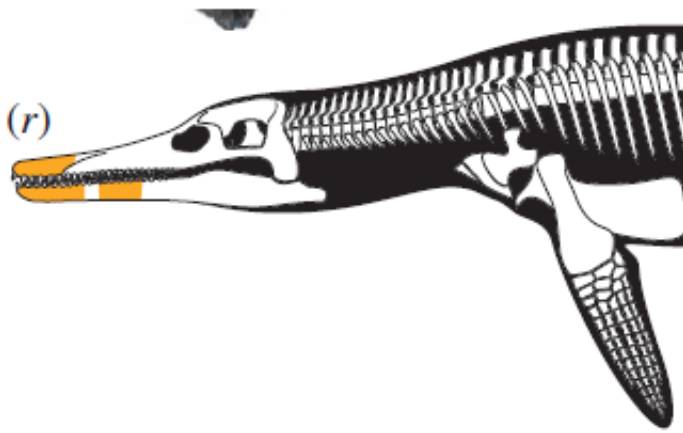


# Newly discovered pliosaur terrorised ancient Russian seas

January 18 2016, by Victoria Costello

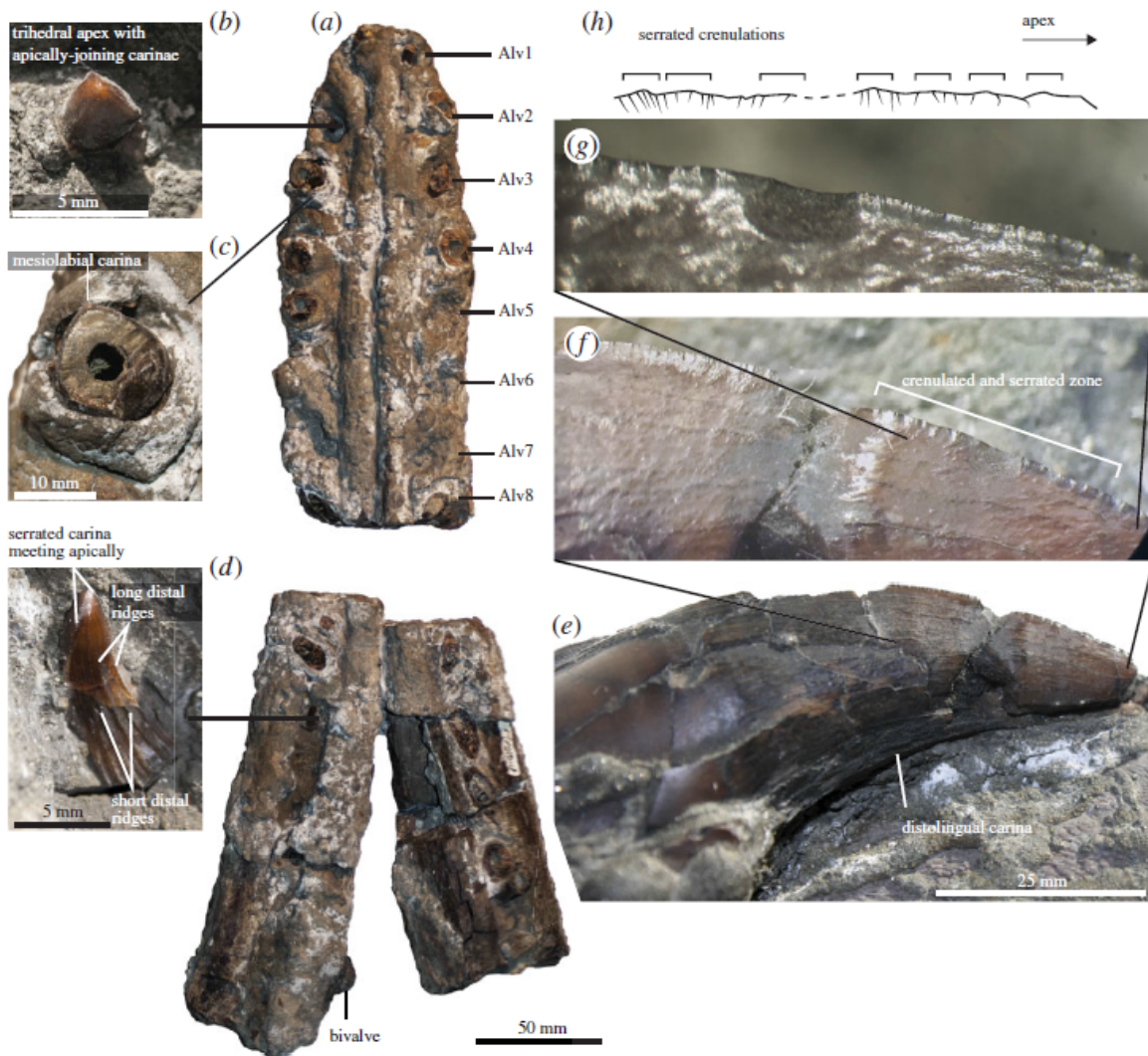
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The Mesozoic played host to some of the most dangerous predators to ever swim the Earth's oceans. Among these, pliosaurs were lethal hunters, and some of the largest predators ever on this planet. They were the shorter-necked cousins of the plesiosaurs, which are often spoken of in reference to their superficial similarity to the Loch Ness Monster, which we're definitely not going to do here. Together, pliosaurs and plesiosaurs form a group known as Sauropterygia, which existed in the oceans from the Triassic right until the end of the Cretaceous, when they went extinct along with the non-avian dinosaurs and other vertebrate groups. This actually makes sauropterygians the longest living group of marine-adapted tetrapods (animals with four limbs), which is quite an

impressive feat!

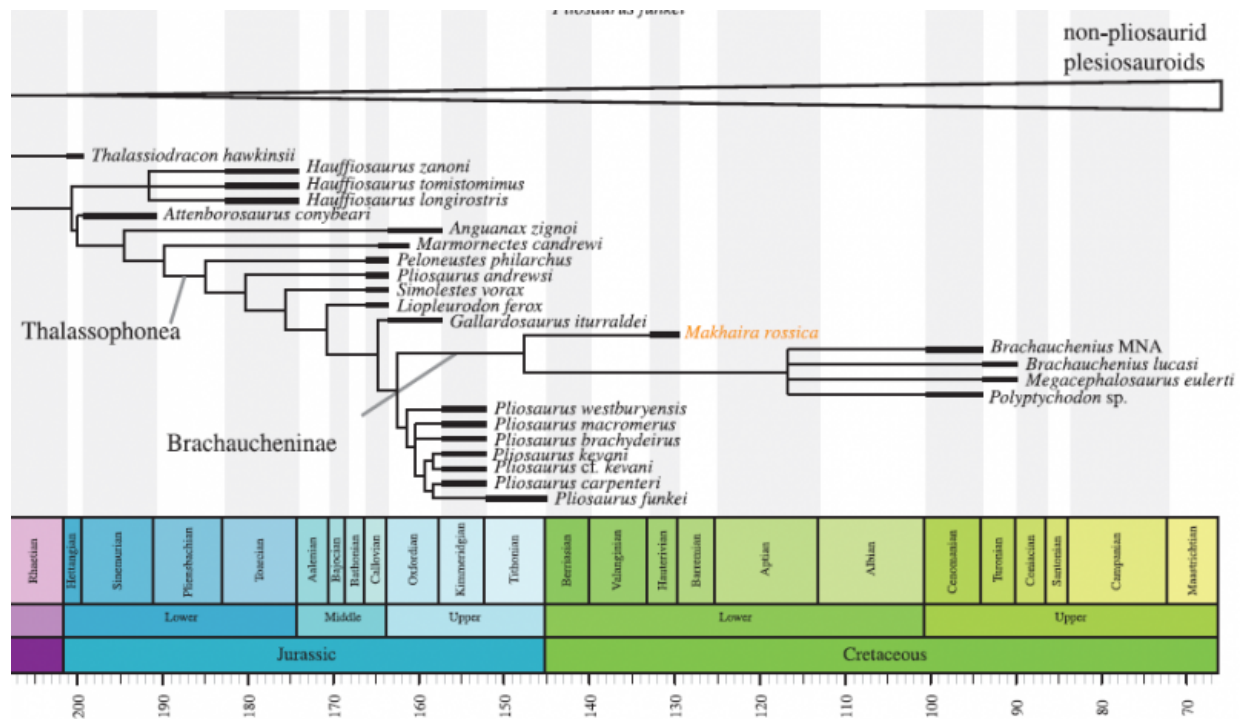
New discoveries show that perhaps this evolutionary success can be attributed to the ecological diversity that this group possessed, and in particular an ability to adapt to different feeding styles.



Fossils of the new pliosaur, Makhaira. Credit: From Fischer et al. 2015

Valentin Fischer from the University of Oxford and an international team of researchers have discovered a new pliosaur from western Russia, named *Makhaira rossica*. The name derives from the Latinized Ancient Greek word 'mákhaira', which describes a blade with a curved outline, as well as the Latin word 'rossica', which means Russian. The specimen comprises a fragmentary skeleton of a sub-adult animal, found within a series of limestone nodules along the banks of the Volga River.

*Makhaira* comes from a period in Earth's geological history, known as the earliest part of the Cretaceous, where our knowledge of vertebrate life is relatively poor due to the way in which fossils are differentially preserved through time. Sadly, this lack of knowledge means that our understanding of how faunas changed from the latest part of the Jurassic period into the first part of the Cretaceous is relatively poor compared to other important geological boundaries.



Evolutionary relationships of Makhaira with other Jurassic and Cretaceous pliosaurs. Fischer et al. 2015.

Analysis of the evolutionary placement of this [new species](#) places it as the most basal member of a group known as Brachaucheninae, which survived through the Cretaceous. However, the new species is different in being a little smaller than some of its more advanced relatives.

The weirdest feature of the new beastly has to be the teeth. The teeth occur in pairs, and have a trihedral form, meaning they had three peaks on each alveolus, and the edges of the teeth were adorned with wicked serrations. They were also very large, similar even to some teeth from theropod dinosaurs roaming the lands at the time!

The morphology of these teeth suggest that they were equipped just for one thing – devouring other large animals! This form of feeding is known as macrophagy, and was a common form of predation at the time for giant marine crocodyliforms (the ancestors of modern crocodiles) called metriorhynchids. Importantly, this feeding style previously seemed to have been lost in the early evolution of other brachauchenine pliosaurs, but now appears to have been present in at least one species from this group. This shows that Early Cretaceous pliosaurs were still well adapted to hypercarnivory, and retained a high feeding diversity at the beginning of the Cretaceous, and not lost from their Jurassic ancestors.

Recently, Alessandro Chiarenza, a colleague of mine at Imperial College London, reported on what appeared to be the oldest metriorhynchid remains currently known, from a fossil site in Sicily. Based on a single fossilised tooth from a period known as the Aptian, later on in the Cretaceous than when Makhaira was found, these remains extended the

duration of metriorhynchids, and their eventual extinction, by several millions of years. However, the morphology of the teeth of Makhaira wasn't known at the time of publishing the crocodyliform fossils, and it seems that it is actually impossible to distinguish between these and the teeth of some metriorhynchids. This means that the Sicilian tooth cannot be referred unequivocally to either a metriorhynchid or a pliosaur – the [teeth](#) of some species is just too similar to say for certain! What does this imply though? Well, it seems that the fate of metriorhynchids is still a mystery concealed by the fossil record, and is only something that future study of these fossils, their other monstrous counterparts, and discovery of new fossils can hope to solve!

**More information:** Valentin Fischer et al. Peculiar macrophagous adaptations in a new Cretaceous pliosaurid, *Royal Society Open Science* (2015). [DOI: 10.1098/rsos.150552](https://doi.org/10.1098/rsos.150552)

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