

# In the Month of Mayfly

**Craig Macadam** describes all the British and Irish mayflies, and how to sample and identify them. Flies illustrated by **Cyril Bennett**

**W**alk along the shore of a lake or river on a summer's evening and you'll notice insects dancing in the lea of a bush. Look closer and you'll see they have two small wings, two large upright wings and two or three tails. These are the flies, commonly known as mayflies though the common name is misleading because flies in this group can appear throughout the year. At one time they were called dayflies due to some of the species having an adult life of a single day. The common name comes from the habit of one species, *Ephemera danica*, of emerging as adults when the mayflower or hawthorn is in bloom.

Mayflies are unique as insects in that they have two winged-adult forms. The nymph emerges from the water as a dull-coloured sub-imago (or dun) that seeks shelter in bankside vegetation and trees. After a couple of hours or more, the sub-imago once again sheds its skin to transform into the brightly coloured imago (or spinner). There is no obvious reason for mayflies to have retained this unique phase in their lifecycle.

A mayfly's life cycle starts when the males form a swarm above the water and the females fly into the swarm to mate. The male grabs a passing female with its elongated front legs and the

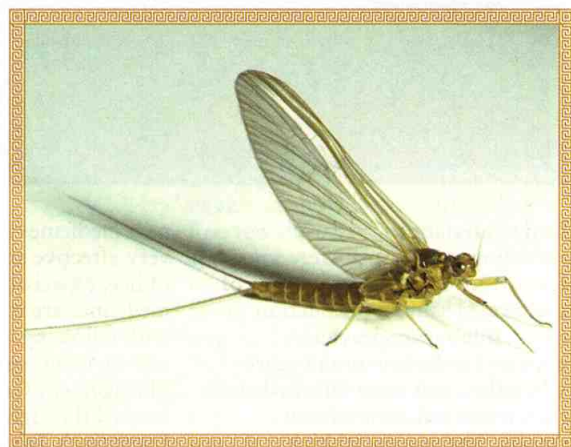
pair mate in flight. After copulation, the male releases the female, which then descends to the water where she lays her eggs. After laying, females will fall, spent, on the water surface; they lie motionless, with wings flat on the surface and fish eat them at their leisure. The male fly rarely returns to the water but he goes to die on the nearby land.

The eggs of surface-laying species fall to the bottom of the water where they stick to plants and stones. The *Baetidae* species pull themselves under the water to attach their eggs directly to the bed before being drowned by the current. The eggs take anything between a few days to a number of weeks to hatch depending on water conditions and the species. The resultant nymphs will spend various lengths of time, up to two years, foraging on the bottom before emerging as an adult fly.

When it is time to emerge the nymphs make their way to the surface where they pull themselves free of their nymphal shuck and emerge as sub-imagos. They are at their most vulnerable to attack from fish whilst resting on the surface to dry their newly-exposed wings.

## *The Mayflies of the British Isles* THE BURROWING NYMPHS

**T**here is only one family of upwing flies that truly can be



*Baetis rhodani*  
(Female subimago)

called mayflies; that of the green- and grey-drakes (family *Ephemeridae*) – large flies with three tails and grey wings. The nymphs of these flies burrow into silt, sand or small stones on the river bed where they feed on detritus. They are robust, cylindrical nymphs their tails densely fringed with hairs. There are three species in the British Isles. *Ephemera danica* is by far the most common species, although in some areas *E. vulgata* can predominate. *E. lineata* is known only from a couple of sites on the River Thames and River Wye.

Although not directly related to the true Mayflies, there is another family of flies that burrows into mud and silt; the



Angler's Curse or broadwings (family *Caenidae*). These are tiny, creamy-yellow flies with three tails. They emerge in the twilight hours of dawn and dusk at the water surface and often they are caught in moth traps located near water. There are nine species resident in British waters, however separating the species is quite difficult. *Brachycercus harrisellus* is distinguished easily from the *Caenis* spp. by the presence of three tubercles on the head. *Caenis horaria* and *C. robusta* can be separated by the shape of their pronotum but with the current key the remaining *Caenis* spp. can at best, only be split into two groups. The *Caenis luctuosa* group contains *C. luctuosa*, *C. macrura* and *C. pusilla* whilst the *Caenis pseudorivulorum* group contains *C. rivulorum* and two recently recorded species - *C. pseudorivulorum* and *C. beskidensis*.

#### The clinging nymphs

The clinging nymphs (Heptageniidae and Arthropleidae) have flattened bodies to allow them to cling to rocks in turbulent rivers or on the wave lashed shores of standing waters. They forage on detritus and debris; they are poor swimmers. As a result, they are well camouflaged and tend to stay out of sight under stones. Generally, they grow to about 12 millimetres in length and have short sparse hairs on their tails. Usually they are found in rivers although *Electrogena lateralis* (the Dusky Yellowstreak) is found also in upland stillwaters and *Ecdyonurus dispar* (Autumn Dun) is found occasionally in the margins of stillwaters.

*Rhithrogena germanica* (the March Brown) could be the most famous of the stone-clinging upwing flies. It is an early season fly that probably is also the most misidentified fly. Many hatches of so-called March Browns occur in locations that have never seen a March Brown nymph. The true March Brown is quite large, with two tails and fawn wings. It has an extremely localised distribution unlike its namesake the Late (or False) March Brown (*Ecdyonurus venosus*) which has a widespread distribution, except in the South and East of Britain. The Late March Brown is similar in appearance to the true March Brown but emerges in the latter part of the year.

Like the nymphs of *Caenis* spp., the nymphs of *Ecdyonurus* spp. and *Rhithrogena* spp. are very difficult to identify. *Rhithrogena semicolorata* (Olive Upright) and



*Serratella ignita*  
(sherry  
Spinner)  
Female imago

*Rhithrogena germanica* can be separated quickly from other genera by the presence of a single dark spot on the femur of the front legs. Similarly, *Ecdyonurus* spp. can be separated from the other genera by the shape of the pronotum.

Adults of *Ecdyonurus torrentis* (Large Brook Dun) and *Ecdyonurus insignis* (Large Green Dun) are characterised by two tails and mottled wings, with the latter fly emerging in the evenings or at dusk rather than during the day. *Heptagenia sulphurea* (the Yellow May Dun) is a widespread fly emerging in the late evening and dusk. It is a medium-sized fly with two tails and a distinctive yellow body. Its body, plus its habit of first emerging in May, gives the fly its common name. The only other species of *Heptagenia* that has been recorded from the British Isles is *Heptagenia longicauda*. This mayfly has been recorded on only four occasions and is superficially similar to *H. sulphurea*. It is difficult to differentiate between the nymphs of the two species and the sub-imagos emerge at sunset so the apparent rarity of *H. longicauda* may be a result of under-recording. It would be useful if lepidopterists running moth traps in the London area could look out for a medium-sized yellow mayfly entering their traps in early summer!

*Ephemera lineata* (Female  
sublimago)



The remaining species of stone clinging nymphs found in British water are *Kageronia fuscogrisea*, *Arthroplea congener* and *Electrogena affinis*. Until recently, *Kageronia fuscogrisea* also was placed in the genus *Heptagenia*. Unusually, this species is the only Heptageniidae species that is associated with submerged aquatic vegetation. It has a widespread though very localised distribution in Great Britain, however it is quite common in Ireland.

*Electrogena affinis* is the most recent addition to the British list. It was found in the River Derwent, Yorkshire in 1994, but it probably exists in other watercourses as it is superficially similar to *Electrogena lateralis*. *Arthroplea congener* (family Arthropleidae) holds a tenuous claim to being a British mayfly. A single adult specimen was found at Stanmore, Middlesex in 1920. It is however unlikely that this species is surviving unnoticed in a large British watercourse as the nymphs have prominent maxillary palps which are visible with the naked eye and most large rivers have been thoroughly searched by the Environment Agency and its predecessors.

A sub-group of these clinging nymphs is the moss-creeping nymphs. There are two species that have this characteristic, both in the Family Ephemerellidae. *Serratella ignita* (the Blue Winged Olive) and *Ephemerella notata* (the Yellow Evening Dun) are medium-sized flies, both with three tails and large hind-wings. *S. ignita* has a widespread distribution and occurs in both rivers and larger stillwaters. Its familiarity to anglers ranks it amongst the great flies such as the March Brown and Iron Blue Dun. *Ephemerella notata* is, as its common name suggests, a yellow fly, which emerges in the late evening. Until recently it was restricted in distribution to limited areas in England, however it has extended its range substantially and now occurs in Central Scotland, where it inhabits rivers with reasonable flow rates.

The Leptophlebiidae are distinguished from other Ephemeropteran larvae by tails that are as long, or longer, than the body. The tails often are held at right angles to each other so that the spread of the tails covers 180 degrees. They have small larvae, rarely over 12mm in length and they have filamentous gills which aid identification to genus level.

The adults of the Leptophlebiidae have two forewings, two large hindwings and three tails in common with the true mayflies (*Ephemera* spp.).



*Paraleptophlebia cincta* and *P. submarginata* were once thought to be part of the *Ephemera* genus.

The female sub-imagines of the Leptophlebiidae are quite distinctive. *Habrophlebia fusca* is the only member of the genus *Habrophlebia* to be recorded in the British Isles. It has dark grey wings and a dark olive body. *Leptophlebia marginata* has pale fawn, heavily veined wings and an overall dark brown appearance. *L. vespertina* is smaller than *L. marginata* with dark grey wings and an almost black body often tinged with claret. *L. vespertina* has markedly paler hindwings than its forewings. It is reported that *L. vespertina* prefers peaty or acidic waters.

*Paraleptophlebia cincta* is similar to *L. vespertina*, but the body is a dark brown colour with a tinge of purple. *P. submarginata* also has a dark brown body and mottled fawn wings. The wings are heavily veined and have a pale area in the centre of the forewing. *P. werneri* is very rare and is characteristic of winterbournes that cease to flow in summer. The nymphs are associated with aquatic vegetation, which often covers the whole stream channel.

The female imagines of the Leptophlebiidae all are broadly similar. They have transparent wings with pale brown venation and brown to dark brown bodies with tinges of claret, red and purple.

All Leptophlebiidae species occur in running waters with *Leptophlebia marginata* and *L. vespertina* also occur in standing waters.

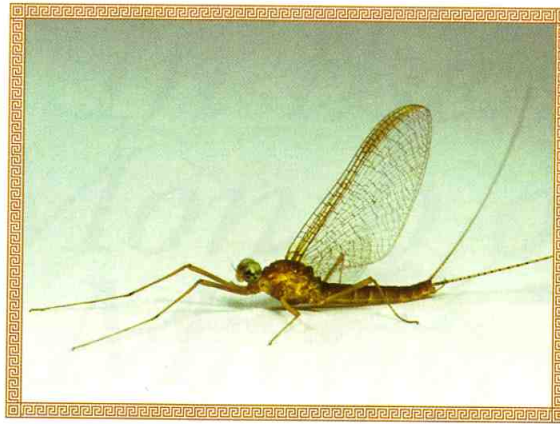
#### The darting nymphs

The darting nymphs are highly streamlined and very good swimmers. They dart around the water feeding on vegetation and detritus. They can grow to 18 millimetres and, like the burrowing nymphs, they have three tails with densely fringed hairs.

The majority of these flies are Olives (Family Baetidae) which are characterised by their two tails and grey wings. *Labioabaetis atrebatinus* (the Dark Olive), *Baetis rhodani* (Large Dark Olive), *Baetis buceratus* and *Baetis vernus* (Medium Olive) and *Baetis scambus* (Small Dark Olive) are widespread, but prefer alkaline conditions.

Two other Olives that are found more commonly in standing waters are *Cloeon simile* (the Lake Olive) and the *Cloeon dipterum* (Pond Olive). Both are distributed widely and look similar to other olives. They emerge from May to October during daylight hours.

Other *Baetidae* flies include probably the most famous mayfly



of all - The Iron Blue Dun (*Nigrobaetis niger* or *Alainites muticus*) and the Pale Watery Dun (*Baetis fuscatus*).

Heptagenia sulphurea (Male imago)

Both *Alainites muticus* and *Nigrobaetis niger* are small flies with blue-black wings and two tails. They emerge throughout the season and *Alainites muticus* is distributed widely throughout the British Isles, apart from the south east. *Nigrobaetis niger* has a sparser distribution, with scattered records from across the country. Unlike the Iron Blue Dun, the Pale Watery Dun has a localised presence in alkaline running waters in England and occasionally in Scotland. When it emerges between May and October it appears as a small fly with two tails and pale grey wings. The male fly has distinctive lemon yellow eyes.

*Procloeon bifidum* (the Pale Evening Dun) occurs widely in alkaline waters and for most of the season emerges in the evenings as a small fly with two tails and pale grey wings. *Nigrobaetis digitatus* has a very limited distribution, being known from Wales and the South of England. It was also recently recorded from Scotland.

Two of the mayflies are known as Spurwings due to the shape of their hind wing. *Procloeon pennulatum* (the Large Spurwing) and *Centroptilum luteolum* (the Small Spurwing) both prefer alkaline conditions, with *C.*

*Paraleptophlebia submarginata* (Female sublimago)



*luteolum* occurring in both flowing and standing waters. The grey winged, *C. luteolum*, is distributed widely although it is absent from Wales. *P. pennulatum*, with blue-grey wings, is present in South Wales, although it is highly localised. It occurs also in South and North England.

There are three mayflies from the family Siphonuridae found in British waters. *Siphonurus lacustris*, *Siphonurus armatus* and *Siphonurus alternatus* (Large Summer Dun) are under-recorded but are likely to be found in running and standing water in localised pockets throughout the country. They emerge during the day between May and August as large, grey winged flies with two tails. These species are fairly unusual as upwing flies tend to emerge at the water surface whereas the Large Summer Dun crawls on stones at the water edge and emerges from there. Although the nymphs are superficially similar to the Baetidae, they are distinguished by the presence of elongated, pointed corners on the abdominal segments of the Siphonuridae. The only other mayfly with these pointed corners is *Ameletus inopinatus* (family Ameletidae). This is a northern species that is found in running water, often at altitudes of 300 metres and above.

The final mayfly from the British Isles is also the rarest that is still known to be present.

*Potamanthus luteus* (the Yellow Mayfly) is a medium-sized mayfly that can be found in only two rivers: the River Wye, Herefordshire and River Usk, Monmouthshire.

#### Collection, Preservation and Identification.

Larval Ephemeroptera are easy to collect. Kick sampling, the disturbance of the bed of a watercourse or waterbody, is the most efficient method in running water, whilst in standing water a net can be swept through submerged vegetation or the substrate can be disturbed and the net swept through the disturbed water. Adult Ephemeroptera can be collected by examining, or beating bankside trees and other vegetation. Alternatively, adults can be caught as they swarm near the water. For species that are attracted to light, traps designed for capturing moths can be used.

Both larvae and adults are best preserved in Isopropyl alcohol, which is available from most chemists. The specimen should be marked clearly with the location, date and grid reference where the specimen was collected and the



collector's name.

APPENDIX I

The identification of British and Irish Ephemeroptera is covered by two scientific publications by the Freshwater Biological Association. These taxonomic keys provide the information required to successfully identify most of the British Ephemeroptera. They include extensive notes on life-cycles and ecology. It should be noted that there have been some recent revisions and additions to the British Ephemeroptera that are not noted in the FBA keys. The Ephemeroptera Recording Scheme can provide further information on the identification of the British Ephemeroptera and is willing to provide limited assistance with the identification of specimens, which should be sent preserved in alcohol. It would be appreciated if collectors would contact the scheme before sending any specimens for identification.

**Ephemeroptera Recording Scheme**  
c/o Craig Macadam, 109 Johnston Avenue, Stenhousemuir, Larbert, FK5 4JY.  
Email: info@ephemeroptera.org.uk  
Tel: 07786 631369.

**Identification keys**  
Elliott, J.M. & U.H. Humpesch (1983): A key to the Adults of the British Ephemeroptera with notes on their ecology. Scientific Publications of the Freshwater Biological Association No. 47, 101pp.  
Elliott, J.M., U.H. Humpesch & T.T. Macan (1988): Larvae of British Ephemeroptera: a key with ecological notes. Scientific Publications of the Freshwater Biological Association No. 49, 145pp.  
Both available from: The Freshwater Biological Association, The Ferry House, Far Sawrey, Ambleside, CUMBRIA, LA22 0LP. Telephone: 015394 42468

**Collection Equipment**  
EFE and GB Nets, PO Box 1, Bodmin, Cornwall, PL31 1YJ. Tel/Fax 01208 77400  
Website: www.gbnetts.info  
Email: sales@efe-uk.com  
See the NEWS pages in this issue for further details.

Craig Macadam is a water quality specialist who runs the National Ephemeroptera Recording Scheme.  
He collaborates with four other experts (from the Natural History Museum, the John Spedan Lewis Trust and Liverpool Museum) to deliver workshops to promote the identification and surveying of river flies by anglers. The workshops are described elsewhere in this issue.

UPWING FLIES (Ephemeroptera)  
ADULT FLY IDENTIFICATION AND NYMPH EMERGENCE TABLES

3 Tails/Large Hindwings

Species	Common Name	Habitat	J	F	M	A	M	J	J	A	S	O	N	D
<i>Ephemera danica</i>	Mayfly	Both												
<i>Ephemera lineata</i>	Mayfly	River												
<i>Ephemera vulgata</i>	Mayfly	River												
<i>Potamanthus luteus</i>	None	River												
<i>Leptophlebia marginata</i>	Sepia Dun	Both												
<i>Leptophlebia vespertina</i>	Claret Dun	Both												
<i>Paraleptophlebia cincta</i>	Purple Dun	River												
<i>Paraleptophlebia submarginata</i>	Turkey Brown	River												
<i>Paraleptophlebia wernerii</i>	None	River												
<i>Habrophlebia fusca</i>	Ditch Dun	River												
<i>Ephemerella ignita</i>	Blue Winged Olive	River												
<i>Ephemerella notata</i>	Yellow Evening Dun	River												

3 Tails/No Hindwings

Species	Common Name	Habitat	J	F	M	A	M	J	J	A	S	O	N	D
<i>Brachycercus harrisellus</i>	Angler's Curse	River												
<i>Caenis beskidensis</i>	Angler's Curse													
<i>Caenis horaria</i>	Angler's Curse	Both												
<i>Caenis luctuosa</i>	Angler's Curse	Both												
<i>Caenis macrura</i>	Angler's Curse	River												
<i>Caenis pseudorivulorum</i>	Angler's Curse													
<i>Caenis pusilla</i>	Angler's Curse	River												
<i>Caenis rivulorum</i>	Angler's Curse	River												
<i>Caenis robusta</i>	Angler's Curse	Both												

2 Tails/No Hindwings

Species	Common Name	Habitat	J	F	M	A	M	J	J	A	S	O	N	D
<i>Cloeon dipterum</i>	Pond Olive	Both												
<i>Cloeon simile</i>	Lake Olive	Both												
<i>Procloeon bifidum</i>	Pale Evening Dun	River												

2 Tails/Large Hindwings

Species	Common Name	Habitat	J	F	M	A	M	J	J	A	S	O	N	D
<i>Siphonurus armatus</i>	Large Summer Dun	Both												
<i>Siphonurus lacustris</i>	Large Summer Dun	Both												
<i>Siphonurus alternatus</i>	Large Summer Dun	Both												
<i>Ameletus inopinatus</i>	Large Summer Dun	Both												
<i>Arthroplea congener</i>	None	River												
<i>Ecdyonurus dispar</i>	Autumn Dun	Both												
<i>Ecdyonurus insignis</i>	Large Green Dun	River												
<i>Ecdyonurus torrentis</i>	Large Brook Dun	River												
<i>Ecdyonurus venosus</i>	Late March Brown	River												
<i>Electrogena affinis</i>	None	River												
<i>Electrogena lateralis</i>	Dark Dun	Both												
<i>Heptagenia longicauda</i>	None	River												
<i>Heptagenia sulphurea</i>	Yellow May Dun	Both												
<i>Kageronia fuscogrisea</i>	Brown May Dun	Both												
<i>Rhithrogena germanica</i>	March Brown	River												
<i>Rhithrogena semicolorata</i>	Olive Upright	River												

2 Tails/Small Hindwings

Species	Common Name	Habitat	J	F	M	A	M	J	J	A	S	O	N	D
<i>Alainites muticus</i>	Iron Blue Dun	River												
<i>Baetis buceratus</i>	None	River												
<i>Baetis fuscatus</i>	Pale Watery Dun	River												
<i>Baetis rhodani</i>	Large Dark Olive	River												
<i>Baetis scambus</i>	Small Dark Olive	River												
<i>Baetis vernus</i>	Medium Olive	River												
<i>Labiobaetis atrebatinus</i>	Dark Olive	River												
<i>Nigrobaetis digitatus</i>	None	River												
<i>Nigrobaetis niger</i>	Iron Blue Dun	River												

2 Tails/Tiny Spur Hindwings

Species	Common Name	Habitat	J	F	M	A	M	J	J	A	S	O	N	D
<i>Centroptilum luteolum</i>	Small Spurring	Both												
<i>Procloeon pennulatum</i>	Large Spurring	Both												

The flies above are expected to emerge in the months shown, however local variations and weather conditions may affect the emergence of some species.

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