PEROMYSCUS NEWSLETTER

NUMBER TWENTY-ONE

MARCH 1996

Cover: An animal from the BW (*bairdii* Washtenaw) closed colony, pedigreed stock of *Peromyscus maniculatus*. This is the type most frequently requested from the Peromyscus Stock Center.

PN Issue Number 21.

Having finished our first 20 issues, we are launching out on another decade and into the next millennium. Here are some of the items on our minds and on our agenda:

An immediate concern is the state of the Federal budget, and the work stoppages in December and January. We rely heavily upon NSF funding to operate the Stock Center, and an interruption in funding or reduction in funding would pose a severe impediment in our ability to serve our clientele. This would be particularly disturbing, in that both the number of requests and the number of *Peromyscus* and other materials we provide to researchers continues to increase. 1995 proved to be record-setting on both accounts.

The Gene Catalog for the Deer Mouse is rapidly being revised and updated. This should be available both as hard copy and on the Internet by late summer. The Catalog is a listing of all formally published, established genetic loci and markers for *Peromyscus maniculatus*. Included for each locus is a synopsis of the gene nomenclature, including obsolete and synonomous symbols and names, a detailed description of the diagnostic phenotype, linkage, interactions, origin and primary references. The nomenclature will closely follow that used for house mouse (*Mus*), but there will be some exceptions to the mouse rules, as applied to *Peromyscus*. Eventually, we expect to include color photographs for coat color and morphological phenotypes, and for many zymograms.

In addition to the Gene Catalog, we hope to build a new computer database of published formal literature on *Peromyscus*. We expect to seek collaborators in this effort.

A new feature in *Peromyscus Newsletter* will be a periodic listing of GenBank accession numbers for *Peromyscus* DNA sequences. We hope that this will be a service to anyone who is looking for a quick scan of what *Pero.* sequences are available without needing to search the Net.

We also will be recruiting individuals willing to prepare or assist with topical essays for future issues of *PN* - topics in search of authors! Among the subjects we plan to cover during the next year or two are "History of *Peromyscus* Cytogenetics", in the vein of our recent two-part account of "*Peromyscus* and Electrophoresis" and "The Current State of Peromyscine Systematics". We also have in mind several more "Peromyscus pioneers" we expect to feature.

As always, we appreciate the accounts of on-going research submitted for our "Contributions" section. Remember we also will publish announcements relevant to *Peromyscus* and related genera. We consider the scope of the Newsletter to include not only Genus *Peromyscus*, but other peromyscine rodents as well.

Deadline for entries and other items for *PN* #22 is September 20, 1996.

Catch us on the Web at **http://www.sc.edu/mouse/peromyscus.html**

E-mail **peromyscus@stkctr.biol.sc.edu**

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NEWS, COMMENT and ANNOUNCEMENTS

Visit the **Beach Mouse Info Page** maintained at Auburn University by **Mike Wooten**. The URL is **http://www.ag.auburn.edu/~mwooten/main.html** There is also a link to a beach mouse FAQ from this page.

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- QUERY -

"We are interested in acquiring some Peromyscus leucopus derived from northern latitudes for investigations of torpor. If anyone has any northern leucopus available, please contact ...

Gregg Demas
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Behavioral Neuroendocrinolgy Group
The Johns Hopkins University
Baltimore, MD 21218
e-mail: demas@ren.psy.jhu.edu

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Peromyscus Nomenclature: STOCKS and STRAINS - the difference.

The terms "stock" and "strain" are frequently confused by people using lab-reared deer mice and other laboratory animals. The term strain in recent times has come to imply "highly inbred" or purebreeding for virtually all genetic loci. In practice this generally means a line which has been maintained for twenty generations or more by sib-sib mating. Only recently have such lines been developed in *Peromyscus* (See p. 32). The term stock is used for *Peromyscus* in the sense of a closed colony bred from a limited number of ancestral animals. After the colony is "closed" no further animals are added, and the stock is maintained by interbreeding within the line. The term "stock" is used in a somewhat different sense for laboratory mice (*JAX Notes* #464 p.2).

X-X-X-X-X-X-X-X

AVAILABLE -- Deer Mice (*Peromyscus maniculatus*). Colony has been viral antibody free for over four years; in captivity since 1950s from capture near E. Lansing, Michigan. Individual animals or entire colony available. Options include both male and female adults and several juveniles of each sex available. Will breed per specifications. Contact: **Dr. Patricia Fail** (919) 541-6079, pat@rti.org or Frank Ali (919) 541-7084 fna@rti.org

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Susan Hoffman *has left Livermore Lab and has a new address: Department of Zoology, Miami University, Oxford, OH 45056*

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Melanie Wike, Texas A&M (mwike@bio.tamu.edu), is working with *P. maniculatus luteus*. She is attempting to develop an effective superovulation protocol. She will welcome any suggestions.

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ANNOUNCEMENT: The *Peromyscus* Behavior Mutant Center, located at the University of South Carolina Aiken Campus, is no longer affiliated with the *Peromyscus* Genetic Stock Center located on the Columbia Campus of the University of South Carolina. Individuals desiring to obtain deer mouse behavior mutants should contact Dr. Suellen VanOoteghem, Dept. Biological Sciences, USC-Aiken or at School of Medicine, University of West Virginia, Morgantown WV 26506 (304) 284-5443.

* * * * *

George Smith, UCLA School of Medicine, has succeeded in developing inbred lines of *Peromyscus leucopus*. See his entry on page 32.

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INFORMATION PLEASE: I am seeking information on lifespan and natural mortality rates in oldfield mice (Peromyscus polionotus). I have been studying the reproductive success of inbred and outbred adults in captivity. Adults are at least 55 days old at pairing, and remain paired for 120 days; thus they are at least 6 months old at the end of the study. Does this approximate or exceed the natural lifespan (i.e., am I approximating lifetime reproductive success)? Any information, even anecdotal, would be much appreciated. SEND INFO TO: **Susan Margulis**, University of Chicago, Comm. on Evolutionary Biology, 940 E. 57th St., Chicago, IL 60637; e-mail: swm@midway.uchicago.edu

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3M Corporation *manufactures a high efficiency (HEPA) respirator for protection from hantaviruses carried by rodents. These sell for $ 7.95/ea, or less for larger quantities.*

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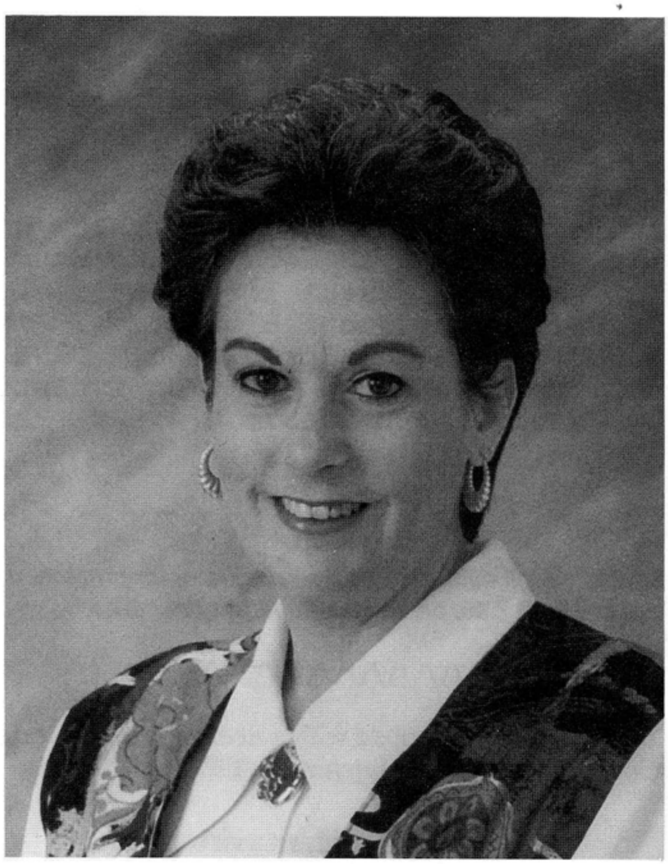
An educational video on hantavirus, complete with a deer mouse-decorated cassette, is available from CDC Atlanta. (Courtesy Dr. Karen Hutchinson, CDC)



JANET CROSSLAND
Stock Center Colony Manager

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 Special Projects 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.

A user fee of **$10 per animal** is charged and 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:

WILD TYPES	ORIGIN
P. maniculatus bairdii (BW Stock)	Closed colony bred in captivity since 1948. Descended from 40 ancestors wild-caught near Ann Arbor MI
P. polionotus subgriseus (PO Stock)	Closed colony since 1952. Derived from 21 ancestors wild-caught in Ocala Nat'l. Forest FL. High inbreeding coefficient.
P. polionotus leucocephalus (LS Stock)	Derived from beachmice wild-caught on Santa Rosa I., FL. and bred by R. Lacy. Seventh to tenth generation in captivity.
P. leucopus (LL Stock)	Derived from 38 wild ancestors captured between 1982 and 85 near Linville NC. Eighteenth to twenty-fourth generation in captivity.
P. californicus insignis (IS Stock)	Derived from about 60 ancestors collected between 1979 and 87 in Santa Monica Mts. CA. Tenth to twelfth generation in captivity.
P. aztecus (AM Stock)	Derived from animals collected on Sierra Chincua, Michoacan, Mexico in 1986 Seventh to tenth generation in captivity.
P. maniculatus X *P. polionotus* F_1 Hybrids	Sometimes available.

MUTATIONS AVAILABLE FROM THE STOCK CENTER[1]

Coat Colors	ORIGINAL SOURCE
Albino *c/c*	Sumner's albino deer mice (Sumner, 1922)
Ashy *ahy/ahy*	Wild-caught in Oregon ~ 1960 (Teed *et al.*, 1990)
Black (Non-agouti) *a/a*	Horner's black mutant (Horner *et al.*, 1980)
Blonde *bln/bln*	Mich. State U. colony (Pratt and Robbins, 1982)
[2]Brown *b/b*	Huestis stocks (Huestis and Barto, 1934)
Dominant spotting *S/+*	Wild caught in Illinois (Feldman, 1936)
Golden nugget b^{gn}/b^{gn} [in *P. leucopus*]	Wild caught in Massachusetts (Horner and Dawson, 1993)
Gray *g/g*	Natural polymorphism From Dice stocks (Dice, 1933)
Ivory *i/i*	Wild caught in Oregon (Huestis, 1938)
[3]Pink-eyed dilution *p/p*	Sumner's "pallid" deer mice (Sumner, 1917)
Platinum *plt/plt*	Barto stock at U. Mich. (Dodson *et al.*, 1987)
[2]Silver *sil/sil*	Huestis stock (Huestis and Barto, 1934)
Tan streak *tns/tns*	Clemson U. stock from N.C. (Wang *et al.* 1993)
Variable white *Vw/+*	Michigan State U. colony (Cowling *et al.* 1994)
White-belly non-agouti a^w/a^w	Egoscue's "non-agouti" (Egoscue, 1971)
Wide-band agouti A^{Nb}/a	Natural polymorphism. U. Michigan stock (McIntosh, 1954)
Yellowish *yel/yel*	Sumner's original mutant (Sumner, 1917)

MUTATIONS AVAILABLE FROM THE STOCK CENTER[1] (continued)

Other Mutations and Variants	ORIGIN
Alcohol dehydrogenase negative *Adh°/Adh°*	South Carolina BW stock (Felder, 1975)
Alcohol dehydrogenase positive *Adh^f/Adh^f*	South Carolina BW stock (Felder, 1975)
[4]Boggler *bg/bg*	Blair's *P. m. blandus* stock (Barto, 1955)
Cataract-webbed *cwb/cwb*	From Huestis stocks. (Anderson and Burns, 1979)
[4]Epilepsy *ep/ep*	U. Michigan *artemisiae* stock (Dice, 1935)
[3]Flexed-tail *f/f*	Probably derived from Huestis flexed-tail (Huestis and Barto, 1936)
Hairless-1 *hr-1/hr-1*	Sumner's hairless mutant Sumner (1924)
Hairless-2 *hr-2/hr-2*	Egoscue's hairless mutant (Egoscue, 1962)
[4]Juvenile ataxia *ja/ja*	U. Michigan stock (Van Ooteghem, 1983)

Enzyme variants. Wild type stocks given above provide a reservoir for several enzyme and other protein variants. See Dawson *et al.* (1983). For origin references see *PN* #18, pp.25-26.

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[1]Unless otherwise noted, mutations are in *P. maniculatus*.

[2]Available only as silver/brown double recessive.

[3]Available only as pink-eye dilution/flexed-tail double recessive.

[4]Available from Behavior Mutant Center

Note: Some of the mutations are immediately available only in combination with others. For example, silver and brown are maintained as a single "silver-brown" double recessive stock. Write the Stock Center or call (803) 777-3107 for details.

OTHER RESOURCES OF THE *PEROMYSCUS* GENETIC STOCK CENTER:

Limited numbers of other stocks, species, mutants, inbreds and variants are on hand, or under development, but are not currently available for distribution. For additional information or details about any of these mutants or stocks contact: Janet Crossland, Colony Manager, Peromyscus Stock Center, (803) 777-3107.

Preserved or frozen specimens of types given above.

Tissues, whole blood or serum of types given 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 can be xeroxed and mailed.

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 and cDNA libraries and a variety of molecular probes are available.
(See next page)

PLEASE CALL WITH INQUIRIES.

Peromyscus Genetic Stock Center
University of South Carolina
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peromyscus@stkctr.biol.scarolina.edu

Materials on Deposit in the *Peromyscus* Molecular Bank

Accession Number	Item	Description	Species	Donor	Location[1]
Probes and Clones:					
Pr-01	LINE1	pDK62	*P. maniculatus*	D. Kass	C
Pr-02	LINE1	pDK55	*P. maniculatus*	D. Kass	C
Pr-03	ADH1	pADH F72	*P. maniculatus*	M. Felder	B
Pr-04[2]	Mys		*P. leucopus*	(Requested)	
Pr-05[2]	SAT		*P. leucopus*	(Requested)	
Pr-06	6PGD	pB5 clones	*P. californicus*	S. Hoffman	A
Pr-07	MHC *Pele*I	38dp2	*P. leucopus*	M. Crew	A
Pr-08	MHC *Pele*I	52ap6	*P. leucopus*	M. Crew	A
Pr-09	MHC *Pele*I	40Bgl	*P. leucopus*	M. Crew	A
Pr-10	MHC *Pele*I	53Pv1	*P. leucopus*	M. Crew	A
Pr-11	MHC *Pele*I	37B2	*P. leucopus*	M. Crew	A
Pr-12	MHC *Pele*I	37B4	*P. leucopus*	M. Crew	A
Pr-13	MHC *Pele*II	α3E23	*P. leucopus*	M. Crew	A
Pr-14	MHC *Pele*III	17E2	*P. leucopus*	M. Crew	A
Pr-15	MHC *Pema*I	pr44	*P. maniculatus*	M. Crew	A
Libraries:					
Lb-01	lambda genomic	liver (ADH+)	*P. maniculatus*	M. Felder	B
Lb-02	lambda cDNA	liver	*P. maniculatus*	M. Felder	B
Lb-03	lambda genomic	testis	*P. leucopus*	M. Crew	A
Lb-04	cosmid genomic	testis	*P. leucopus*	R. Baker	A
Lb-05	lambda genomic	liver	*P. californicus*	S. Hoffman	A
Frozen Tissue for DNA:					
S-01	bairdii (BW)	liver, tail, other[3]	*P. maniculatus*	Stk. Ctr.	A
S-02	subgriseus (PO)	liver, tail, other	*P. polionotus*	Stk. Ctr.	A
S-03	leucopus (LL)	liver, tail, other	*P. leucopus*	Stk. Ctr.	A
S-04	wild-caught SC	liver, other	*P. gossypinus*		A
S-05	aztecus (AM)	liver, tail, other	*P. aztecus*	J. Glendinning	A
S-06	insignis (IS)	liver, tail, other	*P. californicus*	S. Hoffman	A
S-07	inbred PmH1A	liver, other	*P. maniculatus*	Jackson Lab	A
S-08	inbred PmH8	liver, other	*P. maniculatus*	Jackson Lab	A

[1]Location code: **A** = USoCar SAI 01; **B** = USoCar CLS 603; **C** = USoCar CLS 707

[2]Not currently available.

[3]kidney, spleen, testis, carcass.

Peromyscus Nucleic Acid Sequences

Numerous nucleic acid sequences from *Peromyscus* are now registered in GenBank. Beginning with this issue we will annually index these in *PEROMYSCUS NEWSLETTER*. As a service, the *Peromyscus* Genetic Stock Center will furnish a printout of the full GenBank sequence, citations *etc.* Please request by GenBank accession number given in parentheses. Limit requests to no more than five at any given time. Include FAX number and it will be transmitted via FAX if less than 8 pages. A hard copy by mail will also be furnished, if requested. Call (803) 777-3107 or e-mail peromyscus@stkctr.biol.sc.edu

Sequences in this index are listed under major categories: (1) Nuclear genes (2) Nuclear elements and repeats, (3) Mitochondrial genes, and (4) other.

NUCLEAR GENES

Alcohol dehydrogenase *(Adh-1, 2)*

[PERADH1B] *P. maniculatus* alcohol dehydrogenase 1 (*Adh-1*) mRNA, complete cds. **(L15703)**

[PERADH2A] *P. maniculatus* alcohol dehydrogenase 2 (*Adh-2*) mRNA, complete cds. **(L15704)**

Hemoglobin beta chain *(Hbb)*

[PERHIBA] *P. maniculatus* (deer mouse) beta-1-globin (*Hbb-b1*) DNA, 5' region. **(M15292)**

[PERH1BB] *P. maniculatus* (deer mouse) beta-1-globin (*Hbb-b1*) DNA, 5' region. **(M15289)**

[PERH1BC] *P. maniculatus* (deer mouse) beta-1-globin (*Hbb-b1*) DNA, second coding-block region, partial cds. **(M15294)**

[PERH1BD] *P. maniculatus* (deer mouse) beta-1-globin (*Hbb-b1*) DNA, 3' region. **(M15297)**

[PERH2BA] *P. maniculatus* (deer mouse) beta-2-globin (*Hbb-b2*) DNA, 5' region. **(M15293)**

[PERH2BB] *P. maniculatus* (deer mouse) beta-2-globin (*Hbb-b2*) DNA, 5' region. **(M15290)**

[PERH2BC] *P. maniculatus* (deer mouse) beta-2-globin (*Hbb-b2*) DNA, second coding-block region, partial cds. **(M15295)**

[PERH2BD] *P. maniculatus* (deer mouse) beta-2-globin (*Hbb-b2*) DNA, 3' region. **(M15298)**

[PERH3BA] *P. maniculatus* (deer mouse) beta-3-globin (*Hbb-b3*) DNA, 5' region. **(M15291)**

[PERH3BB] *P. maniculatus* (deer mouse) beta-3-globin (*Hbb-b3*) DNA, second coding-block region, partial cds. **(M15296)**

[PERH3BC] *P. maniculatus* (deer mouse) beta-3-globin (*Hbb-b3*) DNA, 3' region. **(M15299)**

Major Histocompatibility Complex - CLASS I *(MHC I)*

[PELEMHC2] *P. leucopus* MHC class I *PeleM4* gene, exons 4 and 5 and partial cds. **(U21212)**

[PLU37435] *P. leucopus* MHC class I antigen *alpha3* domain gene, partial cds. **(U37435)**

[PELEMHC1] *P. leucopus* MHC class I *PeleM4* gene, exons 1, 2 and 3. **(U21213)**

[PERMHA11B] (*P. leucopus* group) Mouse MHC class I antigen (*Pele-A11b*) gene, exon 5. **(M59218)**

[PERMHA24A] (*P. leucopus* group) Mouse MHC class I antigen (*Pele-A24*) gene, exon 5. **(M59220)**

[PERMHA34C] (*P. leucopus* group) Mouse MHC class I antigen (*Pele-A34c*) gene, exon 5. **(M59221)**

[PERMHA37A] (*P. leucopus* group) Mouse MHC class I antigen (*Pele-A37*) gene, exon 5. **(M59222)**

[PERMHA38B] (*P. leucopus* group) Mouse MHC class I antigne (*Pele-A38B*) gene, exon 5. **(M59223)**

[PERMHA42B] (*P. leucopus* group) Mouse MHC class I antigen (*Pele-A42b*) gene, exon 5. **(M59224)**

[PERMHA42C] (*P. leucopus* group) Mouse MHC class I antigen (*Pele-A42c*) gene, exon 5. **(M59225)**

[PERMHA48C] (*P. leucopus* group) Mouse MHC class I antigen (*Pele-A48c*) gene, exon 5. **(M59226)**

[PERMHA6B] (*P. leucopus* group) Mouse MHC class I antigen (*Pele-A6b*) gene, exon 5. **(M59219)**

[PERMHP1LA4] *P. leucopus* MHC class I gene, exon 5. **(M60612, M33984)**

[PERMHP1LA5] *P. leucopus* MHC class I gene, exon 5. **(M60611, M33983)**

[PERMHP1LAA] *P. leucopus* MHC class I gene, exon 5. **(M60613, M33985)**

[PMPEMAT24A] *P. maniculatus* nonclassical class I antigen (*PemaT24*) mRNA, complete cds. **(U03104)**

[PMPEMA11A] *P. maniculatus* major histocompatibility complex class I antigen mRNA, clone *Pema11*, partial cds. **(U16846)**

[PMPEMA13A] *P. maniculatus* major histocompatibility complex class I antigen mRNA, complete cds. **(U12822)**

[PMPEMA41A] *P. maniculatus* clone *Pema41* major histocompatibility complex class I antigen mRNA, complete cds. **(U12885)**

[PMPEMA52A] *P. maniculatus* clone *Pema52* major histocompatibility complex class I antigen mRNA, complete cds. **(U12886)**

[PMPEMA53A] *P. maniculatus* major histocompatibility complex class I antigen mRNA, clone *Pema53*, complete cds. **(U16847)**

[PMPEMA62A] *P. maniculatus* clone *Pema62* major histocompatibility complex class I antigen mRNA, complete cds. **(U12887)**

Major Histocompatibility Complex - CLASS II *(MHC II)*

[PLU34805] *P. leucopus* MHC class II protein alpha-chain *PeleAa (MhcPeleAa)* gene, partial cds. **(U34805)**

Tumor Necrosis Factor *(Tnf)*

[PERPLTNFA] *P. leucopus* tumor necrosis factor (*PlTNF* gene) gene sequence, cds 5' end. **(M59233)**

snRNA *(BC1RNA)*

[PMU33851] *P. maniculatus* snRNA (*BC1 RNA*) gene, partial sequence. **(U33851)**

[PCU33850] *P. californicus* snRNA (*BC1 RNA*) gene, partial sequence. **(U33850)**

NUCLEAR ELEMENTS

LINE-1 *(L1)*

[PLU43365] *P. leucopus* LINE-1 repetitive element reverse transcriptase gene, partial cds. **(U43365)**

[PMU43360] *P. maniculatus* LINE-1 repetitive element reverse transcriptase gene, partial cds. **(U43360)**

[PMU43361] *P. maniculatus* LINE-1 repetitive element reverse transcriptase pseudogene, partial cds. **(U43361)**

[PMU43362] *P. maniculatus* LINE-1 repetitive element reverse transcriptase pseudogene, partial cds. **(U43362)**

[PMU43363] *P. maniculatus* LINE-1 repetitive element reverse transcriptase pseudogene, partial cds. **(U43363)**

[PMU43364] *P. maniculatus* LINE-1 repetitive element reverse transcriptase gene, partial cds. **(U43364)**

[PERL1PM55X] (*P. maniculatus* group) Deer mouse (*L1Pm55*) gene. **(M97518)**

[PERL1PM62X] (*P. maniculatus* group) Deer mouse (*L1Pm62*) gene. **(M97517)**

MYS-1, MYS-2 *(Mys)*

[PLMYS1] *P. leucopus* retrovirus-like transposable element *mys-1*. **(X02855)**

[PERMYS21] Mouse (*P. leucopus*) retrovirus-like transposable element *mys-2*, left flank. **(M13343)**

[PERMYS22] Mouse (*P. leucopus*) retrovirus-like transposable element *mys-2*, right flank. **(M13344)**

ID Repeat *(ID)*

[PMU33854] *P. maniculatus* clone *Pma2* ID repeat element. **(U33854)**

[PMU33855] *P. maniculatus* clone *Pma3* ID repeat element. **(U33855)**

[PMU33856] *P. maniculatus* clone *Pmf0* ID repeat element. **(U33856)**

[PMU33857] *P. maniculatus* clone *Pmg1* ID repeat element. **(U33857)**

[PMU33858] *P. maniculatus* clone *Pmg2* ID repeat element. **(U33858)**

[PMU33859] *P. maniculatus* clone *Pmg3* ID repeat element. **(U33859)**

[PMU33860] *P. maniculatus* clone *Pmg4* ID repeat element. **(U33860)**

[PMU33861] *P. maniculatus* clone *Pmg5* ID repeat element. **(U33861)**

[PMU33862] *P. maniculatus* clone *Pmh1* ID repeat element. **(U33862)**

[PMU33863] *P. maniculatus* clone *Pmh3* ID repeat element. **(U33863)**

[PMU33865] *P. maniculatus* clone *Pmh5* ID repeat element. **(U33865)**

MITOCHONDRIAL GENES

Cytochrome B *(mtcytB)*

[MTPLCYTB] *P. leucopus* mitochondrial DNA for *cyt b* gene. **(X89790)**

[MTPGCYTB] (*P. leucopus* group) *P. gossypinus* mitochondrial DNA for *cyt b* gene. **(X89786)**

[MTPKCYTB] (*P. maniculatus* group) *P. keeni* mitochondrial DNA for *cyt b* gene. **(X89787)**

[MTPMCYTB] (*P. maniculatus* group) *P. melanotis* mitochondrial DNA for *cyt b* gene. **(X89791)**

[MTPPCYTBG] (*P. maniculatus* group) *P. polionotus* mitochondrial DNA for *cyt b* gene. **(X89792)**

[MTPECYTB] *P. eremicus* mitochondrial DNA for *cy b* gene. **(X89799)**

SSU **ribosomal RNA**

[MTPL12SR] *P. leucopus* mitochondrial DNA for *12S* robosomal RNA gene. **(X89797)**

[MTPG12SR] (*P. leucopus* group) *P. gossypinus* mitochondrial DNA for *SSU* ribosomal RNA gene. **(X89795)**

[MTPK12SR] (*P. maniculatus* group) *P. keeni* mitochondrial DNA for *SSU* robosomal RNA gene. **(X89796)**

[MTPM12SR] (*P. maniculatus* group) *P. melanotis* mitochondrial DNA for *SSU* ribosomal RNA gene. **(X89785)**

[PP12SSSUR] (*P. maniculatus* group) *P. polionotus* DNA for *12S* ribosomal RNA gene. **(X89888)**

[MTPE12SR] *P. eremicus* mitochondrial DNA for *SSU* ribosomal RNA gene. **(X89784)**

VARIANT GENETIC LOCI IN NATURAL POPULATIONS OF PEROMYSCUS

Numerous electrophoretic studies of allozymes and other proteins in natural populations of *Peromyscus* have been conducted beginning in the late 1960's (See *PN* #18 and #20). These studies revealed numerous polymorphisms within populations and species, as well as variation among potentially interbreeding species, *e.g. P. maniculatus* and *P. polionotus*. Variants of a protein are generally presumed to identify a genetic "locus", although formal mendelian analysis might not have been accomplished.

PEROMYSCUS NEWSLETTER periodically lists in tabular form the known genetic loci in *Peromyscus* species or species groups. We distinguish between loci which have been formally **demonstrated** and **presumptive** loci. The latter are usually protein variants from natural populations identified by electrophoresis. Separate listings for the two categories are published in PN. Presumptive loci are not listed in the *Peromyscus* Gene Catalog.

In this issue Tables 1. through 4. summarize presumptive variant loci identified in the *P. aztecus, boylii, mexicanus* and *truei* species groups. Similar tables in PN #16 list variant presumptive loci reported in other *Peromyscus* species and species groups. These tables are updated at three year intervals, thus the next update will be in 1999.

Since limited interbreeding in captivity is frequently possible among different species within a species group, we treat a species group as a single gene pool. Thus, while two species may each be monomorphic for alternate alleles, by hybridization heterozygotes might be produced and genetic analysis conducted. Linkage analysis and gene regulation potentially can be investigated using species hybrids. Such systems are currently used in both *Mus* and *Peromyscus*. Therefore, the tables serve as a reference to locate reported variants at given loci. **Completely monomorphic loci, *i.e.* loci for which no variation within the species or species group has been reported, are not listed.**

Only variants reported in refereed research publications, abstracts excluded, are listed in the tables. References are listed at the foot of each table. Please call our attention to omissions, corrections or newly published additions.

Table 1. VARIANT PROTEIN LOCI REPORTED FROM NATURAL POPULATIONS OF THE *PEROMYSCUS AZTECUS* SPECIES GROUP

Protein	Locus	Species	References
Amylase	*Amy-1*	*P. aztecus* *P. spicilegus* *P. winkelmanni*	Sullivan and Kilpatrick (1991)
Carbonic anhydrase	*Car-3*	*P. aztecus* *P. spicilegus* *P. winkelmanni*	Sullivan and Kilpatrick (1991)
Esterase	*Es-1* *Es-2* *Es-5*	*P. aztecus* *P. spicilegus* *P. winkelmanni*	Sullivan and Kilpatrick (1991)
Glutamate oxaloacetate transaminase	*Got-1*	*P. aztecus* *P. winkelmanni*	Sullivan and Kilpatrick (1991)
Hemoglobin	*Hba-1*	*P. aztecus*	Sullivan and Kilpatrick (1991)
Isocitrate dehydrogenase	*Idh-1* (*Icd-1*) *Icd-2*	*P. aztecus* *P. spicilegus* *P. winkelmanni*	Sullivan and Kilpatrick (1991)
Lactate dehydrogenase	*Ldh-2*	*P. spicilegus*	Sullivan and Kilpatrick (1991)
Malate dehydrogenase	*Mdh-1*	*P. winkelmanni*	Sullivan and Kilpatrick (1991)
Malic enzyme	*Me-1* (*Mod-1*)	*P. winkelmanni*	Sullivan and Kilpatrick (1991)
Peptidase	*Pep-1* (A) *Pep-4* (D)	*P. aztecus* *P. winkelmanni*	Sullivan and Kilpatrick (1991)
Phosphogluconate dehydrogenase	*Pgd-1*	*P. spicilegus* *P. winkelmanni*	Sullivan and Kilpatrick (1991)

(Continued)

Table 1. **Protein variants in *P. aztecus* group natural populations (Continued)**

Protein	Locus	Species	References
Phosphoglucomutase	*Pgm-2* *Pgm-3*	*P. aztecus* *P. spicilegus* *P. winkelmanni*	Sullivan and Kilpatrick (1991)
Sorbitol dehydrogenase	*Sdh-1*	*P. aztecus* *P. winkelmanni*	Sullivan ande Kilpatrick (1991)
Transferrin	*Trf*	*P. aztecus* *P. winkelmanni*	Sullivan and Kilpatrick (1991)

Reference

Sullivan, J.M. and C. W. Kilpatrick. 1991. J. Mamm. 72:681-696.

Table 2. VARIANT PROTEIN LOCI REPORTED FROM NATURAL POPULATIONS OF THE *PEROMYSCUS BOYLII* SPECIES GROUP

Protein	Locus	Species	References
Alcohol dehydrogenase	*Adh*	*P. attwateri*	Sugg *et al.* (1990)
Albumin	*Alb*	*P. boylii*	Jensen and Rasmussen (1971)
		P. pectoralis	Avise *et al.* (1974)
			Kilpatrick and Zimmerman (1975)
			Zimmerman *et al.* (1975)
			Kilpatrick and Zimmerman (1976a)
			Kilpatrick (1984)
			Rennert and Kilpatrick (1986)
			Werbitsky and Kilpatrick (1987)
Amylase	*Amy-1*	*P. boylii*	Rennert and Kilpatrick (1986)
			Rennert and Kilpatrick (1987)
Carbonic anhydrase	*Car-1*	*P. boylii*	Rennert and Kilpatrick (1986)
	Car-3	*P. beatae*	Rennert and Kilpatrick (1987)
			Sullivan and Kilpatrick (1991)
Catalase	*Cas-1*	*P. attwateri*	Sugg *et al.* (1990)
Creatine kinase	*Ck-1*	*P. attwateri*	Schnake-Greene *et al.* (1990)
Esterase	*Es-1*	*P. boylii*	Rasmussen and Jensen (1971)
	Es-3	*P. attwateri*	Avise *et al.* (1974)
	Es-4	*P. pectoralis*	Kilpatrick and Zimmerman (1975)
	Es-5	*P. polius*	Zimmerman *et al.* (1975)
	Es-6	*P. beatae*	Kilpatrick and Zimmerman (1976a)
	Es-7		Kilpatrick (1984)
			Rennert and Kilpatrick (1986)
			Rennert and Kilpatrick (1987)
			Sugg *et al.* (1990)
			Sullivan and Kilpatrick (1991)
Glucose dehydrogenase	*Gdh-1*	*P. attwateri*	Sullivan *et al.* (1991)

(Continued)

Table 2. Protein variants in *P. boylii* group natural populations (Continued)

Protein	Locus	Species	References
Glutamate dehydrogenase	*Gtdh-1*	*P. attwateri*	Sugg *et al.* (1990)
Glutamate oxaloacetate transaminase	*Got-1*	*P. boylii*	Avise *et al.* (1974)
		P. pectoralis	Kilpatrick and Zimmerman (1975)
		P. attwateri	Zimmerman *et al.* (1975)
		P. simulans	Kilpatrick and Zimmerman (1976a)
			Kilpatrick (1984)
			Rennert and Kilpatrick (1986)
			Rennert and Kilpatrick (1987)
			Sullivan *et al.* (1991)
α-glycerophosphate dehydrogenase	*Gpd-1*	*P. boylii*	Mascarello and Shaw (1973)
	Gpd-2	*P. pectoralis*	Avise *et al.* (1974)
			Janecek (1990)
Glucose-6-phosphate dehydrogenase	*G6pd-1*	*P. pectoralis*	Avise *et al.* (1974)
	(*H6pd-1*)	*P. boylii*	Kilpatrick (1984)
			Rennert and Kilpatrick (1986)
			Rennert and Kilpatrick (1987)
			Sullivan *et al.* (1991)
			Rogers and Engstrom (1992)
Hemoglobin	*Hb-1*	*P. boylii*	Rasmussen *et al.* (1968)
	Hb-2	*P. pectoralis*	Avise *et al.* (1974)
		P. attwateri	Kilpatrick and Zimmerman (1975)
		P. simulus	Zimmerman *et al.* (1975)
			Kilpatrick and Zimmerman (1976a)
			Kilpatrick and Zimmerman (1976b)
			Kilpatrick (1984)
			Sullivan *et al.* (1991)
Hexose-6-Phosphate dehydrogenase	*H6pd-1*	*P. boylii*	Rennert and Kilpatrick (1986)
			Rennert and Kilpatrick (1987)

(Continued)

Table 2. Protein variants in *P. boylii* group natural populations (Continued)

Protein	Locus	Species	References
Isocitrate dehydrogenase	*Idh-1* (*Icd-1*) *Icd-2*	*P. boylii* *P. pectoralis* *P. attwateri* *P. simulus*	Mascarello and Shaw (1973) Avise *et al.* (1974) Kilpatrick and Zimmerman (1976a) Kilpatrick (1984) Rennert and Kilpatrick (1986) Rennert and Kilpatrick (1987) Schnake-Greene *et al.* (1990) Sugg *et al.* (1990) Janecek (1990) Sullivan *et al.* (1991)
Lactate dehydrogenase	*Ldh-1* *Ldh-2* *Ldh-3*	*P. boylii* *P. pectoralis* *P. polius* *P. attwateri*	Mascarello and Shaw (1973) Avise *et al.* (1974) Kilpatrick and Zimmerman (1975) Kilpatrick and Zimmerman (1976a) Kilpatrick (1984) Schnake-Greene *et al.* (1990) Sugg *et al.* (1990) Janecek (1990)
Leucine aminopeptidase	*Lap-1*	*P. boylii* *P. attwateri*	Kilpatrick (1984) Janecek (1990)
Malate dehydrogenase	*Mdh-1* *Mdh-2*	*P. boylii* *P. pectoralis* *P. attwateri*	Avise *et al.* (1974) Kilpatrick and Zimmerman (1976a) Schnake-Greene *et al.* (1990) Sugg *et al.* (1990) Janecek (1990)
Mannose phosphate isomerase	*Mpi-1*	*P. attwateri*	Sugg *et al.* (1990)
Nucleoside phosphorylase	*Np*	*P. attwateri*	Schnake-Greene *et al.* (1990) Sugg *et al.* (1990) Rogers and Engstrom (1992)
Peptidase	*Pep-1* *Pep-2*	*P. attwateri*	Schnake-Greene *et al.* (1990) Sugg *et al.* (1990) Janecek (1990)

(Continued)

Table 2. Protein variants in *P. boylii* group natural populations (Continued)

Protein	Locus	Species	References
Phosphogluconate dehydrogenase	*Pgd-1*	*P. boylii* *P. pectoralis* *P. attwateri*	Avise *et al.* (1974) Kilpatrick and Zimmerman (1975) Zimmerman *et al.* (1975) Kilpatrick and Zimmerman (1976a) Sugg *et al.* (1990) Janecek (1990)
Phosphoglucose isomerase	*Pgi-1*	*P. boylii* *P. pectoralis* *P. attwateri* *P. simulus*	Avise *et al.* (1974) Kilpatrick (1984) Rennert and Kilpatrick (1986) Rennert and Kilpatrick (1987) Sullivan *et al.* (1991) Rogers and Engstrom (1992)
Phophoglucomutase	*Pgm-1* *Pgm-2* *Pgm-3*	*P. boylii* *P. pectoralis* *P. attwateri*	Mascarello and Shaw (1973) Avise *et al.* (1974) Kilpatrick and Zimmerman (1976a) Rennert and Kilpatrick (1986) Rennert and Kilpatrick (1987) Sugg *et al.* (1990) Janecek (1990)
Sorbitol dehydrogenase	*Sdh-1*	*P. boylii*	Janecek (1990)
Superoxide dismutase	*Sod-2*	*P. boylii*	Janecek (1990)
Transferrin	*Trf*	*P. boylii* *P. pectoralis* *P. attwateri* *P. polius*	Rasmussen and Koehn (1966) Avise *et al.* (1974) Kilpatrick and Zimmerman (1975) Zimmerman *et al.* (1975) Kilpatrick and Zimmerman (1976a) Kilpatrick (1984) Rennert and Kilpatrick (1986) Rennert and Kilpatrick (1987) Werbitsky and Kilpatrick (1987) Sullivan *et al.* (1991)

(Continued)

Table 2. Protein variants in *P. boylii* group natural populations (Continued)

Protein	Locus	Species	References
Xanthine dehydrogenase	*Xdh-1*	*P. boylii* *P. attwateri*	Kilpatrick (1984)
Unspecified protein	"*Gp*"	*P. boylii*	Janecek (1990)

Table 2. References:

Avise, J.C., M.H. Smith and R.K. Selander. 1974. J. Mamm. 55:751-76.

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Mascarello, J.T. and C.R. Shaw. 1973. Texas Rpt. Biol. Med. 31:507-518.

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Rasmussen, D.I. and J.N. Jensen. 1971. Comp. Biochem. Physiol. 39B:19-24.

Rennert, P.D. and C.W. Kilpatrick. 1986. J. Mamm. 67:481-488.

Rennert, P.D. and C.W. Kilpatrick. 1987. J. Mamm. 68:799-811.

Rogers, D.S. and M.D. Engstrom. 1992. J. Mamm. 73:55-69.

Schnake-Greene, J.E., L.W. Robbins and D.K. Tolliver. 1990. Southwest. Nat. 35:54-60.

Sugg, D.W., M.L. Kennedy and G.A. Heidt. 1990. J. Mamm. 71:309-317.

Sullivan, J.M. and C.W. Kilpatrick. 1991. J. Mamm. 72:681-696.

Sullivan, J.M., C.W. Kilpatrick and P.D. Rennert. 1991. J. Mamm. 72:669-680.

Werbitsky, D. and C.W. Kilpatrick. 1987. J. Mamm. 68:305-312.

Zimmerman, E.G., B.J. Hart and C.W. Kilpatrick. 1975. Comp. Biochem. Physiol. 52B:541-545.

Table 3. VARIANT PROTEIN LOCI REPORTED FROM NATURAL POPULATIONS OF THE *PEROMYSCUS MEXICANUS* SPECIES GROUP (*Sensu* Carleton, 1989)

Protein	Locus	Species	References
Esterase (NADA)	*Es-3*	*P. mexicanus* *P. gymnotis*	Rogers and Engstrom (1992)
Glutamate oxaloacetate transaminase	*Got-1*	*P. mexicanus*	Rogers and Engstrom (1992)
6-Glycerophosphate dehydrogenase	*Gpd-1*	*P. mexicanus*	Rogers and Engstrom (1992)
Glucose phosphate isomerase	*Gpi-1*	*P. mexicanus* *P. gymnotis*	Rogers and Engstrom (1992)
Isocitrate dehydrogenase	*Icd-2* (*Idh-2*)	*P. mexicanus*	Rogers and Engstrom (1992)
Malate dehydrogenase	*Mdh-1* *Mdh-2*	*P. yucatanicus* *P. mexicanus*	Rogers and Engstrom (1992)
Malic enzyme	*Me*	*P. mexicanus* *P. gymnotis*	Rogers and Engstrom (1992)
Mannose phosphoisomerase	*Mpi-1*	*P. mexicanus* *P. zarhynchus*	Rogers and Engstrom (1992)
Nucleoside phosphorylase	*Np-1*	*P. zarhynchus*	Rogers and Engstrom (1992)
Peptidase	*Pep-1* (B) *Pep-2* (D)	*P. mexicanus*	Rogers and Engstrom (1992)
Phosphoglucomutase	*Pgm-1* *Pgm-2*	*P. mexicanus* *P. zarhynchus*	Rogers and Engstrom (1992)

Reference:

Rogers, D.S. and M.D. Engstrom. 1992. J. Mamm. 73:55-69.

Table 4. VARIANT PROTEIN LOCI REPORTED FROM NATURAL POPULATIONS OF THE *PEROMYSCUS TRUEI* SPECIES GROUP

Protein	Locus	Species	References
Albumin	*Alb*	*P. truei* *P. difficilis*	Brown and Welser (1968) Jensen and Rasmussen (1971) Johnson and Packard (1974) Zimmerman *et al.* (1975) Avise *et al.* (1979)
Esterase	*Es-1* *Es-2* *Es-3* *Es-4* *Es-5* *Es-6*	*P. truei* *P. difficilis*	Rasmussen and Jensen (1971) Johnson and Packard (1974) Zimmerman *et al.* (1975)
Glutamate oxaloactate transaminase	*Got-1* (*Aat-1*) *Got-2*	*P. truei* *P. difficilis* *P. gratus*	Zimmerman *et al.* (1975) Avise *et al.* (1979) Janecek (1990) Sullivan *et. al.* (1991)
α-glycerophosphate dehydrogenase	*Gpd-1* *Gpd-2*	*P. truei* *P. difficilis* *P. gratus*	Mascarello and Shaw (1973) Johnson and Packard (1974) Avise *et al.* (1979) Janecek (1990)
Isocitrate dehydrogenase	*Icd-1* (*Idh-1*) *Ich-2*	*P. truei* *P. difficilis* *P. gratus*	Mascarello and Shaw (1973) Johnson and Packard (1974) Avise *et al.* (1979) Rogers and Engstrom (1992) Janecek (1990)
Lactate dehydrogenase	*Ldh-1* *Ldh-2*	*P. truei* *P. gratus*	Mascarello and Shaw (1973) Janecek (1990)
Malate dehydrogenase	*Mdh-2*	*P. diffilis* *P. gratus*	Janecek (1990)

(Continued)

Table 4. Variant protein loci in *P. truei* group natural populations (Continued)

Protein	Locus	Species	References
Nucleoside phosphorylase	*Np-1*	*P. truei* *P. difficilis* *P. gratus*	Janecek (1990)
Peptidase	*Pep-1* *Pep-2* *Pep-3*	*P. difficilis* *P. gratus* *P. truei*	Janecek (1990)
6-Phosphogluconate dehydrogenase	*Pgd-1*	*P. truei* *P. difficilis* *P. gratus*	Mascarello and Shaw (1973) Johnson and Packard (1974) Zimmerman *et al.* (1975) Avise *et al.* (1979) Janecek (1990) Sullivan *et al.* (1991)
Phosphoglucose isomerase	*Pgi-1*	*P. truei* *P. difficilis* *P. gratus*	Avise *et al.* (1979) Sullivan *et al.* (1991)
Phosphoglucomutase	*Pgm-1* *Pgm-2* *Pgm-3*	*P. truei* *P. difficilis* *P. gratus*	Mascarello and Shaw (1973) Johnson and Packard (1974) Janecek (1990)
Sorbitol dehydrogenase	*Sdh-1*	*P. difficilis*	Janecek (1990)
Transferrin	*Trf*	*P. truei* *P. difficilis*	Avise *et al.* (1979) Johnson and Packard (1974) Sullivan *et al.* (1991)

References:

Avise, J.C., M.H. Smith and R.K. Selander. 1979. J. Mamm. 60:177-192.

Brown, J.H. and C.F. Welser. 1968. J. Mamm. 49:420-426.

Janecek, L.L. 1990. J. Mamm. 71:301-308.

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Zimmerman, E.G., B.J. Hart and C.W. Kilpatrick. 1975. Comp. Biochem. Physiol. 52B:541-545.

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THANK YOU !

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BIOLOGICAL REPELLENTS AGAINST RODENT AGRICULTURAL PESTS.

Within the project "Small Mammals", that is being carried out by the Group on Fauna of the Centro de Investigaciones Biologicas del Noroeste, we recently began a subproject to analyze the effects of a predator's urine as a biological repellent, on rodent population. We suppose that some quantity of a predator's urine applied on strategic places inside a grain storage could be useful to repel mice.

Although the damage extent caused by rodents inside a grain storage is generally small, it is of great relevance to the microbial proliferation and later infection, caused by the mouse feces and urine. Besides the grain loss caused directly by the rodent action, these organic substances excreted by mice are human disease vectors. Some of the diseases that can be transmitted by them are the bacterial food poisoning salmonellosis, caused by *Salmonella* spp., leptospirosis, caused by *Leptospira* spp., and trichinosis, caused by *Trichinella spiralis*; they usually are spread by feces of infected animals.

In several grain storages located in rural areas, which are owned by extensive producers, by small scale producers and some of them by the government grain distribution office, we detected the presence of the following rodent species: *Peromyscus maniculatus, Chaetodipus baileyi, Ch. arenarius, Dipodomys agilis, D. merriami, Ammospermophilus leucurus* and *Thommomys umbrinus.* An eventual chemical control of such species implies a high risk of toxicity, due to the dispersal and remnant action of the applied pesticide, thus the use of biological repellents may represent a feasible option against rodent presence in these sites.

From the species mentioned above, we selected for initial bioassays *P. maniculatus* and *Ch. baileyi.* On the other hand, the urine to be applied will be extracted from domestic cats (*Felis catus*) and from regional coyotes (*Canis latrans*). A first stage of this project was planned to conclude by the middle of 1997.

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TESTS OF PREFERENCES OF MALES FOR AWAKE ESTROUS VERSUS DIESTROUS FEMALE DEER MICE, *PEROMYSCUS MANICULATUS BAIRDI*

Chemical cues provide the basis for males to discriminate estrous from non-estrous females in many, but not all, species and not under all conditions (Taylor, S. A., and Dewsbury, D. A. 1990. In D. Macdonald, D. Muller-Schwarze, and S. Natynczuk [Eds.] Chemical Signals in Vertebrates. Oxford University Press, 184-198). We found little evidence of preferences in male deer mice for odors from estrous versus diestrous females (Dewsbury, D. A., Ferguson, B., Hodges, A. W., and Taylor, S. A. 1986. J. Comp. Psychol. 100:117-127). Here we test for preferences between intact, awake estrous and diestrous females.

Test cages were standard polycarbonate cages, 46 X 24 X 15.5 cm with hardware cloth inserts to make 15.3 X 12 cm compartments to house an estrous female and a diestrous female in two corners of the cage. Stimulus females were housed individually and checked for estrous condition with daily vaginal smears. Tests lasted 15 min and we determined the amount of time male spent near each female.

In Experiment 1, 14 males completed one test each, spending a mean of 205 s near the estrous female and 160 s near the diestrous female. The 15 males in Experiment 3 were tested similarly on three successive days. The scores for estrus vs. diestrus were 188 vs. 135 on Day 1, 175 vs. 180 on Day 2, and 196 vs. 201 on Day 3. None of the differences were statistically significant.

Three of the males in Experiment 2 consistently preferred the estrous to the diestrous female. These 3 males were given four additional tests to determine whether there might be a few individuals who preferred estrous females or the result was a normal effect of chance variation. They showed no consistent preference for estrous females, suggesting that the latter explanation is the correct one.

Although it might be argued that these procedures are insensitive, we did at least find a clear preference between a side with a conspecific present versus an empty cage, suggesting that deer mice make at least some discriminations.

In the earlier study we found that males did not differentiate between bedding soiled by females in estrus and diestrus. Here, we extend that to show a lack of preference with awake, behaving females as stimulus objects.

(continued)

Donald A. DEWSBURY (continued)

A SEARCH FOR EVIDENCE OF A PATERNAL ROLE IN DEVELOPMENT OF DEER MICE, *PEROMYSCUS MANICULATUS BAIRDI*

There is evidence in a number of rodent species that the male plays an active role in the rearing of young and that his presence contributes to the development of his offspring (e.g., Gubernick, D. J., Wright, S. L., and Brown, R. E. 1993. Anim. Behav. 46:539-546). As male deer mice regularly interact with young in our laboratory (Hartung, T. G., and Dewsbury, D. A. 1979. Behav. Neur. Biol. 26:466-478), we searched for such an effect in this species.

Twenty-six male-female breeding pairs were formed. For half of the pairs there was no manipulation upon the birth of the first litter. For the other 13 pairs, the male was removed one day after the birth of the first litter. This allowed mating in postpartum estrus and avoided a possible confounding that might have occurred when comparing mated vs. unmated females in these tests had males been removed earlier. Pups were weaned and weighed and males were returned to the breeding cage when the litters reached 21 days of age. Pairs were then tested in the reverse condition with their second litter to complete a counterbalanced design.

Analyses of variance revealed no significant effect of male presence on the number of young born, number weaned, number of males, number of females, mass of young weaned, mass of females weaned, mass of males weaned, percent of young weaned, mass/pup, or litter sex ratio. There were some significant effects of test order on several variables. In general, pairs in which the male was present only during the rearing of the first litter were more successful in rearing young than were those in which the male was present only for the rearing of the second litter.

These results suggest that, at least under the benign conditions of the laboratory, the presence and paternal care by the father has little detectable effect on developing deer mice. Such effects might be obtained under more stressful conditions.

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THE INFLUENCE OF SMALL MAMMALS ON TREE INVASION INTO OLD FIELDS.

For the last two years we have been studying how interactions between white-footed mice (*Peromyscus leucopus*) and meadow voles (*Microtus pennsylvanicus*) both affect and are affected by the surrounding plant community in old-fields in upstate New York. Specifically, we are interested in how seed and seedling predation by rodents influence the rate, spatial pattern, and species composition of tree invasion of old fields. To examine these questions, we established six pairs of U-shaped field enclosures at forest-field edges which varied in shrub cover, and thus habitat quality, for voles and mice. In each pair of enclosures, we manipulated vole density (high or low). Enclosures were open along the forest edge to allow mice to move in and out freely while voles are known to treat forest edges as dispersal barriers. In the Fall of 1994 and 1995, we introduced four species of tree seeds and seedlings (red maple or sugar maple, white ash, white pine, *Ailanthus*) at various distances from the forest edge. We also used seedlings of two distinct size classes. White pine seeds experienced the highest, and *Ailanthus* the lowest, predation rates, while the reverse was true for seedlings. Seed survival was highest where vole density was highest, suggesting that voles excluded white-footed mice from these locations. Sites with highest shrub cover had the lowest seed survival, suggesting that old fields with high shrub cover were most heavily used by mice. Seed survival was highest at the forest-field edge and 20 m into the field. Seedlings planted near the forest edge experiences comparatively low predation rates.

The rate and spatial pattern of tree invasion into old fields may also be influenced by variation in seed and seedling density at both local and neighborhood scales. Tree propagule density is likely to examine this question we performed seed and seedling density manipulations in 5 pairs of our field enclosures. Within each enclosure seeds (red maple) and seedlings (black birch) were placed in neighboring treatment plots of high, medium and low density where distance from the forest edge and vegetation type were held constant. An additional, isolated, low density seed plot was established to distinguish the effects of local from neighborhood seed density on the foraging decisions of seed predators. Seedling predation was lowest in the high density treatment plots while seed predation was lowest in the isolated low density plots. Seed survival in the isolated low density plots was greatly accentuated under conditions of high vole densities suggesting again, that voles excluded white-footed mice from these enclosures. Seedling predation, however, was unaffected by vole density manipulations. These results suggest that small mammals are sensitive to small-scale variation in tree propagule density along forest-field edges. Seedlings showed evidence of predator satiation, whereas seeds escaped predation at greater distances from high-density neighborhoods. Overall, these results suggest that small mammal food preferences, habitat distributions and competitive interactions strongly affect the rate, spatial pattern and species composition of tree invasion in old fields. We are now in the process of preparing manuscripts that describe these results, as well as planning follow-up experiments for the 1996 field season.

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THE ISOLATION AND CHARACTERIZATION OF NOVEL ENDOGENOUS RETROVIRAL GENES FROM *PEROMYSCUS LEUCOPUS*

We have utilized the polymerase chain reaction to amplify novel endogenous reverse transcriptase related retroviral genes from *Peromyscus leucopus*. The PCR fragments were cloned into plasmids using the TA cloning system (Invitrogen). Fifteen clones were sequenced and, surprisingly, all represent unique clones, indicating an unusually high number of different retroviral sequences contained within the *Peromyscus* genome. This diversity appears to be in distinct contrast to murine species. These sequences are closely related to each other with closest resemblance to the intracisternal-A endogenous retrovirus particles. Southern blot analysis demonstrates their presence in multiples copies in the genome and library screening experiments indicate that retroviral sequences comprise at least 1% of the genome. This expands the known distribution of these types of endogenous viral genes in vertebrate species and demonstrates a closer relatedness of viral genes within cricetid genera than between cricetid and murine species. Ongoing studies include an analysis of possible expression of these genes and further sequence analysis which will determine if these data are indicative of a retroviral integration event which occurred within the *Peromyscus* genus after its evolutionary split with murine and other cricetids.

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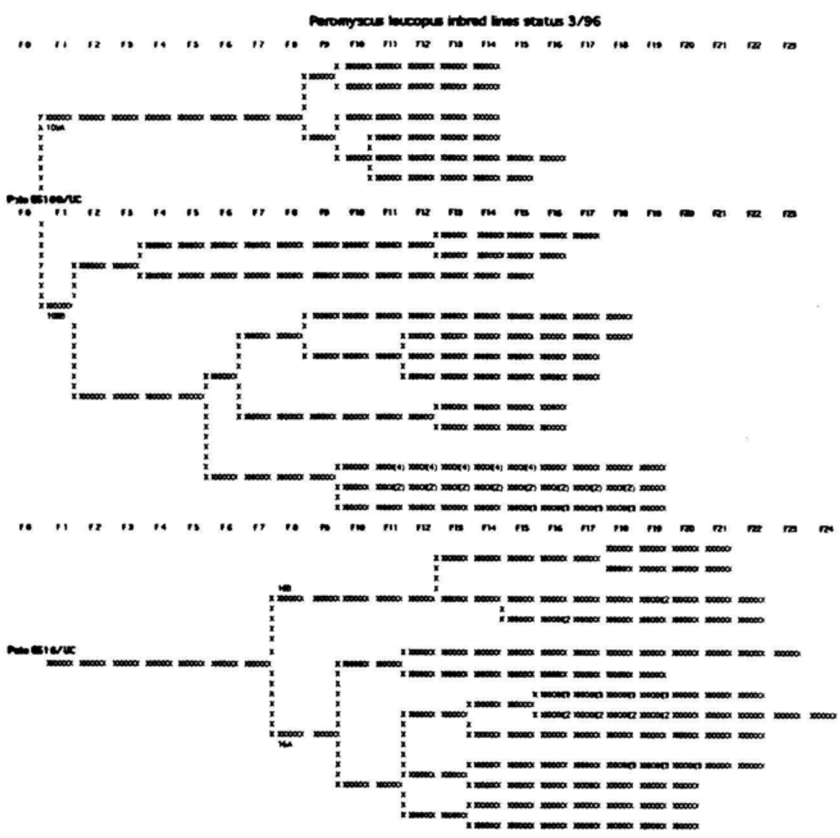
It seems appropriate to inform readers that the inbreeding of *Peromyscus leucopus* has been accomplished. One line called Pele GS 16/UC has reached F24 with several sublines, some separated since F7. Another large line named Pele GS109/UC has reached F19 with several sublines. Two sublines were separated at F1, and others at later generations. The Line charts below illustrate the present main sublines of each without full detail of the last few generations. Three additional lines are struggling along at F15 to F18.

During the next year arrangements will be made to establish as many of the lines and sublines as possible in "breeding houses", such as the Stock Center, for distribution to interested investigators. This will establish a stable and continuing reference standard for the lines and avoid the chaos that would follow a sporadic random release of breeders from my colony. Since it will probably be at least a year before a supply system is established, and since I am frequently discarding exbreeders, unsuccessful breeders, etc., I would entertain making some of these available to researchers.

Suggestions or inquiries from readers are welcome. (310) 825-5746 or e-mail: gsmith@pathology.medsch.ucla.edu



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POPULATION DYNAMICS, HABITAT USE, AND POPULATION GENETICS OF ALABAMA BEACH MICE (*PEROMYSCUS POLIONOTUS AMMOBATES*)

Since 1988, we have conducted monitoring and re-establishment efforts with several endangered and threatened subspecies of beach mice, *Peromyscus polionotus*, found along the Gulf Coast of Alabama and Florida. In Autumn 1994, we began an intensive three-year study of beach mice at Bon Secour National Wildlife Refuge. The primary aims of this study are to determine the relationships among demographics, habitat use and spatial distribution of mice across the study site. Of primary interest is the determination of the function of areas previously considered outside of critical habitat relative to long-term persistence of beach mouse populations. To address this question, three 300 station trapping grids were established in areas that encompass a majority of the available habitat types on the site. Bi-monthly capture/recapture surveys along with individual burrow trapping and radiotelemetry are providing data on habitat use, mouse densities, basic life history estimates, spatial distributions and dispersal. To date, information from 600+ beach mice has been gathered. In addition to providing information for site-specific management and for the development of species-wide recovery plans, the data from this study are being used to parameterize a population simulation model. This model is being used to evaluate the potential impacts of a series of habitat loss and hurricane damage scenarios on the persistence of beach mouse populations.

In association with the field work at Bon Secour, we are generating microsatellite-based genotypes for each mouse trapped during the study. After numerous attempts with allozymes, RAPDs, human probes and mouse primers, we have resorted to the production of primer sets specific for di-nucleotide repeat regions of the beach mouse genome. Laboratory work utilizing nine primer sets is underway with library construction and rescreening for additional repeats scheduled for Summer 1996. The end product of this research will be the construction of microgeographic landscapes for use in testing hypotheses regarding genetic neighborhood formation and inbreeding avoidance.

In October 1995, high seas from hurricane Opal destroyed much of the frontal dune system along the Gulf Coast. The population at Bon Secour suffered only marginal immediate loss but other populations appear to have been devastated. By happenstance, one mouse, a female, had been fitted with a radiocollar shortly before the storm. She survived and was located approximately 50 m inland where she proceeded to construct a new burrow. Another mouse, radiocollared after the storm, was found to make nightly foraging runs of approximately 100 m in one direction across open habitat, thus, clearly incurring increased predation exposure. Efforts to assess the long-term impact of this storm and the refugia value of scrub habitats is continuing.

Updates and additional information are available at our WWW website:
http://www.ag.auburn.edu/-mwooten/main.html

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