Riverside Condos of the Early Cretaceous: Densely Packed, Spiral-Form Burrows in Channel Bank Sediment of the McMurray Formation

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ABSTRACT

Within the Lower Cretaceous McMurray Formation of northeastern Alberta, accretionary bank deposits of tidally influenced channels are very common. These deposits typically contain a low diversity brackish suite of trace fossils, including *Planolites, Cylindrichnus, Teichichnus* and *Skolithos*. In some thin, mud-rich channel deposits, however, a monospecific, high abundance, persistent assemblage of minute, spiral-form ichnofossils is present. The diminutive size of the burrows (with whorls typically on the order of 1mm in diameter) makes it difficult to assess the subtleties of their form, and thus they may have affinity to either the *Gyrolithes* or *Spirophyton* ichnogenera.

The burrowing is hosted by Inclined Heterolithic Strata (IHS) consisting of dm-scale, fining-upward couplets of silt to lower very fine sand and dense mud. The expression of the burrows grades from discrete mud-filled structures in sand to discrete sand-filled structures in mud. They exhibit an organized parallel relationship, oriented vertically to surface-normal, with considerable deformation occurring in sheared mud layers. Transition from the muddy top of one couplet into the sandy base of the next is commonly accompanied by a significant decrease in the size of the burrows, which has been interpreted as the establishment of a new population of juvenile trace makers.

Core-derived examples will be presented to illustrate the relationships between sediment character, population dynamics and morphology of individual traces. IHS pervasively worked by spiral-form burrows represents a very distinct facies within the McMurray Formation, and may carry with it appreciable paleoenvironmental significance. Deposition was accompanied by an ample and stable supply of food, significant down-slope creep on the accretionary bank, and may be related to increased tidal significance within a previously fluvial depositional setting.