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SUPPLEMENTARY ONLINE MATERIAL FOR

Fossilized gill soft tissues in Mesozoic freshwater unionoid bivalves: reinvestigation and new evidence of the evolution of adaptation to the freshwater environment

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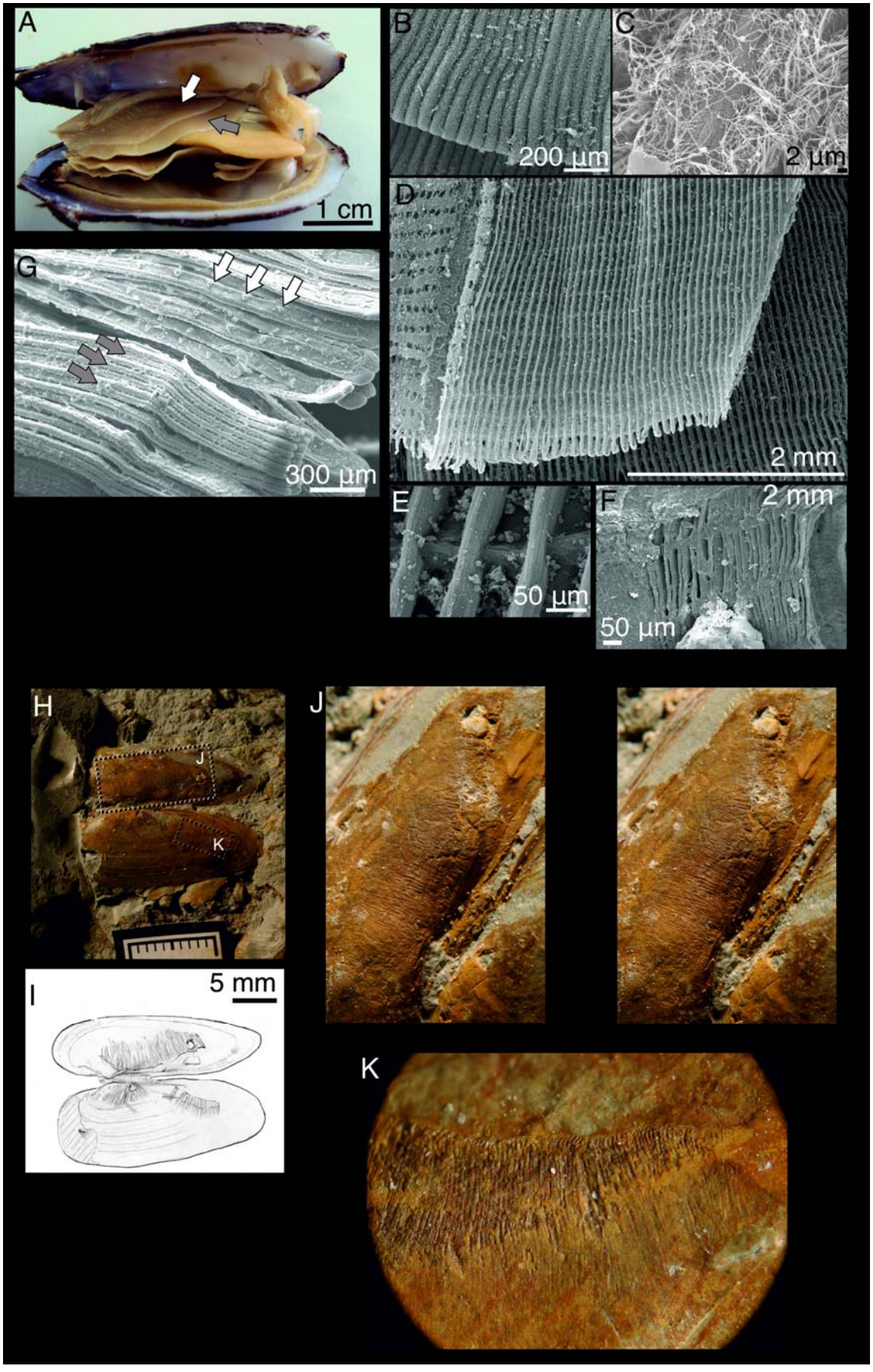
Supplementary Online Material

SOM 1. Recent *Unio tumidus* Philipsson, 1788 (Masurian Lake District, Poland).

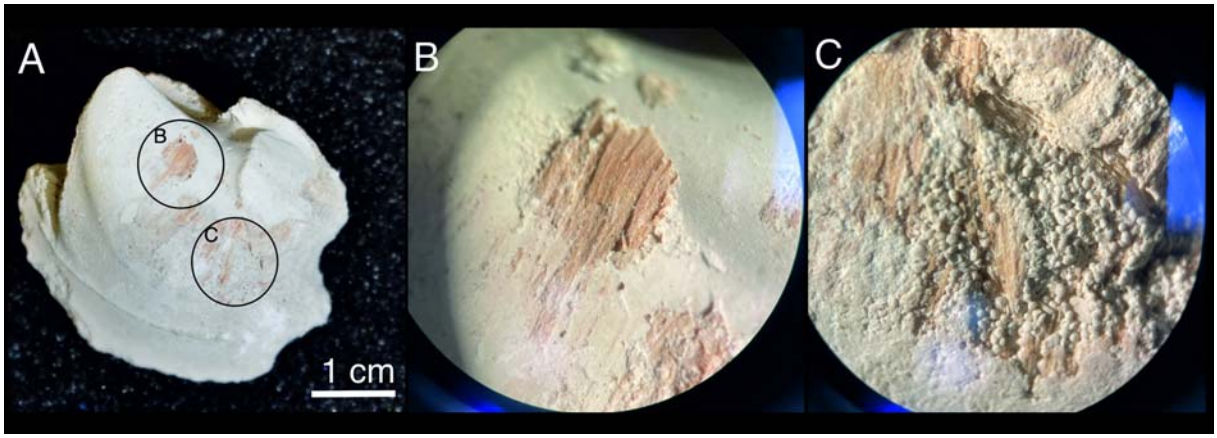
SOM 2. Upper Jurassic *Laevitrigonia gibbosa* (J. Sowerby, 1819) (Isle of Portland, Dorset, UK).

SOM 1



A–C. Recent *Unio tumidus* Philipsson, 1788. **A**. Ventral view of semi-opened individual lying on the left shell – right outer demibranch indicated by white arrow, right inner demibranch – by grey arrow; the gills expands toward posterior part of the bivalve (here the left side of specimen); in the center of mantle cavity a massive foot is visible and symmetric left pair of the demibranchs is here photographed below the foot; also paired labial palps are present. On the inside of the left shell the pallium (mantle) is still attached. **B**. SEM picture of fresh eulamellibranch gills of *U. tumidus*. Note the parallel arrangement of filaments, which are covered by ciliated tissue. **C**. Magnification of a fragment of filament – chitinous gill support of gill filament is visible below the cilia that cover it. **D**, **E**. Eulamellibranch gill of *Unio tumidus.* **D**. Gill after 200 h of experimental decay (see the procedure in Skawina, 2010). Note interfilamentar tissue connections and exposed chitinous gill supports. Some parts of these gill supports are already collapsed (torn) in the middle part (ventral part of outer demibranch, or large area of inner demibranch on the background). See also rounded water channels in the torn part of the outer demibranch at the left side of picture. **E**. Magnification of fragment of D – interfilamentar junctions. **F**. Gills of Recent *Elliptio* sp., a specimen that was not properly preserved for a SEM technique – gills are already partially decayed/destroyed with collapsed gill filaments visible and tissue interfilamentar junctions connecting them. **G**. Fresh filibranch gills of *Mytilus* sp., see the ciliary discs (e.g. white arrows), and shuffled arrangement of single filaments, while other parts of the gills are still connected functionally (grey arrows). **H–K**. *Silesunio parvus* Skawina & Dzik, 2011, ZPAL Ab. III/2208. **H**. The preservation of the "butterfly position" specimen with rectangles indicating areas presented in J and K. **I**. Drawing showing the position of fragments of demibranchs preserved on both valves. **J**. Stereoscopic images of the right valve and three-dimensionally preserved demibranchs (photo: Marian Dziewiński). **K**. Magnification of left-valve fragment of demibranchs – with some shuffled filaments.

SOM 2



Upper Jurassic *Laevitrigonia gibbosa* (J. Sowerby, 1819), Isle of Portland, Dorset, United Kingdom. **A**. NHMUK, PI MB 2424) with exposed gill supports of filibranch anatomy. **B**. Note the functional parallel arrangement of filaments. **C**. Some of them were observed as shuffled/tangled.