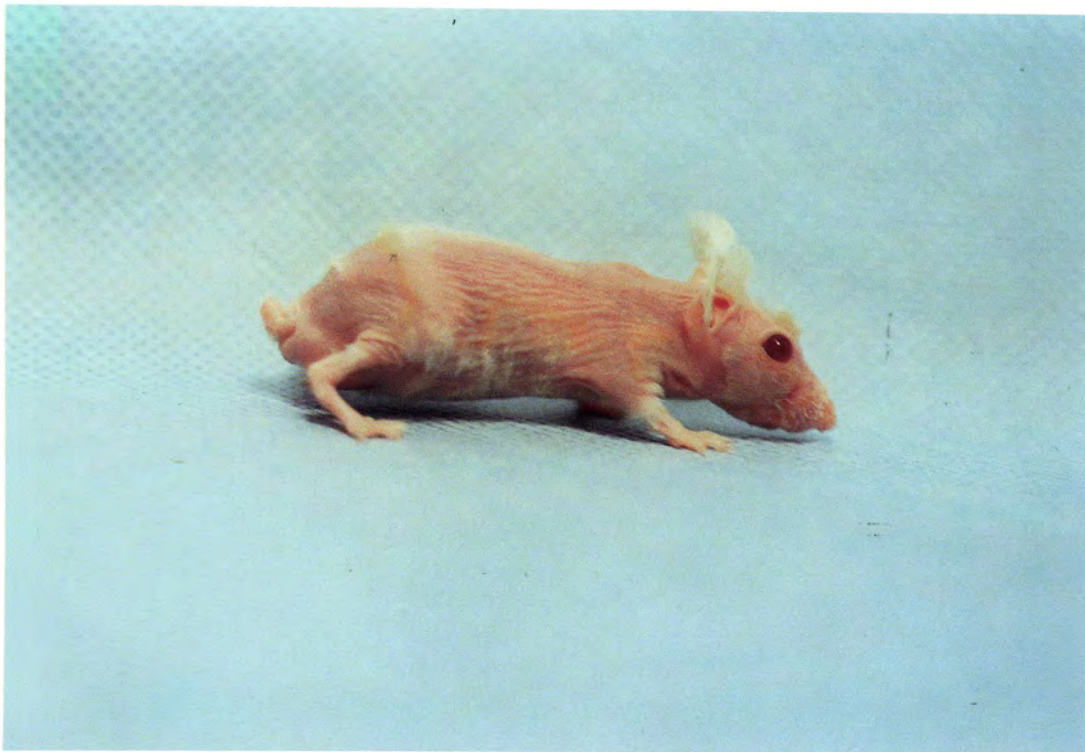


# PEROMYSCUS NEWSLETTER

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NUMBER TWENTY-NINE

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MARCH 2000

Cover: A triple recessive mutant deer mouse for use in linkage analysis. The animal expresses the recessive traits pink-eye dilution, flexed-tail and hairless-2. See. pp. 9, 16. (Photo by Clint Cook)

## ISSUE #29

*After thirty-eight years as a faculty member in the Department of Biological Sciences (formerly Biology) I retired from active service on June 30th of this year. As was indicated in Issue #28 I relinquished my role as Director of the Peromyscus Stock Center to Dr. Mike Dewey in January. Nevertheless, I expect to remain active in several aspects of Stock Center activities: 1. I will remain as editor of Peromyscus Newsletter, 2. I will remain involved and will collaborate with Dewey and others in our continuing efforts to further develop a genomic map for Peromyscus, and 3. I will continue to be involved in data selection, editing and formatting of PeroBase.*

*My final months on "active duty" were fraught with frustration because of unforeseen problems and delays related to moving into our new Graduate Science Center. As a result we were packed and ready to go, but on hold. Many of our regular operations were interrupted, including completion of this issue of PN on schedule. A further complication was my personal move to St. Louis where I will be residing.*

*Now, fortunately, we are beginning to get back into a regular routine. We are attempting to get this issue mailed, no later than the first week in October, and then immediately will begin work on the next issue to resume a normal spring-autumn biannual schedule.*

*Wally Dawson  
Editor*

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**NEWS, COMMENT and ANNOUNCEMENTS**

**FINALLY!!** The *Peromyscus* Genetic Stock Center personnel now have joined the mice in the new Graduate Science Research Center . The animals were moved August 1999, but because the labs and offices on another floor were not completed, the staff had to remain behind in the old Science Annex facility two blocks away. Needless to say, this was very inconvenient and inefficient. We hope that now things will be better organized and we can serve our clientele more effectively.

\*\*\*\*\*

Apologies to Dr. Betty Horner, Smith College, for listing her phone numbers erroneously in our last issue. The correct numbers are: phone (413) 585-3812, fax (413) 585-3786. The Optiplax scanner takes the blame. It misread "8s" as "9s".

Also apologies to Cheri Jones for omitting her entry from our last issue. It is found in the current issue on page 12.

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**Dr. Robert Lochmiller**, Regents Professor of Wildlife at Okalahoma State University and Editor-in-Chief of the Journal of Wildlife Management died unexpectedly March 3, 2000. We regret the loss of a major leader in wildlife management research.

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We also are sorry to report that **Dr. Charles O. Handley, Jr.**, Curator of Mammals at Smithsonian Natural History Museum, recently passed away. Dr. Handley had broad experience with both living and extinct mammals. With John Guilday, he described the extinct species *Peromyscus cumberlandensis*.

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The Annual Meeting of the American Society of Mammalogists was held 17-21 June 2000 at the University of New Hampshire in Durham NH. Twenty-five papers and posters on *Peromyscus* were presented. Several presentations at the Evolution 2000 meeting at Bloomington IN also reported work with *Peromyscus*.

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## PEROMYSCUS STOCK CENTER

**What is the Stock Center?** The deer mouse colony at the University of South Carolina has been designated a genetic stock center under a grant from the Living Stocks Collection 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. Continuation of the center is dependent upon significant external utilization, therefore potential **users are encouraged to take advantage of this resource**. 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. Animals requested in greater numbers frequently require a "breed-up" charge and some delay in shipment.

A user fee of **\$17.50 per wild-type animal** and **\$ 25 per mutant or special stock animal** is charged. The user assumes the cost of air shipment. Animals lost in transit are replaced without charge. Tissues, blood, skins, etc. can also be supplied at a modest fee. Arrangements for special orders will be negotiated. Write or call for details.

### Stocks Available in the Peromyscus Stock Center

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WILD TYPE SPECIES	ORIGIN
<i>P. maniculatus bairdii</i> (BW Stock)	Closed colony bred in captivity since 1948. Descended from 40 ancestors wild-caught near Ann Arbor MI
<i>P. polionotus subgriseus</i> (PO Stock)	Closed colony since 1952. Derived from 21 ancestors wild-caught in Ocala Nat'l. Forest FL. High inbreeding coefficient.
<i>P. polionotus leucocephalus</i> (LS Stock)	Derived from beachmice wild-caught on Santa Rosa I., FL. and bred by R. Lacy. Approximately 15 generations in captivity.
<i>P. leucopus</i> (LL Stock)	Derived from 38 wild ancestors captured between 1982 and 85 near Linville NC. Approximately 26 generations in captivity.
<i>P. californicus insignis</i> (IS Stock)	Derived from about 60 ancestors collected between 1979 and 87 in Santa Monica Mts. CA. Approximately 16 generations in captivity.
<i>P. aztecus</i> (AM Stock)	Derived from animals collected on Sierra Chincua, Michoacan, Mexico in 1986 Approximately 15 generations in captivity.
<i>P. melanophrys</i>	Originated from a group of animals collected at Zacatecas Mexico during the 1970's. Formerly maintained by R.W. Hill at Mich. State Univ.
<i>P. eremicus</i>	Originated from 10-12 animals collected at Carmel Valley CA in 1993. Approximately seven generations in captivity.
<i>P. maniculatus</i> X <i>P. polionotus</i> F <sub>1</sub> Hybrids	Sometimes available.

## MUTATIONS AVAILABLE FROM THE STOCK CENTER<sup>1</sup>

### Coat Colors

Albino *c/c*  
Ashy *ahy/ahy*  
Black (Non-agouti) *a/a*  
Blonde *bln/bln*  
<sup>2</sup>Brown *b/b*  
California blonde *cfb/cfb*  
Dominant spotting *S/+*  
Golden nugget *b<sup>gn</sup>/b<sup>gn</sup>* [in *P. leucopus*]  
Gray *g/g*  
Ivory *i/i*  
<sup>3</sup>Pink-eyed dilution *p/p*  
Platinum *plt/plt*  
<sup>2</sup>Silver *sil/sil*  
Tan streak *tns/tns*  
Variable white *Vw/+*  
White-belly non-agouti *a<sup>w</sup>/a<sup>w</sup>*  
Wide-band agouti *A<sup>Nb</sup>/a*  
Yellowish *yel/yel*

### Other Mutations and Variants

Alcohol dehydrogenase negative *Adh<sup>o</sup>/Adh<sup>o</sup>*  
Alcohol dehydrogenase positive *Adh<sup>f</sup>/Adh<sup>f</sup>*  
Boggler *bg/bg*  
Cataract-webbed *cwb/cwb*  
Epilepsy *ep/ep*  
<sup>3</sup>Flexed-tail *f/f*  
Hairless-1 *hr-1/hr-1*  
Hairless-2 *hr-2/hr-2*  
Juvenile ataxia *ja/ja*

Enzyme variants.

### ORIGINAL SOURCE

Sumner's albino deer mice (Sumner, 1922)  
Wild-caught in Oregon ~ 1960 (Teed *et al.*, 1990)  
Horner's black mutant (Horner *et al.*, 1980)  
Mich. State U. colony (Pratt and Robbins, 1982)  
Huestis stocks (Huestis and Barto, 1934)  
Santa Cruz I., Calif., stock (Roth and Dawson, 1996)  
Wild caught in Illinois (Feldman, 1936)  
Wild caught in Mass. (Horner and Dawson, 1993)  
Natural polymorphism. From Dice stocks (Dice, 1933)  
Wild caught in Oregon (Huestis, 1938)  
Sumner's "pallid" deer mice (Sumner, 1917)  
Barto stock at U. Mich. (Dodson *et al.*, 1987)  
Huestis stock (Huestis and Barto, 1934)  
Clemson U. stock from N.C. (Wang *et al.*, 1993)  
Michigan State U. colony (Cowling *et al.*, 1994)  
Egoscue's "non-agouti" (Egoscue, 1971)  
Natural polymorphism. U. Mich. (McIntosh, 1954)  
Sumner's original mutant (Sumner, 1917)

### ORIGIN

South Carolina BW stock (Felder, 1975)  
South Carolina BW stock (Felder, 1975)  
Blair's *P. m. blandus* stock (Barto, 1955)  
From Huestis stocks (Anderson and Burns, 1979)  
U. Michigan *artemisiae* stock (Dice, 1935)  
Probably derived from Huestis flexed-tail (Huestis and Barto, 1936)  
Sumner's hairless mutant (Sumner, 1924)  
Egoscue's hairless mutant (Egoscue, 1962)  
U. Michigan stock (Van Ooteghem, 1983)

Wild type stocks given above provide a reservoir for several enzyme and other protein variants. (Dawson *et al.*, 1983).

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<sup>1</sup>Unless otherwise noted, mutations are in *P. maniculatus*.

<sup>2</sup>Available only as silver/brown double recessive.

<sup>3</sup>Available only as pink-eye dilution/flexed-tail double recessive.

**OTHER RESOURCES OF THE *PEROMYSCUS* GENETIC STOCK CENTER:**

Highly inbred *P. leucopus* ( $I_{20+}$ ) are available in limited numbers as live animals or as frozen tissues. Several lines developed by George Smith (UCLA) are currently maintained by the Stock Center.

Limited numbers of other stocks, species, mutants, inbreds and variants are on hand, or under development, but are not available for distribution. Currently we can supply up to 10 each of the species *P. eremicus* and *P. melanophrys*.

Preserved or frozen specimens of types given in tables above.

Tissues, whole blood or serum of types given in tables above.

Flat skins of mutant coat colors or wild-type any of the species above.

Reference library of more than 2400 reprints of research articles and reports on *Peromyscus*.

Copies of individual articles can be photocopied and mailed. Please limit requests to five articles at any given time. There will be a charge of 5 cents per photocopied page after the initial 20 pages.

Materials are available through the *Peromyscus* Molecular Bank of the Stock Center. Allow two weeks for delivery. Included is purified DNA or frozen tissues from any of the stocks listed above. Several genomic libraries and a variety of molecular probes are available. (Inquire for more information)

*For additional information or details about any of these mutants, stocks or other materials contact: Janet Crossland, Colony Manager, Peromyscus Stock Center, (803) 777-3107.*

**PLEASE CALL WITH INQUIRIES.**

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**NOTICE**

**PEROMYSCUS NEWSLETTER IS NOT A FORMAL SCIENTIFIC PUBLICATION.**

**Therefore ...**

***INFORMATION AND DATA IN THE CONTRIBUTIONS SECTION SHOULD NOT BE CITED OR USED WITHOUT PERMISSION OF THE CONTRIBUTOR.***

**THANK YOU!**



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**Development of a Genetic Map for *Peromyscus***

Laboratory stocks of both wild-type and genetically variant *Peromyscus* are used for investigations in which laboratory-based studies can be interfaced with those of natural populations. The *Peromyscus* Genetic Stock Center, established in 1985, provides a reliable source of these animals and related materials to the national scientific and educational communities. The Stock Center is the focus of a major effort involving a number of investigators to establish an intermediate density genetic map, relying heavily on PCR based genetic markers such as microsatellites, RAPDs, and ESTs in addition to traditional markers. A set of genome-wide radiation hybrids is being developed to aid in linkage analyses. The considerable effort devoted to this project will benefit members of the *Peromyscus* research community interested in identifying and studying genes involved in a variety of processes including speciation, genome imprinting, disease susceptibility, and behavioral and physiological adaptation to habitat.

\* \* \*



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**Telomere length in *Peromyscus leucopus*:  
Possible influence of inbreeding**

The dynamics of telomere maintenance has been the focus of much attention in recent years, especially with regard to senescence and malignant conversion. However, telomere length has also been found to vary from one species to another or from one tissue to another and to be influenced by genetic factors. It also can be affected by the state of domestication and/or inbreeding of a species (Bickle et al., FASEB J 12:1845, pt 1, suppl S, '98). We have recently applied a flow cytometric procedure to measure telomere lengths of blood leukocytes from a managed outbred colony of *Peromyscus leucopus* (LL) and an inbred strain (I<sub>24-26</sub>) of *P. leucopus*. Overall, telomere length of *P. leucopus* appears to be comparable to human values, and to be much smaller than found in *Mus musculus*. Interestingly we also observed a substantial difference between the inbred and outbred *P. leucopus* ( $56,948 \pm 5,451$  MESF units vs  $32,995 \pm 9,219$ ;  $P < 0.005$ ). Thus, it would appear that inbreeding *per se* is accompanied by genetic or epigenetic factors that influence telomere length. We plan to extend these studies to other inbred strains of *P. leucopus*.

\* \* \*

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As part of a conservation project in the Gulf of California we have identified the *Peromyscus guardia* mice as an important issue. We have several endemic species in the area but *P. guardia* is very important because of its endangered status. We are planning a project in the Midriff Island region in the Gulf, especially in the Angel de la Guarda Archipelago. The islands of the Angel de la Guarda archipelago, in the central province of the Gulf of California, has been widely recognized as priority area for conservation. Its biological importance, diversity, and high number of endemisms have been extensively documented. An example of this privileged situation is the endemic mice *P. guardia*. This species is restricted to Angel de la Guarda and two northern islands, Mejia and Granito, each of them with its own subspecies. The nominal species, *P. g. guardia*, in the northern part of Angel de la Guarda, *P. g. mejiae* in Mejia and *P. g. harbisoni* in Granito. It is documented that the three subspecies were very common at the beginning of the 1960's, by the end of that decade the species is reported as common in Mejia and Granito but rare in Angel de la Guarda. At the beginning of the 1990's no mice in the three islands were captured. Researchers suspect that *P. g. harbisoni* is probably extinct, *P. g. mejiae* has severe conservation problems and the *P. g. guardia* population has also been considerably depleted. The possible cause of this problem is that these islands are a base for fishing camps, and receive an increasing number of researchers and adventure tourists (mostly US). The most remarkable impacts of the activities performed by visitors are species introduction, particularly rats, mice and cats. The rats and mice compete for space and resources with the endemic mice and cats feed on them.

The project will have three stages:

1. Trapping the islands searching for the mice and elimination of introduced species (rats, house mice).
2. Breeding in captivity
3. Reintroduction to their natural habitat.

Because of the previous statements we are interested in obtaining information about:

- The availability of *P. guardia* in your stock
- Articles regarding breeding in captivity

\* \* \*

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### Small mammals of the Comanche National Grasslands, Baca County, Colorado

In 1997, the former Chair of the Department of Zoology, C. R. Preston, began a study examining habitat use by raptors (ferruginous, Swainson's, and red-tailed hawks) on the Comanche National Grasslands in southeastern Colorado. In 1998, my co-workers and I started live-trapping small mammals on the Grassland and conducting spotlight transect counts of lagomorphs. In the past two field seasons, we have documented the presence of 16 species of small mammals, including one insectivore, two lagomorphs, and 13 species of rodents (including *Peromyscus leucopus* and *P. maniculatus*). *P. maniculatus* represented 13% of the 364 captures in the 1999 field season and were captured in all vegetation types except for the shortgrass/no shrub community and the tallgrass/shrub community. Our data will be used to help explain the local distribution of raptors and to document the small-mammal fauna of the Comanche National Grasslands.

\* \* \*



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**Serum thyroxine levels differ between subspecies and color-morph in deermice  
(*Peromyscus maniculatus gracilis* & *P. m. bairdii*)**

*Agouti* has been studied widely for its pleiotropic effects on behavior, physiology, and morphology, as well as its developmental effects on coat-color. Homozygous recessive mutants (nonagouti) that do not express *agouti* produce a uniformly dark coat in addition to exhibiting differences in activity levels, brain catecholamines, spleen size, and body mass in comparison with wild-type (Hayssen, 1992, 1994, 1997).

Body weight measurements show that nonagouti (mutant) female deermice (*Peromyscus maniculatus gracilis*) are larger on average than agouti (wild-type) females, with many of the Smith College Horner colony's nonagouti females as large as 44 grams (> 25 g = obese) (Hayssen, 1996). Obesity is documented in viable yellow mice in which over-expression of AGOUTI protein leads to hyperphagia (over-eating) as well as increased triglyceride storage in adipocytes (Klebig et al., 1995; Xue et al., 1998). The same explanation is not possible for nonagouti mice as this phenotype does not express AGOUTI at all; furthermore, obesity is only observed in females (males of both allelomorphs have the same variation). Obesity is age-related (Hayssen, 1996), but is not related to parity. Since the absence of AGOUTI in nonagouti deermice reduces the likelihood of a fat metabolism mechanism in weight gain, thyroid hypo-activity is implicated.

At least 50 $\mu$ L of serum was collected from blood in heparinized micro-hematocrit capillary from 17 virgin female deermice (8 agouti, 9 nonagouti) from the *Peromyscus* Genetic Stock Center (PGSC; *P. m. bairdii*) by retro-orbital bleeding. Samples were also taken from 21 virgin female deermice (10 agouti, 11 nonagouti) from Smith College (SC; *P. m. g.*) using the same method. Animals were weighed after bleeding. Samples were frozen at -20 $^{\circ}$  prior to total thyroxine (T<sub>4</sub>) monoclonal solid phase radioimmunoassay (RIA; ICN Pharmaceuticals, Orangeburg, NY). Separate assays were conducted for each set of collections, and each sample was prepared in duplicate and the average values (mean gamma counts) used for analysis. Independent standard curves were plotted and regression equations calculated for each assay using Microsoft Excel. ANOVAs were performed using SYSTAT 7.0.

Wild-type mean T<sub>4</sub> levels are 4  $\mu$ g/dL in *P. m. bairdii* and 2.4  $\mu$ g/dL in *P. m. gracilis* females. In *P. m. bairdii*, 50% of agouti samples were > 4  $\mu$ g/dL and 100% of nonagoutis were > 4  $\mu$ g/dL. In *P. m. gracilis*, 25% of agouti samples were > 3  $\mu$ g/dL and 50% of nonagoutis were > 3  $\mu$ g/dL. The difference in mean levels between subspecies could not be statistically compared because each subspecies was analyzed in separate assays, but a qualitative analysis is appropriate. Thyroid secretion rate, protein bound iodine, and gland histology have been found to differ slightly in other wild-type

## LAPSERITIS (continued)

Peromyscine species (*P. m. bairdii* and *P. polionotus*) (Dawson, 1967), suggesting that the subspecies differences seen here are valid.

RIA of T<sub>4</sub> from female agouti and nonagouti *P. m. bairdii* and *P. m. gracilis* revealed hyperthyroidism in female nonagouti deer mice; however, this is converse to the expected result. Nonagouti *P. m. bairdii* T<sub>4</sub> levels are only slightly different from agouti levels (ANOVA, P = 0.08), however in *P. m. gracilis* nonagoutis have significantly higher levels (P = 0.05) when two outliers are eliminated from the analysis. Mutant genotypes in both subspecies have 20% higher T<sub>4</sub> than wild-types. Increased T<sub>4</sub> levels occurred both with obesity (*P. m. gracilis*, P < 0.05) and without (*P. m. bairdii*, P = 0.07). Obesity does not occur in nonagouti *P. m. bairdii* at PGSC. Body mass was not related to T<sub>4</sub> levels in either subspecies.

Hyperthyroidism in nonagouti *P. m. gracilis* females does not explain the observed obesity. Increased levels of thyroxine should increase metabolism, and smaller mass is expected. Female nonagouti deer mice may be insensitive to T<sub>4</sub> negative feedback. Alternatively, increased thyroid activity may be a compensatory action for obesity caused by other factor(s). Future study should include TSH assay, although Pitman III & Bradley (1984) report a lack of cross-reactivity of deer mouse TSH with rat or human RIA kits. Levy et al. (1965) found *P. m. bairdii* to be three times more sensitive to TSH than *P. m. gracilis*, however they report that these results contradict a previous study using a different assay method.

Thyroxine is known to have various developmental effects in combination with other hormones. In addition to interactions with prolactin and growth hormone, the clearance of adrenocorticoids, corticosterone binding globulin levels, and adrenal sensitivity to ACTH are altered by thyroid activity, and high thyroxine levels may reduce corticosteroid levels (Pitman III & Bradley, 1984; Hadley, 1996). The metabolic effects of corticosteroids should not be overlooked in determining the cause of female nonagouti obesity. Current research includes fecal and serum corticosteroid analysis in *P. m. gracilis* (DeFina & Hayssen, unpublished data), and histological comparisons of adrenal gland morphology are suggested. Examination of thyroid gland morphology may elucidate the adrenal-thyroid relationship, and determine the cause of hyperthyroidism.

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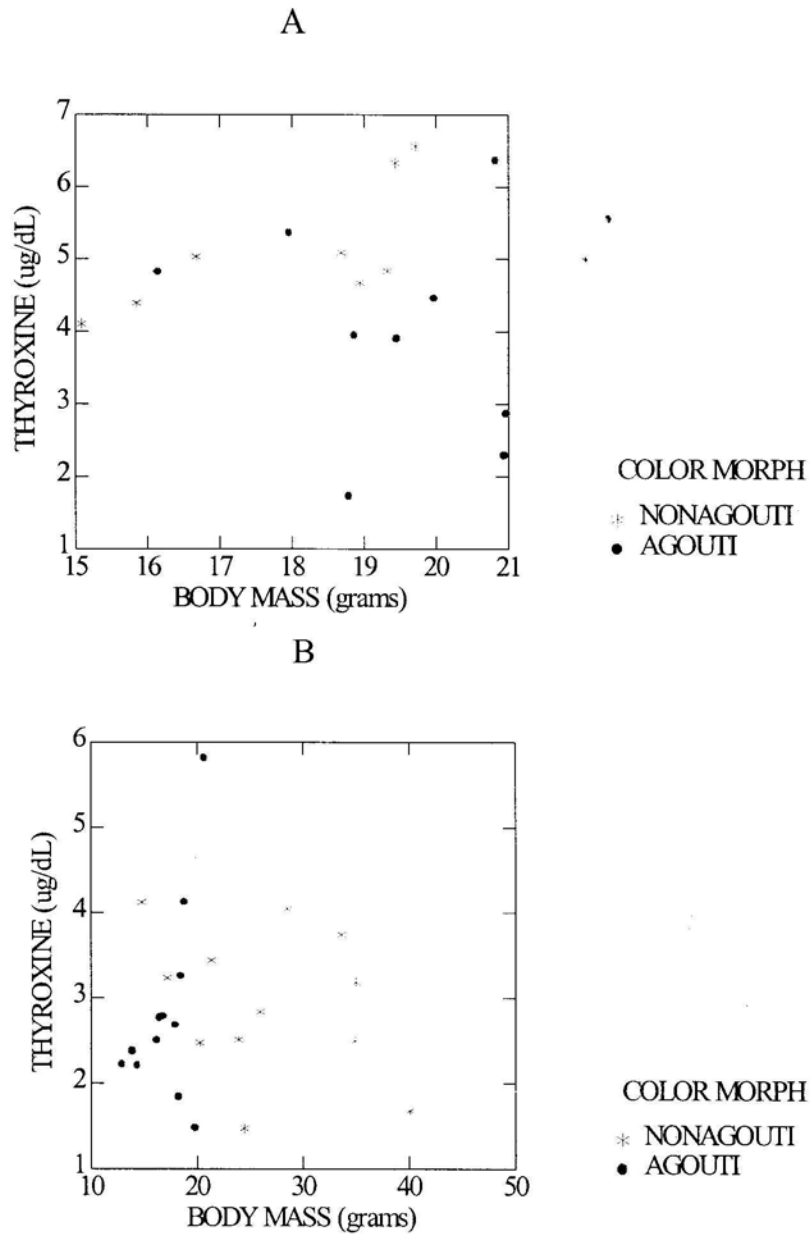


Figure 1: Thyroxine levels in Two Subspecies of Agouti and Nonagouti Deermice. Total serum thyroxine ( $T_4$ ) measurements versus body mass for two subspecies of deermice: A - *P. m. bairdii*, B - *P. m. gracilis*. Nonagouti morphs in both subspecies had  $T_4$  levels 20% higher on average than agoutis indicating hyperthyroidism, but body mass was unrelated to  $T_4$ . Increased  $T_4$  levels occurred with obesity in B ( $P < 0.05$ ), but also in normal sized mice in A ( $P = 0.07$ ).

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### GENOMIC MAPPING IN *PEROMYSCUS*: CHROMOSOME 1

Six genes map to *Peromyscus* (deer mouse) chromosome 1 (Gpi-1, p, c, Hbb, f, and sil). Genomically imprinted sites on Mus chromosome 7, that share homology with a portion of *Peromyscus* chromosome 1, are implicated in placental and fetal growth. Homologous sites in *Peromyscus* may have a similar function. To localize homologous genes in the deer mouse, additional potential markers for chromosome 1 are being identified. We are screening molecular markers reported in recent publications, as well as specifically designing primers based on conserved relevant sequences known for rat, mouse, and other mammals. A current gene of interest is Hbb, or beta globin. Since it is known to be on chromosome 1, a molecular marker for that gene will be quite useful. PCR primers for Hbb have generated a single product in both *P. maniculatus* and *P. polionotus*. This has been cloned and will be sequenced and analyzed for RFLPs.

In addition, microsatellites are being isolated from the genomes of *P. maniculatus* and *P. polionotus*. DNA was isolated from both species by phenol-chloroform-isoamyl alcohol extraction, and then digested to fragments of 200-1000 base pairs. These fragments were ligated to SNX linkers, enriched for microsatellites, and ligated into the p-Bluescript vector. Both heat shock and electroporation are used in transformation. Colonies are generated on media containing ampicillin and kanamycin, using the blue-white selection method. Positive (white) colonies are currently being screened for insert size via PCR. Clones containing inserts of 300-700 base pairs are sequenced using an ABI prism and examined for microsatellites. Primers amplifying these areas will be generated using the sequence data. Microsatellites are generally highly polymorphic and, therefore, should prove to be a useful contribution to the *Peromyscus* mapping project.

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### **Estimating body composition for live *Peromyscus maniculatus***

We developed a series of body composition estimation equations for non-invasively estimating lean and fat tissue. The EM-SCAN Model SA-2 relies on the creation of a magnetic field within the device chamber and the detection of lean tissue amounts based upon a measured (unitless) disturbance created by the relative cation levels found in lean versus fat tissue. Using 41 specimens, we performed a multiple regression of actual lipid mass (determined by chemical extraction) to body mass, body length, and EM reading to derive an estimation of lipid mass. Fourteen animals were measured immediately after capture to represent the “field” condition: 18.48±0.61 g body mass; 0.64±0.03 g lipid mass; 3% body fat. An additional 27 animals were maintained in a laboratory on *ad lib* food and water to “fatten”. Mice were measured for body composition biweekly, with 9 mice sacrificed each two-week period. Change in body composition over time (using “combined” equation discussed below) is presented in Table 1. Overall, mice increased fat from 8% to 14% over this six-week period.

The estimation equations derived using all 41 specimens as well as subsets of the data representing a “field” and a “lab-maintained” condition are as follows:

“Combined” (n=41); used to estimate the species (generic condition)

$$\text{Lipid mass} = -1.28 + 0.61 (\text{mass}) - 0.27 (\text{EM2})$$

“Field” conditions (n=14); animals with low fat-wild condition

$$\text{Lipid mass} = 0.09 + 0.03 (\text{mass}) + 0.01 (\text{EM2})$$

“Lab-maintained” (n=27); animals with high fat-lab-associated condition

$$\text{Lipid mass} = -1.61 + 0.55 (\text{mass}) - 0.20 (\text{EM2})$$

$$\text{EM2} = (\text{EM reading} * \text{body length})^{0.5}$$

Error estimates of lipid mass varied dependent upon the equation. Cross-validation techniques were used comparing actual to estimated lipid values. In the “combined” equation, error estimates averaged 0.73±0.07 g. In the “lab-maintained” condition, error estimates improved to 0.54±0.07 g. An estimate error of 0.34±0.04 g was present in the “field” condition.

UNANGST (continued)

When performing non-invasive estimates of body composition by EM-SCAN, derivation of a species-specific estimation equation is recommended. This is now available using the “combined” condition. However, we also accounted for the change in body composition from “wild” to “lab-maintained” animals and derived equations more specific to the actual body composition of the animal. If researchers are working on lean, field mice, the “field” equation may be more appropriate. If lab-reared mice are used, the “lab-maintained” estimator may be a more appropriate choice. Improvements in estimation accuracy were found in both the “field” and “lab-maintained” equations compared to the “combined” equation. This was expected, as they were derived from subset data with smaller variance in the lipid mass. Thus, the researcher now can use a species-specific equation for general body composition studies (over a wide body composition range) or select a more specific equation to meet more restrictive conditions in deer mice research.

Table 1. Change in body composition over six-week period; mean  $\pm$  1 SE

Week	Body mass (g)	Lipid mass (g)	Fat-free mass (g)	Body fat (%)
0	17.99 $\pm$ 0.64	1.43 $\pm$ 0.18	16.56 $\pm$ 0.52	7.81 $\pm$ 0.76
2	18.32 $\pm$ 0.82	2.27 $\pm$ 0.35	16.06 $\pm$ 0.61	12.08 $\pm$ 1.47
4	19.46 $\pm$ 0.90	2.63 $\pm$ 0.40	16.82 $\pm$ 0.58	13.11 $\pm$ 1.48
6	19.21 $\pm$ 0.83	2.60 $\pm$ 0.33	16.61 $\pm$ 0.59	13.53 $\pm$ 1.42

n=9 (same animals scanned biweekly over a six week period)

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