ScienceNews
INDEPENDENT JOURNALISM SINCE 1921

NEWS LIFE

These tube-shaped creatures may be the earliest known parasites

Animals that lived over 500 million years ago may have stolen food from their hosts' mouths

This artistic rendering shows a 512-million-year-old clamlike brachiopod covered in tubelike organisms (white) that may have been parasites, an analysis of fossils uncovered in China concludes.

ZHIFEI ZHANG/NORTHWEST UNIV.

By Jonathan Lambert

JUNE 2, 2020 AT 11:02 AM

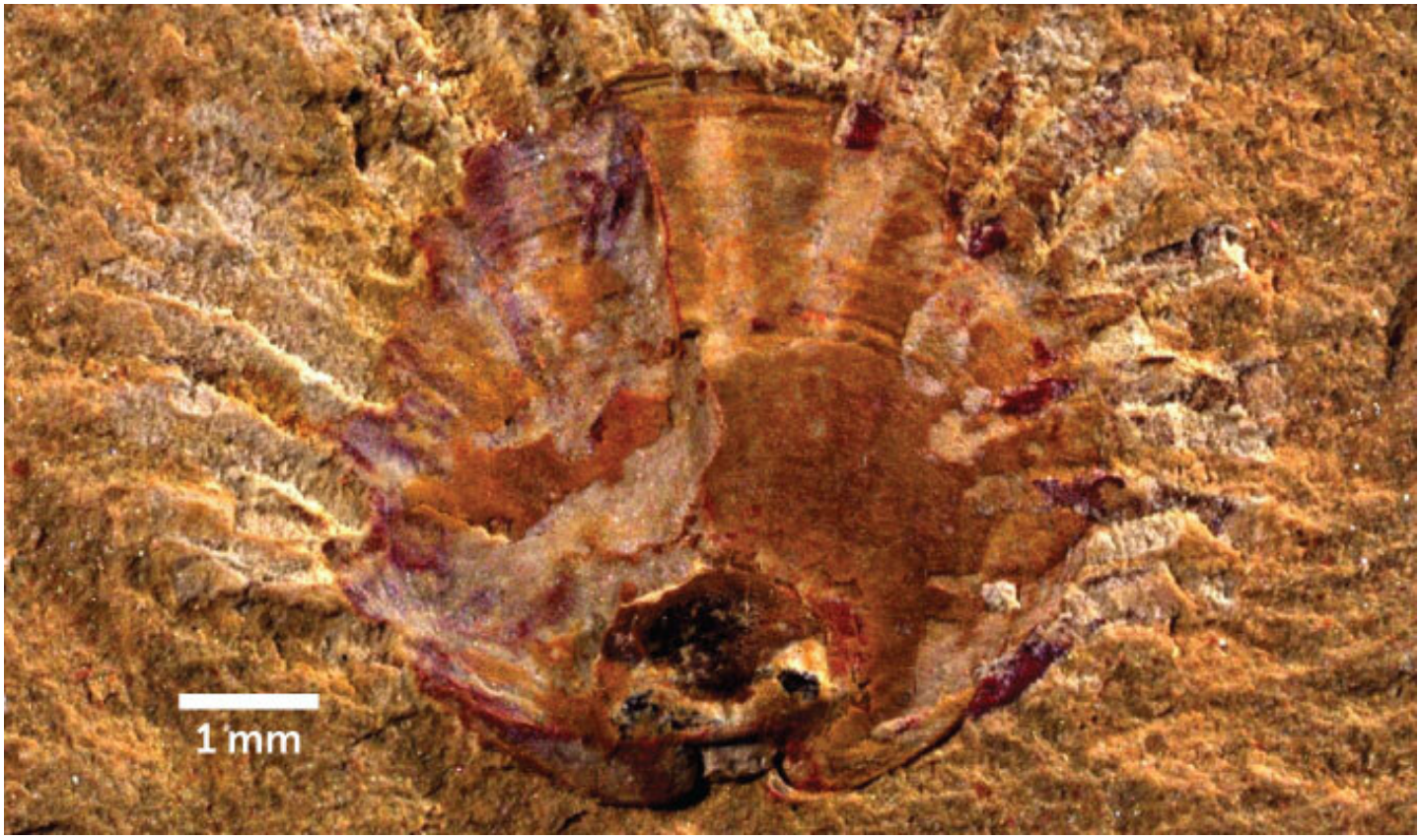
Tube-dwelling creatures that spent their lives cemented to the shells of clamlike brachiopods over 500 million years ago may be the earliest known parasites.

"Parasitism is an integral part of life on Earth, but it's been hard to determine when it emerged," says Tommy Leung, a parasitologist at the University of New England in Armidale, Australia. But, he says, it likely arose early, in part because today "practically every living thing has some kind of parasitic thing living on or in them, even down to parasites themselves."

Sometimes, scientists get lucky and find parasites preserved with their hosts in amber (*SN: 12/10/19*). But usually parasites don't fossilize well because their bodies are often small and soft, Leung says. And even if two organisms happen to be entombed in the same fossil, it can be difficult to discern whether their relationship was parasitic, mutualistic or somewhere in between. Fossils of tongue worms from 425 million years ago represent a clear early example of parasitism, but previously found older fossils from the Cambrian only hint at possibly parasitic relationships.

Now, a 512-million-year-old bed of tube-encrusted brachiopods in Yunnan, China offers compelling evidence of a parasite-host relationship, Zhifei Zhang, a paleontologist at Northwest University in Xi'an, China and his colleagues report June 2 in *Nature Communications*.

In a tan-colored outcropping in southern China, researchers discovered thousands of brachiopods clustered together. Hundreds of them had numerous tubelike, tapered structures affixed to the exterior of the shells. Those structures were arrayed like the spines of a fan with the mouthlike parts positioned along the open edge of a shell. The tubes appeared only on brachiopods, never alone or associated with other fossils, suggesting that the organism couldn't survive on its own.



This 512-million-year-old fossilized brachiopod is encrusted with tubes that may be the remnants of ancient parasites. Scientists think that the tubelike organisms stole food from the mouths of filter feeding brachiopods.

ZHIFEI ZHANG/NORTHWEST UNIV.

The brachiopods were likely filter feeders, catching whatever food happened to drift into their open shells. Zhang and his colleagues hypothesized that these tubes might have snatched food from the edge of the shell before the brachiopod could eat it, making them kleptoparasites.

If that were true, tube-covered brachiopods should be lighter than their tube-free brethren, since they're getting less food. The researchers estimated the mass of brachiopods with and without tubes, finding that the tube-free brachiopods were almost always heavier than their tube-laden brethren, though the number of tubes didn't have any effect.

The study "demonstrates these organisms had an intimate association," says Leung, who wasn't involved in the study. But he isn't so sure that the relationship was antagonistic. If the relationship were truly parasitic, brachiopods with more tubes should be worse off, he says, but that wasn't the case. While brachiopods with tubes were smaller, Leung says this might not reflect a cost of parasitism. Instead, the tube creatures might just prefer to affix to smaller shells.

Whether a relationship is parasitic or not can depend on the ecological context. Tube-laden clams might become stressed by tubes only if food becomes scarce. Or, perhaps tubes catch food too small for the brachiopods anyway. “With these kinds of relationships, the answer isn’t always that this is good or bad,” Leung says. “Interactions are usually more complicated than that.”

CITATIONS

Z. Zhang *et al.* An encrusting kleptoparasite-host interaction from the early Cambrian. *Nature Communications*. Published online June 2, 2020. doi: 10.1038/s41467-020-16332-3.

D.J. Siveter *et al*. A 425-million-year-old Silurian Pentastomid Parasitic on Ostracods. *Current Biology*. Vol. 25, June 15, 2015, p. 1. doi: 10.1016/j.cub.2015.04.035