Giant flying reptiles preferred to walk

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New research into gigantic flying reptiles has found that they weren't all gull-like predators grabbing fish from the water but that some were strongly adapted for life on the ground.

Pterosaurs lived during the age of dinosaurs 230 to 65 million years ago. A new study, published in PLoS ONE this week, by researchers at the University of Portsmouth on one particular type of pterosaur, the azhdarchids, claims they were more likely to stalk animals on foot than to fly.

Until now virtually all pterosaurs have been imagined by palaeontologists to have lived like modern seabirds: as gull- or pelican-like predators that flew over lakes and oceans, grabbing fish from the water. But a study of azhdarchid anatomy, footprints and the distribution of their fossils by Mark Witton and Dr Darren Naish shows that this stereotype does not apply to all flying reptiles and some were strongly adapted for terrestrial life.

Azhdarchids were probably better than any other ptersosaurs at walking because they had long limbs and skulls well suited for picking up small animals and other food from the ground.

Azhdarchids, named after the Uzbek word for 'dragon', were gigantic toothless pterosaurs. Azhdarchids include the largest of all pterosaurs: some had wingspans exceeding 10 metres and the biggest ones were as tall as a giraffe.

Dr Naish said: “Azhdarchids first became reasonably well known in the 1970s but how they lived has been the subject of much debate. Originally described as vulture-like scavengers, they were later suggested to be mud-probers (sticking their long bills into the ground in search of prey), and later still suggested to make a living by flying over the water’s surface, grabbing fish.

“Other lifestyles have been suggested too. These lifestyles all seem radically divergent so Mark and I sat down and carefully examined the evidence and we argue that azhdarchids were specialised terrestrial stalkers. All the details of their anatomy, and the environment their fossils are found in, show that they made their living by walking around, reaching down to grab and pick up animals and other prey.”

Animals like azhdarchids no longer exist but the closest analogues in the modern world are large ground-feeding birds like ground-hornbills and storks.

The researchers studied fossils in London, Portsmouth and Germany and compared the anatomy of azhdarchid with those of modern animals. This showed that azhdarchids were strikingly different from mud-probers and animals that grab prey from the water’s surface while in flight.

Dr Naish said: “We also worked out the range of motion possible in the azhdarchid neck: this bizarrely stiff neck has previously been a problem for other ideas about azhdarchid lifestyle, but it fits with our model as all a terrestrial stalker needs to do its raise and lower its bill tip to the ground.”

Other aspects of azhdarchid anatomy, such as their relatively small padded feet and long but weak jaws often pose problems in other proposed lifestyles but fit perfectly with the terrestrial stalker hypothesis. Mr Witton said: “The small feet of azhdarchids were no good

for wading around lake margins or swimming should they land on water but are excellent for strutting around on land. As for what azhdarchids would eat, they'd have snapped up bite-size animals or even bits of fruit. But if your skull is over two metres in length then bite-size includes everything up to a dinosaur the size of a fox."

The researchers found that over 50 percent of azhdarchid fossils come from sediments that were laid down inland. Significantly, the only articulated azhdarchid fossils we have come from these inland sediments.

Citation: Witton MP, Naish D (2008) A Reappraisal of Azhdarchid Pterosaur Functional Morphology and Paleoecology. PLoS ONE 3(5): e2271. doi:10.1371/journal.pone.0002271; www.plosone.org/doi/pone.0002271

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