

## Ungulates of the middle Miocene Monarch Mill Formation, Churchill County, Nevada, USA

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A middle Miocene, early Barstovian land mammal age vertebrate assemblage, the Eastgate local fauna (LF), is known in the basal-most part of the Monarch Mill Formation. This rich assemblage of fossil vertebrates occurs within the Middlegate Basin in Churchill County, Nevada, USA. The Eastgate LF includes the fossil remains of fish, amphibians, reptiles, birds, and over 25 families of mammals. Previous studies on the mammalian remains have revealed several endemic taxa of rodents and carnivores. Herein, we describe the ungulates, which include two taxa from two families of Artiodactyla (*Ticholeptus* sp., Merycoidodontidae and *Barbouromeryx trigonocorneus*, Palaeomerycidae) and three taxa from three families of Perissodactyla (Equidae gen. et sp. indet., *Moropus merriami*, Chalicotheriidae, and *Teleoceras* sp., Rhinocerotidae). Independent paleobotanical evidence nearly contemporaneous with the vertebrates indicates forest and shrubland paleovegetation, and suggests that the area had been uplifted to 2700–2800 m paleoaltitude. Therefore, this local fauna adds a rare glimpse of a medium-to high-altitude vertebrate community in the intermountain western interior of North America. Temporally-restricted taxa (especially the rodent *Tardontia nevadans* and chalicothere *Moropus merriami*) reinforce the early Barstovian age of the Eastgate LF and are consistent with tephrochronological dates and radiometric analyses. The presence of *Barbouromeryx trigonocorneus* at Eastgate is significant in that its occurrence potentially represents a temporal range extension into the early Barstovian (previously known from latest Arikareean to middle Hemingfordian), and extends the paleobiogeographic range from the Great Plains to the Great Basin. Unequivocally, the ungulates and other mammals of the Eastgate LF support the presence of a temperate forest ecosystem in the Great Basin just subsequent to the Miocene Climatic Optimum.

**Key words:** Mammalia, Ungulata, paleoecology, palaeoclimate, Barstovian, Miocene, Middlegate Basin, Nevada.

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