EXTINCT

TYRANNOSAURUS REX

Ben Garrod

Illustrated by Gabriel Ugueto

ZEPHYR

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Head of Zeus Ltd
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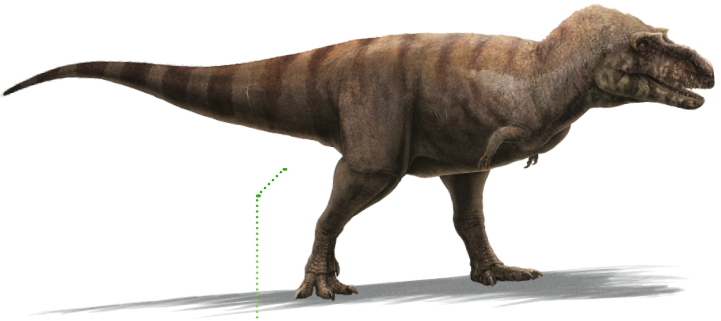
WWW.HEADOFZEUS.COM



What: *Albertosaurus*
Name meaning: 'Alberta lizard'
When/where: 70 million years ago in Canada
Size: 9m long, 2 tonnes (same as a family car)
Did you know? It was a pack hunter – fossils from 26 animals were found at the Dry Island bonebed site

What: *Daspletosaurus* (daz-plet-O sor-us)
Name meaning: 'frightful lizard'
When/where: Between 77 and 74 million years ago in North America
Size: 9m long, could weigh almost 4 tonnes
Did you know? It had the longest forelimbs of any tyrannosaurid

The tyrannosaurids have two parts to their family – the Albertosaurs (al-bert O-sorz) and the tyrannosaurs. Scientists think there may have been about 11 different branches on the Tyrannosauridae tree but some believe there might only have been three. The truth is that we don't know yet and *T. rex* is just a branch in a much more complex family tree.

All of the tyrannosaurids were big, two-legged carnivores, with huge, broad skulls and large teeth. They had long legs and were fast for their size but their arms were small and they usually only had two digits (fingers). Fossils of tyrannosaurids have been found in North America and Asia and when alive, these animals were nearly always the biggest predators in their ecosystems.

ECOLOGY

In brand new research scientists have predicted there may have

been as many as 2.5 billion *T. rex* during their existence. That means over 20,000 were alive at any one time at the end of the Cretaceous.

To fully understand *Tyrannosaurus rex*, we need to look at its environment, the other species (animals, plants, fungi and other organisms within that environment, the role *T. rex* played and the relationship it had with every other part of that ecosystem. The role of a species within its environment and the relationship it has with every other part of its ecosystem is known as its ecology. In many ways, the ecology of *T. rex* is pretty simple to understand. It was mostly a one-way relationship in that *T. rex* was a predator and preyed on other species.

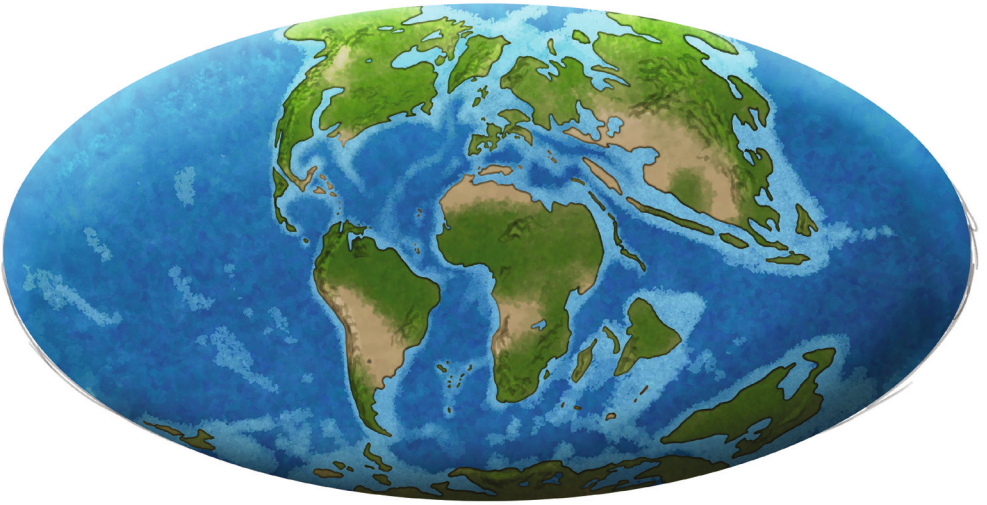
As *T. rex* had a wide distribution across Laramidia (la-ra mid-EE-a), the long, thin, ancient island continent which forms part of the USA today, they would have been found in different habitats. It appears

There is still much to learn about the social behaviour and hunting techniques of *T. rex*. The death of a large animal often brings predators together even if they are not usually social. This dead *Alamosaurus* has attracted a group of *T. rex*, which will feast here for months.

T. rex would have ranged from Canada in the north to as far south as New Mexico. *T. rex* would have existed, 66 million years ago, in desert-like plains, subtropical coastal habitats and inland, slow-flowing swampy environments, similar to the American everglades today. Overall, the environment was said to be subtropical, with a humid, warm climate. In the northern portion of its range, *T. rex* would have encountered *Triceratops* as the most common herbivore, while the large titanosaur *Alamosaurus* (alla-mo sor-us) dominated the southern part of their range.

When

The Cretaceous period was the last of the three geological stages made famous by the dinosaurs and it stretched between 145 million and 66 million years ago. Fossilised bones from *Tyrannosaurus rex* have been dated from between 68 million and 66 million years ago, showing that *T. rex* lived right at the end of the Cretaceous period and was one of the last dinosaurs around before the asteroid struck.



This is how the Earth looked at the end of the Cretaceous period.

Where

From fossil discoveries, it appears *Tyrannosaurus rex* had a much wider range than other members of the tyrannosaur group. They were restricted to the ancient island continent Laramidia, which now forms part of the North American continent. Fossils are restricted to western parts of North America, in an area known as the Hell Creek Formation,

across Montana, South Dakota, North Dakota and Wyoming in the USA, and in Alberta and Saskatchewan in Canada.

Environment

The greatest of the ancient land masses was Pangaea (pan JEE-a), a supercontinent that formed around 335 million years ago and dominated the planet, before starting to break up around 160 million years later. The *smaller* parts would go on to become the continents we know today, although they looked different then. The breakup of Pangaea started during the Jurassic and continues to this day, though its separation was mostly complete by the end of the Cretaceous period. Throughout most of the period, North America was two separate blocks of land, separated by a narrow, shallow sea. The western land mass was called Laramidia and Appalachia (ap-a LAY-SHE-a) sat to the east.

Over the course of the Cretaceous, the climate warmed up, so that by the time *T. rex* was stalking Laramidia, the temperature was between 21 and 23°C, in the location which is now western Texas. If you take an average temperature across the whole of the Cretaceous period, the Earth was about 4°C warmer than it is today, but looking specifically at Laramidia at the time when *T. rex* was alive, the average temperature was 22°C, which is almost the same as the average for western Texas now.

Unlike today, when there is a large range of temperature between the tropical, hot equator and either of the freezing cold poles, temperature across the planet was more even in the Cretaceous. Without the range in temperature, there would have been weaker winds and, because of that, weaker ocean currents. The Earth's oceans would have been more stagnant during the late Cretaceous, making it difficult for life as the surface water temperature in tropical seas may have reached an almost unbelievable 42°C, 17°C warmer than they are today.