

Protected Aquatic Insects of Latvia – *Leucorrhinia pectoralis* (CHARPENTIER, 1825) (Odonata: Libellulidae)

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Abstract: The Large White-faced Darter *Leucorrhinia pectoralis* (CHARPENTIER, 1825) is protected by the Regulations of Cabinet of Ministry in Latvia. *L. pectoralis* can be found in most European countries. Published data, collections, data collected during the project „Analysis of the Specially Protected Nature Territories in Latvia and Establishing of EMERALD/Natura 2000 Network” and material collected by Latvian entomologists have all been used in the analysis of the distribution of this species. The distribution of *L. pectoralis* was mapped using a basic grid of 5x5 km squares in the Baltic grid system. In total, *L. pectoralis* is recorded from 98 squares in Latvia. The most known localities are concentrated in central and northern Latvia. The majority of localities of *L. pectoralis* in Latvia have been recorded in the natural eutrophic lakes with *Magnopotamion-* or *Hydrocharition*-type vegetation (21 records) and oxbow lakes (44 records). Other *L. pectoralis* habitats are hard oligo-mesotrophic lakes with benthic vegetation of *Chara* spp. (3 localities), natural dystrophic lakes and ponds in active raised bogs or transition mires (15 localities), dystrophic water bodies also (11 localities). Only in a few cases species have been observed in ponds (2 localities) and oligotrophic to mesotrophic standing waters with *Littorelletea uniflorae* and/or *Isoëto-Nanojuncetea* vegetation (3 localities).

Key words: Odonata, Libellulidae, *Leucorrhinia pectoralis*, protected species, habitats, distribution, Latvia.

Introduction

The aim of this paper is to summarize all available information about the Large White-faced Darter *Leucorrhinia pectoralis* distribution and characteristic habitats in Latvia. The species is protected in Latvia (Regulations... 2000), but known data were not summarized and the species protection status has not assessed. *L. pectoralis* can be found in the most European countries – Austria, Belarus, Belgium, Bulgaria, Bosnia and Herzegovina, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Italy, Latvia, Lithuania, Luxembourg, The Netherlands, Norway, Poland, Romania, Serbia, Slovakia, Slovenia, Sweden, Switzerland, The Ukraine and Russia (Central, Southern and Northern part of Europe), but it is absent from Great Britain. The species is distributed also in the Asian part of Russia – Western Siberia and Turkey (Askew 1998, Dijkstra 2006). The species is protected in the majority of European countries following the Bern Convention (The Bern Convention... 1979) and EU directives (Council... 1992).

White-faced Darter has been first mentioned in Latvia by H. Kawall (1864) from western Latvia – Venstpils district, Puze. Later the species was found in the other places in western and central part of Latvia – Lake Engure, Liepāja, Pape and Lielauce in the western Latvia (Spuris 1943, 1952, 1960, 1963) and eastern and central part (Spuris 1953, 1968, 1974). Z. Spuris (1956) has summarized all known data about the species until 1956. Some remarks about confirmed localities and distribution have been made in the recent papers (Kalniņš 2001, Inberga-Petrovska 2003).

Methods

Published data, the collections of the Department of Zoology and Animal Ecology of the Faculty of Biology of the University of Latvia, collections of the Institute of Biology of the University of Latvia, collections of the Natural History Museum of Latvia, the data collected during the project „Analysis of the Specially Protected Nature Territories in Latvia and Establishing of EMERALD/Natura 2000 Network” in 2001-2002 and material collected

by Latvian entomologists until 2007 have been used in the analysis of the distribution and habitat preference. Dragonflies were collected by using a hydrobiological net or entomological net, or by direct observations. The material was collected from 1998 to 2007. Both historical and recent data, totally 182 records, were included in the Microsoft Office Access database made by the author.

Distribution of *L. pectoralis* was mapped using a basic grid of 5x5 km squares in the Baltic grid system on a Transverse Mercator projection (TM-1993) of Latvia. Current map is based on 1:50 000 scale satellite maps available for Latvia, published in 1999-2000 by State Land Service of the Republic of Latvia. This map is graduated at 1x1 km (= 1 km²) squares and the border of 5x5 km squares coincide with the every fifth km line. Totally, the terrestrial territory of Latvia is divided into 2785 squares (some squares are not complete). The distribution map of the *L. pectoralis* was prepared based on database data.

The typological classification of water bodies and description of vegetation was based on publications (Kabucis 2000, Cimdiņš 2001) and Internet resources (<http://www.ezeri.lv> 2007), and observations made by the author (oxbow lakes).

Explanations: d. – district; env. – environment; NP – National Park; NR – nature reserve; PPNT – particularly protected nature territory; vill. – village; num. – numerous; ad. - adult. The number of specimens and development stage (adult or unknown) is given in brackets after the date of collection.

Results

A list of localities sorted by administrative districts:

Aizkraukle d., Lake Vāveres PPNT, 03.06.2002 (ad.), leg. D.Telnov.

Alūksne d., Jaunanna PPNT, near River Pedēdze, S from Riestapura meži, 14.07.2002 (ad.), leg. D.Telnov; Katlešu meži PPNT, Lake Liepnica, N part, 15.07.2002 (ad.), leg. D.Telnov.

Balvi d., Pedēdzes lejtece PPNT, Vecpedēdze 05.07.2006 (3 ad.), leg. D.Telnov; Bērzpils purvs PPNT, N part, 09.06.2002 (ad.), leg. K.Vilks.

Bauska d., Paņemūnes meži PPNT, 22.06.2003 (ad.), leg. V.Spuņģis.

Cēsis d., Gauja NP, oxbow lake Benču, 26-27.06.2004 (num. ad.), 17.07.2004 (2 ad.) leg. D.Telnov; oxbow lake S from oxbow lake Benču, 27.06.2004 (num. ad.), leg. D.Telnov; oxbow lake Rakstu Mazā, 05.07.2003 (num. ad.) leg. M.Kalniņš; oxbow lakes near Sarkanās klintis 16.07.2004 (num. ad.) leg. M.Kalniņš; oxbow lake Kripēnu, 05.07.2003 (num. ad.) leg. M.Kalniņš; oxbow lake Tītmaņu near Līgatne, 20.05.2002 (num. ad.), 16.06.2002 (num. ad.), 17.07.2004 (2 ad.), 13.06.2005 (46 ad.), 18.06.2005 (16 ad.), 24.06.2005 (19 ad.), 03.07.2005 (1 ad.), 09.07.2005 (1 ad.), 15.07.2005 (1 ad.), 28.05.2006 (5 ad.), including teneral specimens, leg. M.Kalniņš; Gauja NP, Sudas bog, 05.06.2002 (1 ad.), leg. M.Kalniņš; Kliģene, near River Vedze and Līčupe junction, oxbow lake, 27.05.2005 (1 ad.), leg. M.Kalniņš.

Daugavpils d., Ļubasts PPNT, Lake Ļubasts, 29.06.2006 (3 ad.), leg. D.Telnov; Meduma ezeraine PPNT, Lake Meduma, S part, 26.06.2003 (ad.), leg. R.Cibuļskis.

Dobele d., Lake Lielaunes, marshy banks, 24-25.05.1950 (Spuris 1952, Spuris 1956); River Skujene near River Tērvete (Spuris 1956).

Gulbene d., Lielais Mārku bog PPNT, SW part, near Lake Ušuru, 26.06.2002, leg. K.Vilks.

Jelgava d., Jēkabnieki vill., 15.06-05.07.1941 (Spuris 1943, Spuris 1956); Zaļenieki vill. (Spuris 1956); Bramberģe stream (Spuris 1956).

Jēkabpils d., Lake Piksteres, (Spuris 1956); Laukezers PPNT, Lake Ilzenes, 27.05.2006 (1 ad.), leg. D.Telnov; Rožu purvs PPNT, 1 km E from Karogi, 31.07.2001 (ad.), leg. D.Telnov; Tīreļu purvs PPNT, SE part, small lake, 26.06.2002 (ad.), leg. R.Cibuļskis; Ābeli PPNT, SW part of Kraukļu bog, 09.08.2001 (ad.), leg. V.Spuņģis.

Krāslava d., Lake Drīdzis, Lake Mazais Ožuhņu (Spuris 1953, Spuris 1956); Lake Skaists, Lake Sīvers, River Dubna near Lake Aulejas (Spuris 1956); Lake Salāju (Solovju) PPNT, SW part, 06.06.2002 (ad.), leg. D.Telnov; Lake Čertoks PPNT, 11.06.2002 (ad.), leg. I.Salmane.

Kuldīga d., Maņģenes meži PPNT, S part near River Abava, 09.06.2002 (ad.), leg. V.Spuņģis; Ozolu tīrelis PPNT, ditch in the bog, 09.06.2002

(ad.), leg. V.Spuņģis; Lake Pinku PPNT, 13.05.2005 (ad.), leg. V.Spuņģis.

Liepāja d., Lake Liepāja, S part, 22.05.1957 (4 ad.), 17.06.1958 (1 ad.), near Otaņķi, 17.06.1958 (Spuris 1963); Lake Pape, 23.05.1957, 15.06.1958 (Spuris 1963); Lake Tāšu PPNT, E bank near Vīnkalni and Krasti vill., 22.06.2002 (ad.), leg. V.Spuņģis; Lake Liepājas PPNT, Vītiņu meadows, 27.06.2003 (ad.), leg. V.Spuņģis;

Limbaži d., Lake Maizezers PPNT, 22.06.2002 (2 ad.), leg. A.Skuja; Lake Linezers PPNT near Juglas, 14.06.2001 (ad.), 03.07.2003 (ad.) leg. M.Kalniņš; Lielpurvs PPNT, W part, 27.06.2001 (ad.), leg. V.Spuņģis; Niedrāju-Pilkas purvs PPNT, 27.06.2001 (ad.), leg. V.Spuņģis; Ungurpils meži PPNT, W part, 26.06.2001 (ad.), leg. V.Spuņģis.

Madona d., Teiči NR, 16.07.2003 (2 ad.), leg. D.Telnov; Krustkalni NR, Lake M.Plencis, 27.05.2006 (1 ad.), leg. G.Akmentiņš.

Ogre d., Ogresgals vill. (Spuris 1956); Lake Kaparāmura (Spuris 1953, Spuris 1956). Currently this lake is dehumidified (www.ezeri.lv 2007).

Preiļi d., Ašnieku purvs PPNT, near Liepas and near Tautieši, 09.06.2002 (ad.), leg. I.Salmane; Lake Cīriša PPNT, 09.06.2002 (ad.), Upursala, 10.06.2002 (ad.) leg. I.Salmane; Pelēču ezera purvs PPNT, S part, 10.06.2002 (ad.), leg. I.Salmane.

Rēzekne d., Kvapāni vill., near forest, 15.06.1957 (Spuris 1963); Lake Feimaņu (Spuris 1956).

Rīga d., Lake Aklais, Lake Līņu, Lake Sudrabezers, Lake Vidus (Spuris 1953, 1956); Ropaži vill. near Lielie Kangari (Spuris 1956); Rīga, Beberbeķi (Spuris 1956); Sigulda env., oxbow lakes down River Lorupe (Spuris 1968); Lake Laveru near Carnikava, 22.06.1955 (Spuris 1963); Sigulda env., oxbow lakes Krimuldas, Kalnaklauku, Niedru lāma, Saulstaru lāma, Saulstaru vecupe, 1968-1971, pond Vikmestes, 09.06.1971 (1 ad.) (Spuris 1974); Ķemeri NP, Labais purvs 02.06.2006 (num. ad. and teneral specimens), leg. M.Kalniņš; Ķemeri NP, ponds S from Lake Liljezers, 11.06.2006 (num. ad. and teneral specimens), leg. M.Kalniņš; Lake Lieluikas un Mazuikas PPNT, Lake Lieluikas, 19.05.2001 (num. ad.), leg. M.Kalniņš, V.Spuņģis; Rīga,

ponds River Piķurga, near Biķernieku iela, 23.06.2005 (10 ad.), leg. M.Kalniņš; Rīga, Daugavgrīva PPNT, 10.06.1998 (2 ad.), leg. Z.Spuris.

Talsi d., Lake Engure near Lielā sala, 01.07.1958 (Spuris 1960); Lake Engures, NW bank, 19.06.1960 (Spuris 1963); Lake Sapņu, 06.06.1960 (Spuris 1963); Talsu pauguraine PPNT, Lake Mācītājmājas, Lake Bezdiņezers, Lake Čumalezers, Lake Sirdsezers, 07.06.2002 (num. in all lakes, ad.), leg. V.Spuņģis; Slītere NP: Lake Vecezers, 30.05.2007 (4 ad), Vaides pond, 30.05.2007 (15 ad), small pond (forestry 106.section) in Bažu bog, 31.05.2007 (1 ad), leg. M.Kalniņš; Gipkas lankas PPNT, 31.05.2007 (2 ad), leg. M.Kalniņš.

Tukums d., Lake Engure, 01.01.1958 (Spuris 1960); Lake Engure PPNT, Lake Engure near the Ornithological Field station of Institute of Biology, 22.05.1999 (ad.), 29.05.1999 (4-10 ad.), 07.06.1999 (11-50 ad.), 12.06.1999 (11-50 ad.), 19.06.1999 (51-100 ad.), 26.06.1999 (11-50 ad.), 07.07.1999 (4-10 ad.), 17.07.1999 (ad.), 24.07.1999 (ad.) (Inberga-Petrovska 2003); Jaunmokas, 30.05.2007 (1 ad.), leg. M.Kalniņš.

Valka d., Sedas purvs PPNT, in several places, 07-08.06.2001 (num. ad. and teneral specimens), leg. M.Kalniņš, V.Spuņģis; Sedas purvs PPNT, in several places, 07-26.06.2005 (num. ad. and teneral specimens), leg. M.Kalniņš; Bednes purvs PPNT, 09.06.2002 (num. ad.), leg. M.Kalniņš; Ziemeļgauja PPNT: oxbow lake Pirtsīcīs, 19.06.2001 (num. ad.), oxbow lake near Gaustrumi, oxbow lake near Kaķi, oxbow lake near Starkas, oxbow lake near Strenči, oxbow lake near Zeiri, oxbow lake near Vadži, oxbow lake near Zvejnieki, oxbow lake near Zemā sala, 25.06.2004 (num. ad.), oxbow lake near Maltuve, oxbow lake near Ūdriņas, oxbow lake near Zīle, 26.06.2004 (num. ad.), oxbow lake near Cirgalī, oxbow lake near River Kāršupīte, 03.07.2004 (num. ad.), oxbow lake near Tilikas, oxbow lake near Ūdensmaisi, 04.07.2006 (num. ad.), leg. M.Kalniņš.

Valmiera d., Valmiera (Spuris 1956); Mazsalaca, pond on River Laņģupīte (Gudzonupīte), 01.08.2004 (ad.), leg. D.Telnov; Valmiera, oxbows near Baiļi, oxbow lakes near Kaugurmuiža, 25.06.2006 (num. ad.), leg. M.Kalniņš; Vidusburtnieks PPNT, oxbow lakes near River Rūja and River Seda, 26.06.2001

(num. ad.), leg. V.Spuņģis; Vidusburtnieks PPNT, oxbow lakes near River Rūja and River Seda, 26.06.2005 (num. ad.), leg. M.Kalniņš.

Ventspils d., Puze (Kawall 1864, Spuris 1956); Ance bogs and forests PPNT, oxbow lake near River Irbe at Austerlunka and at Rindzivas, 01.07.2001 (num. ad.), leg. V.Spuņģis; Raķupe PPNT, River Pāce, near Kuikas, 06.05.2006 (1 ad.), leg. D.Telnov.

The data on presence of dragonflies are known from 627 squares (5x5 km) of 2785. *L. pectoralis* is recorded from 98 squares (Figure 1), thus covering 3.5% on the territory of Latvia.

Discussion

Until 2001 assessment, made by author, of populations of *L. pectoralis* indicates that there are 30-40 localities where the species occurs in Latvia. As the types of habitats – eutrophic lakes, oxbow lakes where the species has been found are widespread in Latvia and the environmental conditions of the historically known localities have not changed significantly (www.ezeri.lv 2007, Cimdiņš 2001), the total number of localities where species occurs is likely to be more.

The majority of known recent localities are situated in the central and the northern part of Latvia. This is partially a result of the frequency of visiting of various regions. Data about 70 squares were gathered within the last decade. This is a result of focused studies of protected nature territories during the project „Analysis of the Specially Protected Nature Territories in Latvia and Establishing of EMERALD/Natura 2000 Network” and the author’s studies in the oxbow lakes of the River Gauja.

So far *L. pectoralis* was found in 12 oxbow lakes along the River Gauja inside the Gauja NP and in 19 oxbow lakes along the River Gauja inside the Ziemeļgauja PPNT. Approximately 350-400 oxbows are estimated to occur along River Gauja from Gaujiena to the estuary (stretch length about 250 km) (based on analysis of the orthophotos map). Based on data on the species distribution and habitat requirements, it is estimated that *L. pectoralis* micropopulations may be found in ca. 1/2 of all

oxbow lakes inside the Gauja NP (about 50-60 oxbow lakes) and in ca. 1/3 of all oxbow lakes inside the Ziemeļgauja PPNT (about 80-100 oxbow lakes).

According to Dijkstra (2006) the species prefers marshy borders to bogs, forest lakes, fenlands, marshy ditches, oxbow lakes and even sluggish rivers or canals. Vegetation is typically dense and varied, with both emergent and submerged species. The water is frequently mesotrophic and often coloured brown due to peat. Latvia is situated within the Northern part of distribution range of the species (Dijkstra 2006). The majority of localities of *L. pectoralis* in Latvia has been recorded in natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* – type vegetation (~21 locality) and oxbow lakes with *Magnopotamion* or *Hydrocharition* – type vegetation (~44 localities). Other *L. pectoralis* habitats are hard oligo-mesotrophic lakes with benthic vegetation of *Chara* spp. (3 localities), natural dystrophic lakes and ponds, in active raised bogs or transition mires (15 localities). *L. pectoralis* was found in brownwater bodies also (11 localities). Only in a few cases species have been observed in ponds (2 localities) and oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoëto-Nanojuncetea* (3 localities). Most oxbow lakes inspected by author have dense vegetation with high diversity of aquatic plants species, with stands of Water soldier *Stratiotes aloides* Figure 2 and 3.

The research made in Lake Engure in 1999 (Inberga-Petrovska 2003) and in Tītmaņu oxbow lake in 2005 (Kalniņš 2006) and recent data showed, that flight season of the *L. pectoralis* has been mainly in June and July, rarely in late May and early August.

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Kopsavilkums

Spilgtā purvuspāre *Leucorrhinia pectoralis* (CHARPENTIER, 1825) ir īpaši aizsargājamā kukaiņu suga Latvijā. Suga ir sastopama lielākajā daļā Eiropas valstu. Datu analīzē izmantoti publicētie dati, kolekciju materiāli, projekta “Latvijas īpaši aizsargājamo teritoriju sistēmas saskaņošana ar EMERALD/NATURA 2000 aizsargājamo teritoriju tīklu” dati un Latvijas entomologu ievāktais materiāls. *L. pectoralis* izplatības attēlošanai izmantots 5x5 km kvadrātu tīkls Baltijas koordinātu sistēmā. Pašlaik *L. pectoralis* konstatēta 98 kvadrātos. Vairums atradņu atrodas Latvijas centrālajā un ziemeļu daļā. Lielākā daļa atradņu konstatēta dabīgos eitrofos ezeros ar iegrīmušo ūdensaugu un peldaugu augāju (21 vieta) un vecupēs (44 vietas). Citi *L. pectoralis* apdzīvotie biotopi ir mezotrofas ūdenstilpnes ar bentisku mieturāļgu augāju (3 vietas), distrofi ezeri, arī augstajos un pārejas purvos (15 vietas) un citas distrofas ūdenstilpnes (11 vietas). Tikai dažos gadījumos suga konstatēta dīķos (2 vietas) un oligotrofu līdz mezotrofu augu sabiedrībām minerālvieļām nabadzīgās ūdenstilpnēs (3 vietas).

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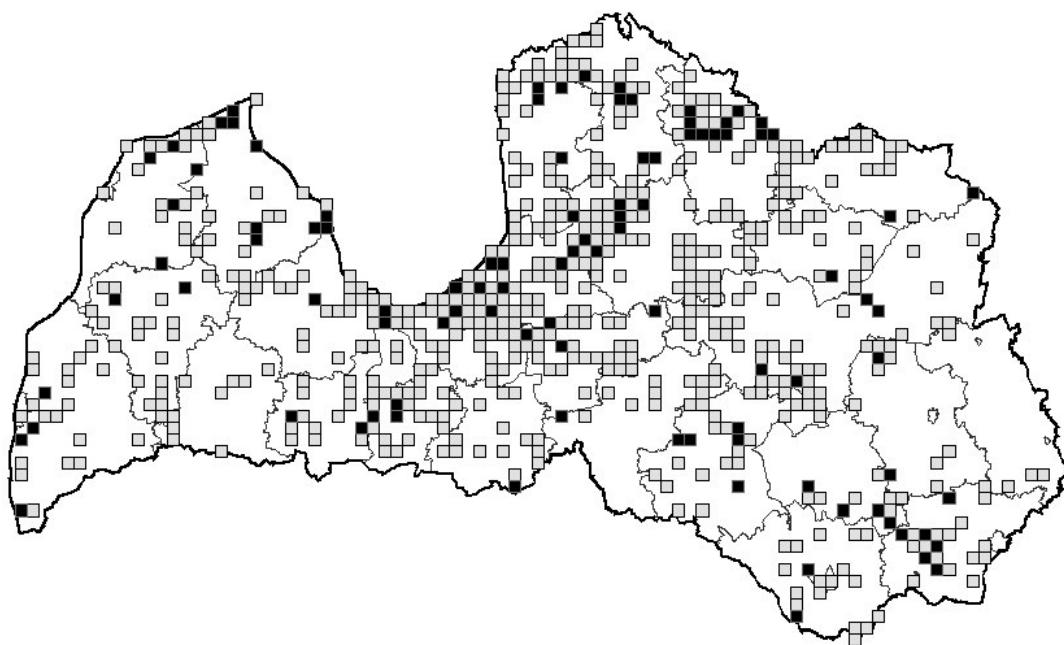


Figure 1. A distribution of *Leucorrhinia pectoralis* in Latvia (black squares) and all dragonfly records (grey squares) until June of 2007.



Figure 2. A characteristic habitat of *L. pectoralis* in the oxbow lake in Gauja NP (Photo: M.Kalniņš).



Figure 3. A characteristic habitat of *L. pectoralis* in the oxbow lake with Water soldier dominated in Gauja NP (Photo: M.Kalniņš).