

**Traces and burrowing behaviors of the cicada nymph *Cicadetta calliope*:  
Neoichnology and paleoecological significance of extant soil-dwelling insects**

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<sup>1</sup>[www.paleo.ku.edu/palaios](http://www.paleo.ku.edu/palaios)

**ABSTRACT**

This study documents the traces and burrowing behaviors of nymphs of the prairie cicada *Cicadetta calliope* (Hemiptera: Cicadidae), as observed in neoichnological experiments. Cicada nymphs were collected from the C horizons of sandy Fluvents along the Kansas River east of Lawrence, Kansas. The nymphs appeared to be fifth instars, 13–17 mm long and 6–7 mm wide. Nymphs were placed in plastic enclosures containing layers of colored, moist, very fine-grained sand. They burrowed immediately, excavating air-filled, sediment-enclosed cells between 20 mm and 40 mm long and averaging 9 mm wide. Burrowing was completed in three stages: (1) sediment in the forward portion of the cell was excavated and rolled into a ball with the forelimbs; (2) the nymph turned 180° using a forward roll, and moved to the back of the cell; and (3) the sediment ball was pushed up against the back wall of the cell and kneaded with the forelimbs into a thin layer. Resulting burrow traces are sinuous and distinctly meniscate and demonstrate that insect larvae construct meniscate, backfilled burrows in well-drained terrestrial settings. *Cicadetta calliope* nymphs and their traces are excellent analogs for meniscate trace fossils commonly found in late Paleozoic–Cenozoic alluvial deposits and paleosols. Such meniscate trace fossils are useful for interpreting the paleoenvironment and paleohydrogeology of the units in which they are found. In addition, such backfilled burrows can be used to supplement the fossil record of cicada-like hemipterans, currently known only from the latest Permian to the Early Triassic.