

## A New Species of Mayfly *Arthroplea congener* BENGTTSSON, 1909 (Ephemeroptera: Arthropleidae) in the Fauna of Latvia

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POPPELS A., SKUJA A., OZOLIŅŠ D., GRUDULE N. 2011. A NEW SPECIES OF MAYFLY *ARTHROPLEA CONGENER* BENGTTSSON, 1909 (EPHEMEROPTERA: ARTHROPLEIDAE) IN FAUNA OF LATVIA. – *Latvijas entomologs* 50: 27-30.

**Abstract:** Now six localities of *Arthroplea congener* have been found in the Northern part of the territory of Latvia, mainly in medium sized streams. The number of individuals in the surveyed localities indicated that the species abundance was rather high in suitable habitats.

**Key words:** Ephemeroptera, *Arthroplea congener*, distribution, Latvia.

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### Introduction

The fauna of Ephemeroptera larvae of inland waters was intensively studied in Latvia during 1998-2010. *Arthroplea congener* BENGTTSSON, 1909 was stated new to the fauna of Latvia in Rauza Stream in 2005 (Poppels 2008). Since that, new localities of the species occurrence have been discovered. Thus, an aim of the paper was to characterise the pattern of species distribution in Latvia.

### Methods

Qualitative samples were generally taken using a hydrobiological net. Quantitative samples were taken using Ekman-Berge sampler in Rauza Stream and in Korģe Stream samples were taken downstream to the pool reach using drift net (sampling period was night, 00:30-01:00 o'clock). All material was preserved in 70 % ethanol. For the identification of species the taxonomic keys were used by following authors: Chernova 1964, Landa 1969, and Remm 1970. Distribution of *A. congener* was mapped using a

basic grid of 5x5 km squares in the projection (TM-1993) of Latvia.

### Results

Since 2005, *A. congener* was found at the larval stage in six streams (Fig. 1). Details of the records are presented:

1. Rauza Stream, middle reaches, 8.05.2005 (3 specimens), leg. / det. A. Poppels.
2. in the Lake Burtnieks near the source of the River Salaca, left bank, 25.05.2006 (1 specimen), leg. D. Levans, det. N. Grudule.
3. mouth of the Korģe Stream, 19.05.2007 (1 specimen), leg. / det. A. Skuja.
4. in the outfall of the Mergupe Stream, 23.06.2007 (3 specimens), leg. / det. A. Poppels.
5. Zaķupe Stream, upper and middle reaches – 9.06.2007 (10 specimens), 24.05.2008 (43 specimens), 20.06.2009 (10 specimens), 8.05.2010 (10 specimens), leg. / det. A. Poppels.
6. Brasla Stream, 7.07.2007 (1 specimen), leg. / det. A. Poppels.

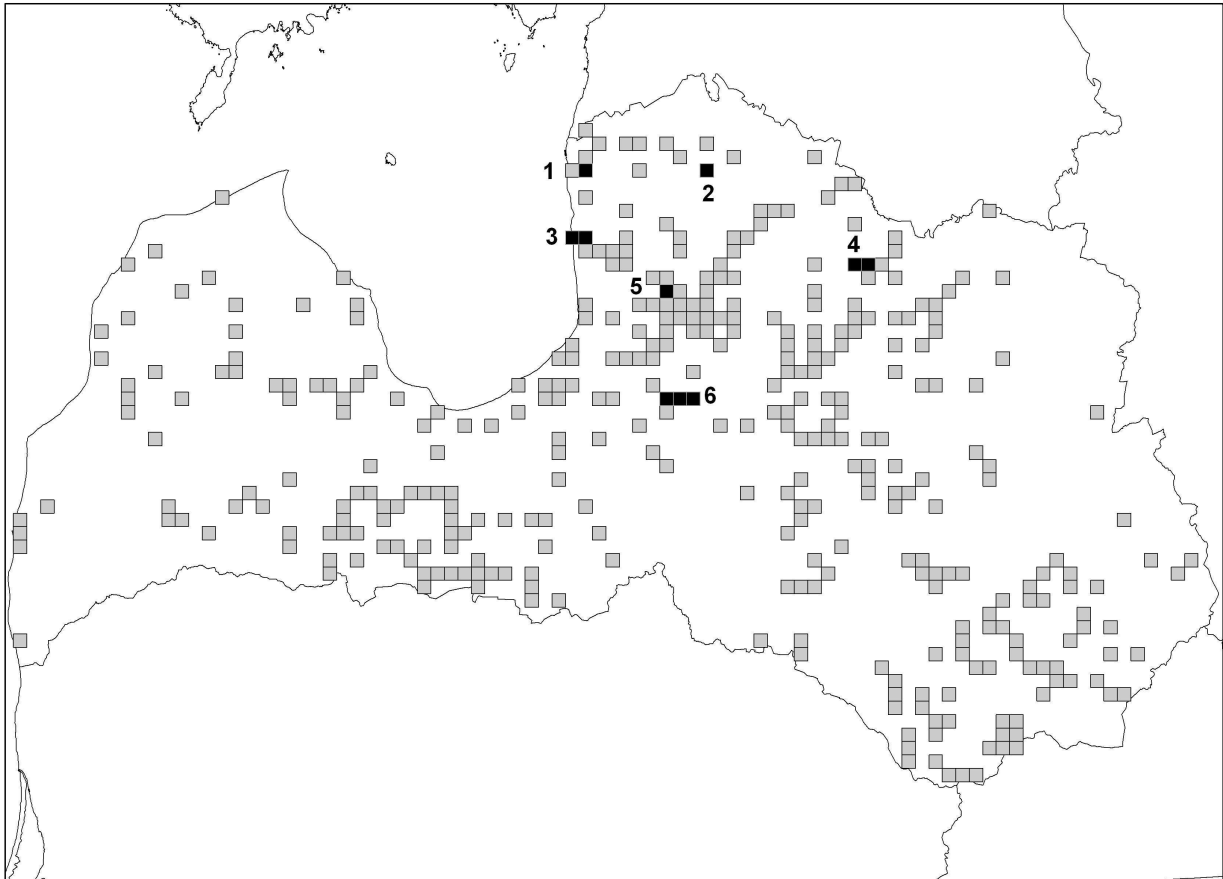


Figure 1. Distribution of *Arthroplea congener* in Latvia.

Grey squares (5x5 km) indicate localities, where investigation of mayflies was done; black squares (5x5 km) – localities, where the larvae were found. 1 – the Korģe Stream, 2 – the Lake Burtnieks near the source of the River Salaca; 3 – the Zaķupe Stream, 4 – the Rauza Stream, 5 – the Brasla Stream, 6 – the Mergupe Stream.

### Discussion

The specimens were found only in the northern part of the territory of Latvia in Vidzeme district (Fig. 1). The streams where *A. congener* was found have different catchment areas: Zaķupe Stream is small stream (catchment area <math><100\text{ km}^2</math>); Rauza Stream, Korģe Stream, Mergupe Stream and Brasla Stream are medium sized streams (catchment area >math>100\text{ km}^2</math>) and Salaca River – large stream (catchment area >math>1000\text{ km}^2</math>). Thus, a catchment area of the stream probably is not significant factor.

The substrate composition differed in the studied streams. However, the depositional habitats with relatively slow current velocity were characteristic with plant detritus (particulated organic matter), sand and sparse macrophyte stand (e.g. *Potamogeton* spp.)

substrates.

Quantitative methods were used for the sampling of the mayflies only in the Rauza Stream and Korģe Stream. Few individuals were collected in the streams, except Zaķupe stream, where numerous individuals were gathered repeatedly. Thus, the species may form abundant and permanent population under favourable conditions.

Larvae inhabit waters with slow current velocity (Elliott, Humpresh 1983). Froehlich (1964) have found that nymphs live typically among sedges in standing or very slowly flowing waters. Also Müller et al. (2009) mentioned that larvae prefer submerged macrophytes. *A. congener* is a particle-feeder, using its highly specialized feeding apparatus for straining detritus and small organisms from the environment (Froehlich 1964). Maxillary palp of larvae is unusually elongated, 2-

segmented and the first segment reaches mesonotum (Kluge 2004). Using its maxillary palps, larva can gather particles dispersed in water, and also can swim back and front (Kluge 2004). Larvae hatch from April to May, emerge on August and are univoltine (Müller et al. 2009).

*A. congener* occurs in the East Palaearctic in the territory of Austria, Czech Republic, Finland, Germany, Norwegian mainland, Poland, Russia (East, North and Northwest part of Europe) and Sweden (including Gotland) (Thomas, Belfiore 2010, Puthz 1978, Haybach, Malzacher 2002). Elliott and Humpresh (1983) assert that *A. congener* may no longer occur in British Isles. For the first time adult specimens and larvae have been found in Germany in the beginning of 1970s (Zimmermann 1975). Later this species have been found also in Austria and in France (Moog, Römer, Julienne, Brulin 2005). According to Puthz (1978) *A. congener* occurs in the Baltic Province (Ecoregion No. 15) (Illies 1978). Species has been found in Estonia (Remm 1970) and before 1960s in Lithuania (Ruginis 2006). The species has been found in Estonia in the end of May 2008 (Anonymous 2008), but in the recent years individuals have not been found in Lithuania (Ruginis 2006). Müller et al. (2009) summarised that *A. congener* have been described as typical boreo-mountain species with disjunctive areal and it is considered that it is coldwater stenotherm species, that origins from tundra. Now it is postglacial and regressing species in Central Europe. According to our results, the localities in Latvia may represent the southern boarder of the northern part of the disjunctive distribution area in Europe.

### Acknowledgments

We sincerely thank to Mārtiņš Kalniņš (Nature Protection Agency, Sigulda, LV) for preparation of distribution map and to Tomas Ruginis (Coastal Research and Planning Institute, Klaipeda University, LT) for the providing us with the information about species distribution in Lithuania.

### References

- Anonymous 2008. [http://urmaskruus.planet.ee/pohjaloomad/E\\_failid/Arthroplea congener.html](http://urmaskruus.planet.ee/pohjaloomad/E_failid/Arthroplea%20congener.html) (last accessed: March 1, 2011).
- Chernova O.A. 1964. Ephemeroptera. Mayflies. – In: *Identification keys of insects of European part of the USSR*. Nauka, Moscow-Leningrad, Volume 1: 110–136 (in Russian).
- Elliott J.M., Humpresh U.H. 1983. A Key to the Adults of British Ephemeroptera with Notes to Their Ecology. – Freshwater Biological Association, Scientific Publication No. 47: 1–101.
- Froehlich C.G. 1964. The Feeding Apparatus of the Nymph of *Arthroplea congener* BENGTTSSON (Ephemeroptera). – *Opuscula Entomologica* 24, No. 3: 188–208.
- Haybach A., Malzacher P. 2002. Verzeichnis der Eintagsfliegen Deutschlands (Insecta: Ephemeroptera). – *Entomologische Zeitschrift* 112, No. 2: 34–45.
- Illies, J. 1978. *Limnofauna Europea. A Checklist of the Animals Inhabiting European Inland Waters with Accounts of their Distribution and Ecology (except Protozoa)*. 2<sup>nd</sup> ed., Gustav Fischer Verlag, Stuttgart: 1–532.
- Julienne L., Brulin M. 2007. Additions à la faune des Éphémères de France (11): *Arthroplea congener* Bengtsson, 1908 [Ephemeroptera, Arthropleidae]. – *Ephemer* 2005 (2007) 7, No. 2: 89–94.
- Kluge N. 2004. *The Phylogenetic System of Ephemeroptera*. Kluwer Academic Publishers, Dordrecht: 1–456.
- Landa V. 1969. [Fauna of Czechoslovakia. Mayflies – Ephemeroptera]. Svazek 18. Československa Akademie věd., Praha: 350 pp. (in Czech).
- Moog O., Römer, A. 1995. *Arthroplea congener*, BENGTTSSON (1908), (Ephemeroptera Arthropleidae) – neu für Österreich. – *Lauterbornia* 20: 87–91.
- Müller R., Haybach A., Schönfelder J. 2009. *Arthroplea congener* BALTHASAR, 1937 und *Baetopus (Raptobaetopus) tenellus* (ALBARDA, 1878) (Ephemeroptera: Arthropleidae, Baetidae) – neu für

- Brandenburg. – *Lauterbornia* **67**: 131–138.
- Puthz V. 1978. *Ephemeroptera*. – In: Illies J. (ed.) *Limnofauna Europaea*. 2<sup>nd</sup> ed. Gustav Fischer Verlag, Stuttgart: 256–263.
- Remm E. 1970. [A key to the Estonian Ephemeroptera]. – *Abiks Loodusevaatlejale* **60**, Tartu: 1–60 (in Estonian).
- Poppels A. 2008. Results of the Mapping of the Distribution of Ephemeroptera Species in Latvia (1982-2007). – International Joint Meeting on Ephemeroptera and Plecoptera, Programme and Abstract Book, 8–14 June, 2008, Stuttgart, Germany, Staatliches Museum für Naturkunde: 69.
- Ruginis T. 2006. The Checklist of Mayflies (Insecta: Ephemeroptera) of Lithuania. – *Acta Zoologica Lituanica* **16**, No. 1: 67–76.
- Thomas A., Belfiore C. (eds.) 2010. Ephemeroptera. Fauna Europea version 2.3. <http://www.faunaeur.org> (last accessed: March 1, 2011).
- Zimmermann G.W. 1975. Zum Erstnachweis von *Arthroplea congener* BENGTTSSON 1909 (Ephemeroptera, Heptageniidae, Arthropleinae) in der DDR. – *Entomologische Nachrichten* **4**: 54–59.

Received: March 1, 2011.