Chicken-hearted tyrants: Predatory dinosaurs as baby killers

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Two titans fighting a bloody battle -- that often turns fatal for both of them. This is how big predatory dinosaurs like Tyrannosaurus are often depicted while hunting down their supposed prey: even larger herbivorous dinosaurs. The fossils, though, do not account for that kind of hunting behavior but indicate that theropods, the large predatory dinosaurs, were frying much smaller fish.

Dr. Oliver Rauhut, paleontologist at Ludwig-Maximilians-Universität (LMU) in Munich, and his collegue Dr. David Hone surmise that giant carnivores like Tyrannosaurus preyed mainly on juvenile dinosaurs. "Unlike their adult and well-armed relatives these young animals hardly posed any risk to the predators," says Rauhut. "And their tender bones would have added important minerals to a theropod's diet. Now we hope for more fossils to be found that add new evidence to our hypothesis." (*Lethaia* online, 3 August 2009)

He's the king of tyrants: Tyrannosaurus rex is by far the most famous dinosaur. Not even recent finds of slightly bigger - and maybe even more terrifying - species like Giganotosaurus could dent the aura of "T-Rex". But what would happen if the king turned out a baby killer instead of fearless hunter of much bigger prey? "Animals such as Tyrannosaurus are often seen as the perfect 'killing machines' with extremely powerful bites, which were able to bring down even the largest possible prey," says Rauhut of the Bayerische Staatssammlung für Paläontologie und Geologie and LMU Munich. "But the very few fossils that reflect the hunt of predatory dinosaurs on large herbivores tell a tale of failure - the

prey either got away, or both prey and predator were killed."

On the other hand, the also extremely sparse cases of direct evidence for the diet of predatory dinosaurs - stomach contents and coprolites - show that juveniles or much smaller prey species were ingested and the latter were swallowed whole. Rauhut and Hone, who is now at the Institute of Vertebrate Paleontology and Paleoanthropology in Beijing, China, therefore propose as a hypothesis that large predatory dinosaurs only as an exception attacked other large dinosaurs, but mainly fed on juveniles. "Even modern predators prefer old and sick animals or unexperienced young individuals," states Hone. "These are an easy prey to bring down and the risk of injury for the predator is much lower. This strategy was probably the same in dinosaurs."

Another look at recent predators reveals an additional benefit of young prey: Crocodiles, the closest living relatives of dinosaurs, have extremely strong acids in their stomachs. They can completely dissolve the poorly ossified bones of young animals which adds important nutrients to the reptiles' diet. The fossil finds of juvenile dinosaurs that have been swallowed whole by theropods support the idea that dinosaurs might have profited from this as well. Missing fossils, though, lend even more plausibility: "Finds of dinosaur nesting sites indicate that they contained large numbers of eggs which should have resulted in a high number of offspring," says Rauhut. "But little of this is reflected in the fossil record: Juvenile dinosaurs are surprisingly rare - maybe because many of them have been eaten by predators. Hopefully there will soon be more evidence to help us really understand the theropods' hunting behavior."

More information: "Feeding behaviour and bone utilization by theropod dinosaurs;" David W. E. Hone and Oliver W. M. Rauhut; *Lethaia* online, 3 August 2009; DOI: 10.1111/j.1502-3931.2009.00187.x

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