The Ostracod Fauna of Groby Pool

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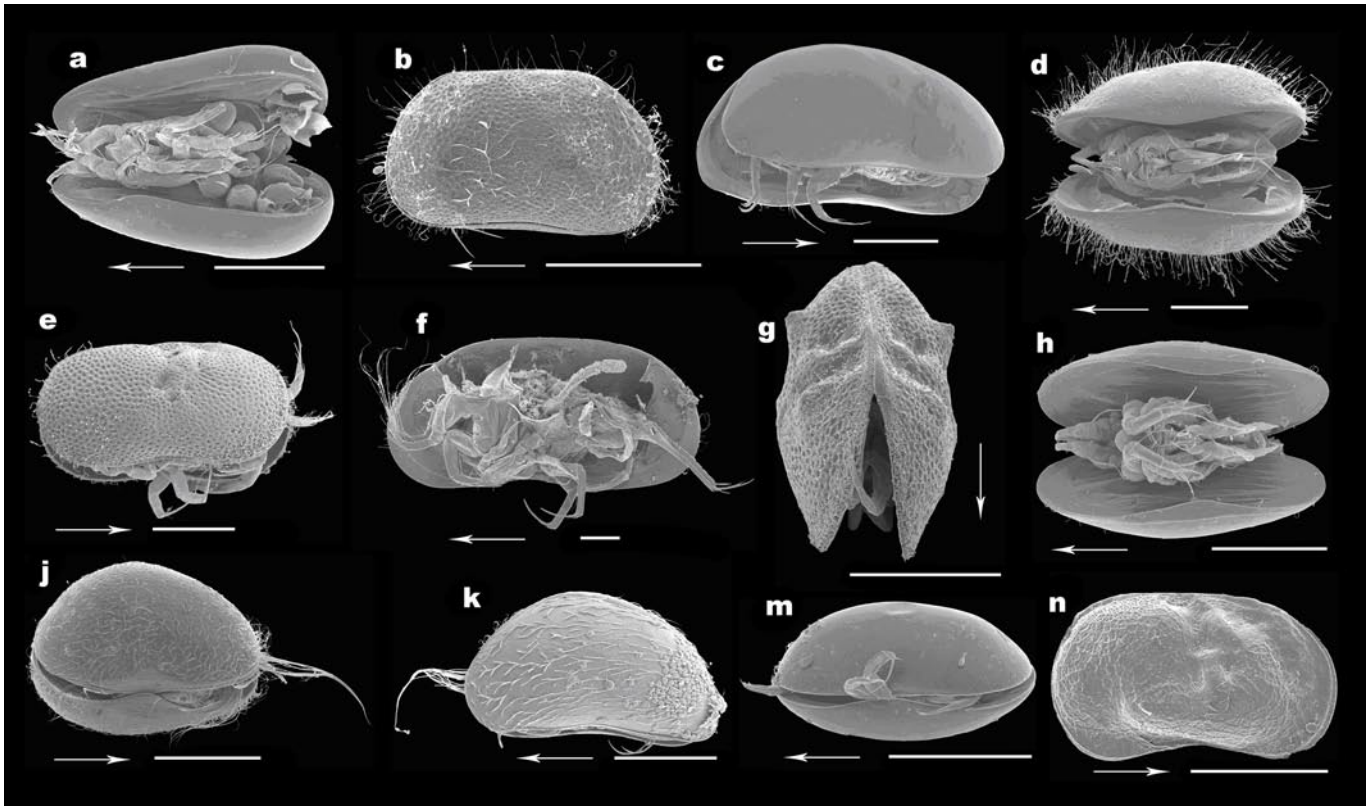
Ostracods are small, bi-valved crustaceans with calcareous valves that hinge above the dorsal region of the body. The valves when closed totally enclose the body and appendages. Their bodies have between 5-8 pairs of limbs, which protrude from the gaping valves and are adapted to swimming, crawling, grasping, cleaning and feeding. Adults typically grow to sizes of between 0.5 and 2.0 mm. They hatch from eggs and moult eight times before adulthood, taking around one month. Many populations are totally female, as they reproduce parthenogenetically.

Ostracods are considered to be the most diverse crustaceans (Meisch, 2000). They can be found in practically every aquatic environment, with some adapted to a semi-terrestrial life. They have the best fossil record of any arthropod, with an estimated 33,000 living and dead species (Horne *et al*., 2002). They can be found throughout the fossil record for the past 500 Ma, from the Ordovician to the present day. Widespread distribution, a small size, and easily preserved calcified valves, mean these microfossils can be found easily. Ostracods have a variety of uses in studies of palaeo-environments, basin evolution, plate tectonics, sea-level changes and modern pollution (Boomer *et al*., 2003).

Groby Pool lies northwest of Leicester and is considered to be the largest natural expanse of water in Leicestershire. It is a natural lake, recorded as far back as the 12th century, and since then it has varied in size. It is currently relatively small, spanning 13.85 hectares, with its greatest depth measuring less than 1.8 m. Groby Pool has been designated a SSSI, due to the richness of the biota living in the pool and in the surrounding woodland.

The aims of the current study were to establish the composition of the living ostracod fauna of Groby Pool, and determine patterns of abundance and distribution among the population. One may question why a geologist would undertake a study of a living rather than fossil fauna. As an undergraduate at the University of Leicester, I had to carry out research for my final year project. Having an interest in micropalaeontology, and wanting to gain experience using specialized equipment, this project proved ideal. During April 2007, the Ostracod Group of the Micropalaeontology Society sampled living ostracods from various sites around Groby Pool. Ostracods were present. Along with training in ostracod identification from Dr David Horne of Queen Mary University of London, this formed a foundation for the project.

Qualitative ostracod samples were collected, by sieving (250 μm mesh size) 10 litres of mixed substrate at each of the six selected sample sites. Each sample



SEM micrographs of selected ostracods. Arrows point towards the front of each; scale bars are each 300 μm (0.3 mm) long.
a *Darwinula stevensoni*, adult female with eggs. **b** *Paracandona euplectella*, adult female. **c** *Candona candida*, adult female.
d *Pseudocandona compressa*, adult female. **e** *Ilyocyprs bradyi*, adult female. **f** *Herpetocypris reptans*, juvenile female.
g *Ilyocypris gibba*, adult male?. **h** *Cypria ophtalmica*, adult female. **j** *Cypridopsis vidua*, adult female.
k *Potamocypris pallida*, adult female. **m** *Candona lactea*? adult female. **n** *Limnocythere inopinata*, adult female.

was processed the same or the next day, to ensure the ostracods did not die before picking. They were examined under a binocular microscope, and ostracods were extracted with a glass pipette. They were easily recognizable by the unique way they swam or crawled. Where possible, 100 live specimens were extracted. Specimens were initially preserved in 30% ethanol to ensure the valves gaped open, to expose appendages. After around 15 minutes, specimens were pickled in 80% ethanol for further study. An additional 100 dried, dead valves were collected from each sample.

Many freshwater species show similar valve characteristics, so it was important to preserve soft body parts to aid identification. The best way to view soft body parts in great detail is to use a scanning electron microscope (SEM) to capture images. However, specimens had to be dry before entering the vacuum chamber of the SEM. Normal drying in an oven would damage the samples by the surface tension and volume changes when liquid turns to gas. The technique of critical point drying was used to dry out the samples, with minimum cell damage. 'Wet' specimens were placed in a pressure chamber, where ethanol was replaced with liquid carbon dioxide. The temperature and pressure were then raised to 31.5^{o}C and 73.8 bar, where the carbon dioxide becomes supercritical and passes from liquid to gas with no structural change that could damage organic tissues. Temperature and pressure were then brought to normal atmospheric levels, leaving dry and intact samples.

The SEM allowed made it possible to view the samples in great detail, and all specimens were identified to species level. Sixteen taxa, from eleven genera, belonging to the families *Darwinulidae, Candonidae, Ilyocyprididae, Cyprididae* and *Limnocytheridae,* were recorded. This roughly accounts for one sixth of the reported ostracod species in Britain. The maximum number of species per site was thirteen. *Cypridopsis vidua* was the most frequently occurring species, found in all six sample sites, and accounted for over 40% of the total live and dead counts. The results demonstrated that ecological factors determine distribution, but many of the species showed wide ecological tolerance, making general distribution patterns hard to recognize.

References

Boomer, I., Horne, D.J. & Slipper, I.J., 2003. The use of ostracods in palaeoenvironmental studies, or what can you do with an ostracod shell? *The Paleontology Society Papers*, **9**, 153-179.

Horne, D.J., Cohen, A. & Martens, K., 2002. Taxonomy, morphology and biology of Quaternary and living Ostracoda. *Geophysical Monograph,* **131**, 5-36.

Meisch, C., 2000. Freshwater Ostracoda of Western Central Europe. In Schwoerbel, J. & Zwick, P. (eds), *Suesswasserfauna von Mitteleuropa* 8/3. Spektrum Akademischer Verlag, Heidelberg.