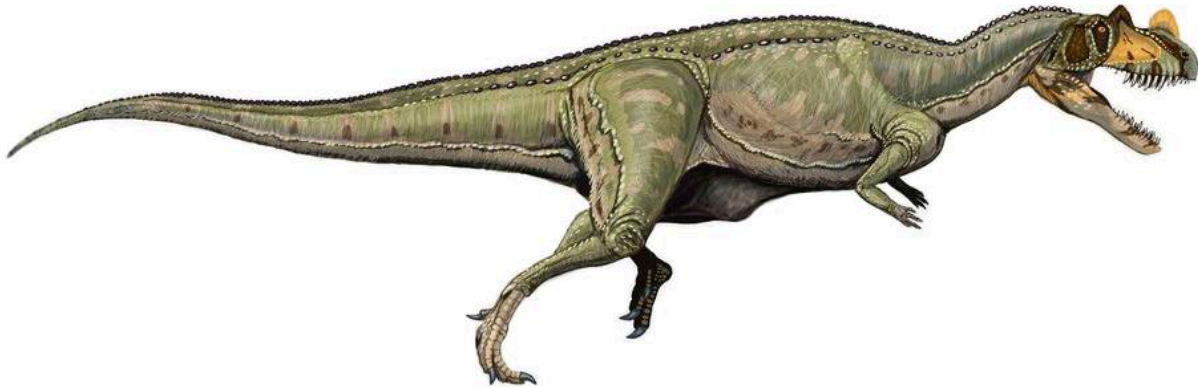


Ceratosaurus: A Fast-Growing, Ecologically Distinct Predator of the Late Jurassic

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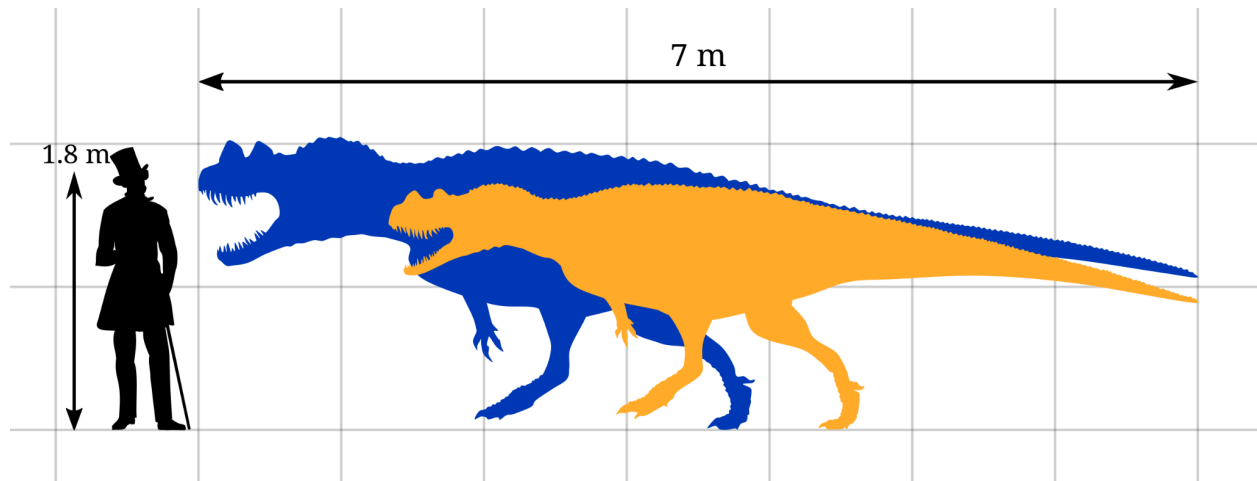


Life reconstruction of Ceratosaurus. Image credit: DiBgd

Ceratosaurus was a medium-to-large carnivorous theropod of the Late Jurassic Morrison Formation, recognizable by its nasal horn, paired lacrimal bumps, and a series of small midline osteoderms along the back and tail (Madsen & Welles, 2000). Most well-preserved adults measure around 5–7 m in total length, though new specimens show considerable size variation across individuals and localities (Madsen & Welles, 2000; Foster, 2003). Its deep, laterally compressed tail and dermal ornamentation distinguish it from contemporaneous large theropods such as Allosaurus, hinting at a different locomotor profile and ecological role (Madsen & Welles, 2000; Foster, 2003).

Recent osteohistological research reveals that Ceratosaurus grew far more rapidly than previously assumed. Sombathy et al. (2025) documented annual growth rates several times higher than those of smaller ceratosaurian relatives, indicating a quicker progression from juvenile to adult size. This pattern, supported by multiple limb and rib thin sections, suggests Ceratosaurus passed through vulnerable early life stages relatively quickly, reaching functional predatory size sooner than a slower-growing theropod would. While rapid early growth does not necessarily imply a short lifespan, it does point to a life history in which juveniles grew quickly before transitioning into a more conservative, maintenance-focused adult phase (Sombathy et al., 2025).

These growth dynamics carry significant ecological implications. Rapidly growing juveniles could occupy different feeding niches from adults, reducing intraspecific and interspecific competition and broadening the species' overall ecological range.



Size of two specimens compared to a human, with the holotype of *Ceratosaurus nasicornis* (USNM 4735) in orange and a larger specimen (UMNH VP 5278) in blue. Image credit: PaleoGeekSquared

Ceratosaurus remains are rarer than those of *Allosaurus* at many Morrison sites, a pattern partly attributable to taphonomic and collection biases but possibly also to lower population densities and fast-passing juvenile stages. The recent discovery and public sale of a juvenile specimen underscores how limited our understanding of early ontogeny remains and how crucial juvenile material is for refining ecological interpretations (Sombathy et al., 2025).

Histological sampling of an osteoderm and rib also sheds light on hypotheses about *Ceratosaurus*' lifestyle. Earlier proposals of semi-aquatic habits, based on skull shape, presumed prey, and dermal structures are not strongly supported by the new data. The osteoderm's well-vascularized bone tissue indicates a biologically active role (display, protection, or physiological function) rather than a passive, water-adapted structure (Sombathy et al., 2025).

When paired with sedimentological evidence for seasonal floodplains, this supports a model of *Ceratosaurus* as a primarily terrestrial predator capable of exploiting riparian resources when they were advantageous, rather than as a specialized semi-aquatic hunter.

Functional studies show that *Ceratosaurus* likely used fast, slashing bites powered by robust and rapidly acting neck muscles, contrasting with the high-force, bone-crushing strategies seen in later tyrannosaurids (Snively & Russell, 2007). Its long, narrow skull and elongate maxillary teeth support a predatory repertoire focused on swift strikes, possibly targeting small-to-medium terrestrial prey or ambushing animals near waterways. Dental-frequency and taphonomic patterns suggesting a link to aquatic or semi-aquatic prey (Bakker & Bir, 2004) remain debated, and likely reflect opportunistic foraging rather than a tightly specialized feeding mode (Yun, 2019).

Within the diverse Morrison theropod guild, niche partitioning was essential for the coexistence of *Ceratosaurus*, *Allosaurus*, and *Torvosaurus* (Foster, 2003). The relative rarity of *Ceratosaurus* fossils, combined with its distinct morphology narrow skull, deep tail, and midline osteoderms supports the idea that it inhabited different microhabitats or pursued different prey than its more common contemporaries (Madsen & Welles, 2000; Foster, 2003). Integrating morphology, functional anatomy, occurrence patterns, and new histology, the emerging picture is of a nimble, quick-striking, and ecologically flexible predator that occupied a distinct but overlapping niche within Morrison ecosystems (Snively & Russell, 2007; Bakker & Bir, 2004; Sombathy et al., 2025).

Overall, *Ceratosaurus* appears to have combined rapid juvenile growth, versatile feeding behavior, and a unique suite of anatomical traits that allowed it to persist as a stable component of Late Jurassic predator communities. Future research particularly isotopic dietary analyses, expanded ontogenetic series, and comparative biomechanical modeling will refine how specialized or generalist this theropod truly was. Current evidence, however, supports a predator that grew quickly, struck rapidly, and exploited an ecological role distinct from that of its more famous Morrison contemporaries (Snively & Russell, 2007; Sombathy et al., 2025).

References

Bakker, R. T., & Bir, G. (2004). Discussion of Ceratosaurus and possible aquatic prey preference. In *Feathered Dragons: Studies on the Transition from Dinosaurs to Birds* (Chapter discussion). Indiana University Press.

Foster, J. (2003). *Paleoecological Analysis of the Vertebrate Fauna of the Morrison Formation (Upper Jurassic), Rocky Mountain Region, U.S.A.* New Mexico Museum of Natural History and Science Bulletin 23.

— See also: Foster, J. (2020). *Jurassic West: The Dinosaurs of the Morrison Formation* (2nd ed.). Indiana University Press.

Madsen, J. H., Jr., & Welles, S. P. (2000). *Ceratosaurus (Dinosauria: Theropoda): A Revised Osteology*. Utah Geological Survey Miscellaneous Publication MP-00-2.

Snively, E., & Russell, A. P. (2007). Functional variation of neck muscles and their relation to feeding style in Tyrannosauridae and other large theropod dinosaurs. *The Anatomical Record*, 290(8), 934–957. <https://doi.org/10.1002/ar.20563>

Sombathy, R., O'Connor, P. M., & D'Emic, M. D. (2025). Osteohistology of the unusually fast-growing theropod dinosaur *Ceratosaurus*. *Journal of Anatomy*, 247(3–4), 765–789.

<https://doi.org/10.1111/joa.14186>

(PMCID: 12397097; PMID: 39909856)

Yun, C. (2019). Comments on the ecology of the Jurassic theropod *Ceratosaurus* (Dinosauria: Theropoda) with a critical reevaluation of the proposed semiaquatic lifestyle. *Vestnik of the Geologic Society* (journal citation as given).