

Durophagous predation on scaphitid ammonoids in the Late Cretaceous Western Interior Seaway of North America

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The study of the evolution of predator-prey interactions has contributed much to our understanding of the ecological background of biodiversity change through geological time, because they represent a driving force of natural selection. This study is the first to report a trend of predation intensity on scaphitid ammonoids from the Turonian to the Maastrichtian (Late Cretaceous) on the basis of analysis of ventral shell breakage in large samples from the U.S. Western Interior Province. Analysis of 835 adult specimens revealed ventral shell breakage in 50 specimens. In most of the damaged specimens, the breakage occurred in a preferred position at the rear part of the body chamber. Ventral breakage is rare in the Turonian specimens, whereas it is common in the Campanian and Maastrichtian specimens. The shell diameter of adult scaphitid ammonoids tends to increase with time. The position of the breakage and the absence of repairs indicate that the ventral breakage resulted from lethal predation. Based on the incidence of breakage and the size and shape of the breaks, possible predators include fish, reptiles, and cephalopods such as *Placentoceras*, *Eutrephoceras*, and coleoids. Our statistical analysis of ventral shell breakage indicates that the incidence of lethal predation increased in conjunction with an increase in adult shell size, suggesting that the body size of the prey was an important factor in predator-prey interactions. In addition, the predatory damage is more extensive in larger adults.