

**Discrimination of end-Cretaceous anodontine Unionoidea from North Dakota:  
How many taxa make sense?**

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The Das Goods Locality (L6516) is a remarkable site for the occurrence of anodontine (Unionoidea) mussels. Stratigraphically just 63 cm between the Cretaceous-Paleogene boundary, it is the youngest Cretaceous mussel locality. Even without shell material, this is the best-known record of in situ anodontine bivalves from the Cretaceous of North America. There is little context for interpreting other Late Cretaceous anodontine taxa. The earliest taxa described as anodontine were reported by White in 1877 and 1878, respectively: *Anodonta propatoris* (Campanian Judith River Formation, Montana) and *A. parallela* (Maastrichtian Laramie Formation, Colorado). Russell later (1935, 1932, respectively) described poorly preserved Canadian taxa: *A. johnseni* (Campanian Milk River Formation, Alberta), and *A. argillensis* and *A. macconnelli* (Maastrichtian Whitemud Formation, Saskatchewan). L6516 bivalves are unsculptured and elliptical to ovate in marginal outline. External growth lines are variously preserved. Because no landmark features are clearly available, identifying characteristics are limited to the anodontine nature of the specimens and the shape of the marginal outlines. Elliptical Fourier analysis (EFA) was performed on 33 specimens exhibiting a complete or

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near-complete outline. A conservative model was used to complete the outlines of the latter group. For comparative purposes, outlines were included in the EFA of illustrated holotypes of the taxa mentioned above and *Margaritina nebrascensis* Meek, 1871, which also exhibits anodontine character. Preliminary study using principle component analysis (PCA) suggests that unidentified Das Goods mussels can be grouped according to existing fossil "*Anodonta*" species by shell outline morphology; however, this species group is likely artificial. L6516 bivalves form at least two groups after PCA. Shape distribution is potentially sexually dimorphic, amplified by compression of inflated valves. Das Goods bivalves share both a lack of dentition and environmental preference with modern anodontine forms, but there is little evidence linking these two groups phylogenetically under the modern genus *Anodonta*.

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