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Cladocera News

The Newsletter of the Cladocera Interest Group

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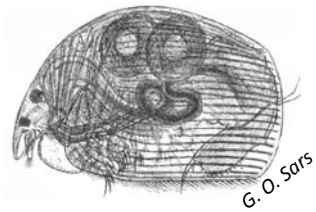

Welcome to the third edition of Cladocera News. This should have been sent out in the Autumn but is unfortunately very late due to illness, hopefully we are back on track now. My thanks to all who have sent in copy. Although we are no nearer the production of a new and comprehensive British key there are within this issue good pointers for the accurate identification of some difficult species, hopefully a trend which will continue in future issues.

Some new records have been contributed to the on line recording system and though no new users have signed up, this can still be done via the website. Some archive and literature records have been sent in by members and Paris Stefanoudis, a PhD student from UCL, has contributed the data set obtained during studies for his thesis in some Norfolk ponds for which we are very grateful. Pending the establishment of a national recording scheme for the British Isles all such records will be held and backed up securely. A 'records received' section will appear in the next Clad News.

If anyone wishes to contribute papers of interest to members which can be circulated, please read the article on page 3, but do make it clear what restrictions you wish to place on their circulation.

Please keep contributing observations, photographs, comments, articles and records, without which there can be no further editions. My intention is that Cladocera News 4 will appear as soon as we have enough material and will certainly not take as long as this last issue. Meanwhile my best wishes for a productive 2013.

Adrian Chalkley December 2012

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The Classification of Crustacea ..... a pdf download

Rodney Harmsworth sent in a link to the following paper "An Updated Classification of Recent Crustacea" by Joel Martin and George Davis of the Natural History Museum of Los Angeles County. This was published in 2001 and can be freely downloaded from the museum website.

The link for this PDF document is:
http://www.nhm.org/site/sites/default/files/pdf/contrib_science/SS-39.pdf

This link will also be added to the cladocera group website, http://www.cladocera.org.uk

We would welcome any links to other useful documents or websites you want to share with our members, please send them to website@cladocera.org.uk

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Comments Arising from Newsletter 2 ……. Adrian Chalkley

In Newsletter 2 I discussed the problems of accepting records and asked if anybody had any thoughts as to which species could be identified reliably enough not to need verification and which should be listed as problematical and would always need verification.

Judging by the small number of records sent in my thoughts may have been somewhat academic. However John Bratton made the following comments.

On Easy and problem species:

"I am reluctant to suggest a list of easy species which should always be accepted, because I have seen so many misidentifications over the years that one would never have guessed would occur. I'm not referring just to Cladocera here, but the principle applies to all natural history. I've even known Sialis be misidentified as New Forest Cicada! So I'm afraid a scheme organiser will always have to assess the competence of the recorder before accepting even Polyphemus records. Species illustrated in popular pond life books will always be prone to over-recording.

I can certainly suggest problem species. The Daphnia longispina / hyalina group is a nightmare with the added complication of D. rosea. The Daphnia pulex group is not as bad, but I find pulex and curvirostris are not always as clear-cut as the key suggests, and there is pulicaria to look out for.

Bosmina is OK if you ignore longispina.

I find Alona difficult and usually have to resort to Flossner. According to Catherine Duigan the FBA key is wrong to rely on spinules on the basal spine of the claw to separate affinis and quadrangularis so records of these need extra scrutiny."

Speaking for myself, and for many others I expect, I agree that the *D. longispina / hyalina* group is very problematic (see also Jim Green's comments on *D. parvula*). *Alona* is also a group I have to feel my way through and compare with the limited specimens I have collected. This is all very time consuming and of course the number of specimens I have is limited. All of which underlines the problems of managing to create an improved key to British species.

Whilst bemoaning my limited number of voucher specimens I remember wondering which species members had seen & which they had never encountered. John Bratton again took up this point.

"I can't remember exactly which species I have seen. Ones I've definitely never seen include:

Alona elegans	*Ilyocryptus acutifrons*
Alona protzi	*Kurzia latissima*
Alona weltneri,	*Lathonura rectirostris*
Anchistropus emarginatus	*Macrothrix rosea*
Camptocercus lilljeborgi	*Monospilus dispar*
Ceriodaphnia setosa	*Ophryoxus gracilis*
Chydorus gibbus	*Oxyurella tenuicaudis*
Daphnia parvula	*Pleuroxus denticulatus*
Disparalona rostrata	*Rhynchotalona falcata*
Dunhevedia crassa	*Streblocerus serricaudatus*
Holopedium gibberum	*Tretocephala ambigua "*

Well at least we have photos of *D. parvula* and *D. crassa* in this issue. However I would conquer with John's list except that I have seen *H. gibberum*, *D. rostrata, P. denticulus* & *T. ambigua*.

I would also add the following species which I have never seen:

Acantholeberis curvirostris	*Chydorus latus*
Acroperus angustatus	*Drepanothrix dentata*
Alona intermedia	*Ilyocryptus agilis*
Alona karelica	*Leydigia acanthocercoides*
Camptocercus rectirostris	*Pleuroxus laevis*

None of this means of course that these species are necessarily difficult to identify or rare, more a reflection on where we live and where we have been. Are some of these species on your 'not seen' list? Would comparing enough of such lists help give an up to date idea of common / rare species ? All comments welcome.

Kaiser's glycerol jelly ….. sent in by Rodney Harmsworth

Below is some information on making Kaiser's glycerine jelly which is useful for mounting Chydorids, although you can buy it from any supply house. The original formula contains phenol but I never use it.

According to the Microtomist's formulary and guide (Gray), the formula is:

Water 40 mL
Gelatin 7 g
Glycerol 50 mL
Phenol 1 g

I put the bottle on a hot plate and warm it just until it melts. Take a small glass rod dip it in the jelly and transfer to the slide. Add the chydorid straight from water on a small loop and cover with a cover slip. If the specimen is not oriented properly you can put the slide on the hot plate, warm and then move the specimen before adding the cover slip.

If you ever get the chance to visit the British Museum of Natural History there are slides of chydorids from Harding in glycerine jelly in their collections. They have a great collection of type species.

Gray cites:
Kaiser (1880), Botanisches Zentralblatt, vol 1, pp 25

Dunhevedia crassa in the Breckland Meres: Raymond Watson comments on the article in Clad News 2

John Bratton's article on *Dunhevedia* crassa in Newsletter 2 produced this response from Raymond Watson. John forwarded Raymond's email and I have reproduced it here as it contains some detail which may be of use to members seeking either to re-establish the presence of *D. crassa* in the Brecks or to find new sites for this species.

"I was given your email by Malcolm Storey (a Cladocera Interest Group member) on account of the reference to my work many years ago in respect of the records of *Dunhevedia crassa*. My work on the Breckland Meres was reported to the then Nature Conservency. My MPhil at the University of East Anglia concentrated on the seasonal cycles of invertebrates in the Meres and in particular on the ability of invertebrates to withstand the Meres drying out. I studied all taxa.

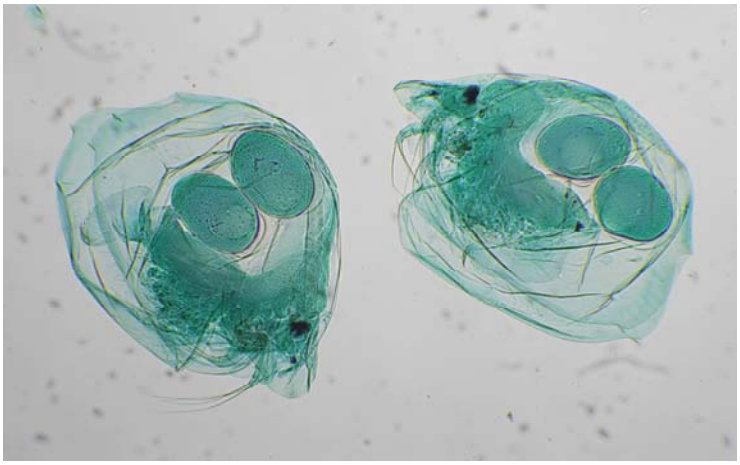
I have kept all of my slides from the Meres work and have just looked them up, I have 5 with *Dunhevedia crassa* and attach a photo from one of the best. Unfortunately only two slides are labelled with location and only one with date.

***Dunhevedia crassa*,** male

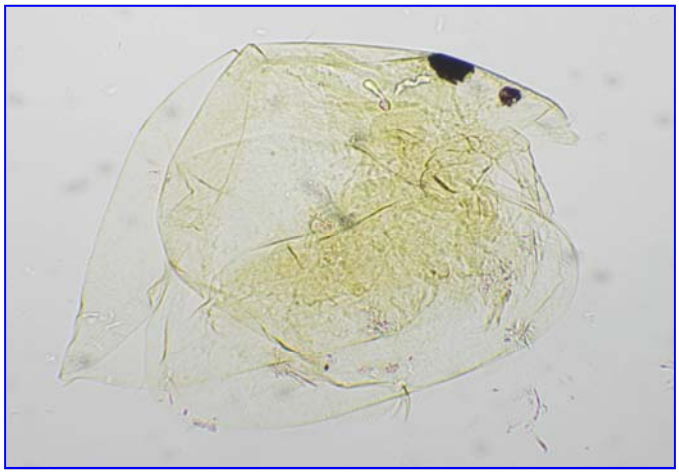
Dunhevedia crassa was universally distributed within the area of these semi-permanent Meres of the Breckland.
I spent time searching sediment from the meres in the cold room to find invertebrate resting stages and discover their viability folowing desication.

The following is a paragraph from my MPhil:-
'*Dunhevedia crassa* King ephippia were found at all the larger Meres also at the mere on Larling Heath and was hatched from Bagmore Pit mud. Ephippial females were found at Ringmere. Ephippia hatched readily in the laboratory. The ephippium is strongly and evenly thickened and is a shiny and dark or light chestnut colour. The inner membranes can usually be detected but the egg is rarely visible. The surface is irregularly and densely but very finely pitted. Its width is about half the length. Unlike many Chydoridae species' ephippia, it retains very little shape of the adult. The occurrence of this species in the Meres is the first known record of this species in Britain. The *Dunhevedia sp*. ephippium figured by Scourfield (1902) was from Australia.' "

***Dunhevedia crassa*,** adult females



***Dunhevedia crassa*,** Ringmere May 1972



All photographs by Raymond Watson recently taken from his original microslides

A Protocol to deal with Papers Received ? ..... Adrian Chalkley

One of our new members, Gerald Louette from Belgium has sent in the following paper which he has kindly donated for our archives.

Louette, G., De Bie, T., Vandekerkhove, J., Declerck, S. & De Meester, L. 2007. Analysis of the inland cladocerans of Flanders (Belgium) – Inferring changes over the past 70 years. *Belg. J. Zool*., 137 (1) : 117-123

This joins a number of other papers which have been sent in since the group was formed. We need some sort of protocol to deal with these so they can be of maximum use to our members. Obviously we have to be careful with copyright and one possibility is to give members a password so they can log in to a protected part of the site in which way downloads can be limited.

However we will need to have express permission from the authors. So in the new year we will be in touch to confirm permissions from those who have contributed papers to the group. In the meantime we welcome the donation of copies of papers for the 'archives' of the Cladocera Interest Group, but please do confirm that they may be shared freely between group members.

Hopefully newsletter 4 will contain a list of papers which by then will be on the website for download. As always your comments and ideas on this are welcome.

Records from literature sources, a suggestion from John Bratton

As has been previously pointed out the number of Cladocera records on the NBN database is rather poor in comparison to other freshwater invertebrates. Obviously there is a pressing need for more modern records to be made, however there are plenty of early records out there to be found in literature sources. It would be beneficial to collate these and it has been suggested by John Bratton that it would be useful to put a list of the literature sources that we have records for onto the website, to prevent duplication of effort.

To start this off John has sent in records of 11 species recorded by Thomas Scott in the 1890's. These were culled from the following reference:

Scott, T., & Lindsay, J. 1898. The Upper Elf Loch, Braids. Transactions of the Edinburgh Field Naturalists Society, 1897-1898: 369-384

The species concerned were:

Alona guttata
Alonella nana
Chydorus sphaericus s. str.
Alona quadrangularis
Ceriodaphnia reticulata
Graptoleberis testudinaria
Ilyocryptus sordidus
Alona costata
Simocephalus vetulus
Paralona pigra

I intend to start off a section of the website therefore, probably structured as a table, detailing the number of records from each lit. source and the species concerned.

Hopefully this could become a resource which can be used for comparison by members when finding a new literature source. If it is too complicated to put all record details on to the website these could always be kept in spreadsheet form to be provided on demand by members.

To make the task of putting this together a little less onerous I would ask that people submit literature records as a spreadsheet using the blank record spreadsheet which is downloadable from the website: http://www.cladocera.org.uk

Hopefully the four or five literature sources we have awaiting processing (including John's) will get uploaded onto the website early in the new year.

Adrian Chalkley

Bythotrephes longimanus
(photo by Phil Greaves)

Cladocera of the Lake District ……. Rodney Harmsworth

As I was going through newsletter 2 it occurred to me that one way in which to get a more complete species list, at least for the Chydoridae and Bosminidae, is to use the paleolimnological techniques pioneered by D. G. Frey (summarized in **Frey, D.G.** Remains of animals in quaternary lake and bog sediments and their interpretation, *Arch. Hydrobiol. Beih. Ergebn. Limnol.* **2**: I-II, 1-114 Stuttgart, April 1964).

I was lucky enough to meet Frey as an undergraduate student of J. Rzoska and later went to Indiana University to study paleolimnology (1963-6). I collected a core from Blelham Tarn at the suggestion of Mrs Tutin and worked it up in Indiana. At that time lake typology was all the rage and I thought that a survey of the English Lake District lakes using Pearsall's typological series would lead to conclusions concerning lake evolution. On the next page is a table that I prepared for publication but never did publish the data. It shows 8 lakes and 24 species of Chydoridae. The table could provide a useful guide to the chydoridae of the Lake District.

We are sure that the techniques are of general application because of a number of papers that were published in the early 60's. Frey sampled sediments from the 5 Madison lakes (**Frey D.G. June 1960** On the occurrence of Cladoceran remains in lake sediments, *Nat Acad Sci.* **V46, No6** 917-920) where for more than 30 years E.A.Birge had found 23 species of chydorids Frey found 22 of the species found by Birge plus an additional 6 species not listed by Birge in lake sediments. **Mueller W.P. 1964** "The distribution of cladoceran remains in surficial sediments from three northern Indiana lakes" *Invest. Ind. lakes and streams* **Vol VI No.1** p1-63 shows that remains are fairly distributed over lakes of differing morphometric types

(*The table of Rodney's data appears overleaf).*

CLADOCERAN REMAINS FROM THE ENGLISH LAKE DISTRICT

P=Present A=Absent

SPECIES	BLELHAM TARN	WINDERMERE SOUTH	WINDERMERE NORTH	CONISTON WATER	BASSENTHWAITE LAKE	DERWENT WATER	CRUMMMOCK LAKE	ENERDALE LAKE
Acroperus harpae	P	P	P	A	P	P	P	P
Alona affinis	P	P	P	P	P	P	P	P
Alona costata	P	A	A	A	A	A	A	A
Alona guttata	P	A	A	A	A	A	P	P
Alona intermedia	P	P	P	P	A	P	P	P
Alona rectangula	P	P	P	P	P	P	P	A
Alona quadrangularis	P	P	P	P	P	P	P	P
Alona rustica	A	P	A	P	P	P	P	P
Alonella excisa	P	P	P	P	P	P	P	P
Alonella exigua	A	P	P	A	A	P	A	A
Alonella nana	P	P	P	P	P	P	P	P
Alonopsis elongata	P	P	P	P	A	P	P	P
Anchistropus emarginatus	A	A	A	A	A	P	A	A
Camptocercus rectirostris	A	P	P	P	P	P	P	P
Chydorus globosus 1	P	A	A	A	P	P	A	A
Chydorus piger	P	P	P	P	P	P	P	P
Chydorus sphaericus	P	P	P	P	P	P	P	P
Eurycercus lamellatus	P	P	P	P	P	P	P	P
Graptoleberis testudinaria	P	P	P	P	P	P	P	P
Monospilus dispar	A	A	P	P	A	P	P	A
Peracantha truncata	A	A	A	P	P	A	A	P
Pleuroxus laevis	A	A	A	P	A	A	A	A
Pleuroxus trigonellus	P	P	P	P	A	P	A	P
Rhynchotalona falcata	A	P	P	P	P	P	P	P
NUMBER OF SPECIES	16	17	17	18	15	20	17	17
NUMBER OF REMAINS EXAMINED	124	171	170	135	140	556	271	226
NUMBER OF SPECIES ALL LAKES	24							

1 ..... *Pseudochydorus globosus*

The sediments were collected by staff at the FBA in 1964. Rodney Harmsworth prepared and anaysed ther chydorid remains.

Viewing headpores in *Alona* …….. John Bratton

The traditional distinction between *Alona affinis* and *A. quadrangularis* has been the presence of a comb of fine spinules on the basal spine of the claw of the former, and no spinules in the latter (Lilljeborg, 1900; Scourfield & Harding, 1966; Amoros 1984). However Flossner (1972) pointed out that the basal spine of *A. quadrangularis* occasionally has the spinules, or is "indistinctly feathered".

A. quadrangularis **(3 pores)**

Electronmicrographs of both species were presented by Duigan (1992), and of the two, her *A. quadrangularis* is the closer match to the figure of *A. affinis* in Scourfield & Harding. Clearly, these spinules are not a reliable way of distinguishing this species pair unless you can be absolutely certain they are absent.

The distinguishing character used by Duigan (1992), citing Frey (1959), is the arrangement of headpores, and these too are shown in electronmicrographs. They are also illustrated by Flossner (1972). *Alona quadrangularis* has a row of three connected headpores in the midline towards the hind end of the headshield, while *A. affinis* has only two. Both species also have lateral pores adjacent to the ones in the mid-line.

This unambiguous distinction is fine, provided you can see it. It requires that you look down on the mid-line of the Alona, which means the animal has to be propped up on its ventral edge. I find this impossible while the Alona is submerged in 70% alcohol. The rather crude method I use is to screw up a small piece of tissue paper so that its surface is uneven, soak this in 70% alcohol or water and place it on a microscope slide. The Alona is placed on the wet tissue and by fitting it into a fold, it can be set in a position where the head shield is visible. The specimen does not dry out and shrivel up because the paper is saturated, and more water can easily be added to the paper if necessary.

Lighting then becomes critical. At the highest magnification of my dissection microscope, x 80, the headpores can just be made out under fairly dull illumination from an ordinary anglepoise lamp. Under the more focussed light from a flexispot microscope lamp there is too much glare to see any pores.

A. affinis **(2 pores)**

If anyone can suggest an improved method, short of buying a better microscope, I would be pleased to read it.

References

Amoros, C. 1984. Introduction pratique à la systématique des organismes des eaux continentales Françaises. 5. Crustacés cladocères. *Bulletin de la Société Linnéenne de Lyon*, no. **3**: 72-145.

Duigan, C.A. 1992. The ecology and distribution of the littoral freshwater Chydoridae (Branchiopoda, Anomopoda) of Ireland, with taxonomic comments on some species. *Hydrobiologia*, **241**: 1-70.

Flössner, D. 1972. *Krebstiere, Crustacea (Branchiopoda, Branchiura)*. Jena, Fischer. (Tierwelt Deutschlands, **60** Teil.)

Frey, D.G. 1959. The taxonomic and phylogenetic significance of the head pores of the Chydoridae (Cladocera). *Internationale Revue der gesamten Hydrobiologie,* **44**: 27-50.

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Scourfield, D.J., & Harding, J.P. 1966. A key to the British freshwater Cladocera with notes on their ecology. 3rd edn. *Freshwater Biological Association Scientific Publication*, no. 5.

(Note: The article by Rodney Harmsworth may well be worth reading in conjunction with the above. …… Ed.)

Notes on Mounting Chydorid Head Shields ……. Rodney Harmsworth

Chydoridae are well preserved in lake sediments as are the remains of some plants and animals (Frey, D. G. 1964). Although others had observed chydorid remains in lake sediments it was Frey (1959, 1962) who first studied the head shields and realized their taxonomic and phylogenetic significance. Chydorid collections rarely contain intact head shields so they must be obtained by disarticulating the intact organism. Megard (1965) discussed a technique using hot hydrochloric acid.

Through a lucky accident, I stumbled upon an excellent method for obtaining good clean head shields. While collecting in Indiana I forgot to fix a sample with formalin. A week later I started to look at the jar without formalin. It was clear from the distinctive smell of the collection that bacteria had been at work. I added formalin, or you can use alcohol, to get rid of the smell and started to look at the collection. The specimens were disarticulated and I was able to find many excellent head shields, truck limbs, post abdomens and carapaces for my collection. I picked out each exoskeleton and mounted them in polyvinyl lactophenol that had been treated with a small amount of lignin pink. The exoskeleton takes up the stain and leaves a nice slide. Polyvinyl lactophenol has the disadvantage of being carcinogenic and does not make permanent slides. I now stain the exoskeletons with a small amount of lignin pink dissolved in water and alcohol mixture then mount on a slide with glycerin jelly. For permanent slides I seal the edges of the cover slip with nail varnish after a week or two.

Frey, D.G. 1959. The Taxonomic and Phylogenetic significance of the Head Pores of the Chydoridae, Cladocera). *Int. Rev. Hydrobiol.* **44**: 27-50.

Frey, D.G. 1962. Supplement to: The Taxonomic and Phylogenetic significance of the Head Pores of the Chydoridae, Cladocera). *Int. Rev. Hydrobiol.* **47**, 4: 603-609.

Frey, D. G. 1964. Remains of animals in Quaternary lake and bog sediments and their interpretation. *Arch. Hydrobiol. Beih. Ergebn. Limnol.* **2** I-II, 1-114 Stuttgart.

Megard, R.O. (1965). A Chemical Technique for Disarticulating the exoskeletons of Chydorid Cladocera. *Crustaceana* **9** (2): 8-10.

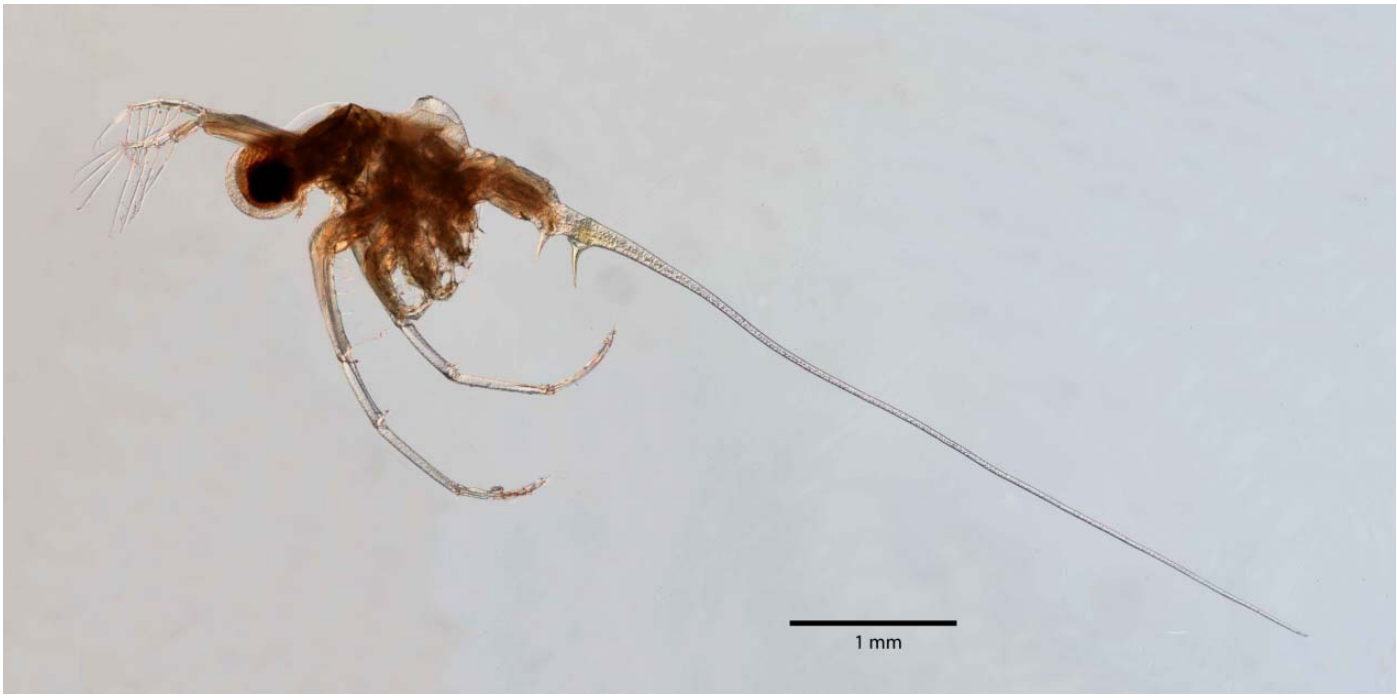
Bythotrephes longimanus, The Spiny Water Flea ……. Phillip Greaves

Living in the south of England, the large predatory water fleas – *Leptodora* and *Bythotrephes* – are denied to me. I eventually encountered *Leptodora* on holidays and the odd business trip to the Lake District, but *Bythotrephes* remained elusive (perhaps my Lakes trips were always 'wrong lake at the wrong time') until this year. A two week holiday touring Scotland was arranged for late August and collections were made at every opportunity. *Bythotrephes* escaped me until the penultimate day; a jetty on Loch Lomond allowed me to sample in water approximately 30 feet deep and several trawls eventually resulted in two specimens.

And what a revelation! I thought *Leptodora* was spectacular until I saw live *Bythotrephes* (I had previously only seen preserved specimens). Very active animals with the 'legs' poised for capture of prey, and with a transparent but muscular body. The photograph, taken after one month preserved in formaldehyde does not do justice to the living animal (muscle darkens to a mid-brown and loses its colourful translucency). Overall length can be around 15 mm (the specimen illustrated was about 7.1 mm) with the long 'tail' or caudal spine typically 2 to 2.5 times the length of the body. The spine has some prominent spikes which protect the animal from fish predation.

The species is very pleomorphic with some varieties (not recorded from British waters) having a much larger (6mm) trunk and shorter spine (var. *arcticus*) to others ….

***Bythotrephes longimanus* from Loch Lomand (Phillip Greaves)**



(continued from page 7)

(var. *cederstroemi*) having small bodies and spines over 4 times the body length.

So why is *Bythotrephes* so difficult to find? Perhaps it is me (and my limited sampling) but it appears to be restricted to the larger lakes in the north; Scourfield and Harding list the species as occurring in north England, Scotland and Wales [1]. However Rivier [2] states that the species is widely distributed in the Palaearctic region in both large lakes and small tundra pools. Perhaps temperature is the issue, with smaller water bodies in the UK heating in summer above a tolerable range. Does anyone know more on this?

[1] **Scourfield, D.J. & Harding, J.P. 1966**. A Key to the British Species of Freshwater Cladocera. *Freshwater Biological Association.*

[2] **Rivier, I.K. 1998.** The Predatory Cladocera (Onychopoda; Podonidae, Polyphemidae. Cercopagidae) and Leptodorida of the world. *Backhuys Publishers*

Strange head spines on juvenile Daphnia — Dan Hoare

This may be my inexperience, or possibly just a higher magnification that I am used to, but in a sample from some fen ditches in the Broads, I found these young Daphnia which have an odd spine on the rear of the head that I have never seen before. (Apologies for poor focus through the full depth of field, I'm not sure I can get over that with my set up).

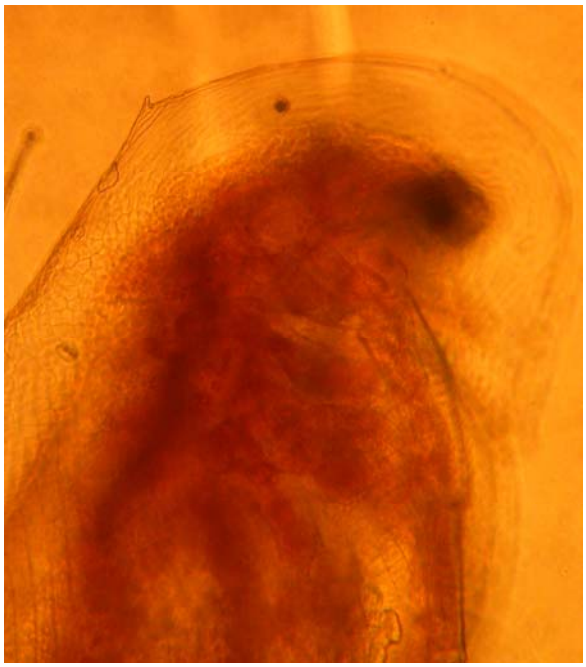
This feature is in none of my books other than in one picture of a juvenile *D. rosea* in a Spanish reference work by Alonso, so it struck me as odd. All adults in this sample were *D. hyalina* and *D. pulex*, so this is not *D rosea*, but is this particular feature typical in juvenile Daphnia?

A little detail on the circumstances of my observation may be useful to include here.

A fen ditch was sampled at the end of August 2012, on the RSPB Strumpshaw reserve, next to the River Yare in The Norfolk Broads. The sampling was part of the reserve's BioBlitz. Apart from the Daphnia species (adults of *D. hyalina* and *D. pulex*), *SImocephalus vetulus* and *Scapheloberis mucronata* were the other Cladocera species found in the same location. There was also a large number of phantom midge larvae (*Chaoborus sp.*) present, suggesting low fish abundance. The very clear water dyke was lined with reeds and a moderate amount of submerged and floating aquatic macrophytes (Rigid hornwort *Ceratophyllum demersum*, Frogbit *Hydrocharis morsus-ranae* and Ivy leaved duckweed *Lemna trisulca*).

Water quality sampling back in February showed only 33 ug/l total phosphorus, which is relatively low but expected given the conservation management of the side and predominant ground water input to the fen. No recent salinity data is available, but intermittent sampling over the last 5 years has shown high variability with tidal surges periodically introducing brackish water into the fen. Conductivity values of between 2,000 - 3,000 micro Siemens were typical in the most recent data.

If it is indeed an external factor influencing the physiology of the juvenile *Daphnia*, the salinity is perhaps the most likely stressor, but I really don't know of any definitive cause!



Any thoughts from other members would be welcomed, has anyone come across similar headshield features or indeed any other unusual features of cladoceran morphology within a local population?

Polyphemus pediculus in Suffolk …. Adrian Chalkley

For me the predatory cladoceran *Polyphemus pediculus* is one of the most intriguing species I have recorded in my home county of Suffolk. *P. pediculus* is certainly a unique and easily identifiable species but not always easy to find.

The lack of a carapace exposes the four pairs of limbs. The first 3 of which are used both for catching prey and also to grind it up by virtue of a masticatory appendage at the base of each. The fourth pair are reduced flat plates lined on the inner surfaces with ribs covered in setae and spines, these retain the food whilst it is pushed into the food chamber. This chamber lies under the limbs and can be closed by the mandibles which further grind up the prey before it is sucked into the gut. The F.B.A provide a translation of a Russian paper, (Butorina, 1965)

Polyphemus pediculus
(my thanks to Phil Greaves for the use of his photograph)

which gives a detailed description of the feeding mechanism.

Unlike the usual jerky cladoceran movement *Polyphemus* is also distinctive for the speed and determination with which it actively chases its prey. Having seen a suitable candidate; infusoria, rotifera, other cladocera, ostracoda etc., and sometimes smaller members of it's own species, *P. pediculus* swims rapidly after it. It then pauses, shadowing it's prey, and may then either break off the chase or leap onto the victim. It appears the shadowing is used to determine prey size (Young, S. & Taylor, V., 1988). The reason for breaking off the chase seems to be due to prey being of an incorrect size. Butorina (1970) states that the distance between the grasping legs of Polyphemus establishes a maximum prey size which can be handled, and also (Butorina, 1971) that their morphology prohibits the catching of prey which are too small.

There are a couple of video clips on the net which illustrate *Polyphemus'* swimming abilities:-

Polyphemus1.mov - Polyphemus in motion (501 KB): http://cfb.unh.edu/cfbkey/media/polyphemus1/polyphemus1.html

Polyphemus2.mov - Immature and adult Polyphemus swimming. Note the multidirectional swimming and the rapid movement of the second (swimming) antenna (2.2 MB). http://cfb.unh.edu/cfbkey/media/polyphemus2/polyphemus2.html

Being an active predator *Polyphemus* is dependant on good sight and the chasing behaviour ceases in the absence of light as shown by Young & Taylor (1988). The large, single eye of *P. pediculus* is formed by the fusion of two compound eyes and is the most obvious distinguishing feature for the species. That eye is of course the reason for the name, Polyphemus being the giant cyclops that ate several of Odyseus' men on their way back from the Trojan war!

P. pediculus is around 1mm in size and is common throughout the Holarctic, the only other related species, *P. exiguus,* inhabits open zones in the Caspian Sea. But how common is it in Suffolk and in the British Isles as a whole? Strangely, although I sample for Cladocera wherever I go as county freshwater recorder I have only taken *P. pediculus* on two occasions. Furthermore although I have a number of archive cladocera records for Suffolk dating back to 1890 none mention this distinctive species. On the NBN website there are only records for 16 separate British sites . My first record in June 2006 was at Lound Lakes not far from the Norfolk border (TM 544924), a series of reservoirs serving Lowestoft. Only isolated individuals were taken in a trawl with a plankton net across the open water of one of the large lakes. In this instance the other species taken (potential prey) were:

Alona affinis, A. costata, Bosmina longirostris, B. longirostris var. cornuta, Ceriodaphnia reticulata, Daphnia longispina, D. pulex, Disparalona rostrata, Eurycercus lamellatus, Macrothrix laticornis, Scapholeberis mucronata f. cornuta, Sida crystallina and Simocephalus vetulus.

The second record of *P. pediculus* was from the other end of the county entirely, from the River Stour at Flatford on the Essex border in April 2011. In this case it was recorded by a student attending my freshwater invertebrates course. Whilst looking for beetles from the river bank using a pond net he came across an obviously dense aggregation of *P. pediculus*, spread across several square metres of the river. When dipping the net in the water caught dozens at every pass. On examination it was clear that all of the catch were not only parthenogenic females but most produced fully formed young as the students observed them under the microscopes.

Now *Polyphemus* can occur in extremely dense aggregations but apparently these only form at certain times, though what triggers this behaviour is unclear. The typical density of *Polyphemus* when non-aggregated can be less than 10^3 per cubic metre (Packard, 2001), presumably the sort of situation I found at Lound.

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Dense aggregations have been reported as up to 10^7 individuals per cubic metre. Butorina (1986) suggests that efficient feeding is one function that can be attributed to aggregation behavior, though this is disputed by Packhard (2001). The situation at Lound in 2006 could certainly bear out the former theory as there were many prey species to feed on at quite high densities, so perhaps non aggregated hunting was effective. Conversely in the river at Flatford prey was less numerous and less diverse. Did this low prey density lead to the dense aggregation or did it result from it? *Polyphemus* is known for cannibalism so is a large aggregation at this point in the life cycle disadvantageous? Packhard (2001) found that cannibalism is independent of prey density. Two weeks later, when visiting the Flatford Mill Field Study Centre again I sampled the same spot on the river bank and, though it appeared the aggregation was reduced in density, numerous *P. pediculus* of varying sizes were still present.

Meanwhile I continue to look out for *Polyphemus* which I feel must be more frequent than my records suggest. I would welcome any observations from members especially from anyone who finds it to be more common in other parts of the country or who can suggest why it is not located more often.

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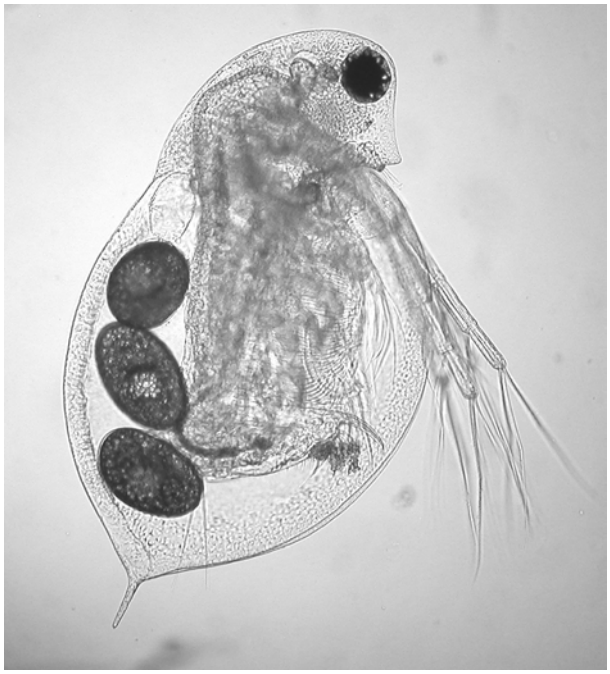
Daphnia parvula, a new record with notes on identification — Jim Green

The presence of Daphnia parvula on the British List is based on a record from the Round Pond on Chobham Common, in Surrey. It was identified by Prof. Vladimir Korinek, based on specimens collected by Dr Mary Morris in April 2009.

Fig. 1 ***Daphnia parvula***

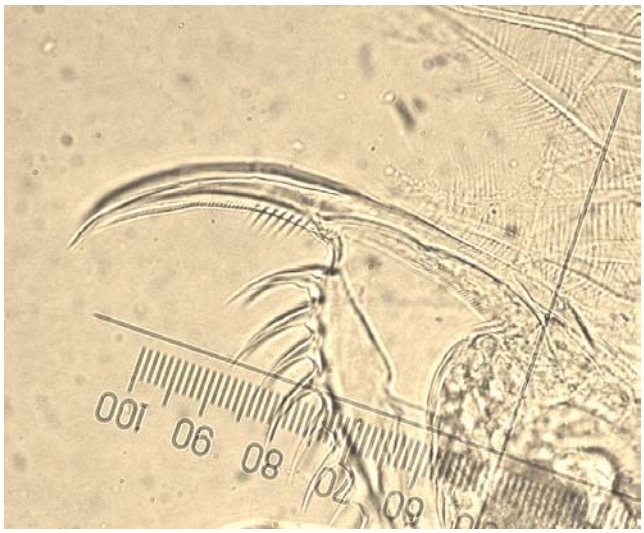


I have recently (November 20012) found this species in Broom Water, an artificial channel cut from the River Thames just above Teddington Lock. (*OS ref TQ172710 … Ed.)*

I have been sampling the zooplankton in this semi-static backwater for over ten years. Several species of Daphnia have occurred here, including *Daphnia ambigua*, which is very similar in general appearance to *D. parvula*, but the latter species has a clearly enlarged middle comb on the postabdominal claw (fig. 2). These two species were present in the same sample, and Prof Korinek says this is not unusual, so it is necessary to examine the postabdominal claw, which in *D. ambigua* is like that of the longispina group, without any enlargement of the second comb.

Originally from North America, *D. parvula* is now widespread in continental Europe, and is thought to have been introduced on amphibious vehicles brought to Europe by the US army during the second World War.

Fig. 2 ***Daphnia parvula***
postabdominal claw



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(Editor's comment …)
Reading Jim's document on Daphnia parvula whilst keeping one eye on Scourfield & Harding, as I suspect many of our members will also do, the following occurred to me.

If one captured specimens of D. parvula without any D. ambigua the presence of the enlarged comb on the postabdominal claw in parvula would, in S&H, lead one to the pulex group & couplet 12.

Jim's photo of the whole animal shows the antennules to be situated on a development of the lower surface of the rostrum which, whilst possibly not quite the 'distinct prominence' quoted in S&H, could lead to identifying the specimen as D. obtusa. The spine in fig 1 seems to be fairly short, is this typical?

WIth this in mind I wondered if there were any other pointers Jim might add which could be used by members to amend their copy of S&H. We need to try to avoid any misidentifications for those who only have access to the easily available keys. Indeed if we are ever to update the old FBA key and get more recording done then small additions such as this will be very important.

The following reply from Jim will I think help many members:

Yes you are quite right, *D. obtusa* and *D. parvula* have a similar general appearance, with a similar shaped head and short posterior spine. But D. *obtusa* has more conspicuous spines around the ventral margin of the carapace, it also has a group of plumose setae in the middle of this margin (absent in *D.* parvula and *D. ambigua*, also absent in *D. pulex* and *D. curvirostris*). These setae are not mentioned in S.& H. but are important in identifying *D. obtusa*; they often lie just inside the carapace margin.

There is another interesting twist in the parvula story. Alonso (1996) uses a different set of characters, involving detailed examination of the thoracic limbs, to separate the longispina group. Using these characters he places parvula in the longispina group, where it is the only species with an enlarged second comb on the postabdominal claw. It may well be that in the future we may need to dissect out the thoracic limbs to be certain of identifying some Daphnia species.

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Postscript to *Pleuroxus hamatus* John Bratton

In Newsletter no. 2, Kay van Damme and Jean-Francois Carte concluded that Baird's records of *Pleuroxus hamatus* could not be matched to a modern species. As further evidence of the need for caution in using such early records, I offer the following quote from Baird (1838):

"*The Daphnia longispina of Muller and many other succeeding authors, among them Ramdohr, is merely a variety of D. pulex, or rather the same insect in a less advanced stage of growth. The D. magna of Straus is also a mere variety of the pulex, as I have found them both together in considerable numbers and running into each other*."

I don't repeat this in order to mock Baird, but rather to demonstrate the primitive state of cladoceran taxonomy in the early 19th century. Perhaps they should have let the women have a go. Returning to the journal containing Baird's 1835 Berwickshire paper, we can read the list of 27 members of the Berwickshire Naturalists' Club. It contains seven Reverends including two Bairds, demonstrating the importance of the clergy to early British natural history; ten doctors and surgeons including William Baird himself; plus a Captain, a Major and a Sir. Then comes the category Extraordinary Members, occupied by four women. The rules don't mention this category so we can only speculate in what sense they were extraordinary. Possibly it was in having extreme tolerance for male-dominated natural history societies.

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