

New research discovers adult Komodo teeth are surprisingly similar to those of theropod dinosaurs

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Kilat, 20-year-old Komodo dragon. Credit: Toronto Zoo

Kilat, the largest living lizard at the Toronto Metro Zoo, like other members of his species (*Varanus komodoensis*), truly deserves to be

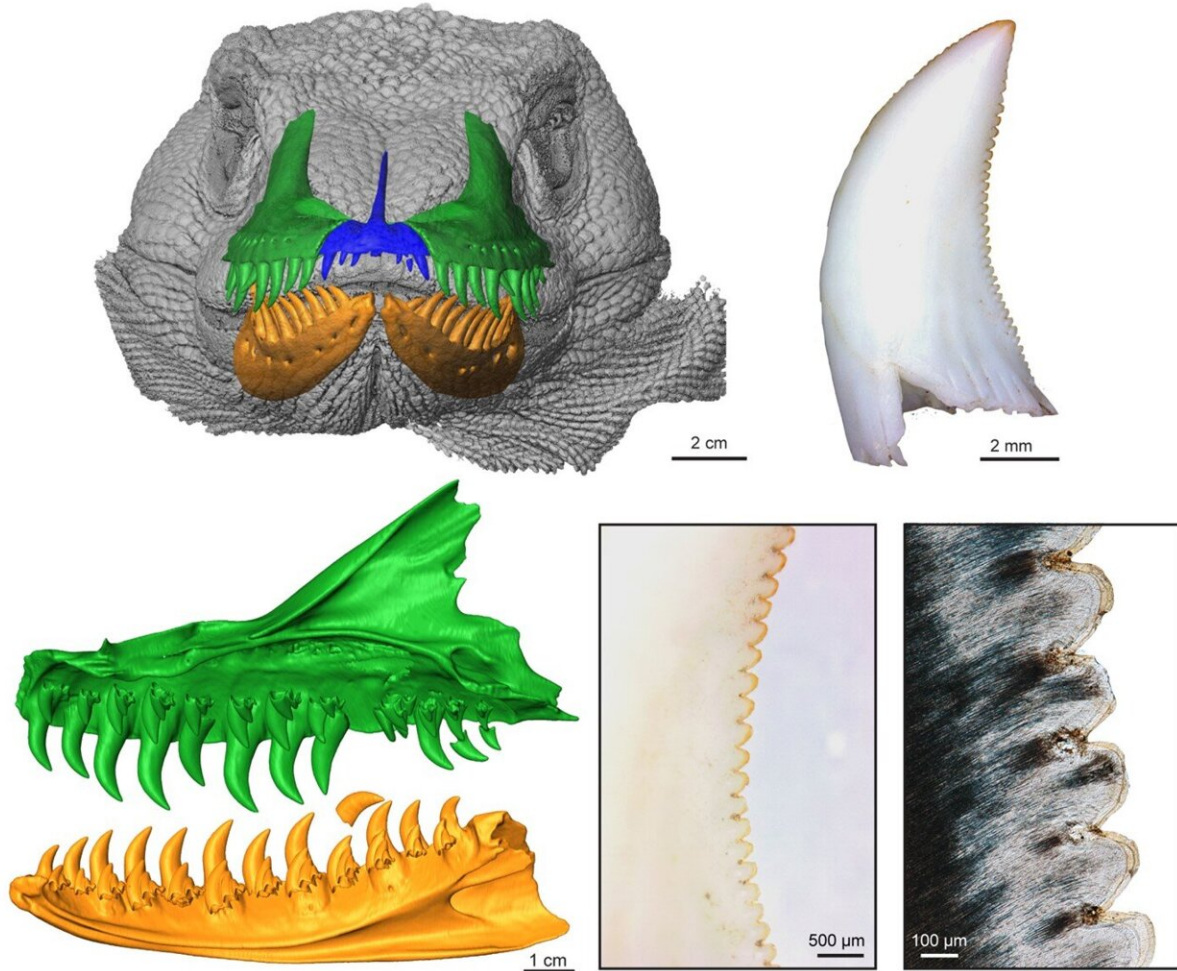
called the Komodo dragon. His impressive size and the way he looks at you and tracks your every move makes you realize that he is an apex predator, not unlike a ferocious theropod dinosaur.

So, it is not surprising when you look around at his enclosure to find that there are shed teeth sparkling on the ground, a common find when hunting for Mesozoic [theropod dinosaurs](#). This startling phenomenon has led researchers to study the teeth and feeding behavior of this predator. The Toronto Zoo Team collected many shed teeth and allowed the team to undertake this study, and skulls in the skeletal collection of the Royal Ontario Museum were also made available to them.

Previous studies have focused on the unique feeding behavior of the Komodo dragon but have not related this to its unique dental morphology, development, and replacement. The team examined the dentition and jaws of adults and juveniles with a combination of histological analysis and computed tomography (CT). They discovered that the adult Komodo teeth were surprisingly similar to those of theropod dinosaurs, with the strongly recurved teeth of adults having serrated cutting edges that were strengthened by dentine cores.

"We were very excited by this discovery because it makes the Komodo an ideal living model organism for studies of the life history and feeding strategies of the extinct theropod dinosaurs," said Ph.D. student Tea Maho, lead author of a [paper](#) on this research, published in *PLOS ONE*.

The Komodo dragon, like most other reptiles, including the extinct theropod dinosaurs, replaces its teeth continuously throughout its life. The histology—a common technique for studying the microstructure of teeth—and X-ray CT of Komodo dragon heads showed that the Komodo dragon maintains up to five replacement teeth per tooth position in their jaws.



Shed teeth, histology and X-ray CT reveal exceptionally rapid tooth development in the largest living lizard. Credit: Tea Maho, University of Toronto Mississauga

"Having this many teeth within the jaw at a given time is a unique feature among predatory reptiles, and only seen in the Komodo," noted Dr. Robert Reisz, co-author of the research paper.

Most other known reptiles have one or at most two replacement teeth in the jaw, and this includes most theropod dinosaurs. Perhaps the most

surprising discovery was that the Komodo started to make new teeth in each tooth position every 40 days. This is why there were so many shed teeth in the Komodo dragon enclosure, and this is how new teeth very rapidly replace the old functional teeth. Other reptiles, including most theropod dinosaurs, usually took three months to make a replacement tooth, sometimes as long as a year.

"So, if in the wild a tooth breaks during prey capture or defleshing, no problem, a new one would replace the broken tooth very quickly," explained Tea Maho.

Since the team had skulls and teeth of both adults and juveniles of the Komodo, they were also able to discover an interesting correlation between the Komodo dragons' teeth and their feeding behavior. Hatchlings and juvenile Komodos have more delicate teeth, not suited for the typical defleshing behavior of the adults, and spend most of their time in the trees, avoiding the adults and feeding mainly on insects and small vertebrates.

As they grow to adult size, their teeth change dramatically in shape, and they eventually descend from the trees to become apex predators, able to attack and kill anything in their domain.

The researchers also noticed that the front [teeth](#) of the Komodo adults are either very small or completely missing. This unusual dental morphology correlates well with their tongue-flicking behavior, using the slender, forked snake-like tongue to forage for prey without having to open the mouth.

More information: Tea Maho et al, Exceptionally rapid tooth development and ontogenetic changes in the feeding apparatus of the Komodo dragon, *PLOS ONE* (2024). [DOI: 10.1371/journal.pone.0295002](#)

Provided by University of Toronto

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