THE FOX AND HOUNDS
COUNTRY HOTEL

Catching the Bug

By Matt Lane

ONE OF THE FEW THINGS I love about fly fishing is that there is always something new to learn. A new fishing technique, a new water type, the unachievable mastery of fly tying. Every topic offers a bottomless opportunity for exploration and discovery that often becomes a passion. And the bug that has bitten me most recently is entomology.

Before taking on The Fox and Hounds Country Hotel, I had little experience of small-stream fly fishing. Every day was an opportunity to learn a bit more about the water, small-stream techniques, the fish, and the ecosystem. But until recently, I was quite happy to spot 'a green fly' or 'a grey fly' and tie on something that matched. It wasn't until I learned that different invertebrates have different tolerances to pollution and started to wonder 'do we have any of those sensitive ones on the Taw?' Then the compulsion began.

Ephemera Danica

Setting goals – and changing them

At first, identifying the individual species of our local invertebrates sounded like a reasonable goal. Between Tom and I, we're on the water almost daily and well positioned to note the different bugs, trends, and changes throughout the season. Once we started though, it became clear that this entomology lark can be hard. In

some cases, very hard. To simplify things, we revised the goal to initially identifying just the species of mayfly on our bit of the Taw.

In the UK there are generally considered to be around 52 species of mayfly (although one of the early things you discover with entomology is that nothing is ever static or absolute, and no two sources seem to agree).

Of these species, current records suggest we likely have roughly half that number on the Taw.

Pairing it down, we get a list of 24 species to find, identify, and confirm (plus a few extras that we might expect to see in this part of the country).

Ecdyonurus torrentis - at different stages of molt

That doesn't seem too bad. Of course, each one has three separate stages of development and two sexes which can look quite different, so that's closer to 150 morphologies to be familiar with. And most of them are tiny. Gills, foot segments and wing veins are tough to see on insects that are often 8mm or less. Add to this that colours and feature definitions continually change throughout most of their life cycle and you can start to see the problems with getting a confident confirmation.

For us, confirmation means obtaining photographs that clearly show diagnostic features and verified up by expert opinion where there's uncertainty. We don't want to harm the insects during identification, so everything is done with live specimens in the field, which adds another layer of difficulty.

Pollution Sensitivity

The pollution sensitivity of invertebrates and their presence in our system can provide an indication of river health, particularly when looked at over time. Each species (or in some cases, family, or genus) is assigned a pollution sensitivity score. The most widely used system is the Whalley-Hawkes-Paisley-Trigg Index (WHPT), often paired with ASPT (Average Score Per Taxon), which helps standardise scores across samples with different numbers of taxa. These scores, combined with records and publications

documenting the species in our area, give us the framework to set about answering our key question.

At the very top of the sensitivity tables we have March Browns, Olive Uprights and Large Brook Duns. Our Green Drake, *Ephemera danica* is another sensitive species but it tolerates fine sediment better than many higher scoring species, moving it a bit lower in the table.

March Brown (spinner)

Olive Upright (spinner)

Large Brook Dun

Brachycercus harrisellus is even lower scoring despite being considered a valuable indicator species. Because the Caenidae family of mayflies are often difficult to identify reliably to species level, records may be grouped into broader, generally more pollution-tolerant categories. So our tables are a useful guide, but not a bible. In any event, *B–harrisellus* is definitely a species we would like to find as an indicator of good river health.

Identification Quick Wins

A big part of identification is elimination, at least at the level we're working at. If we can quickly discount all the things a specimen isn't, it's much easier to focus on a few comparative features to get a positive identification. For example, we don't need to worry about all 3,000-plus mayfly species worldwide - or even all 52 British species - if we can confidently rule most of them out geographically. Time of year, size, eye colour, wing colour/shape, and number of tails are just as useful for elimination as they are for identification.

Our Green Drake (E. danica) - shown here - is a case in point. Visually, it can only realistically be one of three species in the UK, and with the other two absent locally, identification becomes easy.

Another quick win is the Yellow May Dun (H. Sulphurea), a bright yellow medium sized mayfly that appears from May onwards. Since there aren't any other bright yellow mayflies in the area, we can name this with a high degree of confidence, even from a distance.

Some nymphs are equally distinctive. Turkey Browns (P. submarginata) have unmistakable paired strap-like gills, with the first pair noticeably shorter. Likewise there is nothing remotely similar to the nymph of the Ditch Dun and its branching filament-like gills.

Yellow May Dun

Turkey Brown nymph

Ditch Dun nymph

With each mayfly we identify, we eliminate it from the pool of unidentified insects in our list and focussing our efforts on a more limited number of targets.

Easy-*ish* Wins

Not all species are as obvious as the Green Drake or Yellow May dun, but the more you observe, the easier it becomes to identify different species. Many anglers can probably identify a Blue Winged Olive nymph (*S–ignita*) from its leg and tail banding, gill placement, and distinctive swimming motion. As adults, the three banded tails, large hindwings and red eyes of the males make them similarly recognisable (although they can sometimes be confused with the less common Ditch Dun).

Less well-known species like the Turkey Brown are also distinctive as duns, with their dark mottled wings and three tails, and again become obvious with a bit of practice.

Blue winged Olive dun

Turkey Brown dun

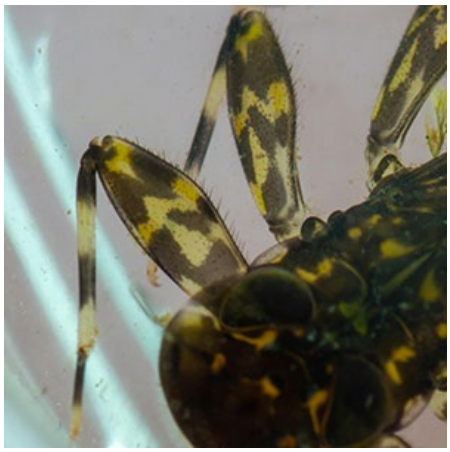
Probably This... But Possibly That

More often we can narrow specimens down to two or three likely candidates. March Browns and Olive Uprights are a perfect example - they're among the most pollution-sensitive species, and encouragingly we seem to have plenty of both on the Taw.

Finding the nymphs is easy enough. Turn over almost any rock in the river and you'll find plenty of big (10-14mm) chunky, flat headed rock clingers (*Heptageniidae*), especially in the spring months. If the nymph has a thick, jelly-like neck, it's not what we want. Nymphs with a pronotum extending down toward the thorax are Ecdyonurus and will turn into our Large Brook Duns and Late/False March Browns.

If the pronotum doesn't extend backwards, but the femurs of the legs have a kind of "W" pattern on them and short thick hairs, with no black marking near the claw, discount these as well, as they'll be our Yellow May Duns. What we're looking for are slimmer looking nymphs with a distinctive pale patch on the femur containing a dark central dot (see image below on the right). If we see this, Bingo – sort of...

Highlighting pronotum



Heptagenia sulphurea nymph

Highlighting black dot on femur

We know we've found the nymph of either a March Brown (*Rhithrogena germanica*) or an Olive Upright (*R–semicolorata*), but there is no visual characteristic that can confirm which it is, even under a microscope.

Fortunately, adults are easier. That little dark dot on the femur persists throughout the entire life cycle, so you'll see it on duns and spinners. Duns with the characteristic dot on the leg and mottled wings are your March Browns, while slightly smaller, lighter bodied duns and plain grey-ish wings will be your Olive Uprights.

March Brown dun

Olive Upright dun

As spinners, Olive Uprights develop a beautiful dark copper sheen near the base and leading edge of the forewing, distinct from the transparent wing of the March Brown.

There are many instances of being able to narrow down to a few possibilities, which can be both exciting and frustrating. It does however force one to look very closely at the differences. For example, the main difference between The Iron Blue and Southern Iron Blue is that one has three veins in its hind wing, while the other has two. So far, we've only been able to find Iron Blues – so if anyone spots a two veined Baetis niger, let us know!

Iron Blue dun

Too Close to Call

Some species simply can't be separated visually at certain stages. Like the Rhithrogena nymphs, female *Baetis scambus* and *B–fuscatus*, are effectively indistinguishable without DNA analysis. Thankfully, the males make life easier, with either red-orange or bright yellow eyes.

Baetis scambus male

Baetis fuscatus male

The baetid nymphs are another challenge. Many identification keys rely on microscopic features like mandibular ridges or tiny structures around the genitalia. Phone cameras are remarkably capable now, but they still aren't quite enough for that level of detail. We can look at tail length, banding, gill details, distance between antennae and other features to try and narrow the possibilities, but with such small specimens, such calls can be subjective. Comparison is sometimes easier when looking at subjects side by side, so a sample containing many specimens is useful, but it is often easier to look at the adult stages for confirmation.

We've found some Caenidae nymphs, but these are seriously small, sometimes measuring only 3-4mm when mature. We'll likely leave identification towards the end of the project – although there is a 5x extreme macro lens I've had my eye on 😉

Early Days

We've been able to confirm for ourselves that the many of the most pollution sensitive mayfly species are present on the Taw. While we haven't finished verifying

all the species in our list, and our methods are far from scientific, it's an encouraging sign. It also provides a foundation for future observations, particularly with respect to changes that we might see in future years.

It's been an interesting journey so far and we've learned a lot over the past year. There's plenty to keep us busy as we work towards our original goal, and like all fly fishing interests, plenty of gear in our wish list!

Each discovery opens another door and leads deeper into this complex and amazing world. It's fascinating, occasionally frustrating, and endlessly rewarding. And incredibly, it's all just there, right on our doorstep.

Photography and words © Matt Lane

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