

Preservation of the Ediacaran Sponge Skeletons from the Yangtze Gorges Area in South China

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Sponge skeletons have been identified in the lower part of the Neoproterozoic Doushantuo Formation in the Yangtze Gorges area (South China), which has an age of about 600 million years ago. These sponge skeletons consist of siliceous, four-pronged tetraxonal magascleres with axial canals, monaxonal microscleres and gemmoscleres. All of the four-pronged tetraxonal magascleres were broken and their new cross sections show that spicules have a concentric lamellar organization that can be divided into three parts: in the center is axial canal, around the canal an axial cylinder, and outmost the lamellar region lamellae. These microscleres and gemmoscleres are embedded in the outer coat of sponge gemmules. The electron probe microanalysis (EPMA) analysis of the gemmoscleres indicates that they are siliceous. All of these skeletons are referred to as the Porifera, class Demospongiae. The preservation of sponge skeletons suggests that the sponges may have already appeared, 50 to 70 million years before the Cambrian Explosion, in terminal Proterozoic.

Keywords: Sponge spicule, tetraxonal magasclere, monaxonal microsclere, Doushantuo Formation

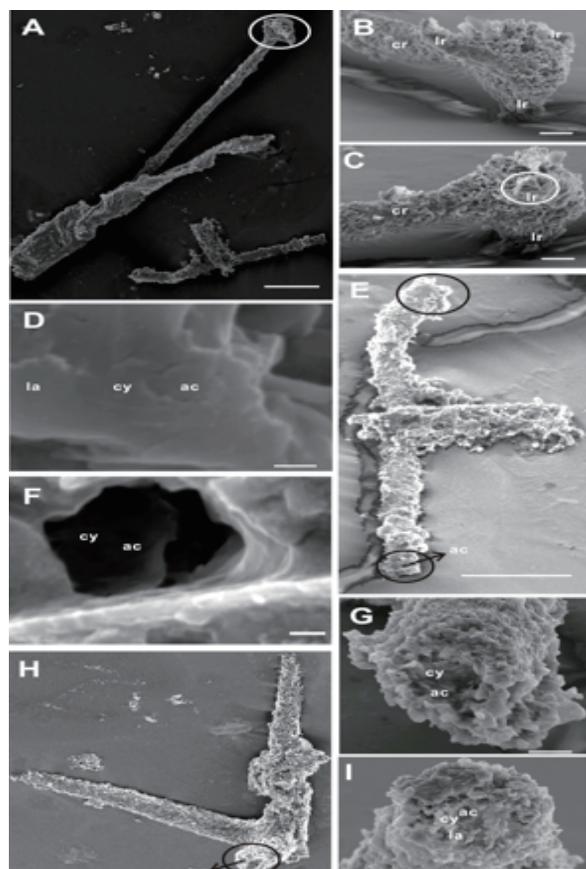


Fig (A) A broken tetraxon. Scale bar, 100 μm .

(B) The magnification branch point of the tetraxon, showing the four-pronged rays. One central ray (cr), and three lateral rays (lr).

Scale bar, 10 μm .

(C) – (D) Traverse broken section of the left main spicule; the same area is shown at increasing magnifications.

(C) The lamellar and concentric organization of the silica layers around the axial canal is seen. Scale bar, 2 μm . (D) The axial canal (ac), an axial cylinder (cy), and concentric silica lamellae (la). Scale bar, 0.5 μm .

(E) – (F) Traverse broken section of the right dropped lateral ray.

(E) Axial canal in the dropped lateral ray. Scale bar, 20 μm .

(F) Shape and size of the axial canal. Scale bar, 0.5 μm .

(G) The other part of the dropped lateral ray, showing the broken concentric lamellar structure. Scale bar, 5 μm .

(H) A four-pronged tetraxon is triradiate owing to the absence of one ray. Scale bar, 50 μm .

(I) The traverse broken section of triradiate tetraxon, showing the concentric organization. Scale bar, 5 μm .

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