

## IMAGING TECHNIQUES IN THE STUDY OF FOSSIL SPIDERS

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Spiders present particular problems for paleontologists. The vast majority are found in Cenozoic ambers, while most Mesozoic and Paleozoic finds are from Fossil-Lagerstätten deposited in water-lain sedimentary environments. Extracting morphological data of phylogenetic importance can be challenging because the details used to identify comparative extant spiders are commonly small and may not preserve well. Amber presents the lesser problem, unless it is opaque, in which case modern techniques such as synchrotron x-ray computed tomography can extract exquisite details. Among matrix-preserved fossils, different study techniques are necessary for the different facies in which spider fossils occur: these range through lacustrine volcanoclastics, mudstones, siltstones and carbonates, to estuarine and marine settings. Here, I review techniques used to extract morphological data from fossil spiders, giving some examples of amber preservation, but mostly concentrating on the wide variety of strategies used to visualize spider fossils in matrix preservation, including macrophotography, photomicrography, and scanning electronic microscopy. Using case studies, I show how the digital revolution in photography has allowed paleoarachnologists to observe morphological details which, until recently, would have been considered unpreserved or undetectable, thus enabling fossil spiders to be included in phylogenetic studies alongside their modern counterparts.

