

American Museum Novitates

PUBLISHED BY THE AMERICAN MUSEUM OF NATURAL HISTORY
CENTRAL PARK WEST AT 79TH STREET, NEW YORK, N. Y. 10024

NUMBER 2478

DECEMBER 14, 1971

The Systematic and Historical Status of the Florida *Eumops* (Chiroptera, Molossidae)

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ABSTRACT

Specimens of *Eumops* from Florida that have been identified as *E. glaucinus* are shown to be markedly larger than tropical American material of that species. The Recent Florida specimens show good agreement, however, with the Florida Pleistocene *E. floridanus*. Judged by the degree of difference which characterizes specific as opposed to subspecific differentiation in *Eumops*, the Florida form may be called *Eumops glaucinus floridanus*. No convincing explanation has been found for the restriction of this form to extreme southern Florida since the Pleistocene.

INTRODUCTION

Prior to 1936, the only species of the bat genus *Eumops* known from the United States was *E. perotis* of the Southwest (Sanborn, 1932). In that year, Barbour (1936) recorded a specimen from Miami, Dade County, Florida, which had been identified by G. M. Allen as *Eumops glaucinus*. Although the record was of course repeated in numerous checklists and regional accounts, no additional information concerning Florida *Eumops* was published until 1963, when Ray, Olsen, and Gut (1963) showed that a fossil species described by Allen (1932) as *Molossides floridanus* was really a species of *Eumops*, closely allied to *E. glaucinus*.

Abbreviations used in reference to specimen numbers are:

AMNH, the American Museum of Natural History
FMNH, Field Museum of Natural History

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DISTINCTION OF FLORIDA *EUMOPS*

In 1958, the American Museum of Natural History obtained a series of four *Eumops* (179948–179951) collected by James I. Moore in the Miami High School. Since then, the American Museum has received as a gift or on loan from O. T. Owre of the Department of Biology, University of Miami, 17 additional specimens from nearby Coral Gables. These, together with five specimens in the Field Museum of Natural History and one in the Carnegie Museum, all from Miami, which I have studied, form a fairly good series for comparison with *E. glaucinus* from South America, Middle America, Jamaica, and Cuba. I am unable to detect any systematic differences among the specimens I examined from these last four areas. Besides material in the American Museum of Natural History, these include specimens in the United States National Museum, Academy of Natural Sciences of Philadelphia, Los Angeles County Museum, University of Kansas Museum of Natural History, and Field Museum of Natural History. In all, material from Cuba, Jamaica, Mexico, Honduras, Colombia, Ecuador, Venezuela, and Brazil (state of Pará) is represented. The Florida specimens are markedly larger than any of the others (see fig. 1). The more useful measurements for the 20 Florida adults are as follows (the range of the pooled tropical American *E. glaucinus* in parentheses): forearm, 61–66 mm. (55–62); condylobasal length, 24.2–25.3 mm. (21.0–23.7); zygomatic width, 16.0–17.2 (13.9–15.2); interorbital width, 5.0–5.4 (4.6–5.2); maxillary tooth row, 10.0–10.5 (8.8–9.8); width across M^3 , 10.5–11.3 (9.4–10.5).

No such differences are seen when mandibles of the Recent Florida form are compared with the type mandible (and as yet only specimen) of Allen's *Molossides floridanus*. Following are the mandibular measurements of 10 Recent Florida adults (my measurements of the fossil are in parentheses): anterior tip of jaw to mandibular foramen, 15.5–16.7 (16.0); anterior tip of jaw to back of M_3 , 11.6–12.0 (11.5); depth of mandible at front of M_1 , 2.9–3.1 (3.6); depth of mandible behind M_3 , 3.1–3.3 (3.5); length M_1 – M_3 , 6.9–7.5 (7.3). I have not taken these mandibular measurements for most of *E. glaucinus* I have studied, but for AMNH 70540 from Honda, Colombia (which has the longest maxillary tooth row), the comparable mandibular measurements are 15.2, 11.1, 2.0, 3.2, 6.8 respectively. It is clear that the fossil mandible agrees more with the Recent Florida specimens than with the Recent tropical American material. There is no reason, therefore, why Allen's name cannot be applied to the living Florida *Eumops*.

SYSTEMATIC STATUS

If we grant that *floridanus* is the name for the distinctive large *glaucinus*-

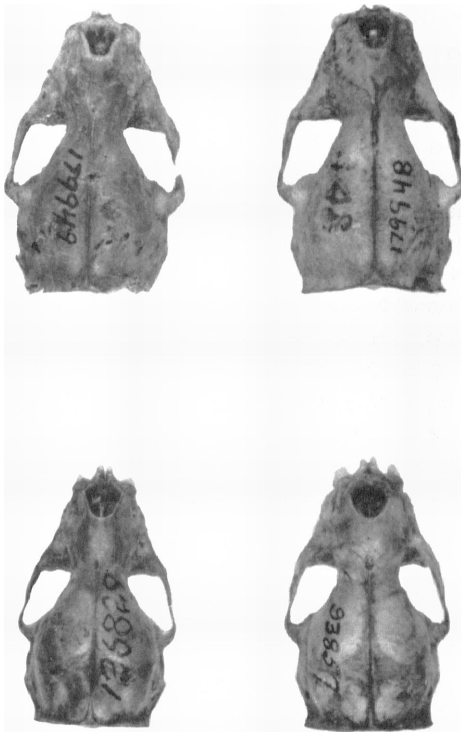


FIG. 1. Skulls of *Eumops glaucinus floridanus* (top) and *Eumops glaucinus glaucinus* (bottom). The two skulls of each form have been selected to show size extremes. $\times 1.4$.

like Florida *Eumops*, the next question is whether to regard it as a separate species or as a subspecies of its closest relative, *E. glaucinus*. Since the Florida *Eumops* is geographically isolated from all other forms of the genus, this can only be inferred from comparisons of various species in the genus. The Florida form shows no real morphological intergradation with *E. glaucinus*. On the other hand, it agrees with *glaucinus* in all the distinctive characters of the species, particularly the characters used to distinguish *E. glaucinus* from its close sympatric relative, *E. auripendulus* (= *abrasus*). (See Sanborn, 1932, for the characters which distinguish the two species.)

The species of *Eumops* seem to be rather distinct. (In addition to the above-mentioned forms, I have seen *E. perotis*, *E. trumbulli*, *E. underwoodi*, *E. geijskesi*, *E. hansae* [including *amazonicus*, see Gardner, Laval, and Wilson, 1970], and *E. bonariensis*.) The only exceptions to this statement

are the differences between *E. perotis* and *E. trumbulli*, which again are only a matter of size and of about the same magnitude as the size difference between *glaucinus* and *floridanus*. Husson (1962) also mentioned a character of the shape of the canine, but this does not hold for the material of the two forms at the American Museum (including 14 specimens of *trumbulli* from the Brazilian states of Pará and Amazonas). The records known to me of the two forms in South America do not really indicate sympatry between them, *trumbulli* being known from Surinam (Husson, 1962), Amazonian Brazil and Peru, and the Orinoco basin of Colombia and Venezuela (Smith and Genoways, 1969), whereas *perotis* is recorded from eastern Brazil, Paraguay, Argentina, the Pacific coast of Peru (Ortiz de la Puente, 1951) and Ecuador (Brosset, 1965), and northern Venezuela (Pirlot, 1965). The only suggested sympatry is in eastern Peru, where Sanborn (1932) recorded a specimen from "Loreto," indicating the Department of Peru, from which *trumbulli* has also been recorded (Sanborn, 1949). I have examined the specimen, which is a skull only, from the upper Rio Nanay (FMNH 34239). It is immature but agrees well with immature *trumbulli*. Tuttle (1970, p. 81) apparently interpreted Sanborn's (1932) remarks to refer to two specimens, one *perotis*, the other *trumbulli*, but I have only been able to find one, and Mr. Philip Hershkovitz confirms this (*in litt.*). Only much later were two other specimens of *trumbulli* collected in the Department of Loreto (Sanborn, 1949). Although both forms occur in Venezuela, the three localities of *perotis* cited by Smith and Genoways (1969) are all along the northern coastal mountain range, whereas the single locality (Maripa) of *trumbulli* is in the Orinoco Valley. There is thus no evidence of sympatry in Venezuela. There is also some approximation between the ranges of the two forms in northeastern Brazil, the distance being about 350 miles between Mocajuba in the state of Pará (*trumbulli*-AMNH specimens) and Barro do Corda in the state of Maranhão (*perotis*-Sanborn, 1932). In view of the lack of demonstrated sympatry and the doubt as to the specific status of *trumbulli* (see Sanborn, 1932, 1949), I do not believe that the *perotis-trumbulli* difference can be used to gauge the taxonomic distinction between *glaucinus* and *floridanus*. Since all other species-pairs in *Eumops* are more distinct, I tentatively regard *floridanus* as a well-marked subspecies of *Eumops glaucinus*. Also pertinent to this question is the fact that the size differences among the various subspecies of *E. bonariensis* (see Sanborn, 1932 for measurements) are of the same order of magnitude as those between the two forms of the *glaucinus* group.

HISTORICAL STATUS

Barbour (1936), under the impression that the Florida *Eumops* was

indistinguishable from *E. glaucinus* and having only a single specimen, believed that this was a human import from Cuba. It is now evident that a population exists in the Miami area and has existed in Florida for a considerable period of time. Unfortunately, *E. g. floridanus* as a fossil is known from only one specimen, which is of uncertain age. This is due to the uncertain stratigraphic position of the fossil, although the general consensus is that the type of *Molossides floridanus* came from stratum 2 of the Melbourne bed and is therefore Pleistocene. Just how late in the Pleistocene or perhaps even post-Pleistocene it is, is uncertain. Allen (1932), Ray (1958), and Auffenberg (1963) should be consulted concerning the stratigraphy at the Melbourne locality. If the age is very late Pleistocene or even early post-Pleistocene, the temperature in the area would have been somewhat cooler than at present. Yet, whereas all Recent *E. g. floridanus* have come from the vicinity of Miami, the fossil came from near Melbourne, about 150 miles farther north. As *Eumops glaucinus* is essentially a tropical bat, this implies that either the range in Florida has been considerably constricted toward the south during the past few thousand years in spite of a general trend toward warmer conditions during this period, or that *E. g. floridanus* really has a much more extensive range in peninsular Florida than the known records indicate. If the former is true, there seems to be no ready explanation as to why the range should have become so reduced. If the latter, it is surprising that it has not turned up in Florida outside the Miami area. Most of the living species of mammals recorded from the Melbourne deposit (Ray, 1958) are widespread in peninsular Florida today. A few are northern forms that do not now reach southern Florida. The only species that suggest a more tropical element than was found in central Florida in the recent past are *Monachus tropicalis* and a small species of *Felis* (probably either a margay or a jaguarundi). Whatever the explanation for the disappearance of these forms particularly the *Felis* from central Florida, it may also explain the more restricted distribution of *Eumops glaucinus floridanus*.

ACKNOWLEDGMENTS

First, I am greatly indebted to Dr. O. T. Owre, Department of Biology, University of Miami for supplying on loan and in part by gift of the major portion of the series of *Eumops glaucinus floridanus*. I also wish to thank Dr. J. K. Doult of Carnegie Museum who lent another specimen. The following people made available specimens in their care and extended other courtesies: Miss Barbara Lawrence, Museum of Comparative Zoology, Cambridge; Mr. Robert Grant, Academy of Natural Sciences of

Philadelphia; Dr. C. O. Handley, United States National Museum, Smithsonian Institution; Dr. J. C. Moore and Mr. Philip Hershkovitz, Field Museum of Natural History; Dr. J. K. Jones, University of Kansas Museum of Natural History; Dr. C. A. MacLaughlin, Los Angeles County Museum. I am also indebted to Dr. Guy G. Musser, the American Museum of Natural History, for helpful information and to Dr. C. E. Ray, United States National Museum, for critical reading of the manuscript.

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