

Species dossier:

Hydropsyche bulgaromanorum

Scarse grey flag

July 2011



Adult Hydropsyche bulgaromanorum

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***Hydropsyche bulgaromanorum* (Malicky, 1977)**
Scarce grey flag
(Trichoptera: Hydropsychidae)
Previously considered *Hydropsyche guttata*

Nomenclature

Malicky (1977) recognised that the species called *Hydropsyche guttata* was a complex of more than one species. He decided, Malicky (1984), that all the UK material belonged to this new species.

Introduction

The Scarce grey flag (*Hydropsyche bulgaromanorum*) is a priority species within the UK Biodiversity Action Plan. The purpose of this dossier is to draw together available information on its distribution in the UK and its ecology in order to assist Government Agencies, Planning Authorities, landowners and conservation practitioners with the implementation of action to conserve this species in the UK.

The Scarce grey flag was classified as probably extinct in Shirt (1987) and Wallace (1991). It has no formal legal protection and is not listed in any schedule of the Wildlife and Countryside Act or in annexes to EU directives. The Scarce grey flag has increased in several European countries, e.g. Holland (Higler, 2008 and Bloemane & Sluis, 2004). It is regarded as invasive non-native southern European species in the Rhine region, data summarised by Leuven *et al* (2008).

Summary

The Scarce grey flag (*Hydropsyche bulgaromanorum*) is one of Britain's rarest caddis flies. Modern records come from the lowest freshwater section of the River Arun, in Sussex. There are 19th century records, from the lower River Thames and an un-localised site in Norfolk.

Ecology

This is a characteristic species of the lowest freshwater sections of many European rivers, Kumanski & Botosaneanu (1974) cited from Lecureuil (1982), Bournaud *et al* (1982), Lecureuil *et al* (1983), van Urk, (1991), Pitsch (1993), Guinand *et al* (1996), Czachorowski & Serafin (2004). *Hydropsyche* females are not noted as long-distance fliers or we could confidently expect colonists from Europe to set up populations in several south east England rivers. However, the current Arun population is probably long-standing.

Hydropsyche larvae are morphologically quite similar and all make nets attached to stones to capture plant and animal matter carried by the flow; there is evidence some species may also graze algae from the adjoining substratum discussed in Edington & Hildrew (1995). It is tempting to speculate that this may be significant in *H. bulgaromanorum* as it is associated with the lentic i.e. still parts of the river Czachorowski & Serafin (2004), where it lives in shallow warm water on stones. Aki Rinne confirms that it does make a net in Finnish rivers. The larva has particular features in the form of a very setose head capsule and a small lump on the submentum. Surprisingly no references have been found that describe the behaviour of the larvae to suggest why they have these features. The long setae on the head

are noted as becoming very clogged with fine debris and colonised with micro-organisms (Lecureuil *et al* 1983). This may have a camouflaging effect.

The recent survey of the Arun found that the larvae were always associated with hard substratum. Lecureuil *et al* (1983) found that the third instar larvae were mainly found on gravel but the final instar larvae were found mainly on stones.

In Poland, *H. bulgaromanorum* is the only hydroptychid in the lower sections of the larger rivers, but is found with *H. contubernalis* McLachlan in some (Czachorowski & Serafin, 2004) and that is the situation in the River Arun in this country.

Czachorowski & Serafin (2004) found that *H. bulgaromanorum* was comparatively resistant to organic pollution and artificially raised temperatures; in fact it could build up huge populations in such circumstances. It was possibly the commonest caddis at light traps along the Austrian Danube (Waringer, 1989); whilst being exceeded in numbers by *Brachycentrus subnubilus* Curtis, female *Hydropsyche* were not identified, and usually exceed the number of males at light. By the March River in eastern Austria *H. bulgaromanorum* was the commonest caddis in light traps (Waringer & Graf, 2005).

The flight period seems to stretch from June to October, but the peak in the UK is not known as there are so few records. There are claimed to be two generations a year in southern France (Lecureuil *et al*, 1983) and there are two clear peaks within the flight period in Holland (Higler, 2008) but Higler believed there was only one generation a year. By the Austrian Danube, Waringer (1989) seemed to have only one generation, stretching from June to October, with a peak in August.

History in Britain

Malicky (1984) summarises all the certain older UK records.

Robert McLachlan collected adults from the River Thames between Kew and Richmond on 15.8.1862 and again on 12.7.1864. The latest record for that river is again from McLachlan, from the River Thames Surrey, and was probably from the same area as his earlier records, and is dated 21.6.1866.

Charles Barrett took a specimen from a place in Norfolk in 1887, but unfortunately did not give a more specific location.

Martin Mosely recorded it from Arundel on 5.9.1926, and in 2005 and 2006, biologists associated with the Environment Agency found larvae in the River Arun at South Stoke, Houghton Bridge, Bury and Greatham Bridge. Peter Barnard and Emma Ross took an adult at South Stoke in 2006.

This species was at one time considered to be *Hydropsyche guttata* and there are other records under that name or as earlier synonyms listed by Fischer (1963). Those in Stephens (1836) are a good example. It is likely many are other species e.g. *H. contubernalis*, under which specimens were standing in the Natural History Museum collection (Malicky, 1984). However, there is a possibility that others, especially those which give London as the locality, might have referred to earlier records of *H. bulgaromanorum*. Unfortunately the Stephens collection has been muddled at some time (Kimmings, 1964) making it impossible to assign specimens to his names.

Interestingly this species has been found in early Pleistocene peat deposits at Hill House, Happisburgh, Norfolk (Happisburgh Village Website, 2011 and Nature Publishing Group, 2011).

European distribution

The Fauna Europaea website lists the species from the following countries and major regions, listed alphabetically: Austria; Belgium; Bulgaria; Czech Republic; Finland; France; Germany; Hungary; Italy; Lithuania; Netherlands; Poland; Romania; Russia (East); Russia (North West); Slovakia; Slovenia; Ukraine; United Kingdom; Yugoslavia.

Recent Survey Work

The recent records from the River Arun are the latest for the species. Since 2008, Environment Agency laboratories in south east England are routinely examining *Hydropsyche* larvae taken during monitoring of large rivers, but to date without success.

Survey methods

Adults appear to rest during the day, but can be swept from vegetation. They are most easily collected using light traps, but also appear in other static traps near the waterside such as Malaise traps or water traps. Surveying for this species as adults will be very time-consuming due to the necessity to distinguish them from the large number of other *Hydropsyche* that will inevitably be collected at the same time.

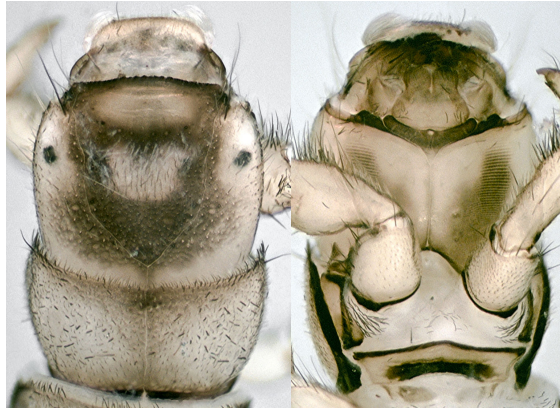
Sampling for larvae seems to be the most efficient method, due to the comparative ease of identification. Stones and rocks from the habitat can be placed in trays and those lifted out as units and the larvae then removed and examined. They can also be collected by the standard kick-sampling technique used by freshwater biologists, but only if there is sufficient current to carry dislodged larvae into the downstream sampling net. The large size of the rivers where this species occurs means not all suitable habitat can be safely sampled.

The examination of samples of *Hydropsyche* taken in routine water quality monitoring of rivers in south east England, should continue as it may reveal new populations.

Identification

With experience, *Hydropsyche* adults can be recognised in the field. Unfortunately, at present no field features are known to distinguish adults of *H. bulgaromanorum* from most of its very common relatives. Examination of the genitalia is required, which usually entails killing the insect; the females may also need to be soaked in 10% Caustic Potash solution until their soft body tissues have macerated to reveal the harder sclerotised parts of the genitalia.

Hydropsyche larvae are un-mistakeable. This particular species can be told from other species by its silt-covered frontal area of the head. Other species, particularly *H. pellucidula* can have very extensive growth of epizoitic stalked ciliate protozoa on the head, and if these are damaged, e.g. in preserved larvae, their stalks can resemble the hairs. The 'bump' on the submentum is obvious under a microscope, but will require dead or anaesthetised larvae, so is not a field feature. The standard UK key is in Edington & Hildrew (1995).



Head of larva *Hydropsyche bulgaromanorum*



Adult *Hydropsyche bulgaromanorum*

Threats

The main threats include:

1. Pollution events
2. Unsympathetic dredging
3. High levels of suspended silt
4. Unsympathetic engineering work
5. Abstraction leading to low water-flows and the upstream migration of the tidal influence
6. Marginal and riparian vegetation is likely to be important to adults for shelter and swarming and large changes in areas where it lives could be detrimental

Conservation opportunities in the River Arun

The recent survey suggests that this species may be limited by the availability of hard substratum, (gravel and stones), and additional habitat could be created. Areas of river bank being eroded by faster flow are often protected from erosion by stone armour, but as this seems to be a species of slow flow, e.g. (Czachorowski & Serafin, 2004) this habitat would be unlikely to be colonised. Anderwald & Waringer (1993) suggest that the species is limited in the Danube by absence of hard substratum of large enough particle size.

It is probable that a population of this species could be re-established in the River Thames, using Arun material. It is questionable if this would be desirable. It is likely to become very numerous and affect other species in unknown ways. It is also under no threat in Europe.

Action plan for the Scarce grey flag (*Hydropsyche bulgaromanorum*)

- 1 Engage with planning authorities and the Environment Agency to ensure that this species is taken into account in developments.
- 2 Include the River Arun within the boundary of the SSSI that covers the adjoining land.
- 3 Ensure that the species is represented on all relevant LBAPs
- 4 Investigate the opportunities for adding hard substratum to increase amounts of habitat.
- 5 Consider use of trays of artificial substratum as a means of monitoring the species (as was done by Lecureuil et al (1983)).

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Appendix 2 Records of *Hydropsyche bulgaromanorum* from the UK

Locality	grid reference	Vice County	Source	Stage	Recorder name	Determiner name	Day	Month	Year
R. Thames between Kew & Richmond	TQ1--7--	17/22	Natural History Museum, London & Malicky (1984)	adult	McLachlan, R.	McLachlan, R.	15	8	1862
R. Thames, between Kew & Richmond	TQ1--7--	17/22	Natural History Museum and Malicky (1984)	adult	McLachlan, R.	Malicky, Hans	12	7	1864
R. Thames, Kew, Surrey	TQ1--7--	17/22	Natural History Museum and Malicky (1984)	adult	McLachlan, R.	Malicky, Hans	21	6	1866
Norfolk	00000000	?	Natural History Museum, London & Malicky (1984)	adult	Barrett, C.G.	Not known			1887
R. Thames, London	00000000	17/22	National Museums of Scotland (Morton Collection)	adult	not stated or recorded	Not known			not dated but presumed pre 1900

R. Thames, Kew	TQ1--7--	17/22	Hickin (1967)	adult	McLachlan, R.	McLachlan, R.			1865
R. Thames, Richmond	TQ1--7--	17/22	Hickin (1967)	adult	McLachlan, R.	McLachlan, R.			1865
Arundel, Sussex	TQ0--0--	13	Natural History Museum and Malicky (1984)	adult	Mosely, M.E.	Mosely, M.E.	5	9	1926
R. Arun, South Stoke	TQ027101	13	Drake & Willo (2009)	larvae & pupae	Drake, C.M. & Willo, A.	Drake, C.M.		4 to 6	2005
R. Arun, Houghton Bridge	TQ025118	13	Drake & Willo (2009)	larvae & pupae	Drake, C.M. & Willo, A.	Drake, C.M.		6	2005
R. Arun, Bury	TQ017130	13	Drake & Willo (2009)	larvae & pupae	Drake, C.M. & Willo, A.	Drake, C.M.		6	2005
R. Arun, Greatham Bridge	TQ031162	13	Drake & Willo (2009)	larvae	Drake, C.M. & Willo, A.	Drake, C.M.		4	2005
R. Arun, South Stoke	TQ02-10-	13	Note sent to caddis recording scheme	adult	Peter Barnard & Emma Ross	Barnard, P.C.		7	2006
R. Arun, Houghton Bridge	TQ025118	13	Note sent to caddis recording scheme	larvae	Environment Agency	Knight, Lee	1	11	2006



Fig. 1 Distribution of confirmed records in the UK

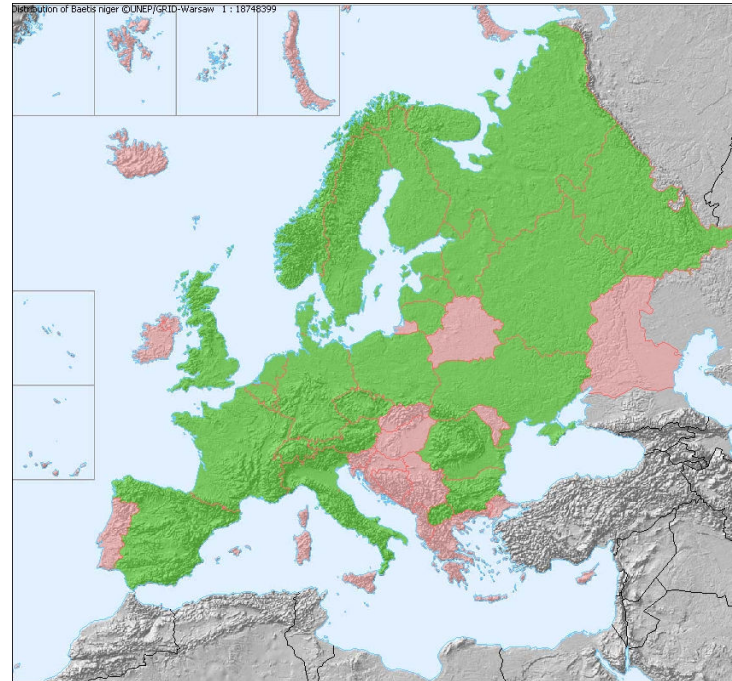


Fig. 2 Distribution of *H. bulgaromanorum* in Europe (from Fauna Europaea)
(Green = Present Beige = No data)