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Friday Fossil

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This week's friday fossil is *Mesolimulus*.



Although it's admittedly very pretty, *Mesolimulus* is actually a friday fossil because, if you were to wander along the Northwest Atlantic coast, you be forgiven for thinking *Mesolimulus* had become depetrified, had crawled out of the museums it was held in and had returned to the oceans once again.



This is not *Mesolimulus*, of course; it is *Limulus*, the horseshoe crab. But you could be forgiven for mistake it for the Mesozoic fossil, because it is so similar.

I'm not generally a fan of the term living fossil, because it implies that these things have just "not evolved" for however long. Instead, they've been selected for the same form, and there are likely to have been soft body changes that we just can't see. So, these fossil examples are just not the same thing as a modern *Limulus*, and so "living fossil" is a bit misleading.

However, the term is eerily appropriate in cases like horseshoe crabs. In fact, even the dinosaurs could have called the horseshoe crab a living fossil, because even in the Jurassic, horseshoe crabs hadn't changed much since the Ordovician. Not only that, they haven't really even changed their habitat; they've stuck with good-old shallow subtidal settings for 400 odd million years.



The oldest horseshoe crab in the fossil record, in Ordovician strata from Manitoba, found by Dave Rudkin of the ROM. A remarkable find, considering that the horseshoe crab's shell is not mineralized, and is made out of protein.

The horseshoe crab is actually a chelicerate, making it closer to a spider than a crab, and when it was around in the inland seas of the early Ordovician (and almost certainly earlier) it shared the waters with trilobites, eurypterids, and other extinct hunters. All these years later, horseshoe crabs are still here, having weathered the storm of 5 or so mass extinctions, whilst its fellow arthropod predators from the Paleozoic have all perished. Why did the horseshoe crab survive and not the others?

It's tempting to say, of course, that the horseshoe crab design is perfect, and just *works*. As my Dad says, if it ain't broke, don't fix it, and so maybe the horseshoe crab has just stuck to what it knows best, and its body form has kept it in good stead for all these years. It also helps being good at occupying the near shore environment, because that is a habitat that has always been around and probably always will be. But there may be another constraint at work, and this is genetics. Horseshoe crabs may be subject to genetic and developmental constraints that has frozen their bodyform and meant they were prevented from diversifying.

How much longer will horseshoe crabs last? Will geologists 400 million years in the future still be singing the praises of horseshoe crabs? I just hope that they won't be another animal to go extinct in the anthropocene. Because they are not too uncommon,

they are often collected en masse and ground into fertiliser, and they are used as bait for many different fish. Because of this harvesting, numbers are steadily declining.

In case you're worried about the plight of the horseshoe crab, there is one thing that you can do to help the horseshoe crab through the anthropocene. If you see a horseshoe crab lying on its back, just flip it over. 10% of the *Limulus* population is lost each year because they cannot turn themselves over. At least this way we can easily offset some of the damage we do in harvesting them.

Rudkin, D.M., Young, G.A.&Nowlan, G.S., 2008. The Oldest Horseshoe Crab: A New Xiphosurid from Late Ordovician Konservat-Lagerstätten Deposits, Manitoba, Canada. *Palaeontology*, 51(1), pp.1–9.

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