

This spiny slug blazed a trail for snails

By Jim Shelton | FEBRUARY 6, 2017



Reach back far enough in the family tree of a snail or a clam and you'll find a spiny little slug with tiny teeth, wearing a helmet-like shell. Scientists have unearthed the 480-million-year-old remains of a creature that reveals the earliest stages in the evolution of a diverse group of invertebrates that includes squids, octopuses, snails, and clams. The discovery was announced in a paper published Feb. 6 in the journal *Nature*.

The animal's name is *Calvapilosa* — which means "hairy scalp" — and it came from a fossil-rich deposit in Morocco known as the Fezouata Formation. The researchers said *Calvapilosa* is an early offshoot of the line leading to modern coat-of-mail shells. *Calvapilosa* has a tooth-lined jaw for feeding, carries a helmet-like shell on its head, and has spines that extend over its back.

"This discovery brings a neat solution to how the ancestor of all mollusks may have looked," said lead author Jakob Vinther, a doctoral student who is now at the University of Bristol. "It was a slug that carried a single shell and lots of little spines."

The researchers believe these spines, which were not mineralized in the earliest mollusks, hardened and became strong shells.

"Mollusks consist of a multitude of distinct groups, which all originated about 520 million years ago in a very short period of time — less than 20 million years," said Derek Briggs, Yale's G. Evelyn Hutchinson Professor of Geology and Geophysics and curator of the Peabody Museum of Natural History. Briggs co-authored the study.

"Their evolutionary history is squeezed into a brief interval of evolutionary time called the Cambrian explosion, which makes the sequence of events difficult to piece together," Briggs said.

Calvapilosa's anatomy is similar to that of some famous older fossils from the Burgess Shale in Canada (*Orthrozanclus*) and Greenland (*Halkieria*). Those animals, along with *Calvapilosa*, now will find places on the earliest branches of the mollusk family tree.

Additional co-authors are Peter Van Roy, a former postdoctoral researcher at Yale, who is now at Ghent University; and Jakob Vinther, a doctoral student at the University of Bristol who will be joining the Briggs lab at Yale in 2018.

"Morocco has revealed itself as a fossil treasure trove for ancient life," said Van Roy, who discovered the Fezouata Biota. "I can't imagine what is discovered there."

The research was supported by a grant from the National Science Foundation and by the Division of Invertebrate Paleontology, Peabody Museum of Natural History, where specimens of the new fossil mollusk are held.

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