

THE PALEOECOLOGY OF THE LATE CRETACEOUS TURTLE *BASILEMYS*

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The fossil turtle *Basilemys* is known from the Upper Cretaceous of the Western Interior of North America, including the San Juan Basin of northwestern New Mexico. We analyze its paleoecology based on shell proportions, forelimb proportions and femur morphology. *B. variolosa* from Alberta has a shape unlike any living turtle: it has a carapace-width-to-plastron-width ratio of 1.36 and a length-to-height ratio of 13.48. *B. gaffneyi* from New Mexico is similar in age to *B. variolosa* but has a distinctly taller carapace with a length-to-height ratio of ~2.6 and a slightly higher carapace-width-to-plastron-width ratio of ~1.6. *B. morrinensis* from Alberta has a carapace-to-plastron-width ratio of 1.64 and a length-to-height ratio of 3.4. All of these ratios suggest an aquatic habitus in the various *Basilemys* species.

Basilemys has a very broad plastron relative to its carapace width compared to most aquatic turtles. The only living turtles that approach these ratios are *Emydoideablandingii*, *Cuoraurocapitata*, *C. pani*, *C. trifasciata*, and *Terrapene coahuila*. These are all swamp dwellers that live in shallow bodies of water comingled with land. Thus, they need to travel over land more often than other aquatic turtles, bringing them additional exposure to predation, both in and out of the water. If *Basilemys* was a resident of these marginal waterways it also might explain its high degree of dorsoventral compression, as this would help keep a turtle submerged in shallower grazing areas and thus less noticeable to terrestrial predators. Given the large size of *Basilemys*, and its environment, the added strength of a domed carapace may not have been needed. Such shallow water would be an unsuitable hunting ground for larger predators.

The articulated limbs of a complete *Basilemysvariolosa* has the bottoms of the manus and pes covered in osteoderms, and the posterior opening of the shell filled with more osteoderms. The lateral ridges on the unguals are larger on the manus than the pes. This might indicate they were used in forelimb digging. These unguals are similar in shape to those of the burrowing synapsid *Varanops*. This supports earlier suggestions of *Basilemys* as a burrower. If *Basilemys* inhabited shallow, often ephemeral, bodies of water, burrowing ability may have played a role in surviving prolonged dry periods. The two fore limbs measured average 49% humerus length, 21% ulna length and 30% hand length. These measurements most closely match the fore limb proportions of semi-aquatic, extant emydids and lead to the inference of a habitus in small or stagnant bodies of water. A *Basilemys* femur from the Dinosaur Park Formation of Alberta has a ratio of the intertrochanteric fossa length to femur length of ~0.13. This most closely approaches that seen in *Chelydra serpentina*, *Kinosternonbaueri* and *Terrapene coahuila*. This is consistent with an aquatic habitus, as all of these species are bottom walkers generally found in shallow water. Thus, we conclude that *Basilemys* were aquatic turtles that frequently had to cross land.

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