

## The invasive Ponto-Caspian mysid, *Hemimysis anomala*, reaches the UK

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### Abstract

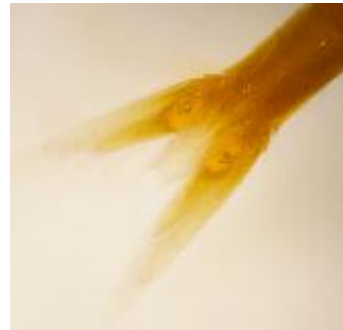
The invasive Ponto-Caspian mysid crustacean *Hemimysis anomala* has been recorded for the first time in the UK in November 2004, and in 2005 at a number of sites in the English Midlands. It occurs in both lentic and lotic environments, including the margins of the relatively fast-flowing River Trent, and large swarms have been observed in one lake. It is not known how the mysid reached the English Midlands, although one site hosts international rowing events.

*Key words:* mysid, crustacean, *Hemimysis anomala*, first record, UK

### Introduction

Until now only two mysid crustaceans that enter freshwater, i.e. *Mysis relicta* and *Neomysis integer*, have been reported from the British Isles. *M. relicta*, a true freshwater species, has only been recorded from Ennerdale Water in N.W. England, and is now scarce or may even be absent, although it is commonly found in Irish lakes and rivers (Gledhill et al. 1993). *N. integer*, is a brackishwater species, but can survive long periods in freshwater, and is occasionally recorded in that environment near the sea.

Recently, in 2004-2005, specimens of a mysid were found in Nottinghamshire in the English Midlands. Initially it was thought that they belonged to one of the aforementioned species, but subsequent examination revealed that they did not fit the descriptions given (Fitter and Manuel 1995), as the end of the telson was truncated and denticulate (Figure 1). Specimens were sent to The Natural History Museum in London, where they were identified as *Hemimysis anomala* G.O. Sars, 1907 (Figure 2). This is the first record for the UK, and most likely for the British Isles.



**Figure 1.** Uropods of *Hemimysis anomala* (showing the statocysts) either side of the truncated, denticulate telson (photo: M Winter and L Rippon)



**Figure 2.** Dorsal view of *Hemimysis anomala* (photo: M Winter and L Rippon)

## Distribution

Two specimens were initially found in net samples taken during routine sampling by the Environment Agency in the Erewash Canal, which empties into the River Trent, in November 2004. Second, numerous specimens were found swarming around jetties projecting into the 2000 m rowing lake at the National Water Sports Centre in May 2005, and a subsequent visit to the lake in June 2005 revealed large swarms of the mysid, which were particularly prevalent in the evening hours. The two sites are several kilometres apart but are linked by the River Trent.

Subsequent studies undertaken by R. Stubbington in August-October, 2005 have shown it to be more widespread in Nottinghamshire, occurring in the River Trent in Nottingham, Gunthorpe and Stoke Bardolph, as well as the Beeston Canal at Beeston Rylands, Erewash Canal upstream of Trent Lock, and the Trent and Mersey Canal at Shardlow. In most of these new sites, the mysids have been found at low densities in crevices between boulders and under hard surfaces at night using torchlight. It has been shown to be able to occupy both lentic and lotic environments, including the margins of the relatively fast-flowing River Trent.

## Discussion

*Hemimysis anomala* originates from the Black and Caspian Seas, but was introduced into the former Soviet Union (including Lithuania) as fish food, from where it had subsequently spread to the Baltic by the late 1990s, Finland by 1992, R. Rhine in Germany by 1997, the Netherlands by about 1998, Belgium by 1999, and more recently into Scandinavia.

Between 1981 and 2005 only five scientific papers were produced on *Hemimysis anomala* (J Dick, personal communication), despite the impact it can have on zooplankton and phytoplankton populations. Adults are between 5.5-12.5 mm in length, and may be deep red to an

ivory-yellow in colour. According to one study (Anon 2005) they are protandrous hermaphrodites (changing from male to female), and have a low fecundity with a maximum of 30 eggs being produced per female. They can tolerate a wide range of salinities as well as freshwater, and undergo diurnal vertical migration. The most detailed study was carried on a population in a freshwater storage reservoir in The Netherlands (Ketelaars et al. 1999), and subsequent laboratory studies showed *H. anomala* to be a voracious predator as well as an omnivorous feeder.

Further studies need to be carried out to monitor its impact and to assess the extent of the distribution of *H. anomala* in UK waters. It is not known whether it was deliberately introduced into the English Midlands, or whether it was brought in with foreign boats used in the rowing centre, or by some other means. Studies by Rachel Stubbington (HA212150@ntu.ac.uk) are ongoing in Nottinghamshire and surrounding regions.

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## References

- Anon (2005) Mysid shrimp or opossum shrimp. Retrieved from <http://www.aquaria.se/eng/mysisraka.htm> on 10 June 2005
- Fitter R and Manuel R (1995) Collins Photo Guide. Lakes, Rivers, Streams & Ponds of Britain & North-West Europe. HarperCollins Publishers, Hong Kong, 382 pp
- Gledhill T, Sutcliffe DW and Williams WD (1993) British Freshwater Crustacea Malacostraca: a key with ecological notes. Freshwater Biological Association Scientific Publication No. 52, Ambleside, 173 pp
- Ketelaars HAM, Lambregtsvan de Clundert FE, Carpentier CJ, Wagenvoort AJ and Hoogenboezem W (1999) Ecological effects of the mass occurrence of the Ponto-Caspian invader, *Hemimysis anomala* G.O. Sars, 1907 (Crustacea: Mysidacea), in a freshwater storage reservoir in the Netherlands, with notes on its autecology and new records. *Hydrobiologia* 394 (1): 233-248

**Annex**Records of *Hemimysis anomala* in the United Kingdom in 2004-2005\*

Location	Geographic coordinates		Record date	Species abundance	Collector
	Latitude, N	Longitude, W			
Erewash Canal, Trent Lock	52° 52.51'	1° 16.30'	18.11.2004	2 individuals	L. Rippon
Holme Pierrepont	52° 56.47'	1° 05.66'	15.05.2005	>100 ind./m3	S. Gallagher
Holme Pierrepont	52° 56.47'	1° 05.66'	17.06.2005	>100 ind./m3	D. Holdich
River Trent, Nottingham	52° 56.48'	1° 07.90'	13.10.2005	10-50 individuals	R. Stubbington
River Trent, Gunthorpe	52° 59.18'	0° 58.79'	17.10.2005	10-50 individuals	R. Stubbington
River Trent, Stoke Bardolph	52° 54.42'	1° 02.18'	17.10.2005	10-50 individuals	R. Stubbington
Beeston Canal, Beeston Rylands	52° 55.02'	1° 11.50'	18.10.2005	10-50 individuals	R. Stubbington
Erewash Canal, u/s Trent Lock	52° 52.92'	1° 16.65'	11.10.2005	10-50 individuals	R. Stubbington
Erewash Canal, u/s Trent Lock	52° 52.74'	1° 16.52'	11.10.2005	10-50 individuals	R. Stubbington
Erewash Canal, u/s Trent Lock	52° 52.49'	1° 16.31'	11.10.2005	10-50 individuals	R. Stubbington
Trent & Mersey Canal, Shardlow	52° 52.20'	1° 20.31'	19.10.2005	3-4 individuals	R. Stubbington

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