Several Microvertebrate Fossils from the Washita Local Fauna

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In the 1998-1999 academic year, we excavated several microvertebrate fossils from Washita Local Fauna. This site is located 7.5 miles south of Weatherford, OK (T11N, R14W, Sec 18, SW 1/4, NE 1/4,). We removed the fossils from a Pleistocene deposit of light gray, silty clay measuring approximately 18 meters long and 2.3 meters deep. This deposit rests unconformibly on Permian sandstone of the Cloud Chief Formation. A gradual color change marks the end of the older Permian and the beginning of Pleistocene sediments. To obtain an accurate age of the deposit, three previously excavated bone samples from Washita Local Fauna were sent to Geochron Laboratories in Cambridge, Massachusetts for radiocarbon dating. These samples include *Bison* cf. *occidentalis*, GX-16060-A (18,295± 270 yr) (*1*), *Equus excelsus*, GX-22604-A (16,440 ± 730 yr) (*1*), and *Bootherium bombifrons* GX-19196 (16,350 ± 190 yr) (*2*). These dates place the deposit in the late Pleistocene Epoch (*3*).

We used a screenwashing method described by Rixon (*4*) to isolate fossils from the sediment collected. A right mandible with an incisor and three molars of *Reithrodontomys montanus,* K-143, were recovered (Fig. 1). Identification was accomplished using a binocular stereoscopic microscope and a digital caliper to make measurements for comparison. The specimen recovered had the distinctive shape and characteristics of the *Reithrodontomys* genus (Table 1)(*5*).

We also found in screenwashing a left molar of a second small mammal, K-144 (Fig. 2). Its identification was made by comparing it to previously excavated fossils in the Southwestern Oklahoma State University (SWOSU) collection, in particular specimen K-138 (*6*). We also compared measurements of its dentine tract (*7*) on the labial surface of the M1 (*8*) to those of the species *Neotoma micropus, N. floridana,* and *N. albigula* (Table 2). The M^1 of these species are characterized by a development of a dentine tract height of less than 0.2 mm. The dentine tract of the specimen recovered from Washita Local Fauna is 0.18 mm. In addition, the following measurements were made. The midlength (3.79 mm), base of lingual fold 1 to base of lingual fold 2 (1.20 mm), and base of lingual fold 2 to anterior face (2.77 mm). All measurements were within the range of those characteristic of *N. floridana*.

The third microvertebrate recovered was a fragmented right mandible of *Sorex hoyi*, K-14 (*5*). It contains two teeth, the M_1 and M_2, and has a total length of 4.87 mm. The total length of the right mandible of *S. hoyi* is 5.6-6.2 mm (*9*). The sample was also identified via comparison with the fossil shrews housed at SWOSU, K-142.

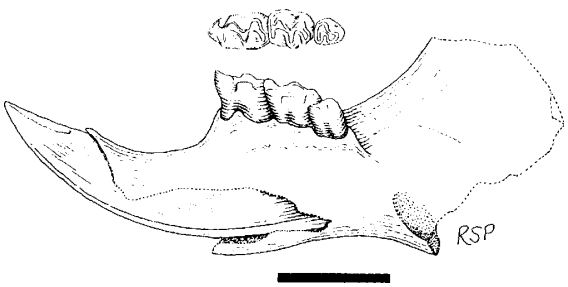

Figure 1. K-143. Right mandible of *Reithrodontomys montanus.* Scale bar = 5 mm.

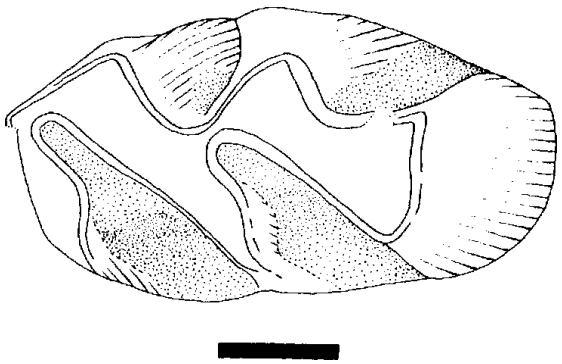

Figure 2. K-144. Occlusal view of first left upper molar of *Neotoma* cf. *floridana*. Scale bar = 1 mm.

The fourth specimen excavated was a lower left mandible of *Sorex cf. cinereus*, K-146. It was identified by comparison with specimens in the collection at SWOSU, K-141. The anterior part of the mandible is fragmented, thus only the M_2 and M_3 are present. The length of M_2 is 1.05 mm and the length of M_3 is 1.07 mm. These measurements fall within the range of the *S. cinereus* (*10*).

Other species recovered from screenwashing are *Microtus* cf. *ochragaster*, K-151 and K-153, and *Synaptomys* cf. *cooperi,* K-152. These fossil rodents were taken to the Natural History Museum at the University of Oklahoma for identification by Nicholas Czaplewski. They were also compared to specimens K-116 and K-139 in the SWOSU collection.

Microtus cf. *ochragaster* is represented by a right mandible with the incisor and M_1 and M_2 present, K-151. The left M_1 *Microtus cf. ochragaster*, K-153, is also present. *Synaptomys cf. cooperi* is represented at the Washita Local Fauna by the left M_1, K-152.

Measurements of the *Microtus* cheek teeth (K-151 & K-153) were obtained using the methods described by Martin (*11*). The M_1 is the best tooth for identifying *Microtus ochragaster* (*11*).

Measurements taken from the M_1 of K-151, the right mandible of *Microtus* cf. *ochragaster*, include occlusal length (L) 2.86 mm, relative length of the anterconid complex (W'/W) 83.3 mm, the ratio of the width of the dentine isthmus connecting T4/T5 and the anterior cap to the width of the anteroconid complex (B/W) 29.75 mm, and the ratio of the width of the dentine isthmus connecting T4/T5 to the width of the anteroconid complex (C/W) 25.6 mm. All of these measurements fall within specification of *Microtus ochragastor* (Table 3).

The measurements obtained from M_2 of K-151 provided the ratio of width of the dentine isthmus connecting T3/T4 to the greatest width across T3/T4 (CI/W).

Measurements of the M_1 of *Microtus* cf. *ochragaster*, K-153, were taken in the same fashion as those from the M_1 of K-151. They are: L 2.73 mm, A/L 58.97 mm, W'/W 98.97 mm, B/W 28.34 mm, and C/W 24.6 mm. Once again all measurements closely match measurements for the identification of the *Microtus ochragaster* (Table 4).

The left M_1 of *Synaptomys* cf. *cooperi*, K-152, measures 3.17 mm x 4.36 mm (L x W) (*12*). These measurements compare favorably to those of *Synaptomys cooperi*.

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TABLE 1. Measurement values for *Reithrodontomys* species (*4*).

Species	M_1-M_3 (mm)	M_1 (mm)	M_3 (occlusal shape)
Reithrodontomys montanus[a]	2.79-3.02	1.28-1.32	"C"
Reithrodontomys megalotis[a]	3.07-3.17	1.32-1.40	"C"
Reithrodontomys fulvous[a]	3.17-3.40	1.32-1.43	"S"
Reithrodontomy montanus[b], K-143	2.84	1.29	"C"

[a]Literature Values, [b]Fossil values

TABLE 2. Measurement values for *Neotoma* species (*6*).

Species	Dentine Tract Height (mm)
Neotoma floridana[a]	0.0-0.2
Neotoma micropus[a]	0.0-0.1
Neotoma albigula[a]	0.0-0.1
Neotoma cf. *floridana*[b], K-144	0.18

[a]Literature values, [b]Fossil values

TABLE 3. Measurements for *Microtus* species.

Measurement	Fossil Values, K-151 (mm)	Literature Values (mm) (*10*)
A / L	l49.19	45-51
W' / W	83.3	80-99
B / W	29.75	10-31
C / W	25.6	12-31

TABLE 4. Measurements for *Microtus* species.

Measurement	Fossil Values, K-153 (mm)	Literature Values (mm) (10)
A / L	58.97	45-51
W' / W	98.94	80-99
B / W	28.34	10-31
C / W	24.61	12-31