Zootaxa 3949 (2): 203–216
www.mapress.com/zootaxa/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

http://dx.doi.org/10.11646/zootaxa.3949.2.3
http://zoobank.org/urn:lsid:zoobank.org:pub:43D9AF95-21AA-4C56-B2DE-41D91F27D7AB

Association of immature stages of some caddisfly species from northwestern Argentina with description of a new species of *Helicopsyche* (Trichoptera: Helicopsychidae)

PAOLA A. RUEDA MARTÍN[1] & ÁGUEDA VERÓNICA ISA MIRANDA[2]

[1]*Facultad de Ciencias Naturales e Instituto Miguel Lillo, Instituto de biodiversidad Neotropical, CONICET, Miguel Lillo 205, San Miguel de Tucumán, Tucumán, Argentina. E-mail: paolamartinzoo@yahoo.com.ar*

[2]*Facultad de Ciencias Naturales e Instituto Miguel Lillo, Miguel Lillo 205, San Miguel de Tucumán, Tucumán, Argentina. E-mail: veronica66_144@hotmail.com*

Abstract

The adult, larva, and pupa of *Helicopsyche obscura* **sp. nov.** from northwestern Argentina are described and illustrated. Descriptions and illustrations of adults and associated pupae and larvae of *Helicopsyche turbida* Navás and *Leptonema boliviense boliviense* Mosely are included. The associations of immature stages were made using the metamorphotype method. *Helicopsyche turbida* is newly recorded from Tucumán province. The adult males of *H. obscura* **sp. nov.** and *H. turbida* have similar structure in the genital segments, however, the most clear differences are in the general color and size of the adult, and in the color, size, and morphology of the metanota in the larval stages as well as the shapes of mandibles, hook plates, and terminal segments of the pupal stages. The larva and pupa of *L. boliviense boliviense* are compared with those of *L. columbianum* and other previously described species, providing differences in color, chaetotaxy, and morphology.

Key words: Hydropsychidae, *Leptonema*, metamorphotype, new records

Introduction

Holometabolous aquatic insects of the order Trichoptera are considered good indicators for water quality, especially because of their low tolerance to changes in habitat conditions (Ward 1992). Trichoptera larvae are important participants in energy flow and nutrient dynamics in the aquatic environment (Wiggins 2004).

The northwestern Argentinean mountain forest is in an area with subtropical climate, including a dry season in the winter. The area studied in this paper corresponds to the biogeographic province known as Las Yungas or Bosque Tucumano–Boliviano (Cabrera & Willink 1973; Morrone 2001). The Yungas Forest has ecologically important altitudinal variation, ranging from 400 m a.s.l. to 3000 m a.s.l. This is a N-S longitudinal belt that can be recognized from the Andes of Venezuela to the northwestern mountains in Argentina.

The Trichoptera fauna of this area has been studied by several authors (Flint 1983; Flint et al. 1987; Angrisano 1984, 1995; Valverde 1996; Angrisano & Sganga 2005; Rueda Martín 2005a, 2005b, 2006, 2008; Rueda Martín & Gibon 2008; Rueda Martín et al. 2011; Sganga 2006; Sganga & Fontanarrosa 2006; Valverde & Abelando 2006). There are about 112 species of Trichoptera in this Forest from among which only 31 have been associated with their immature stages (Valverde & Abelando 2006; Rueda Martín 2005a, 2005b, 2006; Flint 1974; Rueda Martín 2008, 2011; Angrisano & Sganga 2005; Angrisano 1995; Roback 1966; Marlier 1964; Holzenthal 1988; Smith & Lehmkuhl 1980; Ross 1944; Flint 1982, 1983; Wiggins 1996; Wallace & Merritt 1980; Sganga & Fontanarrosa 2006; Ulmer 1909; Flint 1980; Valverde 1996).

Caddisfly larvae are an important and representative group of benthic macroinvertebrates in the rivers of northwestern Argentina. They are used in ecological studies, mainly as part of a biotic index and as contributors to biodiversity and richness (Mesa & Fernández 2007; Mesa et al. 2008; Fernández et al. 2008). The larval stages of

Accepted by J. Morse: 11 Feb. 2015; published: 24 Apr. 2015

Pronotum dark brown with short and truncate setae on anterior margin; posterior margin of pronotum black, strongly sclerotized; each pronotal plate bearing semicircular groove and two small dark spots (Fig. 7E). Mesonotum and metanotum with curved setae in anterior margins; surfaces recovered with dark setae; muscle scar patterns as in Figs 7 F–G. Prosternum irregular, subtriangular, broader anteriorly with short, broad anteromesal projection; posteriorly rounded, coloration pattern as in Fig. 7K. Chaetotaxy of thoracic legs as in Fig. 7J. Forefemur wider in distal 2/3rds, with pointed dorsal process probably associated with stridulation function. Abdomen with pattern of abdominal gills as in Fig. 8A, lateral line vague. Segment IX with pair of ventral subtriangular plates bearing posterior setae (Fig. 7L). Anal prolegs each with brush of long setae on posterior margin of each lateral plate.

Pupa (Fig. 8). Mean body length: 14 mm (n=3). General color in alcohol yellowish. Mandibles each 2.5 times as long as basal width, curved, pointed, bearing serrated internal margins (Fig. 8B). Abdominal tergites III–VIII bearing anterior dorsal hook plates; abdominal tergite III bearing also posterior pair of hook plates (Fig. 8C). Terminal segment elongate with two digitate projections bearing lateral setae (Fig. 8D).

Biology. Larvae of *L. boliviense boliviense* were collected in rivers with much marginal vegetation. These rivers and springs have stony bottoms and abundant allochthonous organic debris from the riparian vegetation. The larva builds a retreat, with sand and bigger stone pieces between stones in small waterfall areas. In the stomachs of some larvae we found coarse particulate organic matter, mainly pieces of leaves. The second most commonly found items were algae and some arthropod sclerites.

Distribution. Argentina, Bolivia, Peru.

Material examined. ARGENTINA: Jujuy: Camino a Tiraxi, Arroyo Hondo Bajo Puente, 2400’25”S, 06522’9 W, 1700 m, Romero & Molineri cols, 2 larvae (IBN); Río Yala, 20.vi.2009, 7 larvae (IBN); **Salta:** Santa Victoria, Río Los Naranjos, 2225’47”S, 06444’20"W, 1109 m, 13.xi.2004, P. Rueda Martín col., 5 larvae, 1 pupa, 20 males (IBN); Los Toldos, Río Huaico Grande, 2216’44”S, 06442’39”W, 1645 m,, 26.x.1999, 3 males (IBN); Río Huaico Grande, 2216’44”S, 06442’39”W, 1645 m, 11.xi.2004, P. Rueda Martín col., 3 pupae, 2 metamorphotype males (IBN); **Tucumán:** Afluente Río Raco, Manantial, 3.iii.2009,1 larva, 1 metamorphotype male (IBN); Arroyo Calimayo, antes de la papelera, 265533”S, 0652319”W, 493 m, 28.vii.2006, Rueda Martín col., 6 larvae (IBN).

Acknowledgements

We want to thanks to Oliver Flint and Carol Flint for making possible the visit to the NMNH in Washington and to the group of researchers of the IBN because of their help in travels and collecting trips. This research was accomplished with a postdoctoral fellowship from CONICET (National Council of Scientific Researchers and Technology from Argentina). Additional financial support was obtained from the "Agencia Nacional de Promoción Científica y Tecnológica" PICT 01–528, PICT RUEDA MARTIN 2281 PRESTAMO BID and "Consejo de Investigaciones de la Universidad Nacional de Tucumán" CIUNT 26G309.

References

Angrisano, E.B. (1984) Nuevas especies de Hydroptilidae Argentinos (Trichoptera). *Revista de la Sociedad Entomologica Argentina*, 43, 1–5.

Angrisano, E.B. (1995) Contribución para el conocimiento de las *Oxyethira* neotropicales (Trichoptera: Hydroptilidae). *Physis, (Buenos Aires)*, Sección B, 50 (118–119), 27–35.

Angrisano, E.B. & Sganga, J.V. (2005) Contribution to the knowledge of the genus *Metrichia* Ross from Argentina (Trichoptera: Hydroptilidae: Ochrotrichiini). *Aquatic Insects*, 27 (2), 113–123. http://dx.doi.org/10.1080/01650420500062782

Banks, N. (1920) New neuropteroid insects. *Bulletin of the Museum of Comparative Zoology at Harvard College*, 64, 299–362.

Banks, N. (1924) Descriptions of new neuropteroid insects. *Bulletin of the Museum of Comparative Zoology*, 65, 421–455, pls. 1–4.

Banks, N. (1938) New West Indian neuropteroid insects. *Revista de Entomologia*, 9 (3–4), 285–304.

Botosaneanu, L. (1994) A study of the larvae of caddisflies (Trichoptera) from Cuba. *Tropical Zoology*, 7, 451–475. http://dx.doi.org/10.1080/03946975.1994.10539267

Cabrera, .L. & Willink, A. (1973) *Biogeografía de América Latina. Monografía 13. Serie de Biología*. Secretaría General de la Organización de los Estados Americanos. Washington, D.C., United States of America, 120 pp.
Fernández, H.R., Romero, F. & Domínguez, E. (2008) Intermountain basins uses in a subtropical region and their influence on benthic fauna. *River Research and Applications*, 25, 181–193. http://dx.doi.org/10.1002/rra.1114
Flint, O.S. Jr. (1964) The caddisflies (Trichoptera) of Puerto Rico. *University of Puerto Rico, Agricultural Experiment Station, Technical Paper*, 40, 1–80.
Flint, O.S. Jr. (1967) Studies of Neotropical caddis flies, V: Types of the species described by Banks and Hagen. *Proceedings of the United States National Museum*, 123 (3619), 1–37. http://dx.doi.org/10.5479/si.00963801.123-3619.1
Flint, O.S. Jr. (1968) Bredin–Archbold–Smithsonian Biological Survey of Dominica, 9. The Trichoptera (Caddisflies) of the Lesser Antilles. *Proceedings of the United States National Museum*, 125 (3665), 1–86. http://dx.doi.org/10.5479/si.00963801.125-3665.1
Flint, O.S. Jr. (1974) Studies of Neotropical caddis flies, XIX: The genus *Cailloma* (Trichoptera: Rhyacophilidae). *Proceedings of the Biological Society of Washington,* 87, 473–484.
Flint, O.S. Jr. (1980) Studies on Neotropical caddisflies, XXVI: New species from Argentina (Trichoptera). *Revista de la Sociedad Entomológica Argentina*, 39, 137–142.
Flint, O.S. Jr. (1982) Trichoptera del Area Platense. *Biología Acuática*, 213, 1–70.
Flint, O.S. Jr. (1983) Studies of Neotropical caddisflies, XXXIII: New species from austral South America (Trichoptera). *Smithsonian Contributions to Zoology*, 377, 1–100. http://dx.doi.org/10.5479/si.00810282.377
Flint, O.S. Jr., McAlpine, J.F. & Ross, H.H. (1987) A revision of the genus *Leptonema* Guerin (Trichoptera: Hydropsychidae: Macronematinae). *Smithsonian Contributions to Zoology*, 450, 1–193. http://dx.doi.org/10.5479/si.00810282.450
Flint, O.S. Jr. & Wallace, J.B. (1980) Studies of Neotropical caddisflies, XXV: The immature stages of *Blepharopus diaphanus* and *Leptonema columbianum* (Trichoptera: Hydropsychidae). *Proceedings of the Biological Society of Washington*, 93, 178–193.
Holzenthal, R.W. (1988) Studies in Neotropical Leptoceridae (Trichoptera), VIII: The genera *Atanatolica* Mosely and *Grumichella* Müller (Triplectidinae: Grumichellini). *Transactions of the American Entomological Society*, 114, 71–128.
Marlier, G. (1964) Trichoptéres de l'Amazonie recueillis par le Professeur H. Sioli. *Memoires l'Institut Royal des Sciences Naturelles de Belgique*, Series 2, Fasc 76, 1–167.
Mesa, L.M. & Fernández, H.R. (2007) La riqueza de artrópodos bentónicos en una cuenca endorreica subtropical (Tucumán, Argentina). *Ecología Austral*, 17, 247–256.
Mesa, L.M., Fernandez, H.R. & Manzo, M.V. (2008) Seasonal patterns of benthic arthropods in a subtropical Andean basin. *Limnologica*, 39, 152–162. http://dx.doi.org/10.1016/j.limno.2008.03.005
Milne, M.J. (1938) The metamorphotype method in Trichoptera. *Journal New York Entomological Society*, 46, 435–437.
Morrone, J.J. (2001) *Biogeografía de América Latina y el Caribe.* Manuales y Tesis SEA 3, Zaragoza (España), 148 pp.
Mosely, M.E. (1933) *A revision of the genus Leptonema.* British Museum (Natural History), London, 69 pp.
Müller, F. (1921) Briefe und noch nicht veröffentliche Abhandlungen aus dem Nachlass 1854–1897. *In*: Möller, A. (Ed.), *Fritz Müller*: *Werke*, *Briefe und Leben.* G. Fischer, Jena, pp. 383–642.
Navás, L. (1923) Estudi sobre Neuròpters (Insectes). *Arxius de L´Institut de Ciències*, 7, 179–203.
Nessimian, J.L. & Dumas, L.L. (2010) Description of the immature stages of *Leptonema tridens* (Insecta Trichoptera: Hydropsychidae) from southeastern Brazil With notes on tis biology. *Zoologia* 27,3, 465–471. http://dx.doi.org/10.1590/S1984-46702010000300021
Reynaga, M.C. (2009) Habitos alimentarios de larvas de Trichoptera (Insecta) de una cuenca subtropical. *Ecologia Austral*, 19, 207–214.
Roback, S.S. (1966) The Catherwood Foundation Peruvian–Amazon Expedition, XI–the Trichoptera larvae and pupae. *Monographs of the Academy of Natural Sciences of Philadelphia*, 14, 235–303.
Ross, H.H. (1944) The caddisflies or Trichoptera of Illinois. *Bulletin of the Illinois Natural History Survey*, 23 (1), 1–326.
Rueda Martín, P.A. (2005a) Larva, pupa and adult male of *Atopsyche* (*Atopsyche*) *maxi*, a new species from northwestern Argentina and southern Bolivia (Trichoptera: Hydrobiosidae). *Aquatic Insects*, 27, 293–298. http://dx.doi.org/10.1080/01650420500327904
Rueda Martín, P.A. (2005b) New record of *Ithytrichia* (Trichoptera: Hydroptilidae) for South America, with descriptions of male, larva and pupa of a new species from northwestern Argentina. *Aquatic Insects*, 28 (4), 251–256. http://dx.doi.org/10.1080/01650420601072276
Rueda Martín, P.A. (2006) Associations, new records, and a new species of *Atopsyche* from northwestern Argentina and Southern Bolivia (Trichoptera: Hydrobiosidae). *Zootaxa*, 1367, 51-62.
Rueda Martín, P.A. (2008) Morfología y biología de los estados inmaduros de *Marilia cinerea*, Navás (1931) y *M. elongata*, Martynov (1912), con redescripción del macho adulto de *M. cinerea* (Trichoptera: Odontoceridae). *Revista de la sociedad Entomológica Argentina*, 67 (1–2), 11–20.

Rueda Martín, P.A. (2011) New Hydroptilidae and new records from northwestern Argentina and Bolivia (Trichoptera: Hydroptilidae). *Aquatic Insects*, 33 (1), 1–11.
http://dx.doi.org/10.1080/01650424.2011.577279

Rueda Martín, P.A. & Gibon, F.M. (2008) New species of Glossosomatidae from Bolivia with new records from Bolivia and northwestern Argentina (Trichoptera Glossosomatidae). *Annales de Limnologie*, 44 (3), 215–225.
http://dx.doi.org/10.1051/limn:2008006

Rueda Martín, P.A., Gibon, F.M. & Molina, C. (2011) Six new species of *Oecetis* from Bolivia with new records from Bolivia and northwestern Argentina (Trichoptera: Leptoceridae). *Zootaxa*, 2821, 19–38.

Schefter, P.W. (1996) Phylogenetic relationships among subfamily groups in the Hydropsychidae (Trichoptera) with diagnoses of the Smicrideinae, new status, and the Hydropsychinae. *Journal of the North American Benthological Society*, 15, 615–633.
http://dx.doi.org/10.2307/1467812

Schmid, F. (1949) Les trichoptères de la collection Navás. *Eos,* 25, 305–426.

Sganga, J.V. (2006) A new species of *Smicridea* from Argentina (Trichoptera: Hydropsychidae). *Revista de la Sociedad Entomológica Argentina*, 64 (3), 141–145.

Sganga, J.V. & Fontanarrosa, M.S. (2006) Contribution to the knowledge of the preimaginal stages of the genus *Smicridea* McLachlan in South America (Trichoptera: Hydropsychidae: Smicrideinae). *Zootaxa*, 1258, 1–15.

Smith, D.H. & Lehmkuhl, D.M. (1980) Analysis of two problematic North American caddisfly species: *Oecetis avara* (Banks) and *Oecetis disjuncta* (Banks) (Trichoptera:Leptoceridae). *Questiones Entomologicae*, 16, 641–656.

Ulmer, G. (1905) Zur Kenntniss aussereuropäischer Trichopteren. (Neuer Trichoptern des Hamburger und Stettiner Museums und des zoologischen Instituts in Halle, nebst Beschreibungen einiger Typen Kolenati's und Burmeister's.). *Stettiner Entomologische Zeitung*, 66, 1–119.

Ulmer, G. (1909) Argentinische Trichopteren. *Zeitschrift für wissenchaftliche Insektenbiologie*, 5, 73–76, 120–124.

Ulmer, G. (1957) Köcherfliegen (Trichopteren) von den Sunda-Inseln, Teil III. *Archiv für Hydrobiologie–Supplement*, 23 (2/4), 109–470.

Valverde, A.C. (1996) Descripción de los estados preimaginales y de los segmentos genitales de *Polycentropus joergenseni* Ulmer, (1909) (Trichoptera: Polycentropodidae). *Revista Brasileira de Entomologia*, 40, 65–70.

Valverde, A.C. & Abelando, M.I. (2006) Caracterización de los estados preimaginales de *Protoptila dubitans* y *Protoptila misionensis* (Trichoptera: Glossosomatidae). *Revista de la Sociedad Entomológica Argentina*, 65 (3–4), 11–17.

Vorhies, C.T. (1909) Studies on the Trichoptera of Wisconsin. *Transactions of the Wisconsin Academy of Sciences*, *Arts and Letters*, 16 (1), 647–738.

Walker, F. (1852) *Catalogue of the Specimens of Neuropterous Insects in the Collection of the British Museum*, *Part I*: *Phryganides-Perlides*. British Museum, London.

Wallace, J.B. & Merritt, R.W. (1980) Filter-feeding ecology of aquatic insects. *Annual Review of Entomology*, 25, 103–132.
http://dx.doi.org/10.1146/annurev.en.25.010180.000535

Ward, J.V. (1992) *Aquatic Insect Ecology. 1. Biology and Habitat*. John Wiley, New York, 292 pp.

Wiggins, G.B. (1996) *Larvae of the North American caddisfly genera* (*Trichoptera*), *2nd edition*. University of Toronto Press, Toronto, 457 pp.

Wiggins, G.B. (2004) *Caddisflies*: *The Underwater Architects*. University of Toronto Press, Toronto, 292 pp.