

***Leuctra quadrimaculata* Kis, 1963 (Plecoptera; Leuctridae) in the Moravskoslezské Beskydy Mts. and Javorníky Mts. (Czech Republic)**

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Leuctra quadrimaculata Kis, 1963 (Plecoptera; Leuctridae) in the Moravskoslezské Beskydy Mts. and Javorníky Mts. (Czech Republic). – Čas. Slez. Muz. Opava (A), 60: 57-62, 2011.

Abstract: The paper brings new information on the distribution of *Leuctra quadrimaculata* Kis, 1963 in the Czech Republic. Until now, it was known only from the one locality in the Bílé Karpaty Mts. (Bojková & Špaček, 2006). The imagines of *L. quadrimaculata* were collected at five localities in the Outer Western Carpathians (3 localities in the Moravskoslezské Beskydy Mts., subunit Klokočovská hornatina and 2 localities in Javorníky Mts.). Presented records confirm the occurrence of the species in the Czech Republic and they are the first records in the Moravskoslezské Beskydy Mts. and Javorníky Mts.

Key words: *Leuctra quadrimaculata*, Plecoptera, Moravskoslezské Beskydy Mts., Klokočovská hornatina, Javorníky Mts., Moravia, Czech Republic

Introduction

Detailed hydrobiological investigation of running waters in the Moravskoslezské Beskydy Mts. and Javorníky Mts. was conducted in 2006-2009 (Kroča et al., 2007). The important part of this investigation was extensive sampling of imagines of aquatic insects to describe species diversity of studied area and to validate identifications of species in the larval stage. During this investigation several rare and endangered species have been found (Kroča, 2010a; 2010b, 2010c). In this paper, new records of the stonefly *Leuctra quadrimaculata* in the Moravskoslezské Beskydy Mts. and Javorníky Mts. are presented.

L. quadrimaculata is Carpathian and Balkanian species. It occurs in Bulgaria (Braasch & Joost, 1971); Serbia (Kaćanski, 1975); Montenegro (Kaćanski & Baumann 1981); Macedonia (Ikonomov, 1976, 1979, 1983, 1986) Bosnia and Hercegovina (D. Murányi, per. comm.), and Albania (D. Murányi, per. comm.). It was recorded in the whole Carpathians - Romania (Kis, 1963; Murányi, 2006), Ukraine (Murányi, 2006) Slovakia (Krno, 2002, 2007) and Poland (Sowa, 1970; Kittel & Wojtas, 2002). In the Czech Republic, the species is known from the only locality the Hrušovka stream near Kaňoury (the Bílé Karpaty Mts.) (Bojková & Špaček, 2006) (Fig. 2.).

Despite a wide geographical distribution (from mountain systems of southeast Europe to Western Carpathians in Central Europe), *L. quadrimaculata* is relatively rare species (D. Murányi, pers. com.).

Material and Methods

Entomological part of the investigation of main running water habitats of the Moravskoslezské Beskydy Mts. and the Javorníky Mts. was conducted in 2007-2009.

Imagines were collected by Malaise traps which were exposed during the whole vegetation season and sampled every three to five weeks. In 2007 Malaise traps were placed at 8 localities in Moravskoslezské Beskydy Mts. and at 2 localities in the Javorníky Mts. (in the Kyčová River basin). In 2008-2009 they were installed at 16 localities, 14 localities in the Moravskoslezské Beskydy Mts. and 2 localities in the Podbeskydská Pahorkatina Upland – Morávka River basin. Imagines were also collected by sweeping at 11 localities along the longitudinal profile of the Morávka River (10) and in the Slavič brook (1) in 2003-2009. In total, samples collected at 37 localities were examined in this study.

Material was conserved by Ethanol (70%) and it is deposited in the T. G. M. Water Research Institute, p. r. i. Prague, branch Brno (coll. J. Kroča).

Tab 1: Localities of *L. quadrimaculata* occurrence

Locality	Geomorphological unit	Symbol	Coordinate		Altitude [m a. s. l.]
			N	E	
Salajka	MSB	SA	49°24'7,215''	18°25'16,685''	719
Smradlava 1.	MSB	SM 1.	49°24'37,454''	18°26'36,18''	634
Smradlava 2.	MSB	SM 2.	49°25'15,244''	18°26'57,149''	600
Makyta	JAV	MA	49°16'33,266''	18°10'44,574''	665
Malá Tisová	JAV	MT	49°16'29,188''	18°8'38,537''	547

Note: MSB – Moravskoslezské Beskydy Mts.; JAV – Javorníky Mts.

Results and discussion

Leuctra quadrimaculata Kis, 1963.

Moravia: Salajka, (6576), 2.vi. – 22.vi.2008, 1 ♂; Smradlava 1., (6576), 11.v. – 11.vi.2009, 13 ♀ 9 ♂; Smradlava 2., (6576), 11.v. – 11.vi.2009, 1 ♀; Makyta, (6775), 14.v. – 11.vi.2007, 3 ♀; Malá Tisová, (6774), 14.v. – 11.vi.2007, 2 ♀ 1 ♂; Malá Tisová, (6774), 9.vii. – 6.viii.2007, 3 ♀ 1 ♂; all J. Kroča leg., J. Kroča det. et coll.

New records of *Leuctra quadrimaculata* confirmed its occurrence in the Czech Republic (Bojková & Špaček, 2006) and they represent the first records of the species in the Moravskoslezské Beskydy Mts. and in the Javorníky Mts.

It is likely that *L. quadrimaculata* can also occur in other small streams of the subunit Klokočovská hornatina (Moravskoslezské Beskydy Mts.), similarly to another stonefly species *Leuctra bronislawi* which was found recently (Kroča, 2010c). In the Javorníky Mts. *L. quadrimaculata* was recorded at both sites which were studied (Fig. 1.). Based on such a small number of studied localities, it is not possible to predict the distribution of the species in this geomorphologic unit.

Taking into account all known localities of *L. quadrimaculata* in the Carpathians in the Czech Republic, it is possible to conclude that its occurrence is linked to the upper sections of streams (hypokrenal - epirhinal) in less rugged mountains which are built by less resistant rocks, with a higher proportion of rocks with calcareous component (Magura nappe).

These localities markedly differ by their morphology and chemical conditions from the localities in the northern part of the Moravskoslezské Beskydy Mts. which are built by largely resistant sandstone without high content of calcareous rocks (Silesian nappe).

Based on these findings, it can be assumed that *L. quadrimaculata* may also occur in other mountains of the Outer Western Carpathians, which consist of rocks of the Magura nappe and have a similar morphology as the Klokočovská hornatina (subunit of the Moravskoslezské Beskydy Mts.) or the Javorníky Mts. (e.g. Vsetínské vrchy or Jablunkovské Mezihoří).

Variability of tergal ornateations in the populations of the Moravskoslezské Beskydy Mts. and the Javorníky Mts. is large (Fig. 5.). No specimen examined had the tergal ornateations described the Romanian population (Kis, 1974; Fig. 3.). Determination of male was based on the shape of the paraproct (stylus and specillus) (Fig. 4.), which is the main determination character in the genus *Leuctra*.

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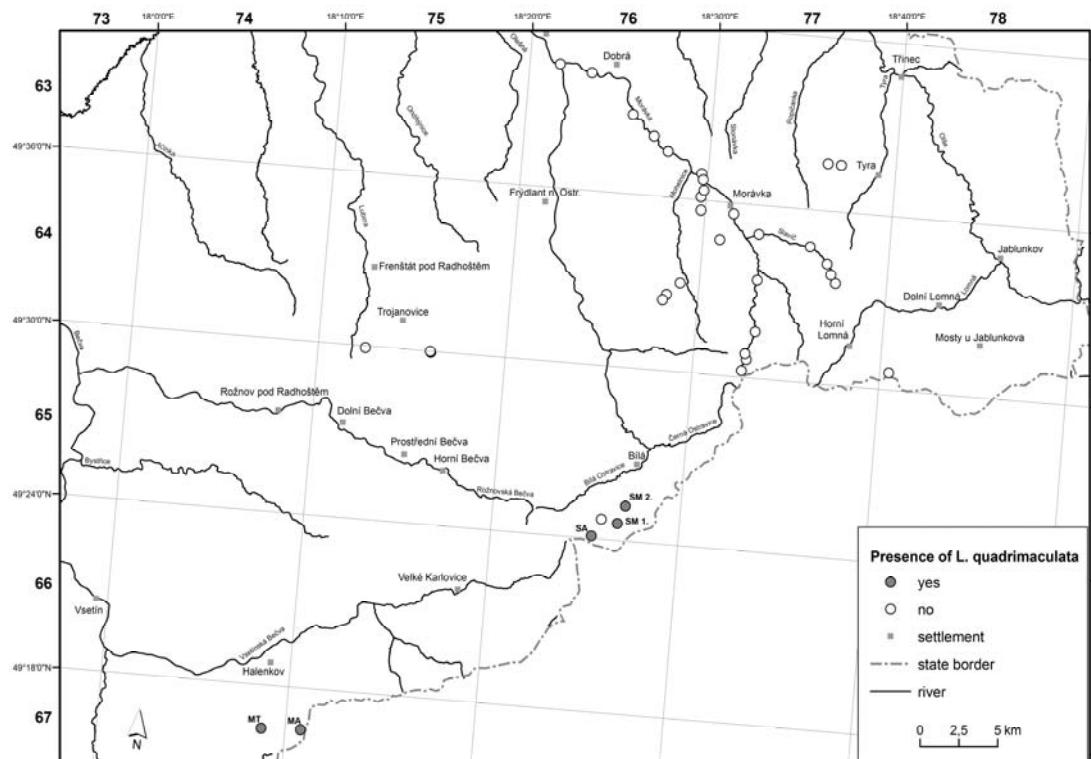


Fig 1: The presence and absence of *Leuctra quadrimaculata* in studied localities of the Moravskoslezské Beskydy Mts. and Javorníky Mts.



Fig 2: Known occurrence of *Leuctra quadrimaculata* in the Southeastern and Central Europe

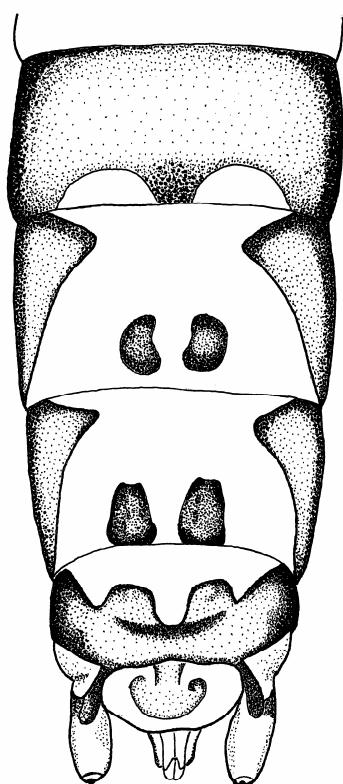


Fig 3: *Leuctra quadrimaculata*: male abdomen, dorsal view (J. Kroča according to Kis, 1974)

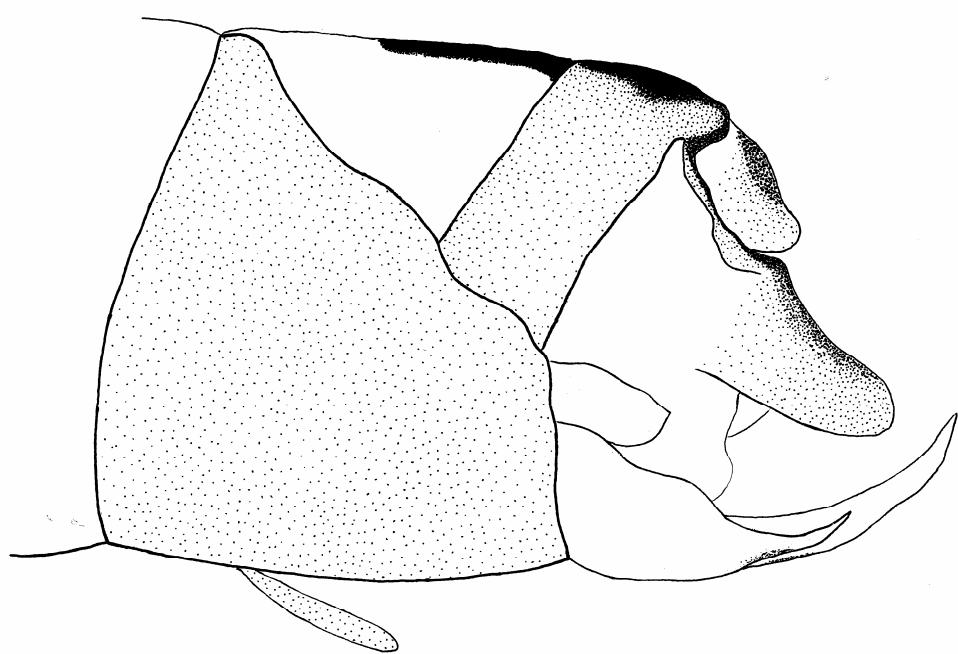


Fig 4: *Leuctra quadrimaculata*: male paraproct, lateral view (J. Kroča)

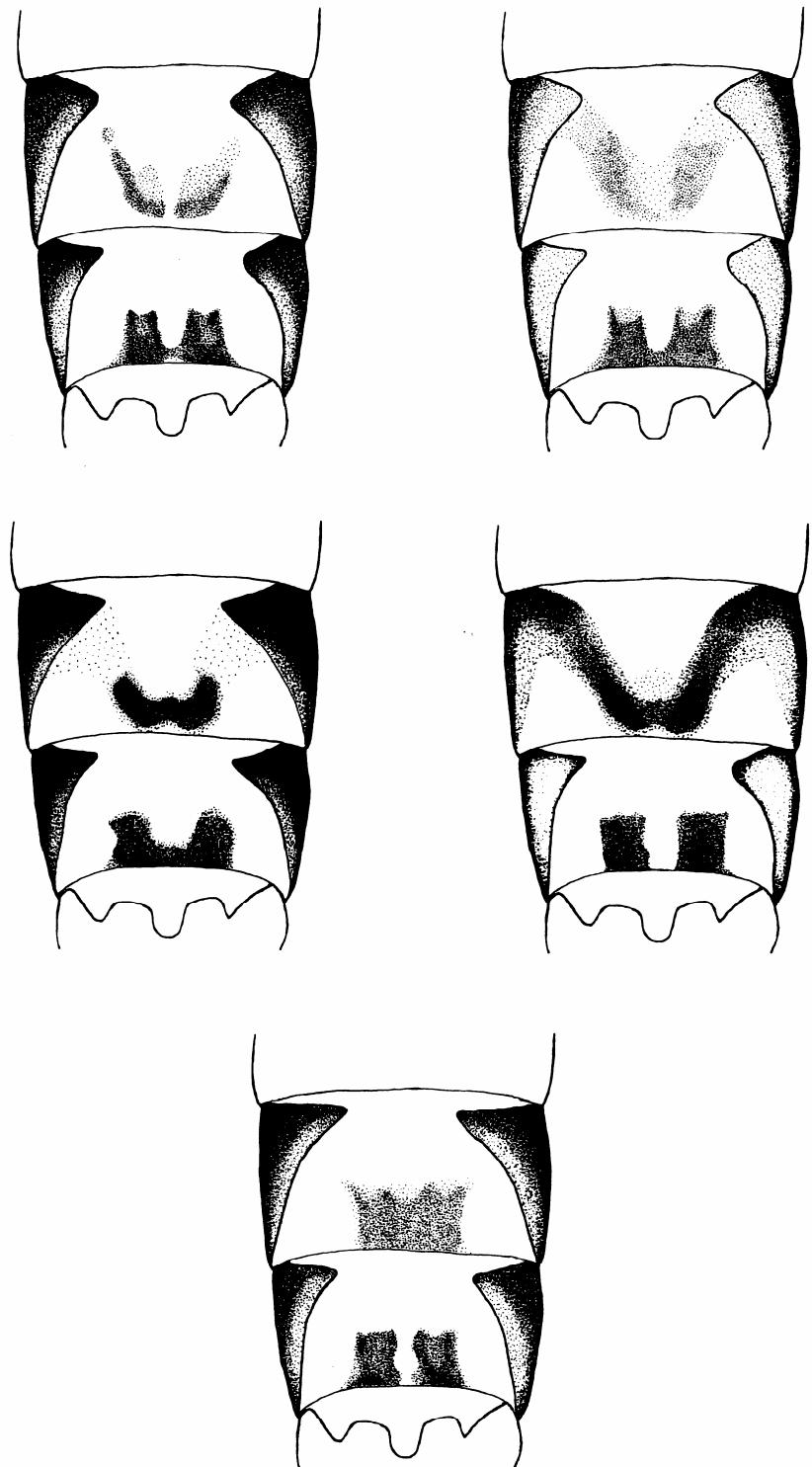


Fig 5: *Leuctra quadrimaculata*: variability of tergal ornateations on 8th and 9th segments of abdomen, dorsal view (J. Kroča)