

Dynasty of plankton-eating giants from Age of Dinosaurs revealed in new study

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(PhysOrg.com) -- Giant plankton-eating fish filled the prehistoric seas for more than 100 million years before they were wiped out in the same event that killed off the dinosaurs, new fossil evidence claims.

An international team, including Dr Jeff Liston of the Faculty of Biomedical and Life Sciences, describe, in a paper published by *Science* today, how new fossils from Asia, Europe and the US reveal a previously unknown dynasty of giant plankton-eating bony fish that once filled the seas of the Jurassic and Cretaceous periods, between 66 and

172 million years ago.

Dr Liston worked alongside experts from the University of Oxford, DePaul University in Chicago, Fort Hays State University in Kansas as well as the University of Kansas.

The experts believe they have discovered an important missing piece in the evolutionary story of fish, mammals and ocean ecosystems.

Dr Liston explains: "The giant plankton-feeders we know to live in today's oceans are among the largest living vertebrate animals alive. However before them the only real animal known to occupy this role was a large fish called Leedsichthys that lived in the Middle Jurassic, around 160 million years ago.

"The fact that creatures of this kind were missing from the fossil record - for over 100 million years seemed peculiar. What we have demonstrated here is that a long dynasty of giant bony fish filled this space in time for more than 100 million years.

"It was only after these fish vanished from the ecosystem that mammals and cartilaginous fish such as manta rays, basking sharks, whale sharks began to adapt to that ecological role."

The project began in Glasgow, with a review of the remains of the giant Jurassic fish Leedsichthys, in conjunction with the excavation of a new specimen of this creature.

Dr Liston, who ran the excavation in Peterborough, England, found it to be an anomaly.

"The existence of these large suspension-feeding fish at this time is highly significant, as it would seem to be the first clear evidence of the

presence of high levels of plankton in Earth's oceans - a 'smoking gun' that they were there in large numbers. This has implications for our understanding of biological productivity in modern oceans, and how that productivity has changed over time," said Dr Liston.

The smallest adult specimens of Leedsichthys are between eight and nine metres long, and other isolated remains indicate that they were capable of growing to over 12 metres - an equivalent size to today's suspension-feeding [sharks](#) - the whale shark and basking shark.

Leedsichthys had been an isolated example of a truly giant filter feeder in the oceans during the age of dinosaurs, with a puzzling gap between it and the first appearance of modern filter-feeders, some 100 million years later.

"The breakthrough came when we discovered additional fossils, similar to Leedsichthys, but from much younger rocks. These specimens indicated that there were giant filter-feeding fishes for much longer than we thought. We then started to go back to museum collections, and we began finding suspension-feeding fish fossils from all round the world, often unstudied or misidentified," continued Dr Liston.

Several of the most important new fossils - all from the same extinct bony fish family as Leedsichthys came from sites in the state of Kansas in the US. Other remains meanwhile, originated as far afield as Dorset and Kent in the UK, and Japan.

One of the best preserved Kansas specimens had historically been interpreted as similar to a fanged predatory swordfish. When members of the team began to clean the specimen, they were surprised to find a toothless gaping mouth, with an extensive network of thin elongate bony plates to extract huge quantities of microscopic plankton from large volumes of Late Cretaceous seawater.



The team named this four to five metre-long fish *Bonnerichthys*, in honour of the Kansas family who discovered the [fossil](#). The Cretaceous suspension-feeding fishes do not seem to have grown as large as the Middle Jurassic *Leedsichthys*

"The most important conclusion we show from these new discoveries is that rather than a blip on the evolutionary radar, this group of giant fishes had a long and successful history. They were cruising the oceans for at least 100 million years—substantially longer than any of the modern groups of giant plankton feeders have been around," added Dr Matt Friedman of the University of Oxford.

Provided by University of Glasgow

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