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MIOSICISTA ANGULUS, A NEW SICISTINE RODENT (ZAPODIDAE, RODENTIA) FROM THE BARSTOVIAN (MIOCENE) OF NEBRASKA

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ABSTRACT

A new genus and species of sicistine zapodid, *Miosicista angulus* from the Barstovian of Nebraska is described. This increases the known diversity of the family in the Miocene of North America. *Miosicista* does not appear to be ancestral to any later zapodids.

† † †

Four species of zapodid rodents representing three genera have been described from the Barstovian of the Great Plains (Green, 1977; Klingener, 1966; Korth, 1987). This is the greatest diversity of zapodids during the Tertiary of North America. An additional specimen from the late Barstovian of Nebraska represents a new taxon that increases this diversity, indicating an early adaptive radiation of zapodids in the Great Plains at this time.

Dental terminology follows that of Wood and Wilson (1936). Teeth designated by capital letters indicate upper teeth, those designated by lower case letters indicate lower teeth.

SYSTEMATIC PALEONTOLOGY

Order RODENTIA Bowdich, 1821
Family Zapodidae Coues, 1875
Subfamily Sicistinae Allen, 1901
Genus ***Miosicista*** new

Type and only species: *M. angulus*, new species. **Range**: Late Barstovian (middle Miocene) of Nebraska. **Diagnosis**: Small, near size of *Macrognathomys*; m1 larger than m2, m3 much reduced; anteroconid or anterior cingulum not connected to metalophid on m1 , m3, only weakly connected on m2; lingual cusps anterior to adjacent buccal cusps (metalophid and hypolophid oblique); anterior cingulum on m2-m3 not anterior to metaconid; mesolophids and ectolophids very low, weak; accessory lophule between hypolophid and posterior cingulum on m1-m2; masseteric fossa ends anteriorly below posterior root of m1; mental foramen near mid-depth of mandible. **Etymology**: Generic name intended to reflect age (Miocene) and systematic relationship with Recent zapodid genus *Sicista*.

Discussion. *Miosicista* differs from *Macrognathomys* Hall (1930) in having: m3 more reduced; mesolophids and ectolophids much lower; anteroconid on anterior cingulum not connected to metalophid on m1, m3, only weakly connected on m2; ectolophid not connected to hypoconid on m1; metalophid and hypolophid more obliquely oriented than *M. gemmacollis* (Green, 1977); anterior cingulum on m2-m3 restricted to buccal two-thirds of tooth (not anterior to metaconid); accessory lophule between hypolophid and posterior cingulum (absent in *M. nanus*) and; m1 larger than m2 (m1 subequal to m2 in other species, Green, 1977: table 4).

Similarly, *Miosicista* differs from both *Schaubeumys* Wood (1935), *Plesiosminthus* Viret (1926), and *Parasminthus* Bohlin (1946) in having: mesoconids much smaller (nearly absent); lingual cusps not aligned with buccal cusps (lophs not directly buccolingually oriented); accessory lophule between hypolophid and posterior cingulum; mesolophids much lower; anterior cingulum not anterior to metaconid on m2-m3; m3 more reduced (except in *S. cartomylos*); masseteric scar ends more posterior; and mental foramen lower on mandible.

The species of *Megasminthus* (Green, 1977; Klingener, 1966) are much larger than *Miosicista*, the cusps of the cheek teeth much more rotund, and the hypolophid is continuous with mesoconid on the lower

molars. The cheek teeth of *Miosicista* are lower crowned and less lophate than *Pliozapus* Wilson (1936) and Recent zapodids.

Miosicista angulus new species
(Fig. 1; Table I)

Type and only specimen: UNSM (University of Nebraska State Museum) 45424, partial mandible with Rm1-m3. **Locality and horizon**: UNSM locality Wt-15, NW 1/4, NW 1/4, sec. 26, T1N, R11W, Webster County, Nebraska; Valentine Formation. **Age**: Late Barstovian (middle Miocene). **Diagnosis**: Only species of the genus. **Etymology**: Latin, *angulus*, corner; patronym for R. George Corner of the UNSM, in recognition of his work at the Meyer's Farm quarry where the holotype of the species was discovered. **Description**: On the mandible of *M. angulus* there is a V-shaped masseteric fossa that ends below the posterior root of m1. In *Plesiosminthus*, *Schaubeumys* and *Parasminthus* the scar extends more anteriorly to below the anterior border of m1 (Bohlin, 1946; Green, 1977). The mental foramen of *M. angulus* is directly anterior to the terminus of the masseteric scar anterior to m1 near mid-depth of the mandible; in the other genera mentioned the mental foramen is higher, within the diastema. There is a large mandibular foramen in the valley separating the cheek teeth from the ascending ramus posterior to m3.

The first molar is slightly longer than m2. The metalophid is narrower than the hypolophid. The anteroconid is isolated and at the center of the anterior margin of the tooth. The metaconid and protoconid are anteroposteriorly even with one another. The posterior arm of metaconid is directed obliquely (posterobuccally). The ectolophid is weak, not connected to hypoconid. The mesolophid is low and continuous to the lingual margin of the tooth. The mesoconid is small and obliquely compressed. A minute metastylid is present. The hypoconid and entoconid are anteroposteriorly compressed, the entoconid is directed slightly posterobuccally. The hypolophid cusps are only weakly connected (anterolingual corner of hypoconid, posterobuccal corner of entoconid). The entoconid is anterior to the hypoconid. The posterior cingulum is low, running from center of the hypoconid to the lingual margin of the tooth. There is a minute accessory lophule in the basin between the posterior cingulum and the hypolophid.

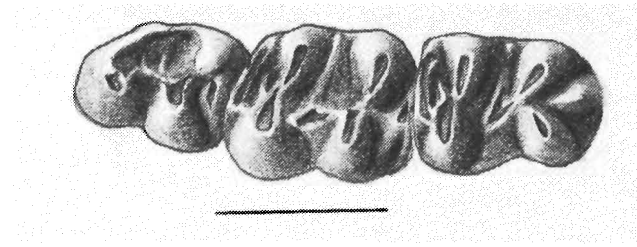

Fig. 1. Holotype *Miosicista angulus*, UNSM 45424, Rm1-m3. Bar = 1 mm.

The m2 is rectangular in occlusal outline. The major cusps are anteroposteriorly compressed. The metalophid is obliquely oriented (posterobuccally) and gently concave anteriorly. The metaconid is anterior to the protoconid and on the anterolingual corner of the tooth. The anterior cingulum is a single cusp (anteroconid) only weakly connected to the metalophid at the junction of the metaconid and protoconid on the buccal slope is bulbous and between the protoconid and anterobuccal on the corner of the tooth. The ectolophid is weakly developed and the mesoconid is minute. The mesolophid is very low, extending to the lingual margin of tooth, terminating in a minute metastylid. The hypolophid parallels the metalophid. The entoconid is anterior to the hypoconid. The posterior cingulum and accessory lophule are as in m1.

The third molar is the smallest tooth (81% of length of m2). The posterior width of the tooth is less than anterior. The metalophid is as in m2. The anterior cingulum is a small, anteroposteriorly compressed cusp, not connected to the metalophid but fused to the anterobuccal base of the metaconid. The ectolophid is a thin lophule. The mesolophid is short, ending in the center of the tooth. The hypoconid is small and circular in outline. The posterior half of the tooth is much reduced. The entoconid is reduced to a minute swelling on a loph connecting the metaconid to the hypoconid along the lingual margin of the tooth.

Table I. Dental measurements of the holotype of *Miosicista angulus*, UNSM 45424. Abbreviations: **a-p**, anteroposterior length; **tra**, anterior transverse width (metalophid); **trp**, posterior transverse width (hypolophid). Measurements in millimeters.

m1			m2			m3		
a-p	**tra**	**trp**	**a-p**	**tra**	**trp**	**a-p**	**tra**	**trp**
1.09	0.75	0.88	1.06	0.82	0.78	0.86	0.72	0.58

Discussion. The oblique alignment of the metalophid (no cingulum anterior to metaconid) and hypolophid and reduction of the mesolophid and mesoconid on the lower molars of *Miosicista angulus* are unique among zapodids. The reduction of m3 and more posterior position of the anterior end of the masseteric scar and lower position of the mental foramen on the mandible of *Miosicista* are features shared with *Macrognathomys* and Recent *Sicista*. Green (1977) argued that *Macrognathomys* was ancestral to *Sicista*, the former needing only minor modifications (such as reduction of m3) to attain a *Sicista*-like morphology. Although the m3 of *Miosicista* may be more reduced than that of the species of *Macrognathomys*, the dental morphology of *Miosicita* (weakness of mesolophid and mesoconid, ectolophid not continuous witih anterior cingulum, no cingulum anterior to metaconid) bar it from the ancestry of *Sicista* or any later zapodids.

CONCLUSIONS

The Eocene record of zapodids in North America is limited to two problematical genera, the Bridgerian *Elymys* (Emry and Korth, 1989) and Duchesnean *Simiacritomys* (Kelly, 1992). Zapodids do not occur again in North America until the Arikareean (Korth, 1980; Martin, 1974) and increase in diversity until the Barstovian, when the greatest diversity of zapodids is attained (four genera and five species). This greater diversity of zapodids is short-lived and restricted geographically in North America to the Great Plains. By the Clarendonian there is only one zapodid represented from the Great Plains (Green, 1971, 1977), and all later Tertiary zapodids are from Oregon (Shotwell, 1956, 1968, 1970) or Nevada (Hall, 1930; Wilson, 1936) until the occurrence of *Zapus* in the Blancan of Kansas (Klingener, 1963). *Miosicista* is part of the early radiation of zapodids in North America but is not ancestral to any later sicistine or zapodine.

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