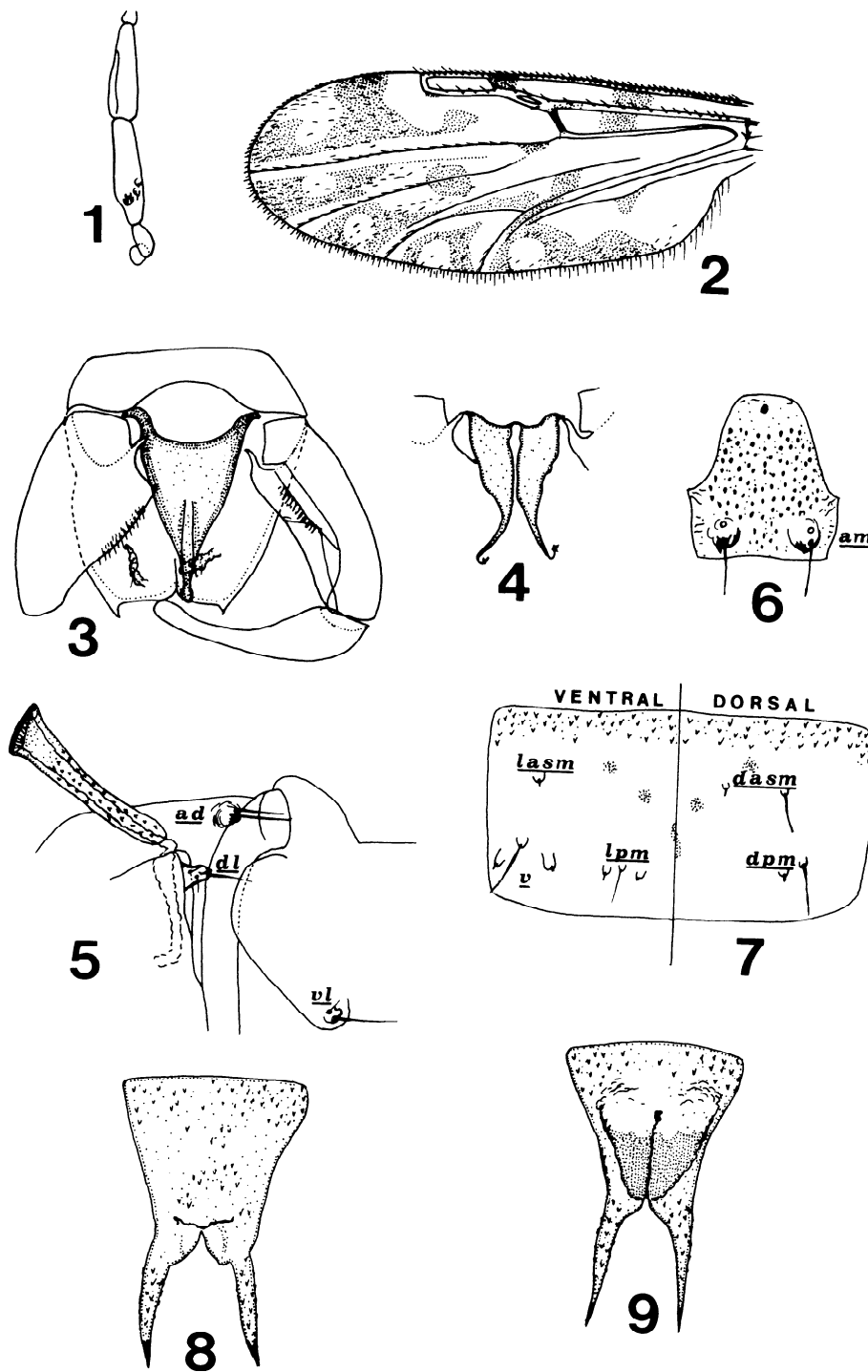
New Record: Uruguay, Salto, Zona Martin Jose, 20-i-1982, Franca Martinez-Salvatella, 1 female, black light.

Culicoides impusilloides Spinelli & Wirth, 1984: 178 (female, male; Brazil, Santa Catarina); Spinelli & Wirth, 1985: 51 (in key; wing photo); Wirth *et al.*, 1988: 14 (in Atlas; wing photo).

New Record: Uruguay, Tacuarembó, 19.iii-1950, T. D. St. George, 1 male.

Literature Cited

- Barbosa, F. A. S.** 1947. *Culicoides* (Diptera: Heleidae) da regio neotropical. An. Soc. Biol. Pernambuco 7: 3-30.
- Carter, H. F., A. Ingram, and J. W. S. Macfie.** 1920. Observations on the Ceratopogonine midges of the Gold Coast with descriptions of new species. Part II. Ann. Trop. Med. Parasitol. 14: 211-274.
- Franca-Rodriguez, M. E.** 1963. Primeros estudios los *Culicoides* de Uruguay (Diptera: Ceratopogonidae). Rev. Urug. Clin. 1(1): 65-70.
- Linley, J. R.** 1965. Descriptions of the pupae of *Culicoides barbosai*, *C. insignis*, and *C. borinqueni* (Diptera: Ceratopogonidae). Ann. Entomol. Soc. America 58: 57-63.
- Ronderos, M. M.** 1990. Dos especies nuevas de *Culicoides* para la Argentina y Uruguay (Diptera: Ceratopogonidae). Revta. Soc. Entomol. Argentina 48: 115-120.
- Spinelli, G. R., and M. M. Ronderos.** 1991. Los polvorines del genero *Culicoides* en areas de influencia de la represa de Salto Grande (Diptera: Ceratopogonidae). Neotropica 37(97): 1-12.
- Spinelli, G. R., & W. W. Wirth.** 1984. Ocho especies nuevas del genero *Culicoides* Latreille de la region Neotropical. Primera descripcion del macho de *C. flinti* Wirth, y de la hembra de *C. lenti* Tavares y Luna Dias (Diptera: Ceratopogonidae). Revta. Soc. Entomol. Argentina 43: 171-186.
- Spinelli, G. R., and W. W. Wirth.** 1985. Clave para la identificacion de las especies del genero *Culicoides* presentes al sur de la cuenca amazónica. Nuevas citas y notas sinonimicas (Diptera: Ceratopogonidae). Revta. Soc. Entomol. Argentina 44: 49-73.
- Wirth, W. W.** 1960. The correct status of *Cotocripus caridei* Brethes, a South American biting midge (Diptera: Ceratopogonidae). Proc. Entomol. Soc. Washington 62: 44.
- Wirth, W. W., & F. S. Blanton.** 1959. Biting midges of the genus *Culicoides* from Panama (Diptera: Heleidae). Proc. U.S. Natl. Mus. 109: 237-482.
- Wirth, W. W., A. L. Dyce, & G. R. Spinelli.** 1988. An atlas of wing photographs, with a summary of the numerical characters of the Neotropical species of *Culicoides* (Diptera: Ceratopogonidae). Contrib. American Entomol. Inst. 25: 1-72.



Figures 1-9. *Culicoides charrus*. 1-2, adult female; 3-4, adult male; 5-9, pupa; 1, palpus; 2, wing; 3, genitalia (parameres and one basistyle omitted); 4, parameres; 5, anterior portion of cephalothorax; 6, operculum; 7, 4th abdominal segment; 8, terminal segment of female; 9, terminal segment of male.