Sponge spicule (*Spongillidae*) in riverine sediments from the Upper Volga River (Russia)

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During the Upper Volga Expedition 2005 an assessment of hydrological, limnochemical and biological parameters was carried out (KUZOVLEV & SCHLETTERER 2006). The main targed within the biological assessment was concentrated on macrozoobenthos, but also other parameters – as suggested by the European Water Framework Directive – were analyzed. Within the sampling procedure of attached algae (phytobenthos), 23 diatom samples were taken in the Volga River and some tributaries. This material was stored in Ethanol (50%) and in the laboratory the preparation of the material was done (protocol according to KINGSTON 1985, modified).

The sponge spicules we found in the diatom mounts, were identified by lack of an actual key for western russian species with different european identification keys (ARNDT 1928, REZVOJ 1936, RUDESCU 1975, PRONZATO & MANCONI 2001, EGGERS 2004). Species which were suitable to find in the investigation area were selected by the Limnofauna Europeae (SIMON 1978). Freshwater sponges (Spongillidae) appear in lentic as well as in lotic water bodies, provided that there is not too much particular matter, which would affect on the pores and close channels. There is no data about sponge species for the research area on the Upper Volga River, but former investigations cover the stretch from the town Tver to the mouth of Volga River in the Caspian Sea (BEHNING 1924). Within diatom samples, taken during the Upper Volga Expedition 2005, it was possible to identify *Spongilla lacustris*, *Ephydatia mülleri*, *Trochospongilla horrida* and *Heteromeyenia baleyi* (SCHLETTERER & EGGERS in press).

Within the *Spongillidae* three different spicule types can be discriminated: (1) Oxe with pinnacled endings, (2) Strongyle with rounded endings and (3) spool-like Amphidiscs. These skeleton-elements consist of biogenic silica (BSi), which is produced by polymerising dissolved silicic acid. The skeleton is compounded by macroscleres (oxe with a size of 180 – 340 µm and a diameter of 10µm), while the small microscleres (oxe, strongyle and amphidiscs) are located in the sponge body. These siliceous spicule are relevant as non-pollen-palynophorms ("extrafossils") for paleolimnological research: After the sponges death its scaffold material sinks to the bottom and gets conserved. The BSi from diatoms can be used to get informations about changes in paleoproductivity (CONLEY 1998). The ratio between stabile oxygen isotopes (^{16}O / ^{18}O) in the SiO_2 from diatom frustles, which depend on changing parameters (T_{H2O} and $\delta 18O_{H2O}$), enabeled the development of a paleothermometer: T_{H2O} (°C) = 190,07 - 5,26 * ($\delta 18O_{Opal}$ - $\delta 18O_{H2O}$) (LÜCKE et al 2005). Biogenic Opal (BSi) from sponge spicule could support the development of a paleothermometer, to gain correlations between different organism groups (diatoms and sponges). Because of the sponges annual live cycle, they would be an interesting indicator for this approach.

Fig.1: (a) Macrosclere of *E. mülleri*, (b) macrosclere of *T. horrida*, (c) microsclere and (d) gemmosclere of *S. lacustris* and (e) microsclere of *H. baleyi* (Scale = 50µ)

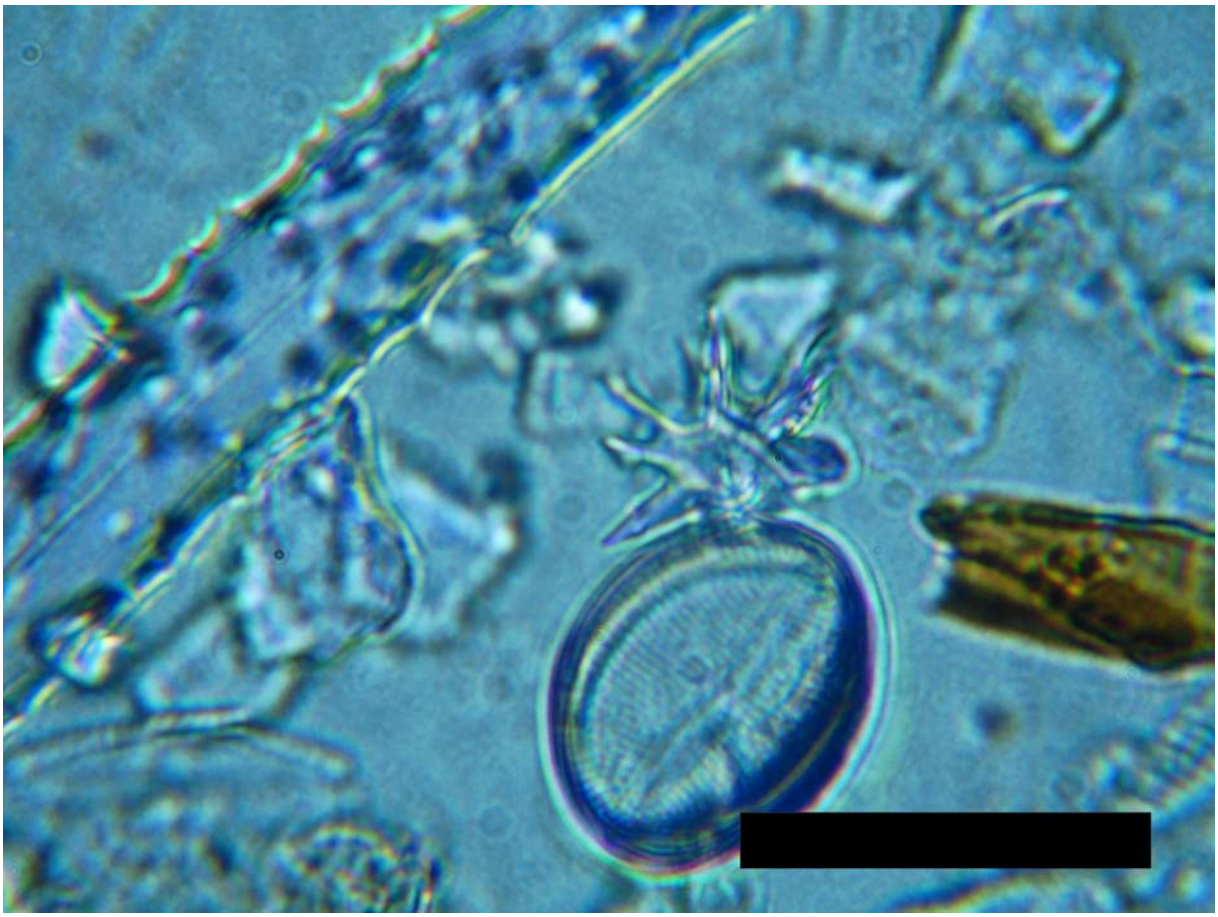

Fig.2: Microsclere and Amphidisc of *E. mülleri* (Scale = 20µ)

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