

THE DISTRIBUTION OF THE MARGARITIFERIDAE:
A REVIEW AND A NEW SYNTHESIS

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Abstract

The disjunct distribution of the Margaritiferidae has long caused speculation among malacologists and biogeographers. Two classic theories have been formed in the past. In 1912 Scharff proposed that the family originated in North America and spread east and west to Eurasia and Walker in 1910 argued that the family originated in Asia and migrated east and west to North America. The Asian theory for many years has been accepted as the more correct. Furthermore, both ideas relied on continental stability and transoceanic landbridges. In addition each assumed a Cretaceous Period origin for the family.

Recent advances in plate tectonics and paleomagnetism indicate vast continental movements have occurred during the last 400 million years. Such drifting of land masses allows for a new analysis of historical distribution patterns. The dispersal of the Margaritiferidae can be interpreted by the wandering of continents, but one must first accept an earlier, mid-Paleozoic origin for the family. Evidence in the fossil record suggests modern appearing mussels were present during the upper Devonian Period. This suggests the family originated 280 million years earlier

than was previously thought.

During the mid-Paleozoic Era all the present continents were joined to form Pangaea. Within central Asia the Margaritiferidae were flourishing and spreading. In late Paleozoic Pangaea a shallow continental sea split the family into eastern and western groups. The Ural and Appalachian Mountain orogenies formed barriers limiting the dispersal of the western group, while the eastern group spread widely. In the early Mesozoic Era a rift zone developed in northeastern Asia driving the eastern population toward the coast. Propagules of this group then invaded lands formed as a result of early plate shifting. By mid-Mesozoic times the family reached its approximate present day distribution in North America, Europe, northern Africa and Asia. Rotation of Laurasia away from Gondwana at the close of the Mesozoic Era separated, North American populations from those of Europe and North Africa. Rifting in eastern Asia continued to compress and split mussel populations. In the early Cenozoic Era most of the drastic land movements ended and by the mid Cenozoic eastern Margaritiferids crossed the Behring Sea land bridge and invaded western North America.