

A FIRST RECORD OF *SPHAERIUM NUCLEUS* IN WALES

The swamp orb mussel *Sphaerium nucleus* (Studer) is a freshwater bivalve of lowland swamps and fen, distributed from Western Europe to central Asia (Falkner *et al.*, 2001). The ecology and distribution of this sphaeriid bivalve is poorly understood (Zettler & Glöer, 2006; Glöer & Diercking, 2009) being only recently recognised as a distinct species based on anatomical, conchological and ecological distinctness (Korniushin, 1994). As a member of the *Sphaerium corneum* species complex, *S. nucleus* has historically been lumped with *S. corneum* s.l. due to morphological similarities and an overlap in habitat utilisation. It has been suggested that *S. nucleus* is relatively widespread (Killeen, Aldridge & Oliver, 2004; Korinkova, Beran & Horsak, 2008), and that historical and voucher specimens of sphaeriid bivalves have often been misidentified as *S. corneum* s.s. Recently, key differences between the life histories of these species have come to light, in addition to evidence of habitat partitioning between *S. corneum* and *S. nucleus*. The former is found in swampy and densely vegetated habitats such as slow moving rivers, peat bogs and pools, whereas *S. nucleus* is distributed in more ephemeral lentic habitats, such as woodland pools and ditches, and cut off meanders (Korinkova, Beran & Horsak, 2008; Falkner, 2000; Korinkova, 2006; Killeen, 2011).

Several authors have also noted that *S. nucleus* is predominantly found in swampy, densely vegetated habitats such as drainage ditches and vegetated lake margins. It has been identified from several European countries (Korinkova, Beran & Horsak, 2008). In the UK, it has been identified from several sites, almost exclusively in the east of England, but also from Ireland (Moorkens & Killeen, 2010). Here, we report the first identification of *S. nucleus* in Wales.

Between June and August 2011 several freshwater habitats were sampled as part of a larger study to faunistically map lentic and lotic habitats in south Wales. During the course of this larger study, benthic samples from a large, semi-permanent pool in an established sand dune system in the Kenfig Nature Reserve (British Grid SS 80238121), Bridgend, Glamorgan, were collected. Samples of benthic substrate were collected using a 2 mm mesh net from several

randomised transects in each habitat. The protocol developed was similar to kick sampling, but adapted for ponds and still waters. Due to the lack of current or water flow in the habitat, a sideways “scooping” motion was employed to ensure that benthic substrate was collected successfully (Sutherland, 1996).

Collected animals were placed in white trays, and macro-invertebrates identified to species level. Where identification was not possible, or when there was uncertainty as to the identity, the animals were killed and preserved in 70% ethanol, stored in labelled containers and returned to the laboratory for later identification. Bivalve samples were identified to species level by C. Clifford and R. Taylor, based on standardised keys (Killeen, Aldridge & Oliver, 2004; Croft, 1986). Shell shape and tumidity, pore density, thickness of the hinge plate, and the arrangement of muscle scars were used as main identification characters. A total of nine sphaeriid mussels were collected from a semi-permanent lentic habitat within the Kenfig sand dune system. Two of the samples were positively identified as *S. corneum* based on morphological characteristics provided by (Killeen, Aldridge & Oliver, 2004). Seven of the samples were initially identified as *S. nucleus* based primarily on shell tumidity and the dense pore structure in the umbonal region. Images of the collected mussels were taken with a Nikon SMZ800 microscope fitted with a Leica DFC290 mounted camera (Fig. 1a,b). Samples were sent for further analysis and verification to A. Holmes and P. Glöer, which confirmed our identification.

This first identification of *Sphaerium nucleus* in the west of mainland Britain is a considerable expansion in the known range of this species. The site was a large semi-permanent pool in the Kenfig sand dune system. The pool is relatively shallow, with densely vegetated banks. Due to the shallow nature of this pool, water levels can fluctuate greatly, often exposing large areas of substrate around the edges. As such, large areas of substrate would classify as ephemeral habitats which can dry out (or flood) in response to environmental conditions. Such ephemeral lentic habitats have been identified as being associated with *S. nucleus*, compared to the more permanent habitats favoured by *S. corneum* (Killeen,

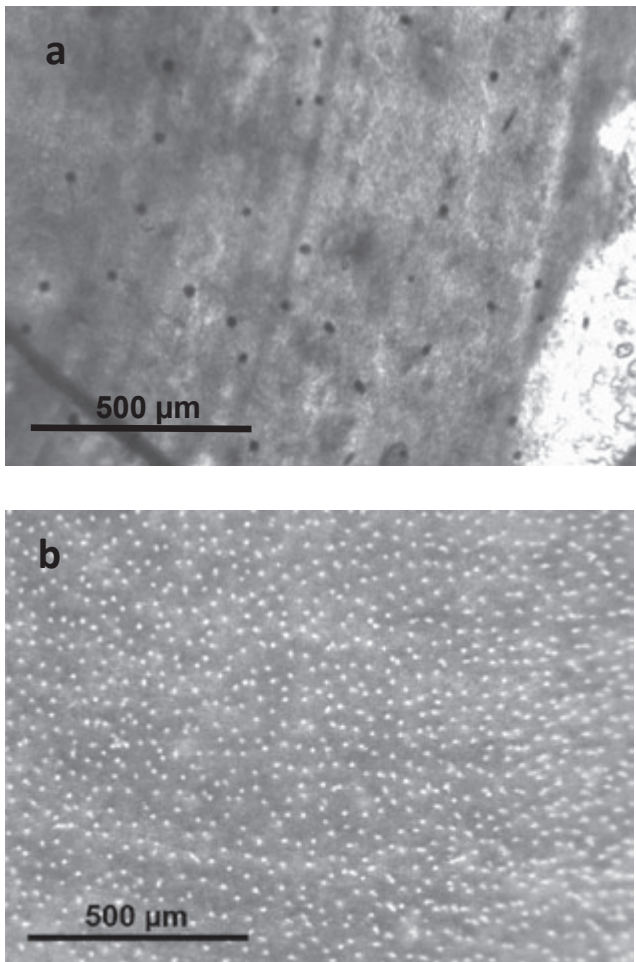


Figure 1a Detail of the porosity in the umbonal region of a valve of *Sphaerium corneum*. **b** Porosity in the umbonal region of *S. nucleus* from Kenfig, south Wales.

Aldridge & Oliver, 2004). The discovery of *S. nucleus* in a pond in dune slacks increases the number of habitat types for this species, but also conforms to the previously identified ephemeral nature of *S. nucleus* habitats.

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