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First record of *Chironomus (Chironomus) calligraphus* Goeldi, 1905 (Diptera: Chironomidae) from Uruguay

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Abstract: Surveillance of the mosquito *Aedes aegypti* was carried out by the Ministerio de Salud Pública in all urban centers of Uruguay, from February 1997 to August 2010, as a strategy for dengue prevention. During this surveillance program the occurrence of Chironomidae was also assessed. *Chironomus (Chironomus) calligraphus*, was found to be sympatric with *Ae. aegypti* and *Culex quinquefasciatus* in a wide variety of artificial water containers in all sample locations within the 19 departments. This is the first record of *C. calligraphus* from Uruguay.

Chironomidae (Diptera) currently includes approximately 15,000 described species, and is among the most widely distributed families of insects. Chironomids are frequently the most abundant insects of inland aquatic environments (Cranston 1995; Ferrington 2008). Some chironomid species are found in habitats also colonized by mosquitoes (Culicidae), and the adults of these families are frequently confused with one another due to their morphological similarity. Nonetheless, chironomid adults are unlike mosquitoes in that they do not feed on blood, and are therefore harmless to humans.

As a strategy for preventing the transmission of dengue fever, the Ministerio de Salud Pública (MSP) has conducted surveillance of *Aedes aegypti* (Linnaeus, 1762) in all major populated centers of Uruguay since 1997. During this surveillance program the presence of chironomids in artificial water containers was assessed.

Samples were received in the entomology laboratory of the Unidad Zoonosis y Vectores of the Departamento Epidemiología of the MSP, as part of the National Plan of Detection and Control of *Ae. aegypti* (Willat *et al*. 2003). The 19 department capitals of Uruguay were sampled, including 132 urban areas throughout the country, from February 1997 to August 2010 (Table 1). Sampling involved multiple institutions and sectors as well as community participation in the peridomestic environment. Consequently, a wide variety of water containers in artificial environments were sampled. Other localities were strategically sampled, including places where there is a high probability of introduction of mosquitoes into the country (*e.g.* international bridges, ports, terminals of load and transport and airports). Moreover, localities where there is a high probability of mosquito multiplication and dispersion (e.g. cemeteries and tire-shops) were also sampled.

In addition to sampling existing containers, larval traps (larvitraps) were implemented as means of detection at each sample site. These were radial sections of tires filled with water and suspended one meter from the ground, thus recreating a favorable habitat for breeding *Ae. aegypti*. They were checked weekly from 1998 to 2003. Larval traps were subsequently replaced with oviposition traps in order to detect the presence of eggs. These were water containers with a wooden support inside on which the eggs were laid. The water and wooden paddle were checked for eggs and replaced once per week.

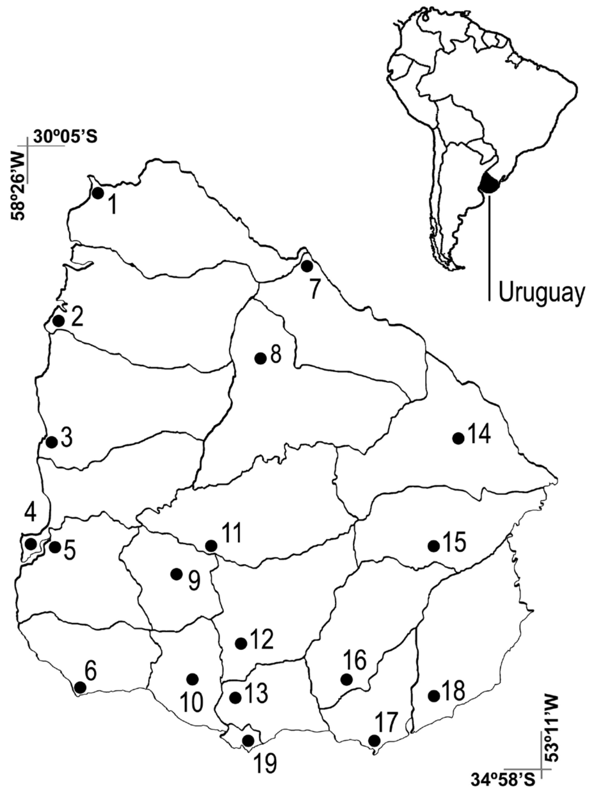

Figure 1. Map of Uruguay showing the cities from which the samples (1-19) were taken. (1 Bella Unión, 2 Salto, 3 Paysandú, 4 Río Negro, 5 Mercedes, 6 Colonia del Sacramento, 7 Rivera, 8 Tacuarembó, 9 Trinidad, 10 San José de Mayo, 11 Durazno, 12 Florida, 13 Canelones, 14 Melo, 15 Treinta y Tres, 16 Minas, 17 Maldonado, 18 Rocha, 19 Montevideo.)

Table 1. Records of *Chironomus calligraphus* from Uruguay, including locality data, collection date, and life stages collected. Abbreviations: Src = source, TS = tire shops, Hou = housing, Cem = cemetery, Con = container, M = male, F = female, PE = pupal exuviae, P = pupa, L = larva, EM = egg mass.

DEPARTMENT	CITY	SRC	LATITUDE (S)	LONGITUDE (W)	DATE	CON	M	F	PE	P	L	E M
Artigas	Bella Unión	TS	30°15'00"	57°35'00"	8/X/97	Tire	1	2	-	4	1	-
Salto	Salto	TS	31°23'00"	57°58'00"	1/IV/98	Tire	-	-	6	-	8	-
Paysandú	Paysandú	Hou	32°19'17"	58°04'32"	6/XII/99	Pool	-	1	11	1	17	-
Río Negro	Fray Bentos	Hou	33°07'57"	58°17'44"	20/III/98	Pail	1	1	23	2	8	-
Soriano	Mercedes	Hou	33°15'21"	58°01'09"	20/III/98	Pool	1	4	9	25	17	-
Colonia	Colonia del Sacra	Hou	34°28'00"	57°51'00"	30/X/97	Tank	1	-	23	4	12	-
Rivera	Rivera	TS	30°54'00"	55°31'00"	28/XII/99	Tire	3	-	-	6	10	-
Tacuarembó	Tacuarembó	Hou	31°44'00"	55°59'00"	5/I/00	Tank	-	3	21	-	28	-
Flores	Trinidad	Cem	33°32'20"	56°53'19"	26/V/98	Vase	-	-	-	2	4	-
San José	San José Mayo	Hou	34°20'15"	56°42'49"	2/II/98	Bath	-	-	21	1	3	-
Durazno	Durazno	Hou	33°24'47"	56°30'02"	13/IX/97	Glass	-	-	16	2	3	-
Florida	Florida	Hou	34°05'44"	56°12'51"	12/I/00	Jar	-	1	1	2	3	-
Canelones	Canelones	Hou	34°31'22"	56°16'40"	2/X/97	Sprinkler	3	4	12	4	7	-
Cerro Largo	Melo	Hou	32°22'00"	54°11'00"	20/X/97	Bottle	1	3	3	2	1	-
Treinta y Tres	Treinta y Tres	Hou	33°14'00"	54°23'00"	26/I/00	Tire	1	1	22	9	18	-
Lavalleja	Minas	Hou	34°22'12"	55°13'30"	12/XI/97	Flask	-	-	5	3	17	-
Maldonado	Maldonado	Hou	34°54'00"	54°57'00"	4/I/00	Pot	2	-	15	2	22	1
Rocha	Rocha	Cem	34°29'00"	54°20'00"	8/I/02	Vase	-	-	-	1	2	-
Montevideo	Montevideo	Hou	34°51'29"	56°10'15"	5/IX/98	Larvitrap	1	1	-	-	19	1

Samples were taken from different artificial water containers by using a fine mesh sieve. Larvae, pupae and pupal exuviae of aquatic insects were transferred to vials containing 70% ethanol as preservative. The vials were properly labeled with information corresponding to the date, city, block number, street and number of inspected property and the type of habitat (housing, commerce, tire shops, junkyard, wasteland, etc.) where the sample was taken. This information was also entered in a field and a laboratory chart; therefore, information about the entire study area was available, which allowed for accurate location of properties and recording of conditions for every sample (Hernández *et al*. 2002). In the cemeteries, grave sites were inspected and samples of aquatic insects taken from vases and flowerpots. This information was recorded using the same methodology described above.

Specimens were identified by using taxonomic keys and descriptions provided by Fittkau (1965) and Spies *et al*. (2002). In the current study, *Chironomus (Chironomus) calligraphus* Goeldi, 1905 was the only species for which all life stages were collected. Voucher specimens from each department (Figure 1) were deposited in the Colección Entomológica of the Facultad de Ciencias, Universidad de la República, Uruguay (Table 1).

Chironomids were often found to be sympatric with *Ae. aegypti* and *Culex quinquefasciatus* Say, 1823. *C. calligraphus* was collected at all sampling locations throughout the 19 departments and in a wide variety of artificial containers (Table 1). This is the first record of the species for Uruguay. *C. calligraphus* exhibits intraspecific morphological variability and a wide distribution in the Americas from the southern United States to Argentina. For these reasons, it has been suspected as a species complex (Spies *et al*. 2002). It lives successfully in many different conditions, and is well adapted to habitats with temporary water and reduced levels of oxygen (Fittkau 1965; Spies *et al*. 2002). Despite the predictability of finding species such as *C. calligraphus* in the same samples as *Ae. aegypti* in Uruguay, there were no previous records published. This is probably due to the fact that, in general, vector surveillance programs only focus on medically important insects. As part of a surveillance program in the Florida Keys (USA), Hribar *et al*. (2004) identified another species of chironomid belonging to the complex *decorus, Chironomus decorus* Johannsen, 1905 in water containers, sewage treatment plants, and storm drains. Long term vector control programs provide excellent opportunities to survey and monitor other organisms.

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