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SECOND RECORD OF A BAT (MAMMALIA, CHIROPTERA) FROM THE WHITNEYAN (MIDDLE OLIGOCENE) OF NORTH AMERICA

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ABSTRACT

An isolated canine from the late Whitneyan (middle Oligocene) Blue Ash fauna of South Dakota is referred to the Chiroptera based on dental morphology (basal cingula, posterior concavity), but cannot be assigned to a definite species due to its fragmentary nature and rarity of defined species of bats from this part of the Tertiary. This fossil is only the second record of a chiropteran from the Whitneyan of North America.

INTRODUCTION

The Blue Ash, or Harris Ranch, fauna from South Dakota has a diverse fauna of small mammals and has been determined to be middle Oligocene in age (=Whitneyan North American Land Mammal age: Simpson, 1985; Korth, 2007, 2009, 2010; Janis et al., 2008: appendix 1). Previously, no elements of fossil chiropterans have been reported from among the thousands of specimens collected from Harris Ranch. However, a single canine collected from anthills is referable to a bat, fills some of this long time gap between known records of chiropterans.

Fossil bats, or chiropterans, are rare in the fossil record due to the small size and delicate nature of the bones, as well as for the environment in which they live, which rarely allows for preservation (Czaplewski et al., 2008). Because of this, the fossil record of bats in North America has large gaps. Czaplewski et al. (2008: fig. 12.4) figured the largest gap between the Orellan (early Oligocene) and the Hemingfordian (early Miocene), a period of approximately 14 million years. The only previously described bat from the Orellan was based only on a partial humerus (Galbreath, 1962), and preceding that, the record of bats has a nearly two million year gap. Czaplewski and Morgan (2012) reported two isolated teeth of bats from the Whitneyan of Florida; this is the only previously cited occurrence of bats from the Whitneyan of North America.

SYSTEMATIC PALEONTOLOGY

Order Chiroptera Blumenbach, 1779
Family ?Vespertilionidae Gray, 1821
Genus and species indeterminate

Referred Specimen.—CM (=Carnegie Museum) 91733, right C1.

Measurements.—CM 91733, crown height = 2.05 mm; occlusal width = 1.10 mm; occlusal length = 1.39 mm.

Description.—The upper canine (CM 91733) is unworn and tapers ventrally to a point and is slightly curved. The root is longer than the crown (2.25 mm), and continues the slight arc of the tooth. A distinct cingulum wraps around the entire base of the crown. In cross-section, the anterior half of the tooth is rounded. There is a ridge running from the apex of the tooth along the posterior margin to the basal cingulum. On either side of this ridge, the tooth has a concave surface; the more lingual being deeper.

Discussion.—The canine referred here to a chiropteran is distinct in having the basal cingulum typical of vespertilionids, and cannot be definitely referred to any of the previously identified insectivorans or marsupials from the Blue Ash (=Harris Ranch) fauna, and is too small to belong to any of the recognized carnivores (Simpson, 1985; Korth, 2007, 2009). Unfortunately, there are no currently recognized cheek teeth from this locality that can be definitely identified as being chiropteran, so no definite genus or species can be assigned to this specimen.

Czaplewski and Morgan (2012) named two species of bats from the Whitneyan of Florida, *Speonycteris aurantidens* and *S. naturalis*. However, the record of the former species was mainly from the Arikareean with only an isolated p4 as the record from the Whitneyan. *S. naturalis* is limited to the holotype, a single m1 or m2. The Blue Ash specimen differs from the upper canine of *S. aurantidens* in being markedly smaller (approximately half the size: Czaplewski and Morgan, 2012:table 5.1), having only a single, ridge along the posterior height of the tooth (two in *S. aurantidens*), and having a continuous basal cingulum (interrupted in *S. aurantidens* with distinct cuspule).

No direct comparison can be made with *S. naturalis* but the single molar of *S. naturalis* is

approximately two-thirds the size of that of *S, aurantidens*; not proportionally as small as the Blue Ash canine is to the canine of *S. aurantidens.*

Ostrander (1987) identified a bat from the Chadronian of Nebraska as ?*Stehlinia* Revilliod, 1919, a genus known elsewhere from the Eocene and Oligocene of Europe (Smith et al., 2012). The Blue Ash canine differs from those of European *Stehlinia* that have a deep longitudinal groove down the anterior face of the crown not present the Blue Ash canine.

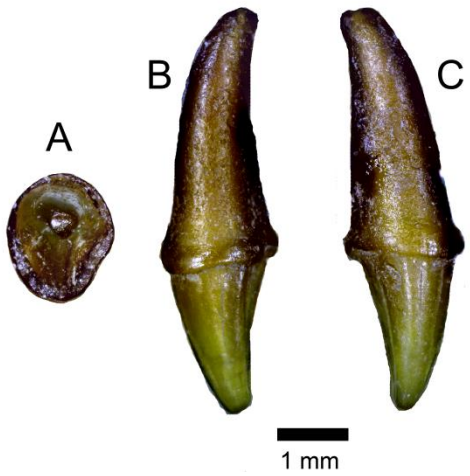

Figure 1. Canine of indeterminate chiropteran from Blue Ash fauna, South Dakota, CM 91733, right C1. A, occlusal view (anterior to top of page). B, lateral view. C, medial view.

CONCLUSIONS

Previously, only two specimens of chiropterans have been described from the Whitneyan (middle Oligocene) of North America. The Blue Ash specimen cannot be referred to either of these based on size and morphology (see above discussion).

The only named species of chiropteran from the Oligocene of the Great Plains is the Orellan *Oligomyotis casementi* Galbreath, 1962, that was based entirely on one limb bone. Czaplewski et al. (1999) described and figured specimens of bats from the early Arikareean (latest Oligocene) of Nebraska. They were unable to specifically identify their Arikareean specimens even though the sample included several dentaries with cheek teeth because of the paucity of bats in the fossils record and the lack of association between the dental elements and the limb elements. These latter specimens were identified only as "?*Oligomyotis* or *?Myotis*" and are smaller than the species from Florida, likely near that of the Blue Ash specimen (Czaplewski et al. 1999: table 1), but no upper canines were reported, so no direct comparisons can be made.

Recently, Person (2015: fig. 7) figured a maxilla of a chiropteran with P4-M3 from the Whitneyan of southwestern North Dakota (see Korth et al. 2019 for age determination) but did not describe the material. The canine described here from the southwestern South Dakota is of a similar age and size to the cheek teeth from North Dakota, but these specimens cannot be directly associated.

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