COVER: The standardized karyotype of *Peromyscus*.

Welcome to the first issue of PEROMYSCUS NEWSLETTER, an informal exchange of information about deer mice, white-footed mice and their allies. Peromyscus Newsletter is made possible under a National Science Foundation grant to the University of South Carolina which also supports, in part, a Peromyscus Stock Center at this institution. The Newsletter is not an official publication and should not be cited without permission from the contributor.

Peromyscus Newsletter is designed to fill several functions. First, the location of laboratory breeding stocks and strains will be identified together with the genetic characteristics and history of each stock. Animals from these stocks may or may not be available for distribution.

Second, there will be periodic updates of the current status of genetic information for species of the genus. Numerous genetic loci have been described for P. maniculatus and a list of these will be updated annually. Linkage information is also available for this species, and this likewise will be included regularly. We plan to alternate genetic updates for P. maniculatus with those for the other species, where less information is available. This first issue includes a table listing published formally described loci in P. maniculatus and the next issue will present similar information for P. leucopus, P. truei and other species. Biochemical loci based on surveys of natural polymorphisms in P. maniculatus and sibling species are listed in a separate table. Biochemical polymorphisms in populations of other species will be given in future issues.

Third, there will be a regular update of karyotypic information for the genus, beginning in an early issue. Dr. Oscar Ward of the University of Arizona has kindly consented to edit this portion of the newsletter, as well as to serve as general co-editor. It is anticipated that it will soon be possible to assign linkage groups to specific chromosomes in the deer mouse, and as this information becomes available it will be included.

Fourth, there will be periodic updates of molecular genetic information for Peromyscus, beginning in the next issue. This will include citation of sequence and restriction map data. Cloned DNA libraries are now being generated for Peromyscus. These will be listed together with pertinent information, such as source and cloning vector. References to known Peromyscus DNA (and amino acid) sequences will be updated annually.
Fifth, periodically the systematics of the genus will be summarized. A table of the currently recognized species as now classified is included in this first issue.

As a matter of human and historical interest in each issue we intend to present a brief biographical sketch of an individual who has made a significant contribution to *Peromyscus* biology. We have labelled this section "Peromyscus Pioneers", and in the current issue we feature Wilfred Osgood.

A major function of the Newsletter is to present contributed entries describing in-progress *Peromyscus* research. Entries have been solicited from persons on our provisional mailing list. We undoubtedly overlooked many who could make interesting contributions, and hope to have contributions in the future from any and all individuals who have an interest. Each entry has been edited to a standard format, but otherwise is verbatim as received from the contributor. The entries are arranged alphabetically by the name of the contributor.

Finally, we have included a list of recent publications dealing with *Peromyscus*. The list has been limited to articles published in the past two years. For this issue the years 1983-85 are listed. The list will be updated with each issue. Our list is probably not complete, so any additions should be called to our attention for future issues. Dr. Bruce Buttler of Canadian Union College is compiling a comprehensive bibliography for *Peromyscus* genetics, and this may be consulted for complete citations of references given in the tables of gene lists.

There are sure to be many suggestions for changes and improvements which can be incorporated into future issues. We also will appreciate any corrections or additions to the information we have presented in the tables and elsewhere that we may have overlooked. PLEASE LET US HAVE YOUR INPUT.

Contributions for future issues and other communications should be addressed to:

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Peromyscus Stock Center  
Department of Biology  
University of South Carolina  
Columbia SC 29208
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SYSTEMATICS

ORDER RODENTIA

Suborder Myomorpha

Family Muridae or Cricetidae

Subfamily Sigmodontinae

Tribe Peromyscini

Genus PEROMYSCUS

Subgenus Megadontomys

P. thomasi - Thomas' Deer Mouse

Subgenus Isthmomys

P. flavidus - Yellow Deer Mouse
P. pirrensis - Mount Pirri Deer Mouse

Subgenus Haplomyllomys

* P. eremicus (14) - Cactus Mouse
P. eva (2) - Eva's Desert Mouse
P. merriami (2) - Merriam's Mouse
P. guardia (3) - Angel Island Mouse (1)
P. interparietalis - San Lorenzo Deer Mouse (1)
P. collatus - Turner Is. Canyon Mouse (1)
P. dickeyi - Dickey's Deer Mouse (1)
P. pemberstoni - Pemberton's Deer Mouse (1)
* P. californicus (5) - California Mouse

Subgenus Habromys

P. simulatus - Jico Deer Mouse
P. chinanteco - Chinanteco Deer Mouse
P. lophurus - Crested-tailed Mouse
P. lepturus (2) - Slender-tailed Deer Mouse

Subgenus Osgoodomys

P. banderanus (2) - Michoacan Deer Mouse
Subgenus Podomys

P. floridanus  - Florida Mouse

Subgenus Peromyscus

crinitus-species group:

* P. crinitus (8)  - Canyon Mouse
P. caniceps  - Burt's Deer Mouse (1)
P. pseudocrinitus  - False Canyon Mouse (1)

hooperi-species group:

P. hooperi  - Hooper's Mouse

boylii-species group:

* P. pectoralis (3)  - White-ankled Mouse
* P. boylii (12)  - Brush Mouse
P. attwateri  - Attwater's Mouse
P. polius  - Chihuahuan Mouse
P. stephani  - San Esteban Island Mouse (1)
P. evides  - Osgood's Deer Mouse
P. aztecus  - Aztec Mouse
P. oaxacensis  - Oaxacan Deer Mouse
P. winkelmanni  - Forest Mouse
P. hyloceter  - Southern Wood Mouse

truei-species group:

* P. truei (15)  - Pinyon Mouse
* P. difficilis (8)  - Rock Mouse
P. bullatus  - Perote Mouse

melanophrys-species group:

P. perfulvus (2)  - Marsh Mouse
* P. melanophrys (6)  - Plateau Mouse

mexicanus-species group:

P. ochraventer  - El Carrizo Deer Mouse
P. yucatanicus (2)  - Yucatan Deer Mouse
* P. mexicanus (6)  - Mexican Deer Mouse
P. gymnotis  - Naked-eared Deer Mouse
P. mayensis  - Mayan Deer Mouse
P. stirtoni  - Stirton's Deer Mouse
P. nudipes (3)  - Naked-footed Deer Mouse
mexicanus-species group (continued):

P. furvus         - Blackish Deer Mouse
P. altilaneus    - Todos Santos Deer Mouse
P. guatemalensis (2) - Guatemalan Deer Mouse
P. megalops (4)   - Brown Deer Mouse
P. melanocarpus   - Zenpoaltepec Deer Mouse
P. zarhynchus     - Chiapan Deer Mouse
P. grandis        - Big Deer Mouse

leucopus-species group:

* P. leucopus (17) - White-footed or Wood Mouse
* P. gossypinus (7) - Cotton Mouse

maniculatus-species group:

* P. maniculatus (64) - Deer Mouse
P. oreas (2)       - Vancouver Deer Mouse
P. sejugis         - Santa Cruz Island Mouse (1)
P. slefini          - Slevin’s Mouse (1)
P. sitkensis (2)    - Sitka Deer Mouse (1)
P. melanotis        - Black-eared Mouse
* P. polionotus (17) - Oldfield or Beach Mouse

EXTINCT SPECIES:

Subgenus Haploomyomys

Pliocene: P. dentalis, P. plicenicus, P. antiquus
Early Pleistocene: P. kansasensis, P. baumgartneri, P. hagermanensis
Mid-Pleistocene: P. irvingtonensis, P. cragini

Subgenus uncertain or transitional

Mid-Pleistocene: P. progressus, P. berendsensis, P. cumberlandensis
Late Pleistocene: P. nesodytes, P. anyapahensis, P. imperfectus

Subgenus Peromyscus

Late Pleistocene: P. cochrani, P. oklahomensis

* Major species, i.e. widely distributed and polytypic. Number of subspecies given in () after specific epithet. I in () after common name indicates exclusively insular species.
GENETIC LOCI IN THE DEER MOUSE

(Peromyscus maniculatus)

Tables Ia through Id list genetic loci described in Peromyscus maniculatus and other species of the maniculatus group. This list is limited to loci for which formal genetic analysis of crosses has been accomplished and reported in the published scientific literature. Brief reports, such as abstracts, or casual reports, as in newsletters, grant proposals, papers presented at meetings, etc., are not included in the citations.

Table II lists presumptive biochemical loci described as polymorphisms in natural populations of P. maniculatus and its sibling species. These are loci which may or may not have been subjected to formal mendelian analysis. Reports of monomorphic loci are ignored. Again, only those reports in article form in the scientific literature are included.

The genetic nomenclature of Peromyscus has not been standardized. In designating gene loci we have used the symbols given by the original investigator, unless these have been superseded by subsequent reports, in which case we have used the most recent revision. Exceptions to this rule have been made 1.) where there is a clear homology with Mus, in which case the laboratory mouse symbol has been adopted; 2.) where a variant has been shown to be allelic with a previously reported gene, in which case a locus symbol is reduced to an allelic symbol; 3.) where two authors have used the identical symbol for different loci, in which case we have given priority to the first reported, and devised a different designator for the other.

References cited in the tables are available in a list of Peromyscus genetic literature compiled by Dr. Bruce Butter, Biology Department, Canadian Union College, College Heights, Alberta, Canada, TOC 0Z0.
### Table IA

**Percyxus maniculatus species group**

**Cost color and pattern, and eye pigmentation variants**

<table>
<thead>
<tr>
<th>Name of locus and alleles</th>
<th>Symbol</th>
<th>Mode of inheritance</th>
<th>Linkage group</th>
<th>Original description and analysis</th>
<th>Collateral descriptions, interactions, and recurrences</th>
<th>Recombination reported</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGOUTI</td>
<td>Pb</td>
<td>dominant</td>
<td>III</td>
<td>McIntosh (1956a)</td>
<td>Blair (1947) as &quot;buff&quot;</td>
<td>Clark (1938) as &quot;buff&quot;; Barto (1956)</td>
</tr>
<tr>
<td>White belly non agouti a*</td>
<td></td>
<td>recessive</td>
<td></td>
<td>Egosuce (1971)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Black)</td>
<td>a</td>
<td>recessive</td>
<td></td>
<td>Horner et al. (1980)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BROWN</td>
<td>b</td>
<td>recessive</td>
<td>II</td>
<td>Huestis and Barto (1934)</td>
<td>Blair (1947); McIntosh (1956a); Dowse et al. (1969)</td>
<td>Huestis and Barto (1934); Blair (1947); Barto (1955, 1956); McIntosh (1956a)</td>
</tr>
<tr>
<td>Orange-tan</td>
<td>b&lt;ot&gt;</td>
<td>recessive</td>
<td></td>
<td>Egosuce and Day (1958)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BLOND</td>
<td>bl</td>
<td>recessive</td>
<td></td>
<td>Pratt and Robbins (1982)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ALBINO</td>
<td>c</td>
<td>recessive</td>
<td>I</td>
<td>Summer (1922)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COLORLESS HAIR TIP</td>
<td>ctp</td>
<td>recessive</td>
<td></td>
<td>Boven and Dawson (1949)</td>
<td>Bowen (1968)</td>
<td></td>
</tr>
<tr>
<td>DILUTE</td>
<td>d</td>
<td>recessive</td>
<td>II</td>
<td>Dice (1933)</td>
<td></td>
<td>Clark (1938); Barto (1942a, 1956); McIntosh (1956a)</td>
</tr>
<tr>
<td>GRAY</td>
<td>g</td>
<td>recessive</td>
<td></td>
<td>Dice (1933)</td>
<td>Clark (1938); Blair (1947); McIntosh (1956a)</td>
<td>Blair (1944, 1967)</td>
</tr>
<tr>
<td>IVORY</td>
<td>h</td>
<td>recessive</td>
<td></td>
<td>Huestis (1938)</td>
<td>Clark (1938)</td>
<td>Barto (1942a, 1956); McIntosh (1956a)</td>
</tr>
<tr>
<td>PINK-EYE DILUTION</td>
<td>p</td>
<td>recessive</td>
<td>I</td>
<td>Summer (1917)</td>
<td>Barto (1942a)</td>
<td>Summer (1922); Clark (1936, 1938); Feldman (1937); Snyder (1980a)</td>
</tr>
<tr>
<td>PLATINUM</td>
<td>pt</td>
<td>recessive</td>
<td></td>
<td>Doolan et al. (1966)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RED EYE (Heterochromia)</td>
<td>r</td>
<td>recessive</td>
<td></td>
<td>Huestis and Willoughby (1950)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DOMINANT SPOT (Whiteface)</td>
<td>s</td>
<td>dominant</td>
<td></td>
<td>Feldman (1936)</td>
<td>Maddock (1966)</td>
<td></td>
</tr>
<tr>
<td>SILVER</td>
<td>si</td>
<td>recessive</td>
<td>I</td>
<td>Huestis and Barto (1934)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WHITE CHEEK</td>
<td>wc</td>
<td>dominant</td>
<td></td>
<td>Blair (1944)</td>
<td>Bowen and Dawson (1977)</td>
<td></td>
</tr>
<tr>
<td>WHITESHADOW</td>
<td>wh</td>
<td>recessive</td>
<td></td>
<td>McIntosh (1956b)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>YELLOW</td>
<td>y</td>
<td>recessive</td>
<td></td>
<td>Summer (1917)</td>
<td>Sumner and Collins (1922); McIntosh (1956a)</td>
<td></td>
</tr>
<tr>
<td>COMPLEXLY INHERITED Traits:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minor white spotting (star, splash, etc.)</td>
<td>p&lt;1; p&lt;2</td>
<td>recessive incompletely dominant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grizzled&lt;sup&gt;+&lt;/sup&gt;</td>
<td>p&lt;sup&gt;+&lt;/sup&gt;</td>
<td>&quot;complex dominant&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coat pattern in F. pallionotus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coat pattern modifiers in F. pallionotus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Squared modifier</td>
<td>ks</td>
<td>incompletely dominant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>*No longer known to be in existence</sup>
Table II
Peromyscus maniculatus species group

<table>
<thead>
<tr>
<th>Name of locus and allele</th>
<th>Symbol</th>
<th>Mode of inheritance</th>
<th>Linkage group</th>
<th>Original description and analysis</th>
<th>Collateral descriptions, interactions, and recurrences</th>
<th>Recombination reported</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cataract-Wesker (syndactyly)</td>
<td>cw</td>
<td>recessive</td>
<td>I</td>
<td>Anderson and Burns (1979)</td>
<td></td>
<td>Huertis and Barto (1936a); Huertis and Pienstra (1942); Huertis and Linnestad (1946); Huertis (1946b); Huertis, et al (1956); Barto (1956); Summer (1924, 1939); Fieldman (1937); Clark (1938); Barto (1942a, 1955, 1956); McIntosh (1956a)</td>
</tr>
<tr>
<td>Flexed-tail</td>
<td>t</td>
<td>recessive</td>
<td></td>
<td>Huertis and Barto (1936a)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hairless-1</td>
<td>br-1</td>
<td>recessive</td>
<td></td>
<td>Summer (1924)</td>
<td></td>
<td>Summer (1924, 1939); Fieldman (1937); Clark (1938); Barto (1942a, 1955, 1956); McIntosh (1956a)</td>
</tr>
<tr>
<td>Hairless-2</td>
<td>br-2</td>
<td>recessive</td>
<td></td>
<td>Egoescue (1962)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Riders (post-juvenile)</td>
<td>n</td>
<td>recessive</td>
<td></td>
<td>Clark (1938)</td>
<td></td>
<td>Barto (1942a)</td>
</tr>
</tbody>
</table>

*No longer known to be in existence.*

Table II
Peromyscus maniculatus species group

<table>
<thead>
<tr>
<th>Name of locus and alleles</th>
<th>Symbol</th>
<th>Mode of inheritance</th>
<th>Linkage group</th>
<th>Original description and analysis</th>
<th>Collateral descriptions, interactions, and recurrences</th>
<th>Recombination reported</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hohler</td>
<td>kg</td>
<td>recessive</td>
<td></td>
<td>Barto (1955)</td>
<td></td>
<td>Vandermeer and Barto (1955)</td>
</tr>
<tr>
<td>Epilepsy (Ep)</td>
<td>e</td>
<td>recessive</td>
<td></td>
<td>Dice (1935)</td>
<td></td>
<td>Clark (1938); Watson (1939); Chance &amp; Ealey (1950); Barto (1954, 1956)</td>
</tr>
<tr>
<td>Juvenile Ataxia</td>
<td>ja</td>
<td>recessive</td>
<td></td>
<td>Van Ooteheen (1931)</td>
<td></td>
<td>Watson (1939); Barto (1954)</td>
</tr>
<tr>
<td>Spindler</td>
<td>sp</td>
<td>recessive</td>
<td></td>
<td>Watson (1939)</td>
<td></td>
<td>Barto (1954)</td>
</tr>
<tr>
<td>Trebor</td>
<td>t</td>
<td>recessive</td>
<td></td>
<td>Huertis and Barto (1936b)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waltzer (waltzing in Bairdii)</td>
<td>w</td>
<td>recessive</td>
<td>III</td>
<td>Dice (1935)</td>
<td></td>
<td>Clark (1958); Watson (1939); Barto (1942a, 1954, 1956); McIntosh (1956)</td>
</tr>
</tbody>
</table>

*No longer known to be in existence.
<table>
<thead>
<tr>
<th>Name of Locus</th>
<th>Allelic designation</th>
<th>Linkage group</th>
<th>Description and formal analysis</th>
<th>Recombination reported</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALCOHOL DEHYDROGENASE (liver)</td>
<td>Adh&lt;sup&gt;+&lt;/sup&gt;</td>
<td>VI</td>
<td>Felder (1975); Burnett and Felder (1974)</td>
<td>Dawson et al. (1983)</td>
</tr>
<tr>
<td></td>
<td>Adh&lt;sup&gt;+&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adh&lt;sup&gt;-&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ALBUMIN (serum)</td>
<td>A&lt;sup&gt;2&lt;/sup&gt;</td>
<td>VI</td>
<td>Brown and Welser (1966); Jensen and Rasmussen (1971)</td>
<td>Dawson et al. (1983)</td>
</tr>
<tr>
<td></td>
<td>A&lt;sup&gt;2&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A&lt;sup&gt;2&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANTILASE (salivary)</td>
<td>A&lt;sup&gt;2&lt;/sup&gt;</td>
<td>VI</td>
<td>Evans et al. (1977)</td>
<td>Dawson et al. (1983)</td>
</tr>
<tr>
<td></td>
<td>A&lt;sup&gt;2&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESTERASE (erythrocytic)</td>
<td>E&lt;sub&gt;2&lt;/sub&gt;</td>
<td>IV</td>
<td>Randerson (1965); Van Deursen and Kaufmann (1978)</td>
<td>Dawson et al. (1983)</td>
</tr>
<tr>
<td></td>
<td>E&lt;sub&gt;2&lt;/sub&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESTERASES (tissue and serum)</td>
<td>E&lt;sub&gt;2&lt;/sub&gt; through E&lt;sub&gt;7&lt;/sub&gt; (Symbols not standardized)</td>
<td></td>
<td>Rasmussen and Jensen (1972); Dawson (1982); Gill (1976); Baccus et al. (1980)</td>
<td>Dawson et al. (1983)</td>
</tr>
<tr>
<td>GLUTAMATE OXALOACETATE TRANSAMINASE (soluble)</td>
<td>G&lt;sup&gt;2&lt;/sup&gt;B</td>
<td></td>
<td>Gill (1976)</td>
<td></td>
</tr>
<tr>
<td>GLUTAMATE OXALOACETATE TRANSAMINASE (soluble)</td>
<td>G&lt;sup&gt;2&lt;/sup&gt;B</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ALDOLOSAL GLUCOSE-6-PHOSPHATE DEHYDROGENASE (soluble)</td>
<td>G&lt;sup&gt;2&lt;/sup&gt;B</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G-GLYCEROPHOSPHATE DEHYDROGENASE (tissue)</td>
<td>G&lt;sup&gt;2&lt;/sup&gt;B</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G-GLYCEROPHOSPHATE DEHYDROGENASE (tissue)</td>
<td>G&lt;sup&gt;2&lt;/sup&gt;B</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HEMOGLOBIN - ALPHA TYPE GLUBINS (Duplicated locus)</td>
<td>Hb&lt;sup&gt;a&lt;/sup&gt;</td>
<td>I</td>
<td>Thompson et al. (1964); Rasmussen et al. (1968); Jensen et al. (1976); Nashawat and Dawson (1976)</td>
<td>Snyder (1978; 1980b)</td>
</tr>
<tr>
<td></td>
<td>Hb&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Hb&lt;sup&gt;+&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HEMOGLOBIN - BETA TYPE GLUBINS (Duplicated or triplicated locus)</td>
<td>Hb&lt;sup&gt;b&lt;/sup&gt;</td>
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<td>HAPTOGLOBIN (serum)</td>
<td>Hpg&lt;sup&gt;+&lt;/sup&gt;</td>
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<td>Rasmussen (1968); Griswold and Dawson (1971)</td>
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<td></td>
<td>Hpg&lt;sup&gt;+&lt;/sup&gt;</td>
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<td>Ig&lt;sup&gt;+&lt;/sup&gt;</td>
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<td>L&lt;sup&gt;1&lt;/sup&gt;</td>
<td>V</td>
<td>Dawson (1982)</td>
<td>Dawson et al. (1982); Dawson et al. (1983)</td>
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<td></td>
<td>L&lt;sup&gt;2&lt;/sup&gt;</td>
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<td>SUPEROXIDE DISMUTASE</td>
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<td>Sod&lt;sup&gt;+&lt;/sup&gt;</td>
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<td>Avis et al. (1970) Baccus et al. (1980)</td>
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<td>Es-7</td>
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<td>P. polionotus</td>
<td>Ahi (1958)</td>
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<td>Rasmussen et al. (1960)</td>
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<td>Avis et al. (1970)</td>
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<td>Chappell and Snyder (1984)</td>
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<td>Avis et al. (1970)</td>
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<td>Pep-2</td>
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<td>Baccus et al. (1980)</td>
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<td>Pgm-3</td>
<td>P. melanotis</td>
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<td>Pgm-4</td>
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<td>Avis et al. (1970)</td>
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<td>Mascarello and Shaw (1973)</td>
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</table>

Reference list is available from Dr. Bruce Butler, Div. Natural & Physical Sciences, Canadian Unives College, 499 College Heights, Alberta T0C 0Z0.
Linkage Map of P. maniculatus Species Group

- I: Gpi, p
- II: b
- III: A^Nb
- IV: Pm, 6, Es-1, Es-5, v, Es-6, Trf
- V': Lap
- VI: Alb, P_a
- VII': Pep-2, 33, 33, 30
- VII: Adh-1

Tentative

1 in P. polionurus
GENETIC LINKAGE MAP OF PEROMYSCUS MANICULATUS

Linkage data for the deermouse (Peromyscus maniculatus) collected before 1972 are summarized by Robinson (11, 12). Several additional linkages have been added in the interim (2, 5, 6, 13). The accompanying figure is a representation of the current status of the linkage map for the deermouse and its sibling species P. polionotus. Six linkage groups are now established by formal genetics and another is tentative. An additional linkage, Es-5 - Es-6, by homology with Mus will probably map to Group IV (5), and is designated IVa in the table.

The order of loci in Group I was reported informally by Huestis and Silliman in an unpublished communication, according to Robinson (12), and has been partially confirmed by Dodson (unpub.). Linkage of Trf and Lap is tentative (5), but is homologous with a similar linkage in Mus. The Pep-2 locus is tentatively assigned to Group VI proximal to Alb, but has not been mapped further (6).

Positive, but not significant, lod scores suggesting possible linkage between the gene pairs Adh – 6Pgd, Adh – Got-1, Adh – Idh, Alb – Pept-1, Alb – Sdh and Est-4 – Sdh, respectively, were reported by Baccus et al. (1). Subsequent information indicates that Adh and Got-1 are independent, as are the Alb and Sdh loci (6).

The Hbe locus probably represents a duplicated or triplicated beta globin site, according to Snyder (13). Unpublished data from Snyder maps the position of the Gpi-1 and Hbe loci relative to the albino (c) and pink-eyed dilution (p) loci. Silliman (unpub.) proposed that there is a duplication, f', closely linked to the f locus.

Two significant markers on the Peromyscus linkage map, d and v, have become extinct in laboratory stocks of deermice. The "flexed tail" trait which now occurs in a laboratory stock may not be identical by descent with the original trait used in early linkage studies, but it maps to the same location in Group I.

The chromosome number of all Peromyscus species is 2N = 48. None of the linkage groups have been assigned to chromosomes.

---READERS AWARE OF ADDITIONAL LINKAGE DATA SHOULD SUBMIT INFORMATION TO US SO THAT THE MAP CAN BE UPDATED AND REMAIN CURRENT---
# Mapped Loci in Peromyscus

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<th>Gene Symbol</th>
<th>Name of Locus</th>
<th>Linkage Group</th>
<th>Reference</th>
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<tr>
<td>A</td>
<td>Wide-band agouti</td>
<td>III</td>
<td>9</td>
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<tr>
<td>Adh-1</td>
<td>Alcohol dehydrogenase (liver)</td>
<td>VI</td>
<td>6</td>
</tr>
<tr>
<td>Alb</td>
<td>Albumin (serum)</td>
<td>VI</td>
<td>6</td>
</tr>
<tr>
<td>Amy-1</td>
<td>Amylase (salivary)</td>
<td>VI</td>
<td>6</td>
</tr>
<tr>
<td>b</td>
<td>Brown</td>
<td>II</td>
<td>9</td>
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<tr>
<td>c</td>
<td>Albino</td>
<td>I</td>
<td>3, 4, 8, 14</td>
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<tr>
<td>d</td>
<td>Dilute</td>
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<td>Esterase-1 (erythrocytic)</td>
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<td>Esterase-5 (kidney)</td>
<td>IVa</td>
<td>5</td>
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<td>Esterase-6 (kidney)</td>
<td>IVa</td>
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<tr>
<td>f</td>
<td>Flexed tail</td>
<td>I</td>
<td>7, 8, 13</td>
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<td>Gpi-1</td>
<td>Glucose phosphate isomerase</td>
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<td>13</td>
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<tr>
<td></td>
<td>(erythrocytic)</td>
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<tr>
<td>Hbe</td>
<td>Hemoglobin &quot;e&quot; chain</td>
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<td>13</td>
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<td>Lap</td>
<td>Leucine aminopeptidase (serum)</td>
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<td>Pink-eyed dilution</td>
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<td>3, 4, 14</td>
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<td>Pointed rump pattern A</td>
<td>VII</td>
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<td>PB</td>
<td>Pointed rump pattern B</td>
<td>VII</td>
<td>2</td>
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<td>Pep-2</td>
<td>Tripeptidase (erythrocytic)</td>
<td>VI ?</td>
<td>6</td>
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<td>Pm</td>
<td>Erythrocytic antigen</td>
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<td>Snub nose</td>
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<td>12</td>
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<td>si</td>
<td>Silver</td>
<td>I</td>
<td>7, 8</td>
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<td>v</td>
<td>Waltzing</td>
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References:
PEROMYSCUS STOCK CENTER

The deer mouse colony at the University of South Carolina has been designated a genetic stock center under a grant from the Biological Resources Program of the National Science Foundation. The major function of the Stock Center is to provide genetically characterized types of Peromyscus in limited quantities to scientific investigators. Sufficient animals of the mutant types generally can be provided to initiate a breeding stock. Somewhat larger numbers, up to about 50 animals, can be provided from the wild-type stocks. A user fee of $5 per animal is charged and the user assumes the cost of air shipment. Animals lost in transit are replaced without charge.

Peromyscus types currently available in the Stock Center:

<table>
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<tr>
<th>WILD TYPES</th>
<th>ORIGIN</th>
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<tr>
<td>P. maniculatus bairdii (BW Stock)</td>
<td>Closed colony bred in captivity since 1948. Descended from 40 ancestors wild-caught near Ann Arbor MI</td>
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<td>P. maniculatus (SM Stock)</td>
<td>Closed colony since 1978. Derived from ancestors wild-caught in southern California combined sonoriensis and gambelii ancestry.</td>
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<tr>
<td>P. polionotus subgriseus (PO Stock)</td>
<td>Closed colony since 1952. Derived from 21 ancestors wild-caught in Ocala Nat'l Forest FL. High inbreeding coefficient.</td>
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<tr>
<td>P. leucopus (LL Stock)</td>
<td>Derived from 38 wild ancestors captured between 1982 and 85 near Linville NC. Early generations.</td>
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<td>P. maniculatus X P. polionotus F1 Hybrids</td>
<td>Sometimes available.</td>
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<td>Coat Color Mutants</td>
<td>Original Source</td>
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<tr>
<td>Albino c/c</td>
<td>Sumner's albino deer mice (Sumner, 1922)</td>
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<td>Black (Non-agouti) a/a</td>
<td>Horner's black mutant (Horner et al., 1980)</td>
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<td>Blonde b/l/b</td>
<td>Mich. State colony (Pratt and Robbins, 1982)</td>
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<tr>
<td>Brown b/b</td>
<td>Huestis stocks (Huestis and Barto, 1934)</td>
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<tr>
<td>Dominant spotting S/-</td>
<td>Wild caught in Illinois (Feldman, 1936)</td>
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<td>Gray g/g</td>
<td>Natural polymorphism. From Dice stocks (Dice, 1933)</td>
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<tr>
<td>Ivory i/i</td>
<td>Wild caught in Oregon. (Huestis, 1938)</td>
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<td>Pink-eyed dilution p/p</td>
<td>Sumner's &quot;pallid&quot; deer mice. (Sumner, 1917)</td>
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<td>Silver si/si</td>
<td>Huestis stock. (Huestis and Barto, 1934)</td>
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<td>White-belly non-agouti aw/aw</td>
<td>Egoscue's &quot;non-agouti&quot; (Egoscue, 1971)</td>
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<tr>
<td>Wide-band agouti AB/AB</td>
<td>Natural polymorphism. Univ. Michigan stock (McIntosh, 1954)</td>
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<tr>
<td>Yellow y/y</td>
<td>Sumner's original mutant. (Sumner, 1917)</td>
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</table>
OTHER MUTANTS AND VARIANTS

Alcohol dehydrogenase negative
  Adh<sup>o</sup>/Adh<sup>o</sup>
  South Carolina BW stock
  (Felder, 1975)

Alcohol dehydrogenase positive
  Adh<sup>r</sup>/Adh<sup>r</sup>
  South Carolina BW stock
  (Felder, 1975)

Flexed-tail f/f
  Probably derived from Huestis
  flexed-tail (Huestis and
  Barto, 1936)

Hairless-1 hrl/hrl
  Sumner's hairless
  (Sumner, 1924)

Hairless-2 hre/hre
  Egoscue's hairless
  (Egoscue, 1962)

Enzyme variants. Wild type stocks given above provide a
reservoir for several enzyme and other protein variants. See

Small numbers of other stocks, mutants and variants are on hand,
or under development, but are not currently available for
distribution. For additional information of details about any of
these mutants or stocks contact:

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U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF BIOLOGICAL SURVEY

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REVISION OF THE MICE OF THE AMERICAN
GENUS PEROMYSCUS

BY
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ASSISTANT, BIOLOGICAL SURVEY

Prepared under the direction of
C. HART MERRIAM
CHIEF OF BIOLOGICAL SURVEY

WASHINGTON
GOVERNMENT PRINTING OFFICE
1909
PEROMYSCUS
PIONEERS

Wilfred H. Osgood
1875 - 1947

The modern history of Peromyscus biology is frequently dated to the 1909 publication of Wilfred Osgood’s classic "Revision of the Mice of the American Genus Peromyscus". (North American Fauna No. 28). Prior to this time the taxonomy of the myriad forms of peromyscine rodents was in disarray, but Osgood’s insight after examination of more than 27,000 specimens permitted him to establish a classification which remains largely intact until the present. Subsequent taxonomic treatments have mostly involved modest modifications to Osgood’s basic scheme. Of his original Peromyscus, only a few forms (Baiomys, Ochrotomys) have been removed from the genus in the most recent classification (Hall, 1981). Thus Osgood’s monumental revision paved the way for the subsequent evolutionary and genetic studies of Francis B. Sumner, Lee R. Dice and many others. It is also noteworthy that the Peromyscus revision established a trend in mammalian systematics of reducing numerous species to the subspecific level and consolidating these into fewer species more realistically representing their biological status. Subsequent hybridization experiments demonstrated that, in most instances, Osgood’s assessment was correct. In this he represented a "new breed" of taxonomist who departed from the contemporary typological paradigm.

Wilfred Osgood was born December 8, 1875, in Rochester, N.H., the oldest of five children. At age twelve he moved with his family to the vicinity of Santa Clara, California, where he attended public schools. He entered the first class of Stanford University, where he came under the influence of its president, zoologist David Starr Jordan. With the support of Jordan in 1897 he secured a position with the Biological Survey in Washington, D.C. prior to completing his undergraduate degree, which he obtained two years later in absentia. Osgood’s first Peromyscus paper, "A New White-footed Mouse from California" appeared in 1901 (Proc. Biol. Soc. Wash., 14:193–194). In 1904 he described the subgenus Haploomyomys and 30 additional forms of Peromyscus from Mexico and Central America (Proc. Biol. Soc. Wash., 17:53–54; 55–57). He published a paper in the first issue of Journal of Mammalogy (1:33–36), and by his death had 205 publications to his credit. However, after the 1909 revision few of his papers treated Peromyscus.

Osgood remained at the Biological Survey until 1909, working as an assistant to C. Hart Merriam, with whom he eventually developed philosophical differences regarding approaches to systematics. In that year he moved to the Field Museum in Chicago,
where he remained until his death. He was Chief Curator of Zoology at the Museum for many years. Osgood, 'known to his colleagues as "Oz", received his doctoral degree at age 43 from the University of Chicago. He became the first Vice President of the American Society of Mammalogists in 1919, and served as President of that society from 1924 until 1926. He was also a member of numerous other scientific and conservation organizations. During his career he collected extensively in Alaska, Canada, Mexico, and South America. He also visited Africa and Indo-China. His efforts in later years departed from rodents and centered on more exotic species, but he is best remembered for his *Peromyscus* revision which served as the pattern for others to follow. Wilfred Osgood died June 20, 1947, in Chicago, after a brief illness. He was unmarried.
PEROMYSCUS NETWORK NEWS AND COMMENT.

INBRED PEROMYSCUS. Dr. Muriel Davisson and colleagues at the Jackson Laboratory at Bar Harbor are inbreeding P. maniculatus. There are several sublines, some of which are now at the 14th generation of sib mating. The ancestral animals were P. m. bairdii from Michigan. -- -- Dr. George Smith at UCLA Dept. of Pathology, is attempting to develop an inbred line of P. leucopus.

* * *

Peromyscus leucopus cytotypes: Dr. Robert Baker and his group at Texas Tech are continuing their studies of the hybrid zone in Oklahoma between two distinctive karyotypic races of white-footed mice. Mitochondrial DNA analysis is included in the study.

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ON THE MOLECULAR FRONT -- Burton et al. (J. Mol. Biol. 187:291 - 1986) have demonstrated that the L1 repeat DNA family occurs in P. maniculatus. EcoR1 digests of whole genomic DNA give a highly repeated 1.8 kb fragment equivalent to a portion of the L1 of Mus. -- Wichman et al. (Nature 377:317-318 - 1985) recently reported another transposable-like family, mys elements, in P. leucopus which they sequenced. This family appears to be limited to New World cricetids, and according to Steven Potter is not homologous with human Kpn, which is about 60% homologous to mouse L1. -- Rodney Honeycutt at Harvard Museum is conducting a comparative study of highly repetitive (satellite) DNA among Peromyscus.


* * *

LEE SNYDER. We were saddened by the death last year of Dr. Lee R.G. Snyder, University of California - Riverside. Lee will be long remembered for his analysis of Peromyscus hemoglobin loci, and for one of the few concrete examples of natural selection on a single locus variant. His studies convincingly showed that higher elevation populations of deer mice have one hemoglobin haplotype (a^c'c^c) in high frequency, whereas lower elevation populations generally have another (a^c1c1) haplotype fixed. The oxygen affinity of these types is appropriate to the native environment. Mark Chappell is continuing some aspects of Lee's work. Lee Snyder will be missed among the ranks of population geneticists and Peromyscus workers.
We also learned of the recent death of W. Frank Blair at Austin, Texas. Dr. Blair will be the subject of a Peromyscus Pioneer biographical sketch in a future issue of the Newsletter.

* * *

Dr. Richard Padgett, while at U. North Carolina working with Marshall Edgell's group, sequenced all three adult globin genes for P. maniculatus. This information should be published soon. Dan Loeb is also involved in this work.

* * *

In addition to the stocks listed in the contributions section of this Newsletter, we are also aware of Peromyscus stocks being held by Bob Lynch at Wesleyan University, Don Dewsbury at Univ. Florida, Sue Vanspeybroeck at Wright State, John Christian at SUNY-Binghampton, Dick Terman at William and Mary and Frank Bronson at U. Texas. Dr. Bernard Pirofsy, Univ. Oregon Health Science Ctr. at Portland and Steve Marx at Boston Childrens Hospital have small numbers of the spherocytosis (sph/sph) mutant in P. maniculatus.

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Judith Paull has a colony of P. maniculatus bairdii, which she expects to disband soon. This colony arises from animals wild-caught in Wisconsin and others from Dick Terman's colony. Her stock has been closed for several years and is free from Sendai and other rodent viral pathogens. Dr. Paull's work has involved toxicology, in collaboration with Dr. Tom Yuill, and reproductive physiology. She has been attempting to define conditions which would permit nuclear transfer between Peromyscus and Mus embryos. Anyone interested in obtaining animals from this stock should contact Dr. Paull, Department of Animal Science, University of Wisconsin, Madison WI 53707 phone: (608) 263-4308.

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The extensive colony of Dr. John King and his associates at Michigan State University is also in the process of being scaled down and, perhaps, disbanded. This colony has served as a valuable source of Peromyscus for many years.

DEADLINE FOR CONTRIBUTIONS TO THE SECOND ISSUE OF

PEROMYSCUS NEWSLETTER IS 1 JULY 1986.
CONTRIBUTIONS

Ann Eileen Miller BAKER
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I work primarily in the field with Mus but indirectly have started working with deermice because they go in the traps I set for Mus.

1. When corncribs are emptied, Mus domesticus were marked as they left the cribs. Traps were set in the surrounding cornfields and ditches to retrap these crib mice. Deermice predominated in the fields, whereas M. d. and Microtus pennsylvanicus predominated in grassy areas, such as ditches. This study was done in Windsor, Ontario with Mike Petras and has been submitted for publication without inclusion of deermice data. It would be nice to let the deermice data be seen by others that might be able to use it— it is too small to publish alone; I would add a note to this effect at the bottom so that people could cite it if they wish.

2. To determine what age-sex-season mice are entering houses, I have started a study where I furnish data sheets and protocols and then cooperators furnish snap-traps. So far, my dentist (!) has set traps with peanut butter in his closet for the prescribed period (number of days when mice enter traps + 14 additional days) and collected 2 female deermice (but I want Mus!)— one with placentals scars, one with unmarked uterus (no wonder there were no babies!). I gave data sheets to others and so the data should accumulate slowly.

***
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Co-worker: Jack P. Hayes

Current Research: Our research concerns the evolution of hemoglobin polymorphisms in *Peromyscus maniculatus* in relation to adaptation to high altitudes. This work is a continuation and extension of Lee Snyder's longterm studies of hemoglobin population genetics and blood gas physiology in *Peromyscus*. Our most recent work involved measurements of whole-animal physiological performance (maximum rates of oxygen consumption during exercise and thermogenesis) at low and high altitudes (340 and 3,800 meters). The effects of hemoglobin genotype were determined using genetic lines of mice which carried particular haplotypes in IBD condition. Most of our experiments were directed at common alpha-globin polymorphisms. However, we also have data on several beta-globin lines and on rare alpha-globin "recombinants".

Thus far, results support Snyder's hypothesis that the major alpha-globin polymorphisms have evolved in response to selection for optimal aerobic capacity at different native altitudes. Mice homozygous for alpha-globin haplotypes common (or fixed) in low-altitude populations perform better at low altitude than do animals from the same IBD line that are homozygous for haplotypes common at high altitudes. When the animals are acclimated to high altitude and retested, the ranking is reversed: mice with "high-altitude" alpha-globins perform better than their compatriots with "low-altitude" alpha-globins. In the single "recombinant" line we have tested, mice carrying "recombinant" alpha-globins are poorer performers than "normal" mice at both high and low altitude.

We are currently examining ecological and behavioral parameters in the field (eastern California) that are relevant to altitudinal adaptation. Field energy budgets are being determined using doubly-labeled water (DLW) during mark-release-recapture experiments. Microclimate studies are also underway. These measurements may elucidate the requirements for thermoregulatory heat production, and hence oxygen demand, at different altitudes and at different times of year.

Stocks: We are presently maintaining 10-15 laboratory lines of deer mice which carry a variety of different hemoglobins. Most of these lines were obtained from small numbers of wild-caught mice, using IBD breeding schemes. We have a number of strains carrying variations of the common alpha-globin polymorphisms. Small numbers of alpha-globin "recombinants" are available. Several lines of beta-globin variants are also maintained.

** **
Genetic Linkage analysis continues as a major focus of interest. We are particularly concerned with conservation of linkage within the myomorphous rodents and comparisons of the Peromyscus linkage map with that of Mus, Rattus, and Mesocricetus. About 37% of the map of the deer mouse is homologous with that of Mus. When biochemical loci only are considered, there is 73% homology between the two. Evidence based on the rate at which chromosomal rearrangements occur and the time since most recent common ancestry was shared by Peromyscus and Mus indicates that linkage conservation is not fortuitous, but conserved by natural selection.

The Peromyscus L1 EcoR1 1.8kb fragment occurs in P. maniculatus and P. leucopus. Preliminary runs indicate that the equivalent fragment in P. polionotus is slightly smaller. If so, a concerted change in this multigene family has occurred.

Harold J. EGOSCUE
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Studies designed to determine the ecology of Peromyscus fleas in the Great Basin of Oregon, Nevada and Utah are being conducted. Seasonal occurrence, altitudinal limits, ecological parameters and geographical distribution of the fleas of P. maniculatus, P. crinitus and P. truei are the main objectives. Of special interest is establishing the extent to which primary Peromyscus fleas are shared when two or more species of Peromyscus are sympatric.

Mary Fleming FINLAY
Benedict College
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We maintain P. maniculatus (BW stock) and P. polionotus (PO) both derived from the University of South Carolina colony.

* * *
The black coat-color mutation in *Peromyscus maniculatus gracilis* described in *The Journal of Heredity* (1980, 71 [1]: 49-51). Horner, B.E., G.L. Potter, and S. Van Ooteghem) continues to be maintained at Smith College. Although inbred for several generations, the mice retain their high level of breeding productivity and show no grossly detectable changes in morphology or behavior. Since 1977 various numbers of these black mice have been sent to individual investigators at the following institutions: Cornell University, Yale University, University of Wisconsin, University of California at Riverside, University of South Carolina, and University of Michigan. The animals sent to Cornell, to Bruce A. Brewer, have recently accompanied him to his present position at the Brookfield Zoo, where they are being maintained as a breeding colony of exhibit interest as well as of research value. Support for the maintenance of the non-agouti stock of mice at Smith College has been provided, in part, by the Blakeslee Fund of Genetics Research at Smith College, a fund established by bequest of geneticist Albert F. Blakeslee. It is anticipated that modest numbers of the mice will continue to be available to investigators until January, 1987, at which time the Smith colony very probably will be terminated.

** John S. MILLAR

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Peromyscus research at the University of Western Ontario:

We currently maintain three breeding stocks of *Peromyscus*.

1. *Peromyscus maniculatus nebrascensis* from south eastern Alberta.

P.m.n. are being used in a selection experiment for early maturation. The reproductive and developmental patterns of P.m.a. and P.m.k. are being documented.

In addition, field studies are being conducted on P.m. borealis in the Kananaskis Valley, Alberta. Stewart Lusk is conducting and experimental study of reproductive inhibition of young females. Sean Sharpe is examining asynchronous breeding among overwintered females.

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My interests in *Peromyscus* relate to the ecology of populations of *Peromyscus* in coastal plain forests in eastern Virginia, primarily in the Dismal Swamp. The population densities of *Peromyscus leucopus* appear to be unusually low in the Dismal Swamp, probably in response to the irregular supply of food from a few species of trees and the few shrubs, as well as because of the difficulties of securing food during the winter when large areas of the Swamp are inundated. One graduate student (Breidling) examined food availability throughout the year in four different forest types in the Dismal Swamp, and another (Walke) used nest boxes with and without supplemental food to evaluate the populations of *P. leucopus* and *Ochrotomys nuttalii* there. Both species used the nest boxes (No. 10 tin cans) as feeding stations, refuges, and even for nesting and raising young. Supplemental food was useful in promoting the acceptance and use of the nest boxes.

*Peromyscus gossypinus* formerly was a member of the small mammal community in the forests of the Dismal Swamp, and probably of similar forests in the region. However, the last record of the cotton mouse dates from the 1930's in the Dismal Swamp (Dice and Hayne, I believe). I have caught one mouse that might have been a cotton mouse, and there is a chance that some locality might have a population. Southeastern Virginia is considered to be the northern edge of the distribution of the cotton mouse.

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Recent cytogenetic studies (Stangl) have involved systematic relationships of Peromyscus species, distribution of cytotypes of P. leucopus, and characterization of the hybrid zone between the two described cytotypes of P. leucopus. At present, ecological and zoogeographical distribution of small mammals, to include Peromyscus species, from Texas and New Mexico, is the focus of our (Stangl and Dalquest) studies. Electrophoretic tissues of many of our specimens from these areas (and northcentral Texas as well) are deposited at The Museum, Texas Tech University, Lubbock, Texas with Dr. Robert J. Baker. Live specimens of northcentral Texas species (maniculatus, leucopus, and attwateri) and west Texas forms (boylii, pectoralis, eremicus, maniculatus, and leucopus) may be available at such times that coincide with our field activities.

--Frederick B. Stangl, Jr., and Walter W. Dalquest
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Population Ecology and Social Behavior of Peromyscus leucopus and Peromyscus maniculatus

From 1980 to 1985 we have been studying the population ecology and social behavior of Peromyscus leucopus niveboracensis and P. maniculatus nubiterrae where they are sympatric in mixed deciduous forests of the southern Appalachian Mountains (study conducted at the Mountain Lake Biological Station). These two species are morphologically and behaviorally similar, and act ecologically as a single species, though they do not interbreed. The study area and methods have been described in previous publications and are cited below. Our experiments and studies have produced the following results.

Species similarities

An analysis of the stomach contents of 109 P. maniculatus revealed a diet similarity of 96.1% (Wolff et al., 1985). The diets consisted primarily of arthropods, fruits, seeds, and green vegetation. Both species increased slightly on food-addition grids during high densities in 1981, but not during low densities from 1982 through 1984 (Gerzoff, 1984; Wolff, 1986). Food does not appear to be a major factor limiting population growth. Approximately 45% of the captures of P. maniculatus and 22% of P.
leucopus captures were in trees. *Peromyscus maniculatus* nests almost exclusively above 4 m in large hollow trees. *Peromyscus leucopus* is more variable in use of nest sites with 46 percent of nests being underground. Arboreal nests of *P. leucopus* are usually in smaller trees than those of *P. maniculatus* and they are usually closer to the ground (Wolff and Hurlburt, 1982; Wolff and Durr, 1986). During winter, *P. leucopus* nest exclusively underground, while *P. maniculatus* remain in arboreal nests (Wolff and Durr, 1986).

**Population Ecology and Social Behavior**

A total of 1,868 *P. leucopus* and 754 *P. maniculatus* were caught 13,630 times on control grids from 1981 through 1985 (Wolff, 1985a; unpubl.). The population density of both species declined from a high of 58 animals/ha in June 1981 to a low of 6 animals/ha in May 1983, and then increased to 19 animals/ha in 1985. The reproductive season for both species was bimodal with peak activity in April-June and September-October with a midsummer lull (Wolff, 1985a; 1986). A food supplement in July-August did not prevent the midsummer hiatus in breeding activity (Wolff, 1986).

An electrophoretic analysis revealed significant differences in allele frequencies between 1981 and 1984 at 13 of 23 polymorphic loci for *P. leucopus* and 8 of 17 polymorphic loci for *P. maniculatus*. It is not known if these changes were a random event or represented selection resulting from intrinsic or extrinsic factors.

Home ranges averaged 590 m² and did not differ between species or ages, but males had slightly larger home ranges than females (Wolff, 1985b). Females had smaller home ranges on food-addition grids than on control grids, but males did not. At low densities individuals of the same sex maintained exclusive home ranges, however, home ranges of males and females overlapped each other considerably (Wolff, 1985b). At relatively high densities of 25 to 58 mice/ha in 1981, both species exhibited intra- and interspecific territoriality within each sex (Wolff et al. 1983). As the population decreased in 1982 and 1983, animals were not aggressive and home ranges were maintained by mutual avoidance (Wolff, 1985b).

The functions of territories in *Peromyscus* appear to be different for males and females. Males are territorial to provide access to reproductive females, and females are territorial to prevent infanticide (Wolff, 1985c).

Baccus and Wolff (in prep.) estimated that up to 33% of the litters of *P. leucopus* were sired by more than one male. We also have electrophoretic evidence that both males and females mate promiscuously.

Using radioisotopes to label embryos in utero, we have been able to identify mothers and their offspring (Wolff and Lundy, 1985). We found that juvenile males disappear from grids (disperse) twice as fast as juvenile females having mean lengths of residence of 5.7 and 10.6 weeks, respectively. Among
juveniles 0% of males and 30% of females attained sexual maturity and bred within their maternal home range. Adult females will sometimes abandon their original home range after weaning their first litter and let their daughters inherit it. Dispersal favoring juvenile males prevents mother-son and brother-sister matings. We have found no aggression between adults and juveniles so apparently juvenile males disperse "voluntarily" and are not "forced" by adult aggression.

Work in Progress and Proposed Studies

1. Determine dispersion patterns of relatives during the breeding season to measure gene flow and coefficients of inbreeding.
2. Compare aggression and other social behavior between kin and nonkin.
3. Correlate changes in aggression with population density and with any genetic changes in population structure.
4. Discern between alternative functions for dispersal.
5. Determine the role of aggression in dispersal and colonization.

References


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