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New remains and paleoecology of uruguaytheriine astrapotheres (Mammalia) from the Middle Miocene of Bolivia

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Astrapotheres (Astrapotheria) are an order of South American native ungulates (SANUs), and the geologically youngest astrapotheres belong to the subfamily Uruguaytheriinae (Astrapotheriidae). In this study, we: (i) analyze uruguaytheriine remains from the late Middle Miocene Quebrada Honda Basin (QHB) of southern Bolivia; and (ii) discuss paleoecology of Bolivian astrapotheres based on new dental mesowear angle data and enamel stable carbon isotope (δ13C) data from these and other specimens. New material consists of a partial left maxilla preserving DP2–3 and an associated deciduous lower incisor. Two newly described specimens include a mostly complete m3 and a partial palate preserving left and right DP2–4. The QHB deciduous premolars are the first described for a uruguaytheriine and among the few described for astrapotheres. We conclude that the QHB specimens represent a new but unnamed species that likely does not pertain to any presently recognized genus. It differs from other uruguaytheriines in its intermediate size, relatively high-crowned teeth, presence of a lingually open M3 central valley, and absence of m3 hypoflexid, among other features. Astrapothere mesowear angle data from the QHB and slightly older Bolivian sites (Cerdas and Nazareno) suggest that Middle Miocene astrapotheres were browsers, perhaps resembling the extant black rhino (*Diceros bicornis*). New and updated enamel stable carbon isotope data suggest that QHB astrapotheres and toxodontid notoungulates fed on isotopically similar vegetation slightly more enriched (~1‰) than vegetation consumed by proterotheriid litopterns (*Olisanophus* spp.) and the notoungulate *Hemihegetotherium trilobus*. These data support paleopedology- and paleoichnology-based habitat reconstructions for the QHB that suggest it was more densely vegetated than Cerdas. Relatively enriched δ13C samples (> -7.0‰) from Cerdas and Quehua (Late Miocene) suggest that some Bolivian notoungulates were grazing on C4 vegetation, which casts doubt on the proposal that the southern Central Andean Plateau experienced significant uplift prior to ~9 Ma.

Key words: Mammalia, Astrapotheria, carbon isotopes, mesowear, paleoelevation, Quebrada Honda Basin, Neogene, Neotropics, South America.

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