

The rise and rise of the flying reptiles

July 6 2011



Extremes in pterosaur morphology. The giant and probably flightless Quetzalcoatlus from the Late Cretaceous of Texas was as tall as a giraffe. The small insectivorous Anurognathus from the Late Jurassic of Germany is seen flying above the artist's head. Drawings by Mark Witton.

(PhysOrg.com) -- Pterosaurs, flying reptiles from the time of the dinosaurs, were not driven to extinction by the birds, but in fact they continued to diversify and innovate for millions of years afterwards.

A new study by Katy Prentice, done as part of her undergraduate degree (MSci in Palaeontology and Evolution) at the University of Bristol, shows that the pterosaurs evolved in a most unusual way, becoming more and more specialised through their 160 million years on Earth. The work is published today in the *Journal of Systematic Palaeontology*.

'Usually, when a new group of [animals](#) or [plants](#) evolves, they quickly try out all the options. When we did this study, we thought pterosaurs would be the same,' said Katy. 'Pterosaurs were the first flying animals – they appeared on [Earth](#) 50 [million years](#) before Archaeopteryx, the first bird – and they were good at what they did. But the amazing thing is that they didn't really begin to evolve until after the [birds](#) had appeared.'



Diversity in cranial characters of the pterodactyloid pterosaurs, showing variations in jaw shape, presence and absence of teeth, skull proportions, and crests on the snout and back of the skull. Pterosaurs shown are: A, Dimorphodon; B, Rhamphorhynchus; C, Coloborhynchus; D, Pteranodon; E, Pterodactylus; F, Pterodaustro; G, Dsungaripterus; H, Tupandactylus; I, Thalassodromeus. Drawing by Mark Witton.

Katy's study was done in conjunction with her supervisors, Dr Marcello Ruta and Professor Michael Benton. They looked at 50 different pterosaurs that ranged in size from a blackbird to the largest of all, Quetzalcoatlus, with a wingspan of 12 metres, four times the size of the largest flying bird today, the albatross. They tracked how all the pterosaur groups came and went through their history and recorded in detail their body shapes and adaptations.

The new work shows that pterosaurs remained conservative for 70 million years, and then started to experiment with all kinds of new modes of life. After birds emerged and became successful, the pterosaurs were not pushed to extinction, as had been suggested. It seems they responded to the new flyers by becoming larger and trying out new lifestyles. Many of the new lifestyle adaptations were seen in the pterosaurs skulls, as they adapted to feed on different food sources; some were seed-eaters, many ate fish, and later ones even lost their teeth. The rest of the body also showed a surprising amount of variation between different groups, when considering that the body forms have to retain many features to allow flight.

'Pterosaurs were at the height of their success about 125 million years ago, just as the birds became really diverse too,' said Dr Marcello Ruta. 'Our new numerical studies of all their physical features show they became three times as diverse in adaptations in the Early Cretaceous than they had been in the Jurassic, before Archaeopteryx and the birds appeared.'

Pterosaurs dwindled and disappeared 65 million years during the mass extinction that killed the dinosaurs. In their day they had been a fair match for the birds, and the two groups divided up aerial ecospace between them, so avoiding conflict.

'We're delighted to see a student mastering some tough mathematical techniques, and coming up with such a clear-cut result,' said Professor Michael Benton. 'Palaeontologists have often speculated about the coming and going of different groups of animals through time, but the new study provides a set of objective measurements of the relative success and breadth of adaptation of [pterosaurs](#) through their long time on the Earth.'

More information: 'Evolution of morphological disparity in

pterosaurs' by Katherine C. Prentice, Marcello Ruta and Michael J. Benton in *Journal of Systematic Palaeontology*.

www.tandfonline.com/action/show...?journalCode=tjsp20&

Provided by University of Bristol

Citation: The rise and rise of the flying reptiles (2011, July 6) retrieved 12 May 2024 from <https://phys.org/news/2011-07-reptiles.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.