

Species dossier:

Isogenus nubecula

Rare medium stonefly

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Larva, *Isogenus nubecula*

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Contents

Introduction	2
Summary	2
Ecology	2
History in Britain	2
Recent survey work.....	3
Survey methods	3
Identification.....	3
Threats.....	4
Action Plan for the Rare medium stonefly (<i>Isogenus nubecula</i>)	5
References.....	5
Appendix 1 Records of (<i>Isogenus numecula</i>) from the UK.....	7

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This dossier is based upon the Datasheet contained in Bratton (1990).

***Isogenus nubecula* (Newman, 1833)**
Rare medium stonefly
(Plecoptera: Perlodidae)

Introduction

The Rare medium stonefly (*Isogenus nubecula*) was listed as a priority species within the UK Biodiversity Action Plan in 2007. The purpose of this dossier is to draw together all available information on its ecology and distribution in the UK, in order to assist Government Agencies, Planning Authorities, landowners and conservation practitioners with the implementation of action to conserve this species.

The Rare medium stonefly is classified as pRDB2 (Vulnerable) (Bratton, 1990) however it is not listed in the British Red Data Book (Shirt, 1987). It has no formal legal protection, and is not listed in any Schedule of the Wildlife & Countryside Act or in annexes to EU Directives.

Summary

The Rare medium stonefly (*Isogenus nubecula*) is a vulnerable stonefly which has only been recorded in the UK from the River Dee, Flintshire. Repeated surveys of the River Dee since 1995 have failed to re-discover this species.

Ecology

Isogenus nubecula is found in large stony lowland rivers. The larvae are predatory, feeding mainly on Ephemeroptera and Chironomidae larvae (Brinck, 1949), although they may also eat some vegetation. Adults are reported as being on the wing between March and April (Bratton, 1990; Hynes, 1977) however sources from Europe suggest that the flight period might be later, occurring in May to July (Brinck, 1949; Lillehammer, 1988). The adults are thought not to feed, though they do drink water.

Hynes (1963) suggested that *I. nubecula* retreated to an area of deeper water during a period of mild pollution on the River Dee. At Bangor, larvae were only found towards the middle of the river where the flow was swift and deep. Mills and Andrew (1984) consider swift-flowing water, 25-30 cm in depth, over unstable cobbles and gravels to be the ideal habitat. Nymphs were not found amongst extensive growths of aquatic *Ranunculus*, or where the river becomes deeper with a substratum predominately of sand and silt. It was also suggested that the regulated flow of the River Dee, which has increased the minimum dry weather flow in the middle reaches to 6 cubic metres per second for 50% of the year, may be the factor creating suitable conditions for *I. nubecula* in this river alone.

History in Britain

There are collections containing old specimens of this species, probably from Britain but lacking data labels. Jones (1949) recorded nymphs as possibly this species from the River Rheidol, Cardiganshire, but these later proved to be *Diura bicaudata* (Hynes, 1952). The first specimen considered authentically British was caught in 1958, probably in the Bettisfield/Whixall Moss area, Shropshire, but there remains doubt about the precise locality and date even of this record (Brindle, 1973). It is reliably known only from the River Dee, Flintshire, (Hynes, 1963) where nymphs were recorded at Bangor-is-y-coed and Overton Bridge in February 1959 and again at Bangor in March and April of that year. A survey in the 1980s found nymphs along a 45 km stretch of the River Dee, between Newbridge and its

confluence with the River Alyn (Alun), with the greatest abundance close to the site of the original discovery (Mills and Andrew, 1984). There is also an old unconfirmed record from Stoke-on-Trent (Morton, 1934), and Hynes (1941) mentions an undated specimen in the McLachlan collection from the Burton-on-Trent district. As both of these are from Staffordshire, it is possible they refer to the same specimen. King and Halbert (1910, cited in Hynes, 1941) stated that *Dictyopterygella* (now *Diura*) *bicaudata* was often erroneously identified as *I. nubecula* in early collections. This is presumably the case with the occurrences recorded by King and Morton (1891) at Loch Rannoch and may be the case with the specimen in the collection of the British Entomological Society labeled 'Rannoch 8.6.98'. *I. nubecula* is widespread in Europe and reaches Siberia and Japan (Despax, 1951).

The range and abundance in the River Dee are thought to have increased between 1959 and 1982, but this is still the only river known to support a population of this species, despite searching in the tributaries of the Dee (Mills and Andrew, 1984) and much other sampling of river invertebrates by the National Rivers Authority, Environment Agency and others (e.g. Bird, 1983). It may have been lost from several European countries. Claessens (1981) could find no records from Austria, Belgium, Switzerland or the Netherlands more recent than 1936 and considered Dutch rivers to be now too polluted to give hope of new records there.

Recent survey work

In 1993 a survey of the middle reaches of the River Dee recorded *I. nubecula* at 5 sites between Overton Bridge and Wern (Davy-Bowker, 1995). A single specimen of *I. nubecula* was taken from the River Dee at Erbistock in 1995 during routine monitoring by the Environment Agency. Despite further surveys in 1997 (Tanner, 1997), 1998 (Milliband, 1998), 2003 (Davy-Bowker, 2003) and 2003/4 (Hammett and Wallace, 2005) no further specimens of *I. nubecula* have been found. Air-lift sampling of deeper water in the lower reaches of the River Dee was undertaken in 2007 (Davy-Bowker et al, 2007). These surveys did not however produce any records.

Survey methods

In shallow water the larvae of this species can be collected by kick-sampling. This is a standard technique employed by biologists to sample aquatic invertebrates and entails disturbing a section of the riverbed. Invertebrates are dislodged and collected in a water net held just downstream. In deeper water air lift sampling can be employed to collect specimens from the river bed. Adults can be collected by examining bankside trees and other vegetation. Cast exuviae may be found on bankside structures such as bridges and walls.

Identification

This species belongs to the family Perlodidae, of which just four other members are found in Britain. A key to the adults and nymphs of stoneflies is available from the Freshwater Biological Association (Hynes, 1977). Lillehammer (1988) also provides keys to adults and nymphs.

Adults have two long cerci (tails) and both the female and male are fully-winged. Females are 15-20mm long while males are slightly shorter at 14-19mm. They are separated from other Perlodidae species through examination of the sub-genital plate in the female and the tenth tergum in the male. Nymphs are 14-21mm long and are separated from the other Perlodidae by examination of the mouthparts.

If you are in any doubt over the identification of adults or larvae, please contact Buglife – The Invertebrate Conservation Trust, who can arrange for them to be checked by an expert.



Adult *Isogenus nubecula*

Threats

Water pollution is the most obvious threat to this species. Water quality in the River Dee is generally good, however pollution incidents, particularly those that occur above Bangor-on-Dee, may be detrimental to the survival of *Isogenus nubecula*. Davy-Bowker, et al. (2007) suggested that an increase in water temperature lead to the River Dee becoming less suitable for this species. In particular, the potential effect of water releases from impoundments on the River Dee requires further investigation.

In lowland areas the riverbanks are sometimes unprotected from livestock on more heavily grazed pasture. The resulting disturbance of the riverbed, together with the potential eutrophication or pollution of the water, may lead to a deterioration of the habitat. Agricultural pollution also poses a serious threat, particularly slurry from factory farming and the leachate from silage clamps.

Any operations that affect the bed material such as dredging, channel modifications or gravel removal could damage the habitat and should be avoided. Similarly, changes to the riparian habitat, whether through flood defence work or removal of bankside trees may result in a loss of habitat for the adult stonefly.

As the adults of this species are potentially attracted to light, the positioning of bankside lights, such as road lights, may also have a deleterious effect on populations.

Action Plan for the Rare medium stonefly (*Isogenus nubecula*)

1. Undertake further surveys to establish the status of *Isogenus nubecula* in the UK. Efforts to concentrate on the River Dee, Flintshire.
2. Environment Agency Wales to keep all specimens of Perlodidae and have them identified to species by the national recorder.

The River Dee has experienced several serious industrial pollution events in the recent past. Appropriate management, particularly of water quality, river morphology and the riparian habitat, of the River Dee - the only known 'site' for this species – will help this species and other aquatic invertebrates.

References

- Bird, L.M. (1983)** Records of stoneflies (Plecoptera) from rivers in Great Britain. Entomologists' Gazette, 34:101-111
- Bratton J.H. (1990)** A review of the scarcer Ephemeroptera and Plecoptera of Great Britain. Nature Conservancy Council, Peterborough, UK. Research & survey in Nature Conservation no. 29:1-39.
- Brinck, P. (1949)** Studies on Swedish stoneflies (Plecoptera). Opuscula Entomologica, Supplementum XI: 1-250.
- Brindle, A. (1973)** *Isogenus nubecula* Newman in Flintshire (Plecoptera:Perlodidae). Entomologist's Record and Journal of Variation, 85:50-53.
- Claessens, E.E.C.M. (1981)** The stoneflies (Plecoptera) of the Netherlands. Nieuwsbrief European Invertebrate Survey – Nederland, 10: 73-77.
- Despax, R. (1951)** Plécoptères. Faune de France, 55: 1-280.
- Davy-Bowker, J. (1995)** Records of *Isogenus nubecula* Newman (Plecopt., Perlodidae) from the Welsh River Dee. Entomologist's Monthly Magazine. 131: 69-70.
- Davy-Bowker, J. (2003)** A survey of the Welsh River Dee for the rare stonefly *Isogenus nubecula* Newman in February 2003. A report by the Centre for Ecology & Hydrology, (Dorset) (unpublished).
- Davy-Bowker, J., Neale, M., Hammett, M.J. & Hull, M. (2007)** An airlift study of the Welsh River Dee for the rare stonefly *Isogenus nubecula* Newman in January 2007. Bangor, Countryside Council for Wales, 10pp. (CCW Contract Science Report No. 793, CEH Report No. C02871/2007/1, Contract No. FC 73-01-580A) (Unpublished)
- Hammett, M.J. & Wallace, I.D. (2005)** A survey for the stonefly *Isogenus nubecula* (Newman) on the Welsh River Dee and its tributaries (December 2003 to April 2004). Countryside Council for Wales (Bangor), Contract Science Report No. 717.
- Hynes, H.B.N. (1941)** The taxonomy and ecology of the nymphs of British Plecoptera with notes on the adults and eggs. Trans. R. Ent. Soc. Lond. Vol. 91. Pt. 10. London.

- Hynes, H.B.N. (1952)** The Plecoptera of the Isle of Man. Proceedings of the Royal Entomological Society of London, Series A, 27: 71-76.
- Hynes, H.B.N. (1963)** *Isogenus nubecula* Newman in Britain (Plecoptera: Perlodidae). Proceedings of the Royal Entomological Society London (A). 38: 12-14.
- Hynes, H.B.N. (1977)** A key to the adults and nymphs of the British stoneflies (Plecoptera) with notes on their ecology and distribution. Scientific Publications of the Freshwater Biological Association, No. 17.
- Jones, J.R.E. (1949)** An ecological study of the River Rheidol, Cardiganshire, Wales. Journal of Animal Ecology, 18: 67-88.
- King, J.J.F.X. & Halbert, J.N. (1910)** A list of the Neuroptera of Ireland. Proceedings of the Royal Irish Academy, 28: 29-112.
- King, J.J. F.X. & Morton, K.J. (1891)** List of Neuroptera observed at Rannoch in June 1899. Entomologists' Monthly Magazine, 27: 45-47.
- Lillehammer, A. (1988)** Stoneflies (Plecoptera) of Fennoscandia and Denmark. Fauna Entomologica Scandinavica, 21: 1-165.
- Morton, K.J. (1934)** What is *Phyrganea bicaudata* of Linné? Journal of the Society for British Entomology, 1: 42-43.
- Millband, H. (1998)** The status of the rare stonefly, *Isogenus nubecula*, in the middle Dee. A report by the Environment Agency, Welsh Region.
- Mills, M.J. & Andrew, D. (1984)** *Isogenus nubecula* Newman (Plecoptera: Perlodidae) in the Welsh River Dee. Entomologist's Gazette, 35: 45-51.
- Shirt, DB. (ed.) (1987)** British Red Data Books: 2. Insects. Nature Conservancy Council, Peterborough, UK.
- Tanner, J.M. (1997)** A survey of the Welsh River Dee for the rare stonefly *Isogenus nubecula*. A report by the Environment Agency, Welsh Region.

Appendix 1 Records of (*Isogenus nubecula*) from the UK

Specific records for this species can be found using the NBN Gateway (http://data.nbn.org.uk/index_homepage/index.jsp).

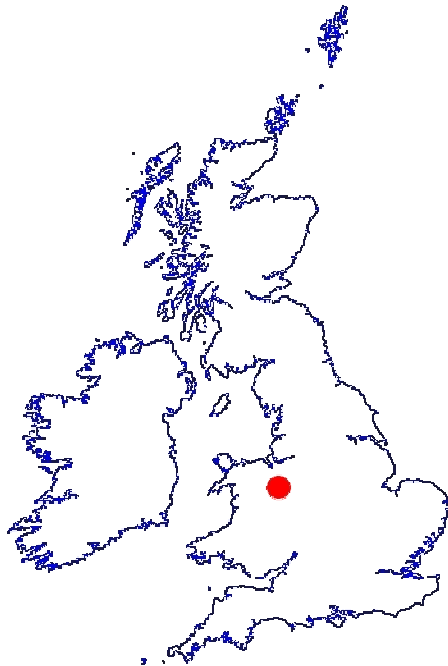


Fig. 1 Generalised distribution map of confirmed records of *Isogenus nubecula* in the UK

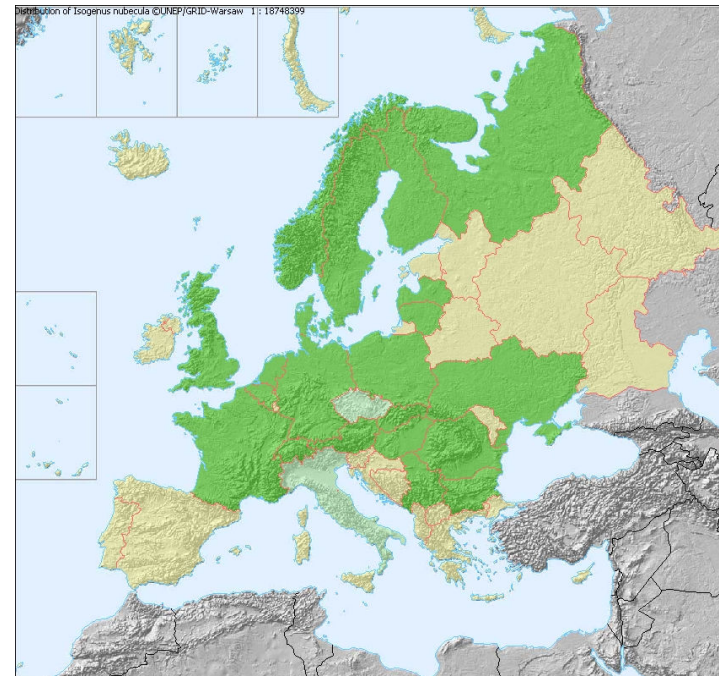


Fig. 2 Distribution of *I. nubecula* in Europe (from Fauna Europaea)
(Green = Present ; Pink = Absent ; Beige = No data)