A NEW *PEROMYSCUS* FROM THE LATE PLEISTOCENE OF ANACAPA ISLAND, CALIFORNIA, WITH NOTES ON VARIATION IN *PEROMYSCUS NESODYTES* WILSON

*By John A. White*
A NEW *PEROMYSCUS* FROM THE LATE PLEISTOCENE OF ANACAPA ISLAND, CALIFORNIA, WITH NOTES ON VARIATION IN *PEROMYSCUS NESODYTES* WILSON

By JOHN A. WHITE

Abstract: A new fossil rodent, *Peromyscus anyapahensis*, is described from one of the California offshore Channel Islands. The new form is compared to closely related forms.

Recently, through the efforts of Edward D. Mitchell, Jr., Jeri Lipps, Michael K. Hammer and James Valentine, specimens of a distinctive cricetine rodent were collected in terrace deposits of the late Pleistocene of West Anacapa Island. These specimens are referred to the genus *Peromyscus* because the cheek teeth are brachydont, the cusps are alternately arranged, the M3 are markedly reduced, and the coronoid process of the mandible is only slightly developed. These characters distinguish *Peromyscus* from most cricetine genera. The cheek teeth in *Reithrodontomys* closely resemble those in *Peromyscus*. However, the smallest of the Anacapa Island specimens is considerably larger than any known specimen of *Reithrodontomys creper*, the largest-sized species of that genus (Hooper, 1952: 175). Furthermore, in *R. creper* and allied species, accessory cusps and lophs are invariably present (Hooper, 1952: 177-183), whereas in the Anacapa Island species no such cusps and lophs are present.

Wilson (1936) described *Peromyscus nesodytes* from the Santa Rosa Island Pleistocene of California. The latter species is characterized by "...its larger size, which is greater than in any living species of *Peromyscus* native to the United States..." (Wilson, 1936: 408). Although clearly related to *P. nesodytes* the Anacapa Island specimens are not referable to that species and differ to such a degree from mainland species that they should be placed in a new species.

*Peromyscus anyapahensis*, new species

Figures 3 and 4

*Holotype:* Los Angeles County Museum of Natural History, Vertebrate Paleontology no. 9205; left mandible with complete dentition and with angular process and tip of coronoid process missing.

*Locality:* West Anacapa Island; Los Angeles County Museum of Natural History, Vertebrate Paleontology locality number 1764.

*Age and stratigraphic position:* Late Pleistocene terrace on the north side of the island, 25 feet above sea level (See Lipps, 1964).

1Department of Biology, California State College at Long Beach, and Research Associate, Los Angeles County Museum of Natural History.

2Based on Anyapah, the Chumash word for Anacapa.
Referred specimens: 8 mandibles with more or less complete dentitions and one partial left palate with dentition, the labial half of M\(^1\) missing.

Diagnosis: Larger than in any living species except species of the subgenus Megadontomys, Peromyscus zarhynchus, and P. nesodytes. Lower cheek teeth similar to those of P. eremicus and P. californicus but of marked larger size. Significantly smaller than P. nesodytes and distinct from P. zarhynchus, and species of P. (Megadontomys) in lacking accessory cusps and lophs in the molars.

Description: Large size (Fig. 1); mental foramen anterior and slightly ventrad of the anterior extension of masseteric scar; capsular process of lower incisor ventrad of coronoid process and with ridge extending posteriad to lower one-third of condyloid process: mandibular foramen dorsad to posterior projection of cheek tooth row and approximately one-half the distance between posterior surface of condyloid process and posterior edge of M\(_4\).

Anterior median cusp of M\(_1\) with a slightly developed furrow or groove on the anterior face causing it to be slightly bipartite. A V-shaped valley exists between the anterior median cusp and anterolingual cusp of M\(_1\). There are no accessory cusps or lophs on the cheek teeth. The cusps on the cheek teeth tend to remain recognizably high even when worn.

Comparisons with other species: The mandible in P. anyapahensis is significantly shorter than in P. nesodytes (Fig. 1). The cheek teeth are smaller and the anterior-median cusp in M\(_1\) is divided by the presence of a groove that extends a shorter distance down the front face of tooth than in P. nesodytes. The mental foramen is situated in front of the apex of the masseteric scar and not variably placed as it is in P. nesodytes.

P. anyapahensis differs from both P. (Megadontomys) and P. (Peromyscus) zarhynchus in the absence of extra cusps and lophs which are conspicuous in the latter groups.

P. antiquus Kellog is as large in size as P. nesodytes, as noted by Wilson (1936) but differs from both P. anyapahensis and P. nesodytes in having a relatively larger M\(_3\) (Fig. 2) and in the relatively shorter anterior lobe of M\(_1\).

The absence of extra cusps and lophs in the molars of P. anyapahensis seems to favor the assignment of this species to the subgenus Haploplysomys. Wilson (1936) and Hooper (1957) agree that the presence or absence of extra cusps and lophs in Peromyscus is quite variable and should be used with caution in characterizing subgenera. However, it is thought that since in both the above island species no trace of such structures can be seen, their assignment to Haploplysomys seems reasonable, especially since all other large-sized species have these structures.

Materials

Most of the comparative materials used in this study are listed herein by species and/or subspecies together with region of collection, source institution
Figure 1. Bar diagrams modified from Hubbs and Hubbs (1953) showing variation in the alveolar length of the mandibular cheek teeth. The numbers in parentheses indicate size of each respective sample. Measurements are in millimeters.
Figure 2. Ratio diagrams modified from Simpson et al. (1960) comparing mandibles in Peromyscus anyapatensis new species (A) with P. nesodytes (B), P. thomasi (C), P. zarhynchus (D), P. antiquus (E), and P. californicus parasiticus (F). AL = alveolar length of mandibular cheek teeth. The logs of the means of the dimensions in P. anyapatensis are assumed to be zero, while the differences between the log of the mean in the latter species (standard) and species being compared are plotted to the positive (+) or negative (−) sides of the zero line.

(abbreviated as indicated under acknowledgments) and numbers of specimens.

Peromyscus nesodytes Wilson
Santa Rosa Island, California, SBM (7), L.A.M. (1).

P. thomasi Merriam
Guerrero, Mexico, MVZ (5).

P. zarhynchus Merriam
Chiapas, Mexico, KUM (19).

P. antiquus Kellog
Thousand Creek beds, Nevada, UCP (1).

P. californicus parasiticus (Baird)
San Francisco Bay Area, California, KUM (14), LACM (8).

Peromyscus nesodytes Wilson
Seven mandibles of this species are in the collections of the Santa Barbara Museum of Natural History and are briefly discussed here since the species was based originally on a single specimen.

The newly-available specimens confirm the "specific characters" proposed by Wilson (1936). The position of the mental foramen, however, varies from a lateral to a nearly dorsal position on the mandibles, probably reflecting the
Figure 3. *Peromyscus anyapahensis* new species. Lingual (A) and buccal (C) views of left mandible (approximately × 4.6), and occlusal view (B) of lower cheek teeth (greatly enlarged) of holotype (LACM 9205).

usual high variability of species (Table 1). Although present, the groove on the anterior face of M₁ is not so strongly expressed as was inferred from the study of the type specimen.

Remarks: The presence of large-sized *Peromyscus* on both Anacapa and Santa Rosa Islands possibly indicates an adaptive trend toward a Neotoma-like habitus. The fact that among several thousand specimens of rodents from Santa
Figure 4. *Peromyscus anyapahensis* new species. Occlusal view (A) of RM₁ (LACM 4588), and occlusal view (B) of left maxillary cheek teeth (LACM 4879). Both A and B above are greatly enlarged and not to the same scale.

**Table 1**

Statistical data relating to four measurements on specimens of *Peromyscus anyapahensis* new species, and *P. nesodytes*. AL indicates alveolar length of mandibular cheek teeth; N = number of individuals in sample; X = arithmetic mean; σ = standard deviation; V = coefficient of variability. All measurements estimated to the nearest 0.01 mm.

*Peromyscus anyapahensis* new species

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>X</th>
<th>Max.</th>
<th>Min.</th>
<th>σ</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL</td>
<td>9</td>
<td>5.51</td>
<td>5.71</td>
<td>5.32</td>
<td>.1425</td>
<td>22.58</td>
</tr>
<tr>
<td>WM₁</td>
<td>8</td>
<td>1.41</td>
<td>1.52</td>
<td>1.31</td>
<td>.0784</td>
<td>5.56</td>
</tr>
<tr>
<td>WM₂</td>
<td>7</td>
<td>1.53</td>
<td>1.60</td>
<td>1.47</td>
<td>.0486</td>
<td>3.16</td>
</tr>
<tr>
<td>WM₃</td>
<td>6</td>
<td>1.18</td>
<td>1.22</td>
<td>1.13</td>
<td>.0334</td>
<td>2.83</td>
</tr>
</tbody>
</table>

*Peromyscus nesodytes*

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>X</th>
<th>Max.</th>
<th>Min.</th>
<th>σ</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL</td>
<td>7</td>
<td>5.95</td>
<td>6.15</td>
<td>5.68</td>
<td>.1614</td>
<td>27.10</td>
</tr>
<tr>
<td>WM₁</td>
<td>5</td>
<td>1.44</td>
<td>1.58</td>
<td>1.32</td>
<td>.1162</td>
<td>8.19</td>
</tr>
<tr>
<td>WM₂</td>
<td>2</td>
<td>1.61</td>
<td>1.66</td>
<td>1.55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WM₃</td>
<td>2</td>
<td>1.19</td>
<td>1.19</td>
<td>1.19</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Rosa Island (Orr, 1962:419) no *Neotoma* bones were found, tends to substantiate the absence of *Neotoma* from the Pleistocene of Santa Rosa, and by inference, from Anacapa Island as well. The numerous specimens of rodents
from Santa Rosa Island consisted principally of *Peromyscus*, most of which were small in size and resembling *P. maniculatus*. It seems probable that the latter specimens are *P. maniculatus streatorii* that inhabit the island. A specimen of *P. nesodytes* was found in association with the pigmy mammoth (*Mammutthus [Archidiscodon] exilis*).

*P. anyapahensis* seems to be intermediate, in size and in dental characters, between *P. nesodytes* from Santa Rosa Island and *P. eremicus* and *P. californicus* from the Recent of the mainland. This suggests that Santa Rosa Island was separated from the mainland before Anacapa Island and that both islands were connected to the mainland to the east.

Subsequent to 1936, biological surveys of the Channel Islands have been conducted, especially of the living biota. The results of these surveys indicate rather clearly that neither *P. anyapahensis* nor *P. nesodytes* have survivors on Anacapa and Santa Rosa Islands, respectively.

**ACKNOWLEDGMENTS**

For helpful suggestions, I wish to thank Seth Benson, C. A. MacLaughlin, E. D. Mitchell, Jr., and R. A. Stirton. Theodore Downs and J. R. Macdonald kindly read and criticized the manuscript. For permission to examine comparative materials in their care I gratefully acknowledge Seth Benson, Museum of Vertebrate Zoology (MVZ) University of California, Berkeley; J. Knox Jones, Jr., Museum of Natural History, University of Kansas (KUM); J. R. Macdonald and C. A. MacLaughlin, Los Angeles County Museum of Natural History (LACM); Phil Orr, Santa Barbara Museum of Natural History (SBM); and R. A. Stirton, Museum of Paleontology (UCP), University of California, Berkeley. Pamela Iimmel made the drawings, and I drafted the other figures.

**LITERATURE CITED**

Hooper, Emmet T.


Hubbs, Carl L. and Clark Hubbs


Lipps, Jere H.


Orr, P. C.


Simpson, G. G., Anne Roe and R. C. Lewontin


Wilson, Robert W.