

Notas / Notes

Presence of *Symbiocladius wygodzinskyi* Roback, 1965 (Diptera, Chironomidae) in Peru. Taxonomic remarks

N. Prat^{1*}, R. Acosta¹ & M. Rieradevall^{1,2}

The midges of genus *Symbiocladius* (Diptera, Chironomidae) live ectoparasitically on nymphs of Ephemeroptera. Two species are known from South America (*S. wygodzinskyi* Roback, 1965 and *S. renatae* Spies, 1997) (Gonser & Spies, 1997; Jacobsen, 1999). The two South-American species have been found living on the Leptophlebiidae (Ephemeroptera) genera *Meridialaris* –*M. chilensis* (Dem.) and *M. diguillina* (Dem.)– and *Masartellopsis* –*M. irrarrazavali* (Dem.)–, and have been recorded only south of 30° S in fast flowing streams at relatively low altitudes (Gonser & Spies, 1997).

The midges of the genera *Symbiocladius* are true parasites (Codreanu, 1939; Soldan, 1979), and the life-cycle of *S. renatae* on *M. diguillina* was described in detail in Gonser & Spies (1997). In the case of *S. wygodzinskyi*, after the original description of Roback from Tierra del Fuego and Argentina, several studies reported the presence of this species in Argentina or Chile (Gonser & Spies, 1997). On the other hand De Oliveira-Roque *et al.* (2004) reviewed several collections of macroinvertebrates parasitized by midges without reporting *Symbiocladius*. Thus, it appears that the species is

absent from the lowlands of the Neotropical Region, at least from Brazil.

The examined material consisted of three specimens (Fig. 1) found on nymphs of *Meridialaris* sp. (Ephemeroptera, Leptophlebiidae) in two different streams in Peru: río Chusgón (La Libertad Department) and río Anchapillay (Aurimac Department). Collected specimens were preserved in ethanol. After removing the larvae and pupae from the host, the specimens were first dissected and prepared in Euparal, as permanent media, on slides for observation under the microscope. The developing adults were dissected from the pupal skin. Dissection techniques, procedures used in the preparation, and larval terminology are described in Epler (2001).

MATERIAL EXAMINED:

Site 1: Department: La Libertad. Province: Sánchez Carrión. Municipality: Sarín. River Chusgón (a tributary of Marañón River), 7° 58' 18.195"S, 77° 57' 51.962"W, 3484 m.a.s.l. 15-V-2010, (C. Ormeño leg.), 1 larvae starting pupation (without well developed and recognizable pupal structures) (Fig. 1a).

Site 2: Department: Aurimac. Province: Cotabambas. Municipality: Cotabambas. River Anchapillay (tributary of

¹ Grup de recerca F.E.M. (Freshwater Ecology and Management). Dept. Ecologia, Universitat de Barcelona. Diagonal 643. 08028 Barcelona (Spain).

² Institut de Recerca de la Biodiversitat (IRBio), Universitat de Barcelona. Facultat de Biologia. Diagonal 643. 08028 Barcelona (Spain)

* Corresponding author: nprat@ub.edu

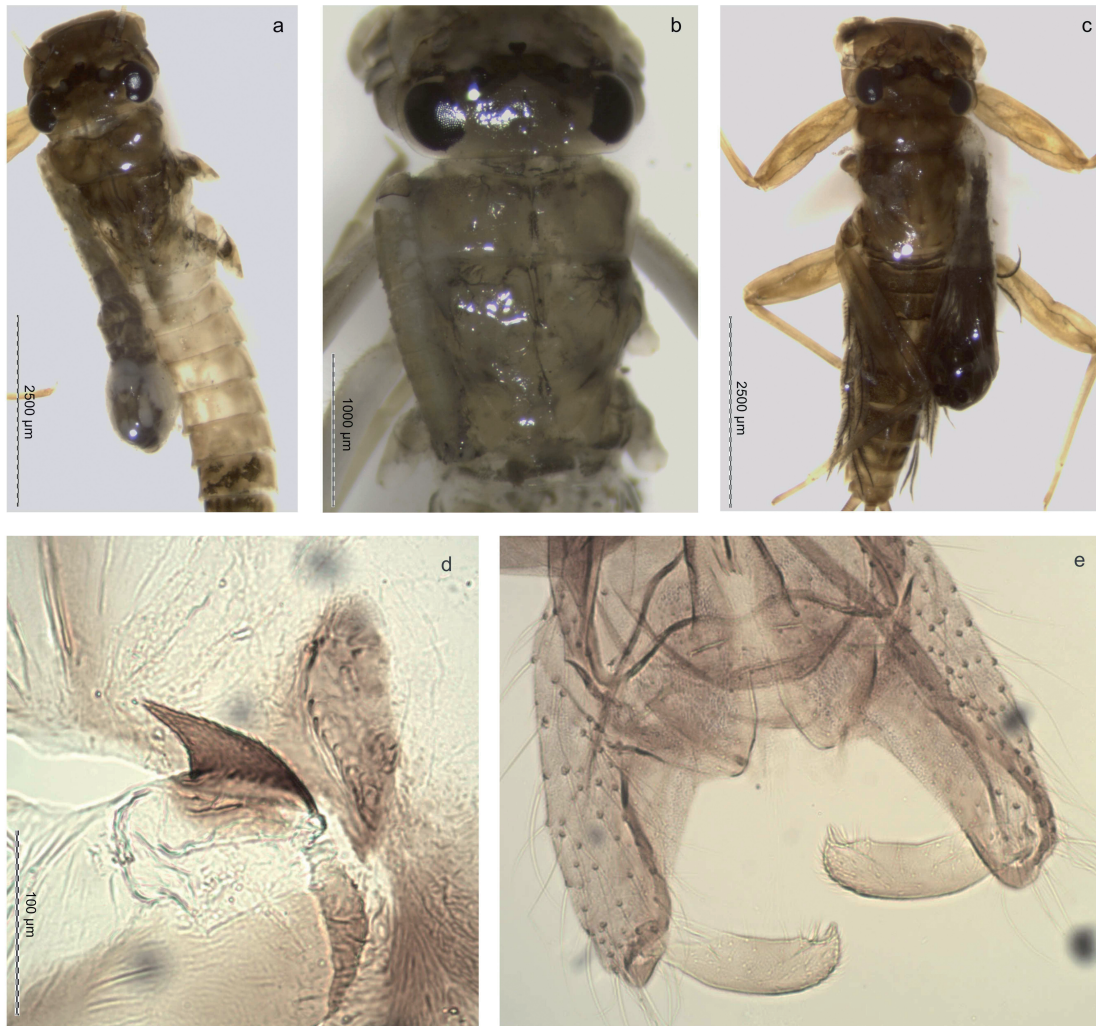


Fig. 1.— *Symbiocladius wygodzinskyi* Roback, 1965 parasitic on *Meridialaris* sp. (Ephemeroptera; Leptophlebiidae) in Peru. a) River Chusgón (larvae in pupation). b) Larvae from River Anchapillay. c) Male pupae from River Anchapillay. d) Pupal thoracic horn. e) Male hypopygia.

Fig. 1.— *Symbiocladius wygodzinskyi* Roback, 1965, ectoparásito de *Meridialaris* sp. (Ephemeroptera, Leptophlebiidae) en Perú. a) Río Chusgón (larva pupando). b) Larva del río Anchapillay. c) Pupa macho del río Anchapillay. d) Cuerno torácico de la pupa. e) Hipopigio del macho

Apurimac River), 14° 2' 57.8106"S, 72° 24' 6.8148"W, 4234 m.a.s.l. 15-VII-2009, (E. Oyague leg.), 1 fourth instar larvae (Fig. 1b) and 1 mature male pupae which still retained the larval exuviae (Fig. 1c) on two different nymphs.

The specimens were identified as *S. wygodzinskyi* from larval, pupal and/or adult characteristics according to distinctive characters of the description of Roback (1965) and the identification key of Gonsler & Spies (1997).

IMAGO: The adult characteristics were those of the mature male pupae from river Anchapillay. The eyes were pubescent. The antenna was 13 segmented, 1214 micrometres long with an AR of 1.33. The setae of the male abdomen were strong. The hypopygia had no anal point (as in Roback, 1965) (Fig. 1e). The gonostylus was 165 micrometres long and the gonocoxite 352 micrometres (similar in size to Roback's data) with three ovate bristles



Fig. 2.— Larvae of *Symbiocladius wygodzinskyi* Roback, 1965. a) Head of larvae. b) Mentum and mandibles. c) Antenna. d) Mentum, arrow indicates the lateral teeth. e) Mandible (with the two internal teeth) and labrum. f) Anterior prolegs. g) Posterior prolegs. Locations: a, b, f and g: (River Anchapilly); c and d: River Chusgón (Perú).

Fig. 2.— *Symbiocladius wygodzinskyi* Roback, 1965, a) Cápsula cefálica de la larva. b) Mentón y mandíbulas. c) Antena. d) Mentón, la flecha indica los dientes laterales. e) Mandíbula (con dos dientes internos) y labro. f) Seudópodos anteriores. g) Seudópodos posteriores. Localización de los ejemplares: a, b, f y g: Río Anchapilly; c y d: Río Chusgón, ambos en Perú.

(as figured by Roback). It was not possible to examine the presence of claws in the tibial spurs.

PUPAE: The thoracic horn of the pupae was characteristic (Fig. 1d) and similar to fig. 3d in Gonser & Spies (1997). Close to the thoracic horn there was a characteristic structure (the roundish humeral hump of Gonser & Spies (1997)), oval in form (115 micrometres long and 35 micrometres wide), darker than the rest of the thorax (Fig. 1d). The abdomen had the tergites II to V with a complete posterior band of spines embedded in a dark coloured area. This median band was medially broken and less extensive laterally in tergites VI and VII and absent in tergite IX. In sternites, no spines have been observed. The collected pupa had a more extensive tergite pattern of hooks that those described by Roback (1965) but otherwise was very similar. Apex of abdomen was membranous.

LARVA: The larva of Fig. 1b was 2 mm long. Its head was 221 micrometres long, yellow in colour with black occipital border (Fig. 2a). Its antenna was tiny (Fig. 2c) with 5 segments, the first segment was 20 micrometres long; segments 2-5 were 13 micrometres altogether (AR = 1.54). The mandible (Fig. 2e) was heavily sclerotized, with only two inner teeth which were similar in size (Fig. 2e) in one specimen, but not in the other (Fig. 2d). The maximum length of the mandible was 56 micrometres. The labrum presented a spine comb with two lobes (Fig. 2e) (5 lobes in figure 7 of Roback, 1965). The mentum was not as heavily sclerotized as the mandibles (Fig. 2b, d) with 5-6 characteristic transparent lateral teeth, similar to figure 2c in Gonser & Spies (1997). The anterior prolegs were short (58 micrometres high) with more than 130 hooks, most of them with an apical tooth and several internal teeth (Fig. 2f). The hooks of the posterior prolegs did not present internal teeth (Fig. 2g). Two anal papillae were present (none according Roback, 1965; two in *S. renatae*, Gonser & Spies, 1997). The variability found in the size of the mandible teeth suggest that this character should be taken with care when Gonser and Spies (1997) key is used for the species determination.

According to Spies (com. pers., 2012) the larvae can live in the host both with the head forwards (as in Fig. 1b) or in a rear position (as in Fig. 1a), but when pupation starts, the larvae build a membranous sheath and remain fixed with the pupal cephalothorax located around the host abdominal segments IV-V (Fig. 1c), as was figured

by Roback (1965). The larva from the Río Anchapillay (Fig. 1b) was in reverse position compared to Fig. 1 in Roback (1965), but in this figure the larvae was in a sheath, while our larvae in Fig. 1d, lacked the sheath and most probably could move freely and become attached in reverse position to the abdomen of the host for the pupation and adult metamorphosis.

This study data enlarges further north, from 30°S up to 7°S, the distribution area of the species originally described by Roback in 1965. At these latitudes, larvae live always in cold waters at very high altitude 3000 m.a.s.l., following the distribution of the host species and probably will be found in other countries where nymphs of the genera *Meridialaris* are distributed. As the other species of this genus, *S. wygodzinskyi* is present only in streams with low temperatures, which in the Neotropics imply that it is restricted to the highlands of the tropical areas while it is found at lower altitudes in Chile and Argentina (Gonser & Spies, 1997).

Acknowledgments

We would like to acknowledge Julio Rivera, C. Ormeño and Eduardo Oyague of Centro de Ornitología y Biodiversidad (CORBIDI) for providing the collected specimens.

References

- Codreanu, R., 1939. Recherches biologiques sur un Chironomidae *Symbiocladius rhithrogenae* (ZAVR.), ectoparasite "cancérigène" des Ephémères torrenticoles. *Archives de zoologie expérimentale*, 81: 1-283.
- De Oliveira-Roque, F., Trivino-Strixino, S., Jancso, M. & Fragoso, E. N., 2004. Records of Chironomidae larvae living on other aquatic animals in Brazil. *Biota Neotropica*, 4(2): 1-9.
- Epler, J. H., 2001. *Identification Manual for the Larval Chironomidae (Diptera) of North and South Carolina. A guide to the taxonomy of the midges of the southeastern United States, including Florida*. Special Publication SJ2001-SP13. North Carolina Department of Environment and Natural Resources, Raleigh, NC, and St. Johns River Water Management District. Palatka. 526 pp.
- Gonser, T. & Spies, M., 1997. Southern hemisphere *Symbiocladius* (Diptera, Chironomidae) and their mayfly hosts (Ephemeroptera, Leptophlebiidae). In: P. Landolt & M. Sartori (eds). *Ephemeroptera & Plecoptera: Biology-Ecology-Systematics*. MTL. Fribourg: 455-466.

- Roback, S. S., 1965. A new subgenus and Species of *Symbiocladius* from South America (Diptera: Tendipedidae). *Entomological News*, 76(5): 113-122.
- Soldán, T., 1979. The effect of *Symbiocladius rhithrogenae* (Diptera, Chironomidae) on the development of reproductive organs of *Ecdyonurus lateralis* (Ephemeroptera, Heptageniidae). *Folia Parasitologica*, 26: 45-50.

género *Meridialaris* sp. (Ephemeroptera: Leptophlebiidae), ambas localidades se sitúan en ríos de la zona alta de los Andes, siempre en agua muy frías. Se señalan algunos detalles de la morfología de las larvas y las pupas no bien descritos en los trabajos originales y se discute la posición de los quironómidos sobre su hospedador.

Palabras clave: Chironomidae; *Symbiocladius* ectoparásitos; Andes tropicales; Leptophlebiidae; Perú.

ABSTRACT

We report the presence of *S. wygodzinskyi* Roback, 1965 (Diptera: Chironomidae) from two different areas in Peru, further north of its previously known distribution, and living on nymphs of genus *Meridialaris* sp. (Ephemeroptera: Leptophlebiidae) at high altitude Andean streams in very cold water. Details of the morphology of the larvae and the pupae are reported and discussed together with the position of the midges on the host.

Keywords: Chironomidae; *Symbiocladius* ectoparasites; Tropical Andes; Leptophlebiidae; Peru.

RESUMEN

Presencia de *Symbiocladius wygodzinskyi* Roback, 1965 (Diptera, Chironomidae) en Perú. Notas taxonómicas

Se cita la presencia de *S. wygodzinskyi* Roback, 1965 (Diptera: Chironomidae) en dos áreas diferentes de Perú, mucho más al norte de la distribución original y viviendo sobre ninfas del

Recibido / Received, 26-09-2012
 Aceptado / Accepted, 28-01-2013
 Publicado en línea / Published online, 22-02-2013
 Publicado impreso / Published in print, 28-06-2013