

**SOCIETY OF VERTEBRATE PALEONTOLOGY
AUGUST 2017
ABSTRACTS OF PAPERS
77th ANNUAL MEETING**

**TELUS Convention Centre
Calgary, AB, Canada
August 23–26, 2017**

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Poster Session III (Friday, August 25, 2017, 4:15 – 6:15 PM)

IMPLICATIONS OF AN ANALYSIS OF DEEP PES TRACES AND MANUS IMPRESSIONS FOR THE SUPPOSED *ATREIPUS-GRALLATOR* ICHNOGENERIC PLEXUS: AN APOMORPHY-BASED APPROACH

WINITCH, Michael L., Scarsdale, NY, United States of America;; OLSEN, Paul E., Lamont Doherty Earth Observatory, Palisades, NY, United States of America

The apparent continuum between the Triassic ichnogenera *Atreipus* and *Grallator* has been used as a basis for hypothesizing an evolutionary continuum between their track makers. We use an apomorphy-, cladistics-based methodology of track maker identification to test the hypothesized *Atreipus-Grallator* complex that we argue does not reflect a biological entity. Eastern North American *Atreipus* (*A. milfordensis*, *A. sulcatus*, and *A. acadianus*) morphology, in well-preserved examples, is consistent with a silesaurid, based on the presence of a highly reduced digit I (hallux) on the pes that is an apomorphy of *Silesaurus* as seen in deep footprints in which the metatarsus is impressed. In marked contrast, brontozoids, including *Grallator*, have pedal traces consistent with early saurischians in retaining the primitive condition of a relatively long digit I, always present in deep footprints. *Atreipus* is usually a quadrupedal ichnite with a manus bearing 3 to 5 short digits and small claws. In contrast, the simplest hypothesis for dinosaur monophyly has the primitive condition for the dinosaurian manus with elongate manual digits I-III that restricted quadrupedal locomotion (e.g., *Heterodontosaurus* and *Herrerasaurus*), and did not allow significant pronation, or extreme hyperextension. Examination of the very few brontozoid and basal sauropodomorph manus impressions is consistent with this interpretation in which manus impressions are present only in resting traces. In medium sized brontozoids (*Anchisauripus*) the manus trace consists only of knuckle impressions of digits II and III. *Atreipus* had small manus with small claws primarily used for locomotion that would itself be highly derived compared to the primitive dinosaurian condition. As silesaurs were a separate clade from dinosaurs and

the common ancestor of dinosaurs and silesaurs was not itself a silesaur, linking the ichnotaxa *Atreipus* and *Grallator* (brontozoids) in any kind of conceptual evolutionary continuum conflates biological characteristics with poor preservation and generalized resemblance that does not hold up to phylogenetic analysis. Therefore the so-called *Atreipus-Grallator* plexus reflects a non-biological concept for generalized facultatively three-toed pes impressions, primitive at least at the level of Dinosauromorpha.