

## SYSTEMATICS, MORPHOLOGY AND PHYSIOLOGY

### A New Generic Synonymy for Leptophlebiidae (Ephemeroptera) from Patagonia, and Descriptions of Female and Subimagos of *Dactylophlebia carnulenta* Pescador & Peters

P PESSACQ

CONICET, Lab de Investigaciones en Ecología y Sistemática Animal (LIESA), Univ Nacional de la Patagonia, Esquel, Chubut, Argentina

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#### Correspondence

PABLO PESSACQ, Laboratorio de Investigaciones en Ecología y Sistemática Animal, LIESA. Sarmiento 849, 9200, Esquel, Chubut, Argentina. [pablopessacq@yahoo.com.ar](mailto:pablopessacq@yahoo.com.ar)

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#### Abstract

Specimens of *Dactylophlebia carnulenta* Pescador & Peters, only known from nymphal stage, were collected and reared *in situ*. From the material obtained, *Archethraulodes spatulus* Pescador & Peters, known from male imago and the only known species for the genus, is proposed as junior synonymy with *D. carnulenta*. Additionally, female imago and subimagos of *D. carnulenta* are described.

#### Introduction

The Leptophlebiidae genus *Dactylophlebia* Pescador & Peters, exclusively known from the immature stage, was described from specimens collected in southern Argentina and Chile, and it includes the only species *Dactylophlebia carnulenta* Pescador & Peters (Pescador & Peters 1980b). Later, the same authors based on three male imagos, created the genus *Archethraulodes* Pescador & Peters, to contain the single species *A. spatulus* Pescador & Peters (Pescador & Peters 1982).

The aim of this paper is to establish a new generic synonymy between *Dactylophlebia* and *Archethraulodes* and to describe the unknown female imago and subimagos of *D. carnulenta* by using specimens reared *in situ*.

#### Material and Methods

Sampling sites in Chubut province (Argentina) were visited in several occasions during January - March 2007, 2008 and 2010. The places where the specimens

were collected are low order (two and three), cold water streams, which runs through native *Nothofagus* forest. These streams are located in the border between Subandean Patagonia (Patagonian subregion) and Valdivian Forest (Subantarctic subregion) of the Andean region (Morrone 2006).

Specimens were collected with aerial and D-Frame aquatic nets. About 40 nymphs were reared *in situ* according to Edmunds Jr *et al* (1976). Streams where the specimens were being reared were visited every three-five days.

Drawings were made with the aid of a camera lucida coupled to a Leika DMLB microscope. All specimens are deposited in the "Laboratorio de Investigaciones en Ecología y Sistemática Animal" (LIESA) collection, Chubut province, Argentina.

#### Specimens examined

Argentina – Eight nymphs, Chubut province, **El Comisario stream** at state route 44, section between Vintter lake and Corcovado town, 43°44'45"S, 71°23'32"W, 772

masl, 21.i.07, Pessacq leg. - Same as previous but: one ♂ subimago (reared *in situ*), 7.iii.08. - Same as previous but: one ♂ subimago, 10.iii.08. - Same as previous but: three ♀ subimagos (reared *in situ*), three ♀ imagos, two ♂ imagos, 14.iii.08. - Same as previous but: one ♀ subimago (reared *in situ*), two ♀ subimagos, one ♂ subimago trapped in nymphal exuviae, two nymphs, final instar, 19.iii.08. - Same as previous but: two ♂ imagos, 18 nymphs, 16.iii.10. - Same as previous but: 1 ♂ imago, **Poncho Moro stream** at state route 44, section between Corcovado town and Vintter lake, 43°39'59"S, 71°24'25"W, 471 masl, 26.ii.07. - Same as previous but: one ♂ imago, eight nymphs, 16.iii.10. - Same as previous but: one nymph, **Irigoyen stream** at intersection with National route 71, Los Alerces National Park, 42°30'57"S, 71°21'43"W, 535 masl, 29.ii.07.

## Results

### *Dactylophlebia Pescador & Peters*

- Genus A Pescador & Peters (1980a): 47.
- Genus D Pescador & Peters (1980a): 47.
- *Dactylophlebia* Pescador & Peters (1980b): 332 (gen. nov. described from nymphal stage); Domínguez *et al* 1994: 41; Domínguez *et al* 2001: 30; Pessacq & Miserendino 2008.
- *Archethraulodes* Pescador & Peters (1982): 1 (gen. nov. described from male imago); Savage (1987): 207; Domínguez *et al* (1994): 41; Domínguez *et al* (2001): 37; Pessacq & Miserendino (2008): 32. **New synonymy.**

### Generic diagnosis

Male adult stage: penis lobes fused from basal third to basal half, with a long, thick, inner-ventrally directed subapical spine. Nymphs: abdominal gills 1-7 alike, plate-like, dorsal and ventral portions of lamellae terminate in several short finger-like processes.

### *Dactylophlebia carnulenta* Pescador & Peters

- *Dactylophlebia carnulenta* Pescador & Peters 1980b: 332 (gen. nov., sp. nov. described from nymphal stage); Domínguez *et al* 1994: 41; Pessacq & Miserendino 2008: 32.
- *Archethraulodes spatulus* Pescador & Peters 1982: 1 (gen. nov., sp. nov. described from male imago); Savage, 1987: 207; Domínguez *et al* 1994: 41; Pessacq & Miserendino 2008: 32. **New synonymy.**

### Female imago

Head: dark brown (in one specimen a pale brown area contiguous to the eyes), antennae pale brown, ocelli whitish, eyes black. Thorax: nota dark brown, pleura and

sterna brown; wings same as in the male but with heavily pigmented dark brown veins, with the exception of Sc, R1 and pterostigmatic transversal cross veins reddish brown; legs dark yellow. Abdomen: in terga I-VII approximately 1/5 of the anterior area pale brown, remaining brown, the limit between the dark and the pale area irregular, two narrow longitudinal dark brown stripes situated to both sides of the medium dorsal line, they might subsequently unite (Fig 1a) or they might continue separated along the posterior part of the segment. In the tergum VII the previous pattern becomes irregular. Terga VIII-X brown. Sterna brown. In one specimen the coloration is darker, and the terga show a pale pattern poorly defined. The sternum IX is cloven apically with rounded lobes (Fig 1b); caudal filament and cerci pale brown, the first one longer.

Measurements (mm, n = 3): total length: 6.3-6.4 (6.36 ± 0.06), fore wing: 7.9-8.5 (8.2 ± 0.42).

### Female subimago

The same as in the female imago except for: Head: dorsum gray. Thorax: pronotum gray; meso and metanotum dark brown, with a pale yellow coloration pattern of tri-dent shape forward directed, which occupies the posterior 2/3 of nota, and with its middle point of square tip. Membrane of wings gray, veins dark gray. Abdomen: same coloration pattern as in the female imago but darker; cerci and caudal filament pale gray, shorter than the abdomen's length.

Measurements (mm, n = 4): total length: 5.8-6.6 (6.075 ± 0.36), fore wing: 7.6-8.4 (7.92 ± 0.36).

### Male subimago

Same as in the male imago but: Head: dark brown, antennae pale brown, ocelli whitish. Upper portion of eyes pale brown, the lower portion dark brown. Thorax: nota dark brown, meso and metanotum with a light brown coloration pattern of tri-dent shape, forward directed, which occupies the middle third of nota, and with its middle point of square tip. Pleura brown, sterna dark brown; membrane of wings gray, veins dark gray; legs dark yellow, coxa and trochanter brown. Abdomen:

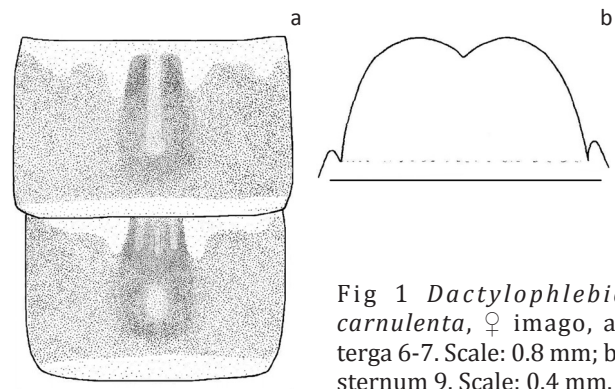


Fig 1 *Dactylophlebia carnulenta*, ♀ imago, a) terga 6-7. Scale: 0.8 mm; b) sternum 9. Scale: 0.4 mm.

terga I-IX with a pale brown spot in the middle area of the ventral margin; terga I-VII brown, anterior margin pale brown, in the limit between the two areas two oval pale brown spots of irregular margins are located to both sides of the dorsal middle line; terga VIII-X dark brown, sterna pale brown. Genitalia: forceps brown, shorter and wider than those in the imago; penes yellow, shorter than those in the imago and with the apical spine forwardly directed; cerci and caudal filament pale brown, shorter than the abdomen's length.

Measurements (mm, n=2): total length: 5.3-5.4 (5.35 ± 0.07), fore wing: 7.4.

### Redescription of Imago

The six collected imagos ranges in coloration pattern from identical to the original description to slightly different: the dark areas in terga II to VI present a more anterior extension, and segments VI-VII present two pale oval areas at both sides of the dorsal middle in the limit between the anterior pale area and the posterior dark area (this pale areas are insinuated in the original description figures).

The penis lobes are described in Pescador & Peters (1982) as fused in their basal halves.

In three of the six imagos collected, the penis are fused on its basal third, while the other three imagos showed an apparently completely fused penis lobes, but when this structure was touched with entomological pins and mounted on the slides, the two lobes become separated and looks identical to the ones of the first three specimens. Thus, the apparent fusion of the penis lobes is not so, and the lobes are capable of some degree of lateral movement.

The fore legs, lost in the typical series, are slightly paler than the rear legs; the tarsal claws same as the rear ones.

Measurements (mm, n = 6): total length: 6.5-7.4 (6.9 ± 0.34), fore wing: 7.4-8.3 (7.9 ± 0.43).

### Discussion

The *Dactylophlebia* female can be easily distinguished from other Leptophlebiidae genera which are found in the area based on its apically cloven sternum IX with rounded lobes (Fig 1b) (apically sharpened in *Meridialaris* Peters & Edmunds, cloven and with acute lobes in *Nousia* Navás and *Penaphlebia* Peters & Edmunds), pterostigmatic veins forming an approximately 90° angle with Sc (forming an acute angle in *Nousia*) and for its small size (big in *Penaphlebia*).

The differences observed between the original description of *Archethraulodes spatulus* and the imagos studied (coloration pattern and penis lobes fusion) ranges at the intraspecific level; variation in coloration pattern

is usual in other Leptophlebiidae species and difference on penis lobes fusion is treated above. The typical series of *A. spatulus* only includes three male imagos, thus, intraspecific variation is hardly observed.

No differences were found between the original description of *D. carnulenta* nymphs (Pescador & Peters 1980b) and the studied material.

Following Pescador & Peters (1980b, 1982), and including the penis variation observed, *Dactylophlebia* can be distinguished from other Leptophlebiidae genera as follows: Adults: vein sc of hind wing is at least three quarters of maximum length of hind wing, claws of a pair are similar, each apically hooked with an opposing hook, base of segment one of the forceps is broad and with inner margin forming an angular bend, penis lobes are fused from basal third to basal half and each lobe has a long, thick, subapical spine. Nymphs: Clypeus is narrower than labrum and lateral margins are divergent, labrum is 2/3-3/4 as long as wide and lateral margins are abruptly curved, outer margin of mandibles is slightly angular and bears a median hair tuft and a long hair along basal 1/2, claws have a double row of denticles and these are progressively larger apically, posterolateral projections occur on abdominal segments 6-9, and abdominal gills 1-7 are alike, plate-like, and dorsal and ventral portions of lamellae terminate in finger-like processes.

Pescador & Peters (1980b) mentioned that *D. carnulenta* has a narrow geographical and ecological range, restricted to altitudes above 1000 masl, with records above 2500 masl. The sampling sites mentioned here, from 43°44'45"S, 71°23'32"W to 40°37'16.7"S 71° 39'52"W and altitudes from 535 masl (Irigoyen stream) to 772 masl (El Comisario stream) expands both the geographical and ecological range of this species. Nymphs were found in small, clear streams, in rocks covered with bryophytes.

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