Guides to British midges

KEYS TO THE ADULT MALE CHIRONOMIDAE OF BRITAIN AND IRELAND by P.H. Langton and L.C.V. Pinder. Freshwater Biological Association Special Publication (SP) 64. Published in 2 Volumes, including a special supplement identifying sixteen species recently recorded from Britain and Ireland. 2007, Volume 1, 240 pp., Volume 2, 168 pp. ISBN 978-0-900386-75-6; ISSN 0367-1887. £50.00

The Freshwater Biological Association of the United Kingdom has a long and honourable role in publishing identification guides to the British freshwater biota, both flora and fauna. Despite the vicissitudes of funding and government support (or lack thereof) for facilities over the past decade, this FBA tradition continues apace. Not only are new works commissioned and brought to the special publications series, but many of the older ones are updated. From my perspective, what is most impressive is the dedication to making difficult and obscure groups available to the ecologist, and perhaps also to the interested lay person – and we all have some interest in our freshwaters, the biota, and their conservation for both aesthetic and utilitarian purposes. Amongst the more difficult groups is the Chironomidae (Diptera) or non-biting midges, which despite or because of their small size are tempting to overlook, but because of their abundance and diversity ‘ought’ to considered. Their larvae, which include the ‘bloodworms’ as a small part of their diversity, are ubiquitous in freshwater, and are encountered wherever there is any biota, from sewage lagoons to pristine upland tarns and streams. Despite this, incorporation of these insects into species-level aquatic studies can be time-consuming, or impossible — too few have been reared to the more readily identifiable pupa or adult male, and discrimination between closely-similar but ecologically different taxa may remain elusive. None-the-less the FBA does still make available a guide to the larval stage for one important subfamily, the Orthocladiinae, produced by a then novice (Cranston, 1982). The general level of identification of larvae to likely composite groups (notably genus) as a surrogate measure for lower level taxa is widespread and has something to recommend it, both in theory and in practice.

However for water quality monitoring, and increasingly for biodiversity estimation that requires species identification, the pupal stage has its advocates, as being easier to sample (via floating or trapped skins, exuviae), easier and quicker to handle (low power microscope work to separate from minimal contaminants) and less difficult to identify, being highly patterned and with much morphological differentiation. In continental Europe, August Thienemann, Lars Brundin and Sepp Fittkau, and their students, showed the value of the ‘exuvial technique’ in both ecological and systematic studies. In North America, Sam Roback and Bill Coffman and his students advocated the technique for biodiversity studies, and for water quality monitoring purposes. In Britain Ron Wilson was an early advocate, who produced user-friendly guides of great value to those testing (and sometimes adopting) the technique in monitoring British waters. Subsequently Les Ruse placed the technique in the ‘mainstream’ suite of sampling techniques for British and eventually European mandated requirements to inventory and monitor biological attributes of surface waters. But this activity can only take place with a means of identifying the exuvial haul – and recently the FBA replaced previous ‘samizdat’ xeroxes of decades-old guides with their Special Publication number 13, a guide to the exuviae of the common genera of Chironomidae of Northern Europe. Accompanied by a concise outline of protocols for the exuvial technique, there is now little excuse not to identify this stage of the diverse Chironomidae and incorporate them into monitoring efforts.

An advantage for the systematist, and perhaps also for the enlightened ecologist or biomonitoring personnel, is that the spent skin, the exuviae or ‘shuck’ of an aquatic insect, may contain an unemerged adult insect. Such an unemerged (pharate) or part-emerged, yet still associated, adult provides critical linkage between the two stages, without the laborious need to rear. A variable, but sometimes quite high proportion of intercepting drifting chironomids, either in flowing waters, or wind-driven to a lake shore, fail to emerge. Since adult chironomids are the stage on which traditional nomenclature has been based, here we have had a perfect means of getting species names onto the distinctive pupal stage. That is, if we have guidance on the identification of the adults – or at least one stage, the male. Prior to 1978 we used Edwards (1929), updated and expanded in Coe, Freeman & Mattingly (1950), but these guides increasingly were at odds with the growing continental European classification into smaller, more homogeneous and ecologically-coherent genera, often based on integration of morphological data from the immature stages as well as the adult males. Recognising these two problems (the need for reliable adult identification and mismatch of generic concepts across the Channel), FBA ecologist Clive Pinder, ably assisted by artist Angela Matthews, undertook the task of reconciling the systems, teasing out the correct generic allocations and species nomenclature, producing workable and comprehensive keys, illustrated by salient features for species-level identification of all the then-known British Chironomidae. And thus the FBA first published a key to adult males of British Chironomidae by Clive Pinder in 1978 as their Scientific Publication 37. Why males? Well it is all about genitals – the hypopygia of Chironomidae, as is so often the case for Diptera, are highly species-specific, whereas the females show much less diagnostic variation. Pinder’s treatment included use and illustration of features from all over the male body in the keys, with a standardized drawing of one half of the male hypopygium provided in a stand-alone section, for confirmation of the keyed identity.

A quarter of a century later, a completely new edition results from a decade-long collaboration between Clive Pinder and Peter Langton – in the form of FBA Special Publication number 64. Interestingly Langton’s knowledge of the adults, though substantial, is dwarfed by his expertise concerning the pupal stage, for which he is the northern hemisphere expert. His advocacy of the use of exuviae in all fields of aquatic study, is exemplified by the numerous species (and quite a few genera) that have been added to the British list through his unpaid work. This new publication
identifies males of 591 species from the British Isles, compared with 439 species in the 1978 key, an increase of one-third. To assist with this much increased national inventory, the authors list the 140 included genera to guide and orientate the user when working through the numerous keys to genera and species. Furthermore, the index acts also as a comprehensive checklist for species where adult males have been recorded from the British Isles. To accommodate this increased number of species, the authors provide nearly 1400 individual line drawings arranged in 276 text-figures, with the (half-) hypopygial figures hosted in a second volume (which is sold with the first as a bundle). As in the 1978 version, Angela Matthews’ illustrations, with some supplementation by Peter Langton, epitomise the focus on the diagnostic, without extraneous detail – they have always really worked for me, although now I tend to add perhaps spurious detail of microtrichiation (perhaps as a displacement activity?).

Inevitably during the production of a work such as this, spread over many years, taxa new to the country continued to be found, perhaps spurred on by the imminent production of this guide. Rather than refer only to the existence of these records in footnotes, or constantly rewriting the keys and rearranging the illustrations, the authors instead have added a supplement to Volume 2 with information and figures to allow identification of 16 ‘newly-recorded species’. It works for me!

The now near 600 species of Chironomidae documented from U.K. represents an unknown fraction of the global biota, but probably is amongst the longest of lists for any one country, exemplifying that intensity of sampling produces this biodiversity ‘signal’. Our colleagues’ researches in the Neotropics suggest we can expect much more from tropical flowing waters – but guides such as those reviewed here from the FBA are yet to be produced.

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References