



A NEW STONEFLY FROM LEBANON, *LEUCTRA CEDRUS* SP. N. (PLECOPTERA: LEUCTRIDAE)

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ABSTRACT

Leuctra cedrus, is described from Lebanon. In the *Leuctra hippopus* group it clearly differs from the previously known species by the shape of the male dorsal ornamentations and genitalia. *L. cedrus* sp. n. is a cold stenothermal species occurring in the close surrounding of rheocene karstic springs on the Western slope of Mount Lebanon. The list of the 17 stoneflies species known from Lebanon is updated.

Keywords: Plecoptera, Stoneflies, *Leuctra cedrus* sp. n., new species, Lebanon

INTRODUCTION

In a recent compilation (Vinçon, Dia, Kovács & Murányi 2013), the detailed list of the Lebanese stoneflies is given with the history of their discovery and with bio-geographical remarks.

In this work, we deal with a new species that remained undescribed until now, although it has been collected periodically for several years since 1996.

MATERIAL AND METHODS

The adult photos were made using two USB Digital Microscopes (Veho Microcapture 40x-200x and Veho Microcapture 20x-400x V1.3).

The specimens were preserved in 70% ethanol. The holotype and one female (paratype) are deposited in the collection of the Lausanne Museum

of Zoology (Switzerland). Other paratypes: one male is stored in the Gilles Vinçon Collection (VIN); other specimens are kept in the Aref Dia (DIA) and Ignac Sivec collections (PMSL). Abbreviations: > = above, br. = brook, spr. = spring, tor. = torrent, vil. = village, N. = north.

RESULTS AND DISCUSSION

Leuctra cedrus Vinçon, Dia & Sivec

Material examined. Holotype male: northern Lebanon, western slope of Lebanon Mount, Abou Aali water basin, Ouâdi Qâdîcha tor., 500 m above Bcherré vil., 1500 m a.s.l., 24.04.1996, deposited in the Zoology Museum of Lausanne (ZML) (type locality = 4th site from top of map on Fig. 1). One female

paratype, El Kebir water basin: near Jabal Qammouaa Mount, Oudine vil., Nsara rheocren spr., 1440 m,

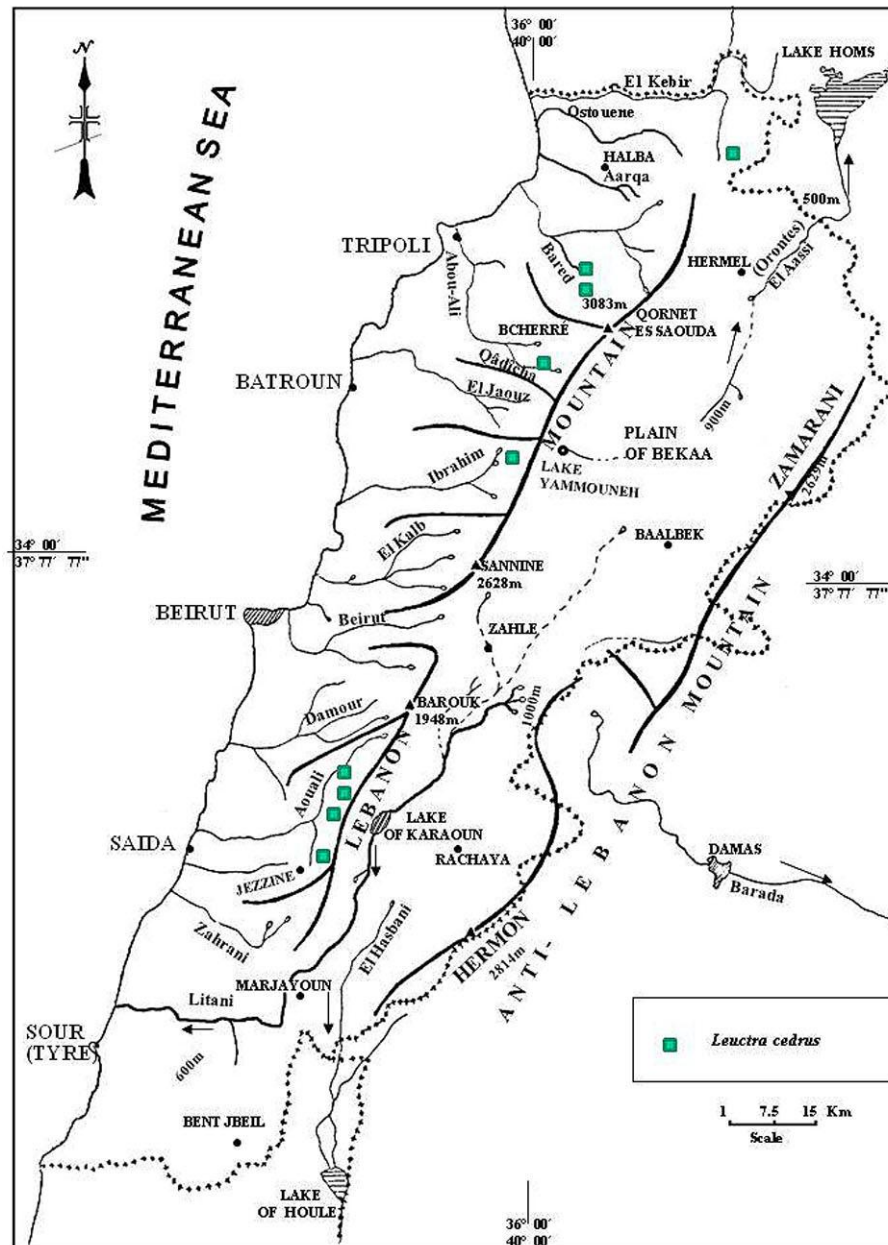


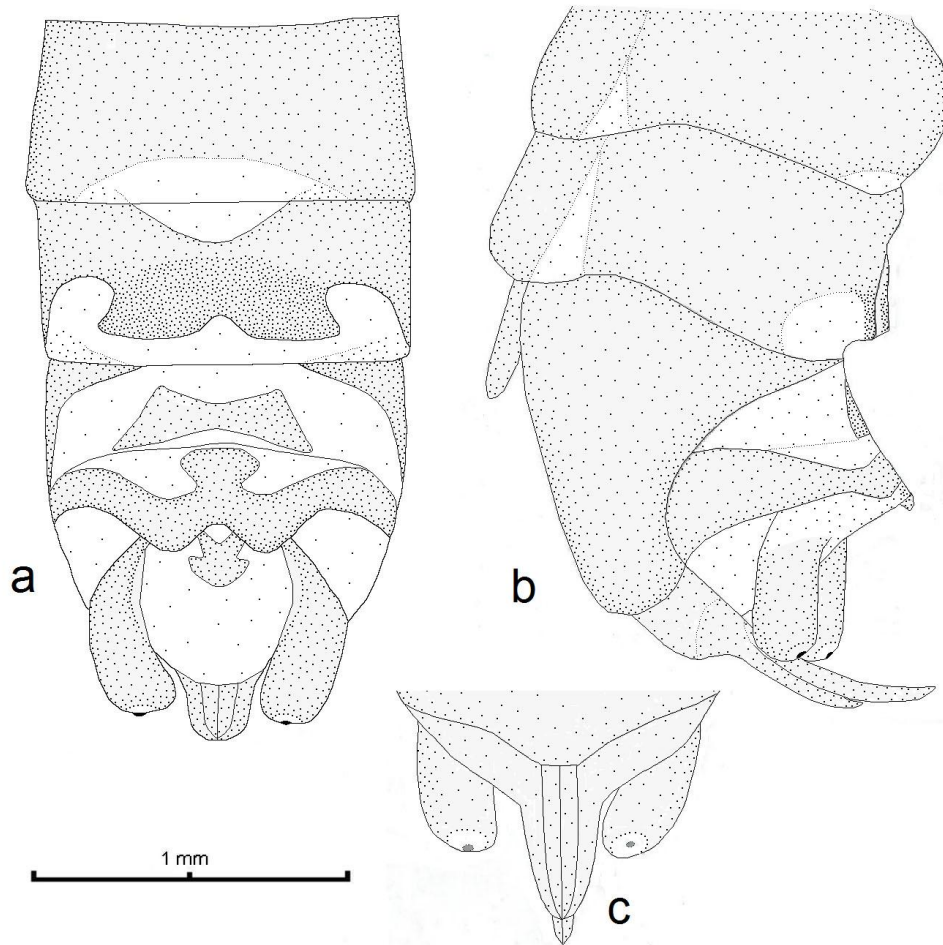
Fig. 1. Map of Lebanon, with the collecting sites for *Leuctra cedrus* sp. n.

20.03.2008, 1♀ (ZML) (1st site from top on Fig. 1).

Other material (from north to south on Fig. 1): **El Bared water basin:** 2 km from Sir El Danniye vil., El Ksaim spr., 1050 m, 20.04.1997, 1♀ (DIA). Source Sir, 29.03.1997, 1♂ (PMSL). **Abou Aali water basin:** Qâdîcha tor., 500 m > Bcherré vil., 1500 m a.s.l., 24.04.1996, 1♂ (VIN); 20.02.1996, ?1 larva (PMSL);

9.03.1997, 2♂, 1♀ (PMSL). **Ibrahim water basin:** 5 km N. Afqa vil., Rouais spr., 1300 m, 9.03.2002, 1♂ (PMSL). **Aouali (Awali) water basin:** Aouali River at Jdaidet ech Choûf bridge, 710 m, 18.02.1982, 1♀ (PMSL); near El Moukhtara village, rheocren karstic spr. (Mourched spr.) and Qachâqich br., 800 m, 19.01.1980, 1♂ exuviae (PMSL); between Hâret Jandal

et de Bâter ech Choûf vil., rheocren karstic spr. (Abou Kharma) and Ouâdi el Blaiyet br., 850 m, st 11,



Figs. 2a-c. *L. cedrus* sp. n.: male abdomen in dorsal view (a), lateral view (b), paraprocts in ventral view (c).

19.01.1980, ?1 larva; near Jezzîne, Aazibi spr. and Nahr Aaray tor., 990 m, st 13a, 5.03.1980, ?1 larva (PMSL); 11.4.1982, 1♀ (DIA).

Description. Medium sized *Leuctra* species: ♂ body length 4,5-7 mm, ♀ 6,5-7,5 mm. Fore wing length ♂ 5-6,8 mm, ♀ 7 mm. General colour brown. Head brown, slightly darker on the front. Antennae blackish, covered with a crown of long erect bristles at the tip of each segment; bristles as long as segment width. Pronotum brown with dark pattern. Legs yellow but tarsi, basal and distal parts of femora and tibiae contrastingly dark brown; tarsal segments brown. Body, veins of wings and legs covered with long erect hairs.

Male abdomen. (Figs 2a-c): tergites I-VI simple, tergites VII-X modified. Tergite VII slightly bulged in lateral view (Fig. 2b) and with narrow posterior membranous stripe (Fig. 2a). Tergite VIII with dark trapezoidal process widening distally and supported by two strong arms hardly prominent in lateral view (Figs 2a-b) and slightly separated in two parts by a small posterior triangular incision more or less visible according to the specimen. Tergite IX: antecosta divided for nearly a third of segment's width; membranous median field with median butterfly-shaped sclerite. Tergite X anteriorly bilobed and with wide rounded posterior notch where epiproct is placed. Cerci rather short, covered with

long erect setae. Epiproct rounded with short stalk (Fig. 2a). Styles of paraprocts with rounded base and

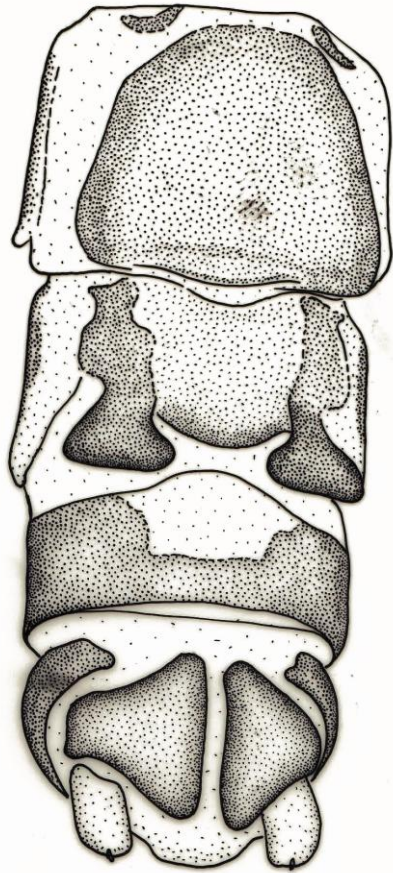


Fig. 3. *L. cedrus* sp. n.: female subgenital plate in ventral view.

long thin expansion gently curved toward tip (Figs 2b-c). Specilla long and thin, clearly longer than styles, rectilinear near the base and progressively curved toward tip, ending in sharp point (Figs 2b-c). Sternite IX: vesicle normal sized, racket shaped (Fig. 2b).

Female abdomen. (Fig. 3): sternite VII with wide bell-shaped bulged median sclerite and two small comma-shaped sclerites near the anterior edge, laterally. Sternite VIII: subgenital plate less long than wide, with sinuate edges, conspicuous median swelling, and two posterior well developed lobes separated by a large notch, about as wide as the width of one lobe (Fig. 3). Lobes trapezoidal, strongly

widening toward tip and with well-developed inner rounded expansions; posterior edge of the lobes nearly rectilinear. Plate poorly sclerotized medially except strongly sclerotized lobes (Fig. 3).

Affinities. In the *L. hippopus* group, *L. cedrus* sp. n. appears rather isolated. The strong median process of tergite VIII is similar to that of several species: *L. holzschuhi* Theischinger, 1976 from Iran, *L. meyi* Braasch, 1981 from Caucasus, *L. transsylvanica* Kis, 1964 from Carpathians, *L. joosti* Braasch, 1970 from Balkans, *L. niveola* Schmid, 1947 and *L. queyrassiana* Ravizza & Vincon, 1991 from the Alps, however it is clearly different in shape from all of these and the genitalia are also obviously different. In the female, the rounded well developed lobes of the subgenital plate are similar to that of *L. elisabethae* Ravizza, 1985, but the tip of the lobes are conspicuously wider in *L. cedrus* sp. n. (Fig. 3).

Geographical distribution and ecology. *L. cedrus* sp. n. is a micro-endemic, cold stenothermal species confined to karstic rheocene springs and torrents on the western slope of Mount Lebanon (Figs. 1, 4). The flight period extends in early spring (II-IV).

Etymology. This species is dedicated to the Lebanese highly symbolic tree *Cedrus libanensis*.

BIOGEOGRAPHICAL ASPECTS OF MOUNT LEBANON STONEFLIES

In a precedent work (Vinçon *et al* 2013), we give a detailed list of 17 Lebanese stoneflies and their relationships with the neighboring countries. The addition of *L. cedrus* sp. n. to the Lebanese endemic species list increases the number of Lebanese stoneflies to 18 and the level of endemism to 67 %.

Moreover, among the 12 Lebanese endemic species, 3 are micro-endemic species strictly restricted to the rheocren karstic springs flowing on the western slope of Mount Lebanon (*Protonemura phoenicia* Sivec & Dia, 2001, *Perlodes thomasi* Vinçon, Dia & Kovács, 2013 and *Leuctra cedrus* sp. n.), giving a higher interest to the protection of these exceptionally rich biotopes, exposed to increasing human impact (pollutions and water captures).

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Fig. 4. Main rheocrene springs and torrents where *L. cedrus* occurs: a = Ouâdi Qâdîcha torrent, Abou Aali tributary, 1500m (type locality); b = El Ksaim spring, El Bared tributary, 1050 ; c= Rouais spring, Ibrahim tributary, 1300m; d = Aouali River at Jdaidet ech Choûf bridge, 710m.

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