

NOTES ON *HEPTAGENIA LONGICAUDA* (STEPHENS, 1835)
(EPHEMEROPTERA: HEPTAGENIIDAE)

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Heptagenia longicauda (Stephens, 1835) is a thermophilic species of Pontic origin and as a result, populations of this species are strongest in the south of Europe. In the United Kingdom, at the edge of its northern range, *H. longicauda* is listed on the UK Biodiversity Action Plan as a priority species.

Most recent accounts of this species list three British records. In 1868, the Reverend A.E. Eaton collected a subimago from near the Kennet and Holybrook by Reading. A female specimen was collected from near the Thames at Staines by E.E. Austen on the 19.v.1904, whilst the most recent specimen, a male subimago, was collected on 28.v.1933 by D.E. Kimmins from a young birch tree, close to the River Wey between Tilford and Elstead. There is however, a further British record. J.F. Stephens first described and named *Baetis longicauda* in 1835 from a specimen he collected near Hertford in mid-June. This additional record is relatively remote from the other known records being to the north east of London, rather than to the south west.

Historically, there has been confusion over the taxonomy and nomenclature of *Heptagenia longicauda*. Kimmins (1942) finally clarified the situation; however any supposed specimens of *H. longicauda* collected before this time should be treated with caution. A male specimen from the JJFX King collection housed in the Zoology Museum at Glasgow University was re-examined in 2001 and found to be *Ecdyonurus venosus* (Fabricius, 1775). It is likely that three female specimens taken by King during the same year are also *E. venosus*.

Recent studies (Teufert, 2001) on *Heptagenia longicauda* have shown that the larvae are found on submerged bankside vegetation in the riffles and shallows of lowland rivers, particularly in areas of low current. As a result, mature nymphs are easily collected by hand from aquatic vegetation from May onwards. The larvae feed on periphyton and organic detritus that they gather from the substrate or scrape from submerged surfaces. It was previously thought that populations of *H. longicauda* and *H. sulphurea* (Müller, 1776) did not co-exist; however it is now understood that these species do occur together, although *H. longicauda* tends to avoid watercourses where there are large populations of *H. sulphurea* (Haybach, A., pers. comm.). It is likely that where these species do occur together, they occupy distinct micro-habitats and competition between the two species is negligible.

In Europe, the flight period of *H. longicauda* is May to September, although in warm weather specimens have been collected as late as October. British specimens have been taken in late May and early June. Sub-imagines begin to emerge around sunset and continue to emerge

whilst there is any light. In Germany, swarms of imagines have been observed up to 22:30hrs when darkness prevented further observations. It is possible that swarming continues after this time. The imagines form loose swarms of approximately 50 individuals over bridges and other prominent bankside markers. The adults are positively phototactic and can be attracted to a mercury vapour light trap. On calm nights adults have also been observed gathering around bankside lights.

Although *H. longicauda* has not been recorded from British waters during the past 70 years, it may be surviving overlooked in some watercourses. All previous records are of adults; however current recording effort is biased towards the collection of larvae. Whilst the current key to the larvae of the British Ephemeroptera (Elliott, Humpesch and Macan, 1988) makes the distinction clearer between *H. longicauda* and *H. sulphurea*, the distinguishing feature used, the filamentous part of the gills, is often lost or damaged during collection. To ensure the correct separation of *H. longicauda* and *H. sulphurea* the following couplets, taken from Sowa (1971) should be used to confirm any identification.

- 1 Cerci banded with black and yellow. *H. sulphurea*
 — Cerci not banded 2
- 2 Labrum broad; pronotum without conspicuous protuberances . . . *H. flava* (not British)
 — Labrum wide (as *H. sulphurea*); pronotum with conspicuous protuberances.
 *H. longicauda*

Adult specimens of *H. longicauda* can be identified using Elliott & Humpesch (1983).

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REFERENCES

- Bratton, J.H., 1990, A review of the scarcer Ephemeroptera and Plecoptera of Great Britain, *Research and survey in nature conservation* No. 29, 39pp.
- Eaton, A.E., 1888, A revisional monograph of recent Ephemeridae or mayflies, *Transactions of the Linnean Society of London (Zoology)*, 3: 1-152.
- Elliott J.M. & Humpesch, U.H., 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., Humpesch, U.H. & Macan, T.T., 1988, Larvae of the British Ephemeroptera: A key with ecological notes, *Scientific Publications of the Freshwater Biological Association* No. 49, 145pp.
- Kimmings, D.E., 1933, *Ephemerella notata* Etn. and *Heptagenia flavipennis* Duf. (Ephemeroptera) in West Surrey, *Entomologist*, 66: 165-166.

- 1942, Notes on Ephemeroptera, *Entomologist*, **75**: 121–125.
- Macan, T.T., 1953, Ephemeroptera – An appeal for material, *Entomologist's Gazette*, **4**: 78.
- 1958, Descriptions of the nymphs of the British species of *Heptagenia* and *Rhithrogena* (Ephem.), *ibid.*, **9**: 83–92.
- Sowa, R., 1971, Note sur les deux espèces de la famille Heptageniidae des Carpathes polonaises (Ephemeroptera). *Acta Hydrobiologica, Kraków*, **13**(1): 29–41.
- Stephens, J.F., 1835, Illustrations of the nymphs of British Entomology, *Mandibulata*, **6**: 53–70, pl. 29.
- Teufert, K., 2001, Neuere Untersuchungen und Nachweise von *Heptagenia longicauda* (Stephens, 1835) (Insect: Ephemeroptera) aus dem Leinegebiet der Landkreise Hannover – Hildesheim, *Veröffentlichungen der Gesellschaft für Umweltschutz Langenhagen*.

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REVIEW

'KATYDIDS AND BUSH-CRICKETS, REPRODUCTIVE BEHAVIOUR AND EVOLUTION OF THE TETTIGONIIDAE' By DARRYL T. GWYNNE. Cornell University Press, Ithaca, New York. [www.cornellpress.cornell.edu]. 317pp. 24 plates. Hdbk. ISBN 0-8014-3655-9. 2001. £27.95.

As stated on the dust cover, this volume in the Cornell series in Arthropod biology describes the diversity and biology, ecology, mating patterns and courtship, feeding, sexual selection, communication and evolution of sexual differences in the Tettigoniidae. The book covers these aspects of orthopteroid biology with the support of well-written text, numerous figures and well-chosen references (many of which pertain to Gwynne's own research).

In the preface, Gwynne justifies the need for the book, stating that the Tettigoniidae is a big family (c.6,000 species) with members on every continent apart from Antarctica and that it is a family that has attracted the attention of taxonomists and animal behaviourists. Because the males call for their mates, these insects make ideal subjects for the study of sexual selection. However, they do not seem to be as well-known to the general public as other orthopteroids (such as grasshoppers), possibly because as a group they have lacked a truly popular name: Gwynne discusses the etymology of the terms 'bush-cricket' (British) and 'katydid' (American).

The first chapter starts with a fascinating historical account of Mormon cricket swarms in the United States, continues by describing variations in mating behaviour in the species and ends by asking some biological questions about such variation. Chapter 2 describes the life-cycles, feeding and economic importance of tettigoniids. Chapter 3 reviews classification, phylogeny and diversity. Chapter 4 reviews predation and population regulation. Chapters 5 to 9 cover different aspects of the reproductive behaviour of bush-cricket, including song, mate choice and the dangers of eavesdropping flies and bats. In Chapter 9 Gwynne discusses the special value of tettigoniids as models for understanding sex differences, courtship role reversal and Darwinian approaches to sexual selection and answers questions posed at the end of the first chapter. There is an appendix listing all the tettigoniids mentioned in the book and references. Monochrome figures appear regularly in the book and there are also 4 sides of 14 attractive and annotated colour plates.

What the reader receives in this attractively presented and reasonably priced hardback is a comprehensive account of tettigoniid reproductive and evolutionary biology, as well as a good read to boot. It will be of value both to general biologists and to orthopterists. — JOHN PAUL.