Journal of Vertebrate Paleontology 23(2):468–470, June 2003

NOTE

A NEW SPECIES OF PALEOCENE MULTITUBERCULATE (MAMMALIA: ALLOTHERIA) FROM THE HANNA BASIN, SOUTH-CENTRAL WYOMING

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The Hanna Basin, south-central Wyoming (Fig. 1) has proven to be an excellent field area for study of the faunal transitions of mammals from the latest Cretaceous through the early Tertiary (Eberle and Lillegraven, 1998a, b; Lillegraven and Eberle, 1999). The transition from the Torrejonian (To) to the Tiffanian (Ti) North American Land Mammal ''Ages'' (Paleocene) is preserved in the northeastern corner of the Hanna Basin, where the Hanna Formation is exposed in an area of badlands called The Breaks (Fig. 1; Lillegraven and Snoke, 1996; Higgins, 2000). Seventy-two mammalian species have been recognized thus far from the section in The Breaks, of which only one is new. The rest are all well described species, previously known from many localities throughout western North America. It is on the basis of the 71 previously described species that high-resolution biostratigraphy across the To–Ti boundary was developed (Higgins, 2000). Seventeen of the 72 recognized species from The Breaks (about 25%) are multituberculates; however, multituberculates represent more than 50% of the individual specimens, identified to the level of genus or species (426 specimens out of a total of 811). The new species, *Fractinus palmorum*, gen. et sp. nov., an unusual multituberculate, is described here.

PALEONTOLOGICAL METHODS USED IN THIS STUDY

All specimens are housed in the Collection of Fossil Vertebrates, Departmental Scientific Collections, Department of Geology and Geophysics, The University of Wyoming (UW). All listed specimens were collected from University of Wyoming localities designated by ''V-.'' Underwater screen-washing and surface crawling were the primary techniques for specimen collection.

Figure 2 illustrates standard measurements taken during this study. Terminology and measurements for multituberculate teeth follow Krause (1982; Fig. 2). All measurements are reported in millimeters and are recorded to the nearest hundredth of a millimeter through use of an Ehrenreich Photo-Optical Industries Shopscope™. Images of specimens in this report were taken using a JEOL 5800LV scanning electron microscope at the University of Wyoming. All are backscattered electronic images taken under partial to full vacuum. Specimens were not carbon coated.

Abbreviations and Terminology

Abbreviations **L** and **R** denote left and right teeth, respectively. Measurement terms (Fig. 2): **Length** = greatest anteroposterior length, **L1** = length from the anterior-most point of multituberculate p4 to first true serration, **W** = greatest width, **H** = height above baseline (extends from the apex of the anterior projection of the crown to where the posterolabial ledge intersects the posterior margin of multituberculate p4; Krause [1982]), **h** = height of first serration of multituberculate p4 above ''baseline,'' **Serr** = number of serrations on a multituberculate p4, ***** = estimated measurement required by fracture or excessive wear.

The known distributions of mammalian species provided include age, horizon, and geographic position. **To3** and **Ti1** denote divisions of the Torrejonian and Tiffanian North American Land Mammal ''Ages,'' respectively, as defined by Archibald et al. (1987).

SYSTEMATIC PALEONTOLOGY

Class MAMMALIA Linnaeus, 1758
Infraclass ALLOTHERIA Marsh, 1880
Family indeterminate
FRACTINUS gen. nov.

Etymology—Fractus, Latin, broken into pieces, in reference to The Breaks locality from which the type specimen was collected.

Diagnosis—As for the type and only species.

FRACTINUS PALMORUM, sp. nov.

Holotype—UW 27063, L p4.

Type locality—V-90043, ''The Breaks 90043,'' The Breaks, Hanna Formation, Hanna Basin, Carbon County, Wyoming.

Hypodigm—From V-90043: UW 27063, L p4; from V-96010: UW 28389, L p4 fragment.

Localities—V-90043 and V-96010.

Known distribution—Ti1, The Breaks, Hanna Formation, Hanna Basin, Wyoming.

Etymology—The specific epithet, *palmorum*, is in honor of Burt and Kaylyn Palm, who own the land where the type specimen was collected and have been kind enough to allow me access to their property.

Diagnosis—A medium-sized multituberculate. Differs most ptilodontid, cimolodontid, and eucososmodontid multituberculates in having fewer (approximately five), more rounded serrations and having the first serration begin more posterior than the exodaenodont lobe. The only ptilodontid multituberculate that it is similar to is *Xanclomys mcgrewi* (Rigby, 1980) from which it differs by having fewer serrations and having all serrations lie along a single line (Fig. 3). Differs *Microcosmodon*, *Pentacocosmodon*, and Taeniolabidids in possessing a prominent exodaenodont lobe, and having all serrations lie along a single line. Differs *Microcosmodon* and *Pentacocosmodon* also by being much larger. Superficially, *Fractinus palmorum* resembles the overall shape of Jurassic multituberculates, such as *Psalodon*, but lacks external cusps.

Description—UW 27063 is a complete L p4 (measurements: Length = 4.92, W = 2.02, L1 = 3.04, H = h = 2.74, D = 1.07, 5 serrations, 1 pseudoserration, present). The tooth can be described as a four-sided polygon when examined in lateral view. The bottom of the enamel over the posterior root is a straight, nearly horizontal line, which forms the base of the polygon. On the labial surface of the tooth, the enamel deviates slightly above this line between the posterior root and the anterolabial bulge. The anterolabial bulge extends below this line, and rejoins it at about the anterior-most point of the tooth. A concavity for a p3 may be present but is difficult to distinguish. The edge from the anterior-most point on the tooth to the pseudoserration forms the slightly convex front edge of the polygon. Five true serrations are all about the same size and lie along a straight line, which is inclined posteriorly about 45 degrees relative to the horizontal base. A ridge extends on the labial surface from each serration roughly paralleling the anterior surface of the tooth. On the lingual surface of the tooth, ridges are seen only from serrations 1, 2, and 3. The pseudoserration is the highest point on the tooth, but it lies in a position slightly below the line along which the other serrations are located. Posterior to the fifth serration is a possible (reduced) sixth serration immediately followed by the nearly vertical posterior margin of the tooth.

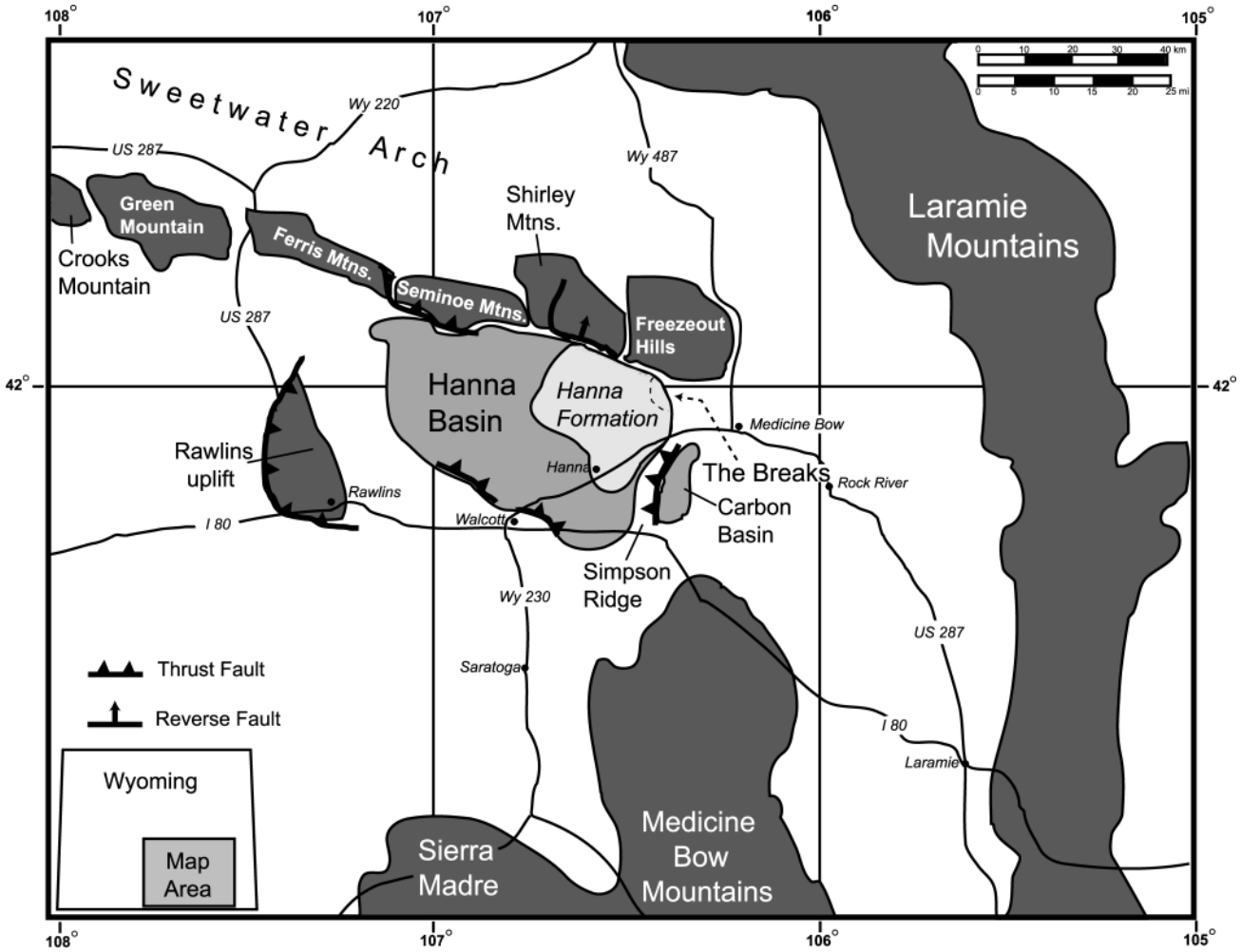

FIGURE 1. Location map of Wyoming, showing location of the Hanna Basin and The Breaks.

UW 28389 is the anterior part of a L p4 (measurements: W = 1.8*; L1 = 2.5*; h = 2.8*; D = 1.6*). It preserves the tooth anterior to the second true serration. Two pseudoserrations are present, which make the anterior surface of this tooth appear more vertical than that of UW 27063. The enamel along the lower edge of this tooth is broken away. The first serration is present, as are the ridges that extend from serrations 1 and 2.

Discussion—This rare species is known only from two specimens found approximately 25 meters (85 feet) apart stratigraphically. These teeth are unlike any multituberculate previously described from late Torrejonian or early Tiffanian faunas, warranting the naming of a new

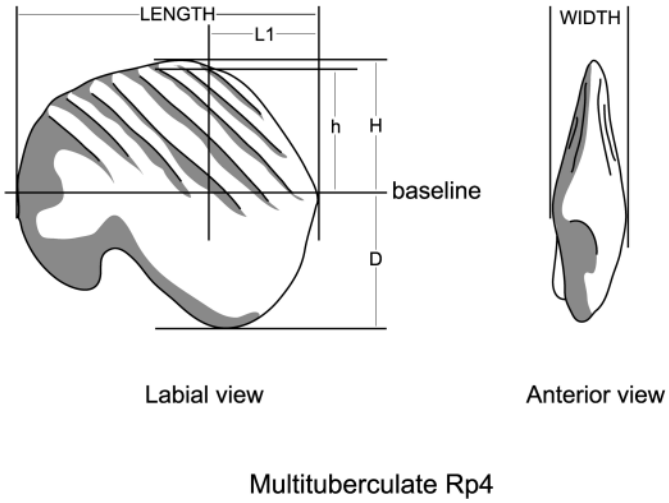

FIGURE 2. Standard dental measurements used in this study.

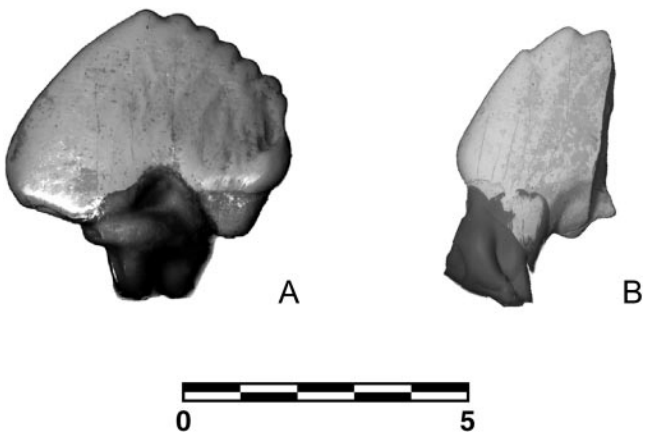

FIGURE 3. *Fractinus palmorum*, gen. et sp. nov., holotype UW 27063, Lp4: **A**, labial view. UW 28389, Lp4 fragment: **B**, labial view. Scale in millimeters.

genus. Superficially, they resemble the overall shape of Jurassic multituberculates, such as *Psalodon*, but lack external cusps.

DISCUSSION

The total fauna from The Breaks includes specimens collected from 136 localities within 550 meters of section. Seventy-two species collected from these localities, most of which are already well known, were used to formulate a high-resolution biostratigraphy across the To–Tiffanian boundary (Higgins, 2000). *Fractinus palmorum* is unique among the multituberculates found from Paleocene localities in western North America. Though represented by only one and a half teeth, it is clearly distinct from all other multituberculate taxa known from the late Torrejonian and early Tiffanian. Within The Breaks, its stratigraphic range is narrow (about 25 meters), and restricted to the earliest Tiffanian (Ti1), suggesting that it may be of use as a biostratigraphic indicator. However, its infrequency in the total fauna from The Breaks (two specimens out of 811) indicates that this was a very rare animal, which is not desirable in an index species.

Acknowledgments—I am most grateful to Burt and Kaylyn Palm for granting me access to their property. This project would not have been possible without their help. I also thank Dr. J. A. Lillegraven for serving as my committee chair as I completed this study toward my Ph.D. at the University of Wyoming. Thanks go to Tom Williamson and an anonymous reviewer for their insightful comments and suggestions that helped strengthen this manuscript. This material is based upon work supported under a National Science Foundation Graduate Fellowship. Partial financial support for research was provided by a teaching assistantship from the Graduate School, the University of Wyoming. Field expenses for the summer of 1996 were offset by a grant to Drs. J. A. Lillegraven and A. W. Snoke from the National Science Foundation (EAR-9506462).

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Received 22 June 2001; accepted 12 May 2002.