

THIRD OCCURRENCE OF THE PROBLEMATICAL RODENT *EPEIROMYS* FROM LATE WHITNEYAN (OLIGOCENE) OF SOUTH DAKOTA

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ABSTRACT

Epeiromys is an extremely rare and enigmatic rodent from the Oligocene of Nebraska and South Dakota, previously only known from two specimens from different horizons (late Orellan and early Whitneyan, respectively). Two additional specimens are described from South Dakota that are slightly younger in age (late Whitneyan), and are morphologically distinct from both the other species. However, the known material is too scarce to name a new species. The family to which *Epeiromys* belongs is still uncertain.

INTRODUCTION

The genus *Epeiromys*, and the type species *E. spanius*, were first named based on a single specimen (dentary with m1-m3) from the late Orellan North American Land Mammal Age [=NALMA] (early Oligocene) of western Nebraska, and referred to an uncertain subfamily of the rodent family Aplodontidae (Korth, 1989). A second specimen was referred to this genus (isolated m3) from the early Whitneyan NALMA (early middle Oligocene) of South Dakota (Korth, 2014) and is distinct from the type species. Two additional specimens referable to *Epeiromys* from a slightly later horizon than the previously known material (late middle Oligocene: late Whitneyan NALMA) appear to represent yet another distinct species, thus increasing the diversity of the genus as well as extending its temporal range.

Dental nomenclature follows that of Wood and Wilson (1936); lower teeth designated by lower-case letters (e.g., m1, m2). Abbreviations for institutions: CM, Carnegie Museum of Natural History; SDSM, South Dakota School of Mines and Technology, Museum of Paleontology; UNSM, University of Nebraska State Museum.

Order Rodentia Bowdich, 1821
Family Uncertain
Genus *Epeiromys* Korth, 1989
Epeiromys sp.
(Figure 1; Table 1)

Referred Specimens—CM 91734, left m2; CM 91735, left m3.

Horizon and Locality—Late Whitneyan (middle Oligocene), Blue Ash anthill fauna, Uint E (=Blue Ash Channel), Harris Ranch Badlands, Whitney Member, Brule Formation, Fall River County, South Dakota (Simpson, 1985).

Description—The m2, CM 91734 (Figure 1A) is rhomboidal in occlusal outline, the lingual cusps (metaconid, entoconid) being slightly more anterior than their opposing buccal cusps (protoconid, hypoconid). The enamel in the basin of the tooth is heavily pitted, making an irregular surface. The cusps are prominent, much higher than the floor of the talonid basin. The metaconid is circular in occlusal outline, and the anterior cingulid runs down its buccal side along the anterior margin of the tooth to its buccal edge, where it turns posteriorly to join the anterobuccal corner of the protoconid. A distinct metaconid crest runs down the posterior side of the metaconid along the lingual edge of the tooth, ending near the center of its lingual side. A small but distinct mesostylid is separated from the posterior end of the metaconid crest and the anterior edge of the entoconid by narrow valleys. The protoconid is also circular in occlusal outline with a strongly developed posterior arm that extends lingually and slightly posteriorly for approximately one-third of the width of the tooth, forming a narrow and short trigonid basin that is open lingually. There is a distinct mesoconid midway between the protoconid and hypoconid that is circular in occlusal outline, and smaller than the major cusps. The ectolophid is thin and connects from the posterolingual corner of the

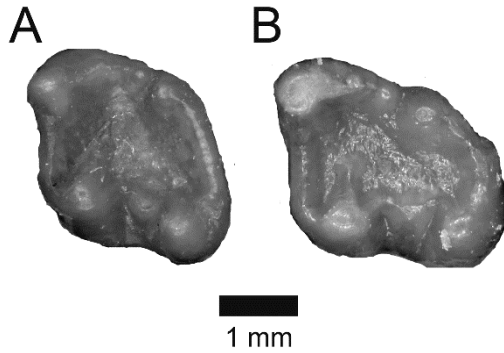


FIGURE 1. Occlusal view of lower molars of *Epeiromys* sp. from the Blue Ash anthill fauna. A, CM 91734, left m2. B, CM 91735, left m3. Anterior to right.

protoconid to the anterolingual corner of the hypoconid. The hypoconid is slightly obliquely compressed (anterolingual-posterobuccal). The posterior cingulid extends along the posterior margin of the tooth from the posterolingual corner of the hypoconid along the posterior margin of the tooth, where it joins the posterobuccal corner of the entoconid. The point of attachment of the posterior cingulid to the hypoconid is much thinner than the remainder of the cingulid, forming a slight valley, just posterior to the hypoconid. The entoconid is round in occlusal outline and slightly obliquely compressed (anterolingual-posterobuccal).

The m3, CM 91735 (Figure 1B) is longer than m2, but nearly equal to it in width. The m3 is also narrower posteriorly than anteriorly. As with m2, the basin of the tooth is filled with enamel irregularities that appear to be random. The anterior part of the tooth (protoconid, metaconid, anterior cingulid, posterior arm of protoconid) are the same as in m2, the metaconid being slightly larger. The posterior half of the tooth is elongated, but the hypoconid and entoconid are not reduced relative to the anterior cusps. The metastylid crest is higher than in m2 and there is a minute cuspule near its center, well anterior to the mesostylid. The mesostylid is also slightly larger than in m2. The ectolophid is more distinct and longer than in m2, but the mesoconid is not any larger. The posterior cingulid bows around the posterior end of the tooth and ends along the lingual side of the tooth at the posterior side of the entoconid. There are no distinct cuspules along the posterior cingulid, but there are several minute grooves that interrupt it.

Discussion—In overall morphology the two molars described here are clearly referable to *Epeiromys* based on the irregularities of the enamel in the basins of the teeth and the generally primitive rodent pattern of cusps. These Blue Ash specimens differ from the type species *E. spanius* in being larger (Table 1) and having

more prominent major cusps, as well as a better developed ectolophid (Korth, 1989: figs. 3D, E). They also differ from the single m3 from Cedar Pass, South Dakota (Korth, 2014: fig. 4D) in being smaller and lacking twinned metastylids on m3.

The Blue Ash anthill fauna, from where these new *Epeiromys* specimens were recovered, is a later horizon than the previously described species of the genus *Epeiromys*: *E. spanius* from the late Orellan NALMA of Nebraska (Korth, 1989) and *Epeiromys* sp. from the early Whitneyan NALMA of South Dakota (Korth, 2014).

CONCLUSIONS

Flynn and Jacobs (2008: 308) included *Epeiromys* in the Aplodontioidea among “Basal Aplodontids” but did not discuss its relationships within the family. More recently, both Hopkins (2008) and Vianey-Lauit et al. (2013), in their reviews of the Aplodontidae, argued that *Epeiromys* was not referable to the Aplodontidae or even the Sciuroidea-Aplodontioidea clade, suggesting that it was the “basalmost” taxon in their studies, but did not refer it to any definite family of rodents and suggested that it may be closely related to the Ischyromyidae without further discussion.

Lacking the deep, unique crenulation of the enamel, the molars of *Epeiromys* do not differ markedly from those of the early Eocene reithroparamyine ischyromyids such as *Acritoparamys* (Wood, 1962: fig. 221D; Korth, 1984: fig. 15), and are of a similar size (Table 1; Wood, 1962: table 22; Korth, 1984: table 5). The masseteric fossa on the dentary of *Acritoparamys* extends to below the posterior half of m2 (Korth, 1984: 29), also similar to the condition in *Epeiromys* (Korth, 1989: fig. 3E). However, the dorsal margin of the diastema on the dentary of *Acritoparamys* is a sharp ridge (primitive condition for ischyromyids), whereas that of *E. panius* is rounded dorsally.

Previously, two species of the sciurid *Hesperopetes* Emry and Korth, 2007, have been described from the Blue Ash fauna. This genus also is characterized by crenulated enamel in the basins of the cheek teeth. However, the specimens referred here to *Epeiromys* differ from those of *Hesperopetes* in lacking the radiating pattern of crenulations in the cheek teeth of the latter, and in being markedly larger (Table 1; Emry and Korth, 2007: table 1). The entoconid of the lower molars of *Hesperopetes* is also greatly reduced and obliquely compressed, unlike that of *Epeiromys*.

In other comparisons, the microparamyine *Lophiparamys* Wood, 1962, is small and has crenulations of the enamel on the cheek teeth. However, the Blue Ash specimens lack the characteristic anterior cingulid of the lower molars

TABLE 1. Comparative dental measurements of species of *Epeiromys*. Abbreviations: L, anteroposterior length; W, transverse width; NE, Sioux County, Nebraska; CP, Cedar Pass, South Dakota; BA, Blue Ash anthills, South Dakota. Measurements in mm. Measurements for *E. spanius* from Korth (1989: table 3), and for *Epeiromys* sp. from South Dakota from Korth (2014: 381).

late Orellan (NE)		m1L	m1W	m2L	m2W	m3L	m3W
<i>E. spanius</i> (type)	UNSM 56399	2.05	1.95	2.30	2.15	2.70	2.20
early Whitneyan (CP)							
<i>Epeiromys</i> sp.	SDSM 56442d					3.35	2.63+
late Whitneyan (BA)							
<i>Epeiromys</i> sp.	CM 91734			2.71	2.80		
<i>Epeiromys</i> sp.	CM 91735					3.07	2.75

(distinct anterostylid and anterior cingulid, separated from protoconid by deep valley) present in *Lophiparamys* and other microparamyines (Wood, 1962; Guthrie, 1971; Anderson, 2008). The latest occurrence of *Lophiparamys* is from the Uintan NALMA (middle Eocene: Anderson, 2008:fig. 18.3), much earlier than the occurrence of *Epeiromys*. Clearly, more complete material of *Epeiromys* is needed in order to determine its familial relationships.

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LITERATURE CITED

- Alston, E. R. 1876. On the classification of the order Glires. Proceedings of the Zoological Society, London 1876:61–98.
- Anderson, D. K. 2008. Ischryomyidae; pp. 311–325 in C. M. Janis, G. F. Gunnell, and M. D. Uhen (eds.), Evolution of Tertiary Mammals of North America. Volume 2: Small Mammals, Xenarthrans and Marine Mammals. Cambridge University Press, New York.
- Bowdich, T.E. 1821. An analysis of the natural classifications of Mammalia for the use of students and travelers. J. Smith, Paris.
- Flynn and Jacobs (2008. Aplodontoidea. Pp. 377–390, in Evolution of Tertiary Mammals of North America. Volume 2: Small Mammals, Xenarthrans, and Marine Mammals. C.M. Janis, G.R. Gunnell, and M.D. Uhen (eds.). Cambridge University Press, New York.
- Guthrie, R.D. 1971. The mammalian fauna of the Lost Cabin Member, Wind River Formation (Lower Eocene) of Wyoming. Annals of Carnegie Museum, 43:47–113.
- Hopkins, S.S.B. 2008. Phylogeny and evolutionary history of the Aplodontoidea (Mammalia: Rodentia). Zoological Journal of the Linnean Society, 153:769–838.
- Korth, W.W. 1984. Earliest Tertiary evolution and radiation of rodents in North America. Bulletin of the Carnegie Museum of Natural History, 24:1–71.
- Korth, W.W. 1989. Aplodontid rodents (Mammalia) from the Oligocene (Orellan and Whitneyan) Brule Formation, Nebraska. Journal of Vertebrate Paleontology, 9:400–414.
- Korth, W.W. 2014. Rodents (Mammalia) from the Whitneyan (middle Oligocene) Cedar Pass fauna of South Dakota. Annals of Carnegie Museum, 82:373–397.
- Miller G.S., and J.W. Gidley. 1918. Synopsis of the supergeneric groups of rodents. Journal of the Washington Academy of Science, 8:431–448.
- Simpson, W. F. 1985. Geology and paleontology of the Oligocene Harris Ranch Badlands, southwestern South Dakota. Dakoterra 2:303–333.
- Vianey-Liaude, M., H.G. Gomes, and L. Marivaux. 2013. Early adaptive radiations of Aplodontoidea (Rodentia, Mammalia) on the

- Holarctic region: systematics, and phylogenetic and paleobiogeographic implications. *Paläontologische Zeitschrift*, 87:83–120.
- Wood, A. E. 1962. The early Tertiary rodents of the family Paramyidae. *Transactions of the American Philosophical Society*, Philadelphia 52:1–261.
- Wood, A. E. and R. W. Wilson. 1936. A suggested nomenclature for the cusps of the cheek teeth of rodents. *Journal of Paleontology* 10:388–391.