



A Summary of the Giant Devonian Scorpion

Praearcturus; Its Ecology, Fossils, and Size

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Summary

Praearcturus gigas was a gigantic aquatic scorpion from the early Devonian period. It is one of the largest scorpions known, though it is only known from fragments. It has been found in Europe and North America and lived in marine environments. It is usually cited as being a full meter long, but proportions of other scorpions point to a smaller size.

Taxonomic History

Praearcturus was a gigantic scorpion named by Woodward in 1871. He named it based on less than half of the posterior carapace and some coxae, but he thought it was a gigantic isopod. Rolfe (1969) said the fossils were, "Doubtful taxa formerly attributed to *Arthropleurida*". In Norway, 1971, Dr. Leif Stormer asked Erik Kjellesyig-Waering to restudy the *Praearcturus* lectotype to investigate the possibility of it being a scorpion. At first, Kjellesyig-Waering did not think it was a scorpion, but due to W.D. Ian Rolfe's persistence, it was finally identified as a gigantic *Holostern*. Photos they had looked at of *Praearcturus* looked very scorpion-like, especially the pedipalp.

Distribution

The lectotype of *Praearcturus* was found at Rowlestone Hill, Herefordshire England. The rocks here, from the Old Red Sandstone, are light grey, mica-rich sandstone. They have been dated to the Lochkovian of the Devonian, 419.2 – 410.8 Ma and would have been 1781 miles south of the equator.

The environment would have been terrestrial. (Kjellesyig-Waering, 1986, and The Paleobiology Database)

The second place *Praearcturus* has been found is the Wayne Herbert Quarry, also in Herefordshire. The rocks here are from the same formation and are very similar but have been dated to 416.0 - 412.3 Ma.

The environment would have been quite a bit wetter than Rowlestone Hill; it was coastal. Here, *Praearcturus* has been found alongside fish like *Pteraspis*, *Cephalaspis*, and an unidentified acanthodian. (Kjellesyig-Waering, 1986, and The Paleobiology Database)

Another place *Praearcturus* has been found is Woodhill Bay, Portishead England. It too is part of the Old Red Sandstone and represented a teeming river channel. Here *Praearcturus* lived in the shallow water at the edges of the channels, living alongside placoderms like *Coccosteus*, *Bothriolepis*, *Groenlandaspis*, *Phyllolepis*, lobe-finned fish like *Holoptychius*, Eurypterids like *Drepanopterus*, the phyllocarid crustacean *Ceratiocaris*, and burrowing worms like *Cochlichnus* and *Diplocraterion*. Plant remains have also been found here. (Lamsdell, Braddy, and Tetlie, 2009)

Finally, *Praearcturus* has been found in Wyoming. The rocks here are part of the Beartooth Butte Formation and have been dated to 419.2 – 410.8 Ma. These rocks represent a teeming estuary ecosystem, where *Praearcturus* lived alongside Pteraspids like *Cardipeltis*, *Lampraspis*, *Cosmaspis*, and *Protaspis*, bony fish like *Uranolophus*, Placoderms like *Aethaspis* and *Simblaspis*, and other fish like *Cephalaspis*. It also lived alongside other large scorpions like *Branchioscorpio*, *Hydroscorpius*, and *Acanthoscorpio*. These scorpions likely had different diets, so they would not have competed for the same food source. At the time, this ecosystem would have been 1316 miles south of the equator. (Kjellesyig-Waering, 1986, and The Paleobiology Database)

Fossils & body plan

The fossils of *Praearcturus* are surprisingly uncrushed. *Praearcturus* was dorsally covered in characteristic tubercles, some sporting small sensory hairs. The lectotype preserves less than half of the back of the carapace, but the parts that are preserved are in excellent condition. The carapace had large lateral lobes and raised posterior. Lateral cheeks are raised and covered in tubercles. A Ridge separates these cheeks, not seen in other scorpions. At base of these cheeks, there are two pits regarded as muscle attachments. The middle of the carapace is rounded, and the carapace gets narrower toward the front. The width at the end of the carapace is 10.2 cm; the middle is 10.0 cm.

The first tergite is very unusual, possibly being an internal structure. It is slightly under the carapace and does not have tubercles. This segment had muscle attachment pits, like the carapace. *Praearcturus* had an intersegment membrane, clear on the fossil. The chelicerae were partially preserved, partially covered by the coxae of the first pairs of legs (see *B* on fig. 1). Only the right pedipalp is known, and its tibia has a deep central sulcus. Its first joint had very coarse ridges (3 per millimeter) on the dorsal side, and these coxae could be swiveled to face the opposite one. These would then be rubbed together as a stridulating organ, making noise. This form of stridulating organ has been documented in modern arachnids, as well as the Triassic scorpion *Mesophonus*. However, this is the earliest of this known occurrence of this. The femur of the pedipalp has openings for setal hairs, used for sensory purposes. The hand is powerful, incomplete, and had many hairs and pustules. (Kjellesvig-Waering, 1986)

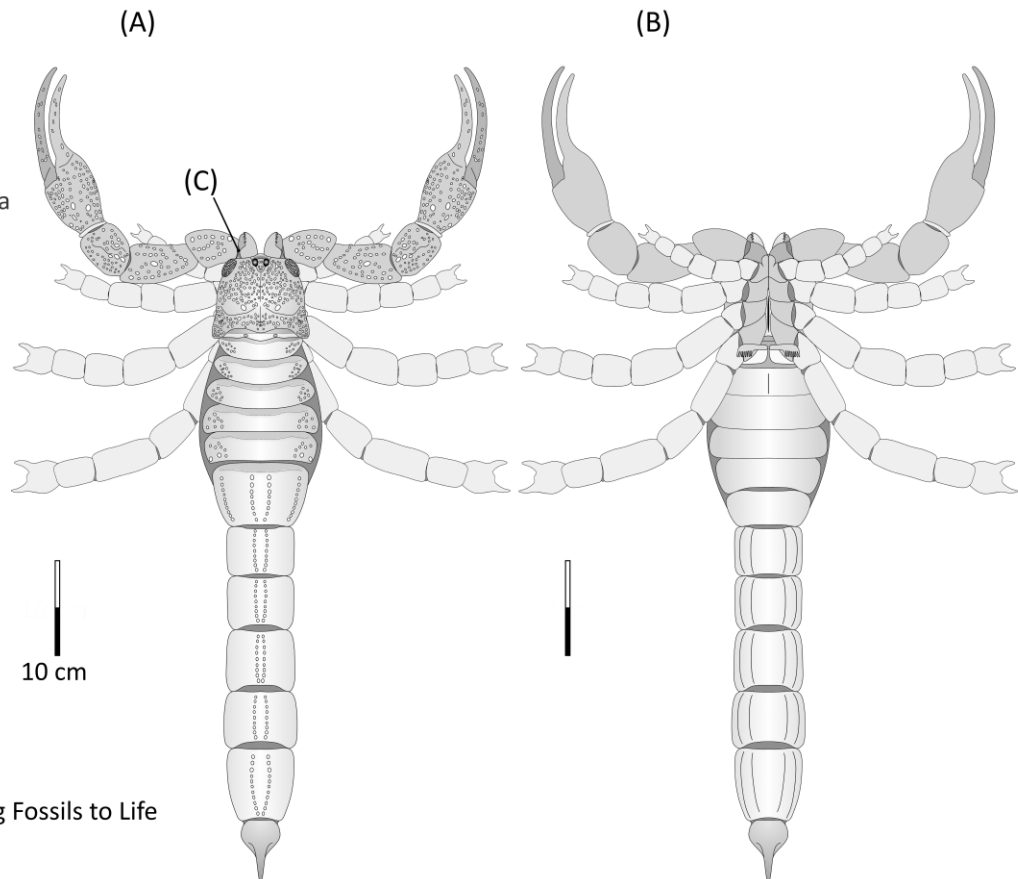
Praearcturus gigas

Woodward, 1871

Arthropoda
Chelicerata
Arachnida
Scorpiones
Holosternina
Spongiophonoidea
Praearcturidae

Herefordshire,
England
Wyoming, USA
Lochkovian of
the Devonian

Total length
roughly 65 cm



Reconstruction of *Praearcturus gigas*, missing parts filled in with a close relative, *Eramoscorpius*. (A) dorsal, (B) ventral.

A Note on Size

Fossil Scorpionida: KJellesyig-Waering sites *Praearcturus* as being a meter long, based on the size of the pedipalp. However, reconstructed proportions based on other closely related and similar scorpions like *Eramoscorpius* bring the estimate down much closer to 65 cm. Though this suggests *Praearcturus* as

being much smaller in terms of length than previously thought, it is still much larger than most other scorpions.

Ecology

Praearcturus has been found in mostly wet, aquatic, or semi-aquatic environments, so it can be assumed that it frequented water. While its legs are not known, save tiny fragments near the coxae, we can assume they were similar to other scorpions like *Eramoscorpius*. *Eramoscorpius* is thought to be able to crawl onto land or at least shallow water to shed its exoskeleton without the dangers of aquatic predators (Waddington, Rudkin, and Dunlop, 2015), and since the lectotype of *Praearcturus* was found in terrestrial deposits, it can be assumed that *Praearcturus* could probably at least crawl into shallow water. However, it does show coxapophyses, which points to aquatic feeding. This suggests that *Praearcturus* rarely went out of the water, if at all.

Being a primarily aquatic scorpion, *Praearcturus* would have fed on the many armored fish it lived alongside. It likely would have been an ambush predator, lying in wait at the bottom of a river channel or stream for a fish or other prey item to swim close enough for the giant scorpion to snatch it in its claws and sting it.

Sources

<https://www.biodiversitylibrary.org/bibliography/10119> Vol. 55, Pg. 125-129

<https://onlinelibrary.wiley.com/doi/full/10.1111/j.1475-4983.2009.00902.x>

https://paleobiodb.org/classic/basicCollectionSearch?collection_no=153544&is_real_user=1

https://paleobiodb.org/classic/basicCollectionSearch?collection_no=201736&is_real_user=1

https://paleobiodb.org/classic/basicCollectionSearch?collection_no=153534&is_real_user=1

https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=281570&is_real_user=1

<https://www.mindat.org/taxon-6893146.html>