

# Evaluation of effectiveness of some mitochondrial genes in biosystematics and phylogeographic studies of house mouse (*Mus musculus*) subspecies

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## ABSTRACT

The identification of the efficiency of some mtDNA genes of *Mus musculus* species complex (house mouse) for biosystematics research was studied in this approach. Recent studies have made use of different mitochondrial genes including NADH dehydrogenase genes, cytochrome b gene, cytochrome oxidase genes, D-loop region and whole mtDNA genome to study the house mouse species. Usage of each of these genome regions has its own advantages and disadvantages. Identification of appropriate genomic regions is very important for molecular biosystematic research. We have shown here that NADH dehydrogenase and Cytochrome oxidase genes (particularly COX2) are especially useful in biosystematics studies and subspecies identification, whereas D-loop region is the best candidate for biogeographic and phylogeographic studies of subspecies of this species efficiency-wise as well as economically. These candidates are introduced considering that the first two gene complexes are highly conserved whereas the latter is well receptive to gaining and preserving the mutations through time.

**Key Words:** biosystematics, house mouse subspecies (*Mus musculus*), mitochondrial genes, phylogeography.

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## Introduction

The house mouse complex includes different subspecies among which the consensus ones are: *Mus musculus domesticus* (found in Western Europe, north of Africa and Middle East), *M. m. musculus* (found in Eastern Europe and north of Asia) and *M. m. castaneus* (found in south-eastern Asia) (1, 2). Besides these three consensus subspecies, two other subspecies are also present in NCBI (<http://www.ncbi.nlm.nih.gov>): *M. m. molossinus* and *M. m. gentilulus*. The 16Kb long mammalian mitochondrial genome is circular and holds 13 protein coding genes: seven NADH dehydrogenase complex genes (MT-ND1, MT-ND2, MT-ND3, MT-ND4, MT-ND5) that encode to ATP synthase subunits (MT-ATP6, MT-ATP8); and one cytochrome b gene (MT-CYB) In addition, 24 RNA coding, 22 tRNA coding and two rRNA coding genes are also present in the mitochondrial genome (3).

The mitochondrial cytochrome *b* gene product forms part of complex III of the mitochondrial respiratory chain in eukaryotes as well as aerobic prokaryotes. The nucleotide diversity of this gene has resulted in its wide use in phylogenetic analyses especially at family, genus and species levels (4). Cytochrome oxidase mitochondrial genes make up parts of complex IV subunits of the respiratory chain; these are also used to investigate phylogenetic relationships (5, 6). NADH dehydrogenase complex constitutes complex I of the respiratory chain. This complex enzyme possesses 45 subunits in mammals of which seven are coded by mitochondrial genes (7).

Since, NADH dehydrogenase, cytochrome oxidase and cytochrome *b* are part of the mitochondrial respiratory chain, their corresponding mitochondrial genes are

constantly being transcribed in order to produce new complexes to replenish enzymes of the aerobic respiratory machine of the cell. Additionally, all these coding genes are under natural selection and therefore mutations in the genes are poorly tolerated. The D-loop which contains the origin of replication of the mitochondrial genome is also constantly operational as mitochondrion replication occurs independently from nucleus replication. However, since the D-loop region does not code for any product, it is under less stringent natural selection; therefore, this region's mutations are better tolerated and selected against to a lesser degree. As a result, D-loop is widely used as a significant marker in phylogeographic studies. The mitochondrial genome is popular for population and evolutionary studies in animals because of relative ease of isolating and comparing homologous sequences, simple sequence organization, maternal inheritance, absence of recombination (in most but not all cases), and rapid rate of sequence divergence (8).

Several studies have been conducted on the house mouse exploiting mitochondrial genome in recent years(1,2,8-31) These studies have made use of a variety of genes among which the most popular include: NADH dehydrogenase, cytochrome b, cytochrome oxidase, d-loop, and whole mitochondrial genome. Considering the wide range of the employed genes, it seems crucial to carry out a comprehensive study so as to reach comparative results concerning the value of usage of these genes in biosystematic investigations.

The present study evaluated the efficacy of the sequences of these genes in proper separation and classification of house mouse subspecies and to draw reliable phylogenetic trees based on them. Bearing in mind how time-consuming and costly molecular studies are,

selecting the appropriate gene is an extremely important step in such studies. Findings of comparative studies as the present one could lead to great saving of time and expenses in molecular biosystematic studies.

## Materials and methods

NADH dehydrogenase complex, cytochrome *b*, cytochrome oxidase complex, D-loop and complete mitochondrial genome sequences (n=713) of house mouse subspecies (*Mus musculus castaneus*, *M. m. musculus*, *M. m. domesticus*, *M. m. molossinus*, and *M. m. gentilulus*) were obtained from NCBI (Table2) Sequences were aligned with Mega5 using Clustal W alignment procedure (32). The corresponding gene sequences of *Mus macedonicus* and *Mus terricolor* were used as outgroups in each analysis. Using Mega5 program (www.megasoftware.net) the Neighbor-joining trees were depicted with a bootstrap of 1000 and complete deletion of the sites including gaps options. Overall mean distance values were also calculated for the sequences to evaluate the mean number of nucleotide substitutions per each nucleotide site. Using DnaSP v5 (33), haplotypes were identified and the haplotype NJ tree was generated by Mega5.

## Results

The genealogical tree was depicted for each investigated genes, using Neighbor-Joining distance matrix. In order to evaluate the genes' efficacy, each data set was separately analyzed.

**Cytochrome *b*:** Robustness of branches and reliability of gene tree was displayed by high bootstrap values on each branch (Fig. 1). It is to be born in mind that though some individuals belong to a certain subspecies according to morphological characteristics, based on cytochrome *b* gene they fall within another subspecific group; for instance, though individuals AB205277, AB205278, and AB205279 are identified as *M. m. castaneus* on NCBI, they fall into *M. m. domesticus* subspecies clade based on their cytochrome *b* sequence. All individuals of the *M. m. molossinus* subspecies fall into clade of the *M. m. musculus* subspecies inferring their genetic vicinity. The individual AB208250c belonging to *M. m. castaneus* subspecies has a position between *castaneus* and *musculus/molossinus* clades; as asserted by the corresponding researcher there has been the multiple errors in the sequence deposited in the GenBank (34).

**Table 1. The sample size of each subspecies downloaded from NCBI.**

subspecies	MtDNA	D-loop	NADH dehydrogenase	Cyt Oxidase	Cytb
<i>Mus musculus domesticus</i>	33	409	33	33	25
<i>M. m. castaneus</i>	2	101	2	2	9
<i>M. m. musculus</i>	3	11	3	3	4
<i>M. m. molossinus</i>	3	3	3	3	3
<i>M. m. gentilulus</i>	-	7	-	-	-
<i>M. terricolor</i>	2	-	2	2	-
<i>M. macedonicus</i>	-	10	-	-	2

**Table 2. Detailed information of the sequences used in the analyses.**

No.	Accession Number (ID)	Genus	Species	Subspecies	Isolate	Haplotype	Gene	Clone
1	EF108342	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	strain CAST/EiJ		mtDNA	
2	NC012387	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>			mtDNA	
3	AB042432	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			mtDNA	
4	GQ871744	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain B10.D1-H2q/SgJ		mtDNA	
5	GQ871745	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain DBA/1J		mtDNA	
6	GQ871746	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain FVB/NJ		mtDNA	
7	EF108344	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain WSB/EiJ		mtDNA	
8	FJ374639	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain 129P3/J		mtDNA	
9	FJ374640	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain BPH/2J		mtDNA	
10	FJ374641	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain BPL/1J		mtDNA	
11	FJ374642	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain BPN/3J		mtDNA	
12	FJ374643	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain BUB/BnJ		mtDNA	
13	FJ374644	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain C57BL/10J		mtDNA	
14	FJ374645	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain CE/J		mtDNA	
15	FJ374646	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain I/LnJ		mtDNA	
16	FJ374647	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain LG/J		mtDNA	
17	FJ374648	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain LP/J		mtDNA	
18	FJ374649	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain LT/SvEi		mtDNA	
19	FJ374650	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain MA/MyJ		mtDNA	
20	FJ374651	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain MRL/MpJ		mtDNA	
21	FJ374652	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain NOR/LtJ		mtDNA	
22	FJ374653	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain P/J		mtDNA	
23	FJ374654	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain PL/J		mtDNA	
24	FJ374655	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain RF/J		mtDNA	
25	FJ374656	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain RIIS/J		mtDNA	
26	FJ374657	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain SB/LeJ		mtDNA	
27	FJ374658	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain SEA/GnJ		mtDNA	
28	FJ374659	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain SJL/J		mtDNA	
29	FJ374660	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain SM/J		mtDNA	
30	FJ374661	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain SOD1/EiJ		mtDNA	
31	FJ374662	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain STR/ort		mtDNA	
32	FJ374663	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain SWR/J		mtDNA	
33	FJ374664	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain TALLYHO/Jng.		mtDNA	
34	FJ374665	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain YBR/EiJ		mtDNA	
35	NC006914	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			mtDNA	
36	AY675564	<i>Mus</i>	<i>musculus</i>	<i>molossinus</i>			mtDNA	
37	EF108345	<i>Mus</i>	<i>musculus</i>	<i>molossinus</i>	strain MOLF/EiJ		mtDNA	
38	NC006915	<i>Mus</i>	<i>musculus</i>	<i>molossinus</i>			mtDNA	
39	EF108343	<i>Mus</i>	<i>musculus</i>	<i>musculus</i>	strain PWD/PhJ		mtDNA	

No.	Accession Number (ID)	Genus	Species	Subspecies	Isolate	Haplotype	Gene	Clone
40	NC010339	<i>Mus</i>	<i>musculus</i>	<i>musculus</i>			mtDNA	
41	DQ874614	<i>Mus</i>	<i>musculus</i>	<i>musculus</i>	strain PWD/Ph		mtDNA	
42	NC010650	<i>Mus</i>	<i>terricolor</i>				mtDNA	
43	EU352649	<i>Mus</i>	<i>terricolor</i>				mtDNA	
44	AY057808	<i>Mus</i>	<i>macedonicus</i>				cytochrome b	
45	AB125770	<i>Mus</i>	<i>macedonicus</i>		isolate:HS537		cytochrome b	
46	AY057805	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>			cytochrome b	
47	AB205280	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate:HS1523		cytochrome b	
48	AB205279	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate:HS2322		cytochrome b	
49	AB205278	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	specimen_voucher: MZB22299		cytochrome b	
50	AB205277	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	specimen_voucher: MZB22298		cytochrome b	
51	AB205276	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate:HS2401		cytochrome b	
52	AB125773	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate:HS2400		cytochrome b	
53	AB125772	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate:HS2925		cytochrome b	
54	AB125771	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate:HS2924		cytochrome b	
55	AB125774	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			cytochrome b	strain:BALB/c
56	AY057807	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			cytochrome b	
57	AY332705	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			cytochrome b	
58	HQ270434	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			cytochrome b	clone 17386
59	HQ270435	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			cytochrome b	clone 9858
60	HQ270436	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			cytochrome b	clone 9859
61	HQ270437	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			cytochrome b	clone 9873
62	HQ270438	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			cytochrome b	clone 9875
63	HQ270439	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			cytochrome b	clone 10233
64	HQ270440	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			cytochrome b	clone 10247
65	HQ270441	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			cytochrome b	clone 10382
66	HQ270442	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			cytochrome b	clone 10954
67	HQ270443	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			cytochrome b	clone 17333
68	HQ270444	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			cytochrome b	clone 17334
69	HQ270445	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			cytochrome b	clone 17366
70	HQ270446	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			cytochrome b	clone 17372
71	HQ270447	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			cytochrome b	clone 17379
72	HQ270448	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			cytochrome b	clone 17383
73	HQ270449	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			cytochrome b	clone 18757
74	HQ270450	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			cytochrome b	clone 18807
75	HQ270451	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			cytochrome b	clone 18899
76	HQ270452	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			cytochrome b	clone 19089
77	HQ270453	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			cytochrome b	clone 19780
78	HQ270454	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			cytochrome b	clone 19781
79	HQ270455	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			cytochrome b	clone 20316

No.	Accession Number (ID)	Genus	Species	Subspecies	Isolate	Haplotype	Gene	Clone
80	AY675564	<i>Mus</i>	<i>musculus</i>	<i>molossinus</i>			mtDNA (cyt b extracted)	
81	EF108345	<i>Mus</i>	<i>musculus</i>	<i>molossinus</i>			mtDNA (cyt b extracted)	
82	NC006915	<i>Mus</i>	<i>musculus</i>	<i>molossinus</i>			mtDNA (cyt b extracted)	
83	AY057804	<i>Mus</i>	<i>musculus</i>	<i>musculus</i>			cytochrome b	
84	AB205275	<i>Mus</i>	<i>musculus</i>	<i>musculus</i>	isolate:HS682		cytochrome b	
85	AB205274	<i>Mus</i>	<i>musculus</i>	<i>musculus</i>	isolate:HS2320		cytochrome b	
86	AB205273	<i>Mus</i>	<i>musculus</i>	<i>musculus</i>	isolate:HS1473		cytochrome b	
87	EF108342	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	strain CAST/Eij		COX 1, 2 & 3	
88	NC_012387	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>			COX 1, 2 & 3	
89	AB042432	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			COX 1, 2 & 3 (extracted from mtDNA)	
90	GQ871744	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain B10.D1-H2q/SgJ		COX 1, 2 & 3 (extracted from mtDNA)	
91	GQ871745	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain DBA/1J		COX 1, 2 & 3 (extracted from mtDNA)	
92	GQ871746	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain FVB/NJ		COX 1, 2 & 3 (extracted from mtDNA)	
93	EF108344	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain WSB/Eij		COX 1, 2 & 3 (extracted from mtDNA)	
94	FJ374639	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain 129P3/J		COX 1, 2 & 3 (extracted from mtDNA)	
95	FJ374640	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain BPH/2J		COX 1, 2 & 3 (extracted from mtDNA)	
96	FJ374641	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain BPL/1J		COX 1, 2 & 3 (extracted from mtDNA)	
97	FJ374642	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain BPN/3J		COX 1, 2 & 3 (extracted from mtDNA)	
98	FJ374643	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain BUB/BnJ		COX 1, 2 & 3 (extracted from mtDNA)	
99	FJ374644	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain C57BL/10J		COX 1, 2 & 3 (extracted from mtDNA)	
100	FJ374645	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain CE/J		COX 1, 2 & 3 (extracted from mtDNA)	
101	FJ374646	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain I/LnJ		COX 1, 2 & 3 (extracted from mtDNA)	
102	FJ374647	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain LG/J		COX 1, 2 & 3 (extracted from mtDNA)	
103	FJ374648	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain LP/J		COX 1, 2 & 3 (extracted from mtDNA)	
104	FJ374649	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain LT/SvEi		COX 1, 2 & 3 (extracted from mtDNA)	
105	FJ374650	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain MA/MyJ		COX 1, 2 & 3 (extracted from mtDNA)	
106	FJ374651	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain MRL/MpJ		COX 1, 2 & 3 (extracted from mtDNA)	
107	FJ374652	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain NOR/LtJ		COX 1, 2 & 3 (extracted from mtDNA)	
108	FJ374653	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain P/J		COX 1, 2 & 3 (extracted from mtDNA)	
109	FJ374654	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain PL/J		COX 1, 2 & 3 (extracted from mtDNA)	

No.	Accession Number (ID)	Genus	Species	Subspecies	Isolate	Haplotype	Gene	Clone
110	FJ374655	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain RF/J		COX 1, 2 & 3 (extracted from mtDNA)	
111	FJ374656	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain RIIS/J		COX 1, 2 & 3 (extracted from mtDNA)	
112	FJ374657	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain SB/LeJ		COX 1, 2 & 3 (extracted from mtDNA)	
113	FJ374658	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain SEA/GnJ		COX 1, 2 & 3 (extracted from mtDNA)	
114	FJ374659	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain SJL/J		COX 1, 2 & 3 (extracted from mtDNA)	
115	FJ374660	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain SM/J		COX 1, 2 & 3 (extracted from mtDNA)	
116	FJ374661	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain SOD1/Eij		COX 1, 2 & 3 (extracted from mtDNA)	
117	FJ374662	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain STR/ort		COX 1, 2 & 3 (extracted from mtDNA)	
118	FJ374663	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain SWR/J		COX 1, 2 & 3 (extracted from mtDNA)	
119	FJ374664	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain TALLYHO/Jng.		COX 1, 2 & 3 (extracted from mtDNA)	
120	FJ374665	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain YBR/Eij		COX 1, 2 & 3 (extracted from mtDNA)	
121	NC006914	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			COX 1, 2 & 3 (extracted from mtDNA)	
122	AY675564	<i>Mus</i>	<i>musculus</i>	<i>molossinus</i>			COX 1, 2 & 3 (extracted from mtDNA)	
123	EF108345	<i>Mus</i>	<i>musculus</i>	<i>molossinus</i>	strain MOLF/Eij		COX 1, 2 & 3 (extracted from mtDNA)	
124	NC006915	<i>Mus</i>	<i>musculus</i>	<i>molossinus</i>			COX 1, 2 & 3 (extracted from mtDNA)	
125	EF108343	<i>Mus</i>	<i>musculus</i>	<i>musculus</i>	strain PWD/PhJ		COX 1, 2 & 3 (extracted from mtDNA)	
126	NC010339	<i>Mus</i>	<i>musculus</i>	<i>musculus</i>			COX 1, 2 & 3 (extracted from mtDNA)	
127	DQ874614	<i>Mus</i>	<i>musculus</i>	<i>musculus</i>	strain PWD/Ph		COX 1, 2 & 3 (extracted from mtDNA)	
128	NC010650	<i>Mus</i>	<i>terricolor</i>				COX 1, 2 & 3 (extracted from mtDNA)	
129	EU352649	<i>Mus</i>	<i>terricolor</i>				COX 1, 2 & 3 (extracted from mtDNA)	
130	HM235698	<i>Mus</i>	<i>macedonicus</i>	<i>macedonicus</i>		Iran_17	D-loop	
131	HM235697	<i>Mus</i>	<i>macedonicus</i>	<i>macedonicus</i>		Iran_16	D-loop	
132	HM235696	<i>Mus</i>	<i>macedonicus</i>	<i>macedonicus</i>		Iran_15	D-loop	
133	HM235695	<i>Mus</i>	<i>macedonicus</i>	<i>macedonicus</i>		Iran_14	D-loop	
134	HM235694	<i>Mus</i>	<i>macedonicus</i>	<i>macedonicus</i>		Iran_13	D-loop	
135	HM235693	<i>Mus</i>	<i>macedonicus</i>	<i>macedonicus</i>		Iran_12	D-loop	
136	HM235692	<i>Mus</i>	<i>macedonicus</i>	<i>macedonicus</i>		Iran_11	D-loop	
137	HM235691	<i>Mus</i>	<i>macedonicus</i>	<i>macedonicus</i>		Iran_10	D-loop	
138	HM235690	<i>Mus</i>	<i>macedonicus</i>	<i>macedonicus</i>		Iran_9	D-loop	
139	HM235689	<i>Mus</i>	<i>macedonicus</i>	<i>macedonicus</i>		Iran_8	D-loop	
140	EU939142	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate JM1230		D-Loop	
141	EU939141	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate JM1229		D-Loop	

No.	Accession Number (ID)	Genus	Species	Subspecies	Isolate	Haplotype	Gene	Clone
142	EU939140	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate JM1228		D-Loop	
143	EU939139	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate JM1222		D-Loop	
144	EU939137	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate JM1220		D-Loop	
145	EU939136	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate JM1217		D-Loop	
146	EU939135	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate JM1215		D-Loop	
147	EU939134	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate JM1202		D-Loop	
148	EU939133	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate JM1201		D-Loop	
149	EU939132	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate JM1200		D-Loop	
150	EU939131	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate JM1199		D-Loop	
151	EU939130	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate JM1198		D-Loop	
152	EU939129	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate JM1197		D-Loop	
153	EU939128	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate JM1196		D-Loop	
154	EU939127	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate JM1195		D-Loop	
155	EU939126	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate JM1194		D-Loop	
156	EU939125	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate IL1358		D-Loop	
157	EU939124	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate IL1345		D-Loop	
158	EU939123	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate HL1104		D-Loop	
159	EU939122	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate HL1075		D-Loop	
160	EU939121	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate HL1053		D-Loop	
161	EU939120	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate HL1040		D-Loop	
162	EU939119	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate CS850		D-Loop	
163	EU939118	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate GA812		D-Loop	
164	EU939117	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate PT1236		D-Loop	
165	EU939116	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate KS1233		D-Loop	
166	EU939115	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate TN1029		D-Loop	
167	EU939114	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate TN1018		D-Loop	
168	EU939113	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate LN928		D-Loop	
169	EU939112	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate LN885		D-Loop	
170	EU939111	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate LN794		D-Loop	
171	EU939110	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate LN781		D-Loop	
172	EU939109	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate SJ932		D-Loop	
173	EU939108	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate SJ871		D-Loop	
174	EU939107	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate SJ733		D-Loop	
175	EU939106	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate TT739		D-Loop	
176	EU939105	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate TT734		D-Loop	
177	EU939104	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate TC1169		D-Loop	
178	EU939103	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate TC1166		D-Loop	
179	EU939102	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate ML1165		D-Loop	
180	EU939101	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate ML1162		D-Loop	
181	EU939100	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate SP695		D-Loop	
182	EU939099	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate GS677		D-Loop	



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183	EU939098	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate TY1128		D-Loop	
184	EU939097	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate KI1118		D-Loop	
185	EU939096	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate SW1113		D-Loop	
186	EU939095	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate In72		D-Loop	
187	EU939094	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate In70		D-Loop	
188	EU939093	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate In69		D-Loop	
189	EU939092	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate In68		D-Loop	
190	EU939091	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate In63		D-Loop	
191	EU939090	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate In62		D-Loop	
192	EU939089	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate In61		D-Loop	
193	EU939088	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate In60		D-Loop	
194	EU939087	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate In59		D-Loop	
195	EU939086	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate In58		D-Loop	
196	EU939085	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate In54		D-Loop	
197	EU939084	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate In53		D-Loop	
198	EU939083	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate In52		D-Loop	
199	EU939082	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate In51		D-Loop	
200	EU939081	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate In49		D-Loop	
201	EU939080	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate In48		D-Loop	
202	EU939079	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate In47		D-Loop	
203	EU939078	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate In45		D-Loop	
204	EU939077	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate In40		D-Loop	
205	EU939076	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate In38		D-Loop	
206	EU939075	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate In37		D-Loop	
207	EU939074	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate In36		D-Loop	
208	EU939073	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate In33		D-Loop	
209	EU939072	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate In25		D-Loop	
210	EU939071	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate In24		D-Loop	
211	EU939070	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate In20		D-Loop	
212	EU939069	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate In17		D-Loop	
213	EU939068	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate In14		D-Loop	
214	EU939067	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate In13		D-Loop	
215	EU939066	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate In12		D-Loop	
216	EU939065	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate In10		D-Loop	
217	EU939064	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate In9		D-Loop	
218	EU939063	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate In6		D-Loop	
219	DQ266063	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate CTA		D-Loop	
220	DQ266062	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate CIM		D-Loop	
221	DQ266061	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	isolate CTP		D-Loop	
222	AY091525	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>		THAI 1	D-Loop	
223	FM211644	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>		casNZ.3	D-Loop	

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224	FM211643	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>		casNZ.2	D-Loop	
225	FM211642	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>		casNZ.1	D-Loop	
226	AJ286324	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>			D-Loop	
227	AJ286323	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>			D-Loop	
228	AJ286322	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>			D-Loop	
229	AF088880	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>		cas-L4	D-Loop	
230	AF088879	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>		cas-L3	D-Loop	
231	AF088878	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>		cas-L2	D-Loop	
232	AF088877	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>		cas-L1	D-Loop	
233	AF088876	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>		cas-S8	D-Loop	
234	AF088875	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>		cas-S7	D-Loop	
235	AF088874	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>		cas-S6	D-Loop	
236	AF088873	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>		cas-S5	D-Loop	
237	AF088872	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>		cas-S4	D-Loop	
238	AF088871	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>		cas-S3	D-Loop	
239	AF088870	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>		cas-S2	D-Loop	
240	AF088869	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>		cas-S1	D-Loop	
241	HQ185282	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate BNF01		D-Loop	
242	HQ185281	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate PJDA0907		D-Loop	
243	HQ185280	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate PJDA0901		D-Loop	
244	HQ185279	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate PAF_09_39		D-Loop	
245	HQ185278	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate PAF_09_33		D-Loop	
246	HQ185277	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Mayes34		D-Loop	
247	HQ185276	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Jac0912		D-Loop	
248	HQ185275	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Jac0902		D-Loop	
249	HQ185274	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate 14		D-Loop	
250	HQ185273	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Cou09_03		D-Loop	
251	HQ185272	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate SG1		D-Loop	
252	HQ185271	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate SJ3		D-Loop	
253	HQ185270	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate SJ2		D-Loop	
254	HQ185269	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate SJ1		D-Loop	
255	HQ185268	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate S4		D-Loop	
256	HQ185267	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate S2		D-Loop	
257	HQ185266	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate S1		D-Loop	
258	HQ185265	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate WPS		D-Loop	
259	HQ185264	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate WB2		D-Loop	
260	HQ185263	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate WB1		D-Loop	
261	HQ185262	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate ECP		D-Loop	
262	HQ185261	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate F10		D-Loop	
263	HQ185260	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate NI1001		D-Loop	
264	HQ185259	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate CIM_09_01		D-Loop	

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265	HQ185258	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate AMS_A1		D-Loop	
266	NC006914	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
267	GQ242020	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Portugal.15	D-Loop	
268	GQ242019	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Portugal.14	D-Loop	
269	GQ242018	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Portugal.13	D-Loop	
270	GQ242017	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Portugal.12	D-Loop	
271	GQ242016	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Portugal.11	D-Loop	
272	GQ242015	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Portugal.10	D-Loop	
273	GQ242014	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Portugal.9	D-Loop	
274	GQ242013	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Portugal.8	D-Loop	
275	GQ242012	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Portugal.7	D-Loop	
276	GQ242011	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Portugal.6	D-Loop	
277	GQ242010	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Portugal.5	D-Loop	
278	GQ242009	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Portugal.4	D-Loop	
279	GQ242008	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Portugal.3	D-Loop	
280	GQ242007	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Portugal.2	D-Loop	
281	GQ242006	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Portugal.1	D-Loop	
282	GQ242005	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Made.32	D-Loop	
283	GQ242004	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Made.31	D-Loop	
284	GQ242003	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Made.30	D-Loop	
285	GQ242002	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Made.29	D-Loop	
286	GQ242001	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Made.28	D-Loop	
287	GQ242000	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Made.27	D-Loop	
288	GQ241999	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Made.26	D-Loop	
289	GQ241998	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Made.25	D-Loop	
290	GQ241997	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Made.24	D-Loop	
291	GQ241996	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Made.23	D-Loop	
292	GQ241995	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Made.22	D-Loop	
293	GQ241994	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Made.21	D-Loop	
294	GQ241993	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Made.20	D-Loop	
295	GQ241992	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Made.19	D-Loop	
296	GQ241991	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Made.18	D-Loop	
297	GQ241990	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Made.17	D-Loop	
298	GQ241989	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Made.16	D-Loop	
299	EU938924	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Is18		D-Loop	
300	EU938923	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Is17		D-Loop	
301	EU938922	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Is16		D-Loop	
302	EU938921	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Is13		D-Loop	
303	EU938920	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Is12		D-Loop	
304	EU938919	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Is9		D-Loop	
305	EU938918	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Is7		D-Loop	

No.	Accession Number (ID)	Genus	Species	Subspecies	Isolate	Haplotype	Gene	Clone
306	EU938917	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Is5		D-Loop	
307	EU938916	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Is4		D-Loop	
308	EU938915	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Is3		D-Loop	
309	EU938914	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Is1		D-Loop	
310	EU194676	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Itl-dom19		D-Loop	
311	EU194675	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Itl-dom18		D-Loop	
312	EU194674	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Itl-dom17		D-Loop	
313	EU194673	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Itl-dom16		D-Loop	
314	EU194672	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Itl-dom15		D-Loop	
315	EU194671	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Itl-dom14		D-Loop	
316	EU194670	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Itl-dom13		D-Loop	
317	EU194669	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Itl-dom12		D-Loop	
318	EU194668	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Itl-dom11		D-Loop	
319	EU194667	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Itl-dom10		D-Loop	
320	EU194666	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Itl-dom9		D-Loop	
321	EU194665	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Itl-dom8		D-Loop	
322	EU194664	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Itl-dom7		D-Loop	
323	EU194663	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Itl-dom6		D-Loop	
324	EU194662	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Itl-dom5		D-Loop	
325	EU194661	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Itl-dom4		D-Loop	
326	EU194660	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Itl-dom3		D-Loop	
327	EU194659	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Itl-dom2		D-Loop	
328	EU194658	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Itl-dom1		D-Loop	
329	EU194657	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Bul-dom10		D-Loop	
330	EU194656	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Bul-dom9		D-Loop	
331	EU194655	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Bul-dom8		D-Loop	
332	EU194654	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Bul-dom7		D-Loop	
333	EU194653	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Bul-dom6		D-Loop	
334	EU194652	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Bul-dom5		D-Loop	
335	EU194651	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Bul-dom4		D-Loop	
336	EU194650	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Bul-dom3		D-Loop	
337	EU194649	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Bul-dom2		D-Loop	
338	EU194648	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Bul-dom1		D-Loop	
339	EU194647	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom39		D-Loop	
340	EU194646	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom38		D-Loop	
341	EU194645	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom37		D-Loop	
342	EU194644	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom36		D-Loop	
343	EU194643	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom35		D-Loop	
344	EU194642	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom34		D-Loop	
345	EU194641	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom33		D-Loop	
346	EU194640	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom32		D-Loop	

No.	Accession Number (ID)	Genus	Species	Subspecies	Isolate	Haplotype	Gene	Clone
347	EU194639	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom31		D-Loop	
348	EU194638	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom30		D-Loop	
349	EU194637	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom29		D-Loop	
350	EU194636	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom28		D-Loop	
351	EU194635	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom27		D-Loop	
352	EU194634	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom26		D-Loop	
353	EU194633	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom25		D-Loop	
354	EU194632	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom24		D-Loop	
355	EU194631	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom23		D-Loop	
356	EU194630	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom22		D-Loop	
357	EU194629	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom21		D-Loop	
358	EU194628	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom20		D-Loop	
359	EU194627	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom19		D-Loop	
360	EU194626	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom18		D-Loop	
361	EU194625	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom17		D-Loop	
362	EU194624	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom16		D-Loop	
363	EU194623	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom15		D-Loop	
364	EU194622	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom14		D-Loop	
365	EU194621	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom13		D-Loop	
366	EU194620	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom12		D-Loop	
367	EU194619	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom11		D-Loop	
368	EU194618	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom10		D-Loop	
369	EU194617	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom9		D-Loop	
370	EU194616	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom8		D-Loop	
371	EU194615	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom7		D-Loop	
372	EU194614	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom6		D-Loop	
373	EU194613	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom5		D-Loop	
374	EU194612	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom4		D-Loop	
375	EU194611	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom3		D-Loop	
376	EU194610	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom2		D-Loop	
377	EU194609	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate Iran-dom1		D-Loop	
378	DQ266054	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate dom13		D-Loop	
379	DQ266053	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate dom10		D-Loop	
380	DQ266052	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate dom6		D-Loop	
381	DQ266051	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate dom5		D-Loop	
382	DQ266050	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate dom3		D-Loop	
383	DQ266049	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate dom1		D-Loop	
384	AF506187	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Israel 10	D-Loop	
385	AF506186	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Israel 11	D-Loop	
386	AF506185	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Israel 8	D-Loop	
387	AF506184	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Georgia 9	D-Loop	

No.	Accession Number (ID)	Genus	Species	Subspecies	Isolate	Haplotype	Gene	Clone
388	AF506183	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		Israel 9	D-Loop	
389	AF517786	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		d	D-Loop	
390	AF517785	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		e	D-Loop	
391	AF517784	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		b	D-Loop	
392	AF517783	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		a	D-Loop	
393	AF517782	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		c	D-Loop	
394	AF517781	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		f	D-Loop	
395	AF517780	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		l	D-Loop	
396	AF517779	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		i	D-Loop	
397	AF517778	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		m	D-Loop	
398	AF517777	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		g	D-Loop	
399	AF517776	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		h	D-Loop	
400	FM211641	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		domNZ.10	D-Loop	
401	FM211640	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		domNZ.9	D-Loop	
402	FM211639	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		domNZ.8	D-Loop	
403	FM211638	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		domNZ.7	D-Loop	
404	FM211637	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		domNZ.6	D-Loop	
405	FM211636	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		domNZ.5	D-Loop	
406	FM211635	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		domNZ.4	D-Loop	
407	FM211634	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		domNZ.3	D-Loop	
408	FM211633	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		domNZ.2	D-Loop	
409	FM211632	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		domNZ.1	D-Loop	
410	FM211631	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.36	D-Loop	
411	FM211630	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.35	D-Loop	
412	FM211629	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.34	D-Loop	
413	FM211628	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.33	D-Loop	
414	FM211627	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.32	D-Loop	
415	FM211626	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.31	D-Loop	
416	FM211625	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.30	D-Loop	
417	FM211624	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.29	D-Loop	
418	FM211623	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.28	D-Loop	
419	FM211622	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.27	D-Loop	
420	FM211621	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.26	D-Loop	
421	FM211620	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.25	D-Loop	
422	FM211619	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.24	D-Loop	
423	FM211618	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.23	D-Loop	
424	FM211617	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.22	D-Loop	
425	FM211616	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.21	D-Loop	
426	FM211615	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.20	D-Loop	
427	FM211614	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.19	D-Loop	
428	FM211613	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.18	D-Loop	

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429	FM211612	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.17	D-Loop	
430	FM211611	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.16	D-Loop	
431	FM211610	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.15	D-Loop	
432	FM211609	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.14	D-Loop	
433	FM211608	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.13	D-Loop	
434	FM211607	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.12	D-Loop	
435	FM211606	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.11	D-Loop	
436	FM211605	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.10	D-Loop	
437	FM211604	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		haplotype BritIsl.9	D-Loop	
438	FM211603	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.8	D-Loop	
439	FM211602	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.7	D-Loop	
440	FM211601	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.6	D-Loop	
441	FM211600	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.5	D-Loop	
442	FM211599	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.4	D-Loop	
443	FM211598	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.3	D-Loop	
444	FM211597	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.2	D-Loop	
445	FM211596	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		BritIsl.1	D-Loop	
446	AM182742	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate MC85		D-Loop	
447	AM182741	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate MC84		D-Loop	
448	AM182740	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate MC83		D-Loop	
449	AM182739	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate MC82		D-Loop	
450	AM182738	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate MC81		D-Loop	
451	AM182737	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate MC59		D-Loop	
452	AM182736	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate MC58		D-Loop	
453	AM182735	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate MC56		D-Loop	
454	AM182734	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate MC52		D-Loop	
455	AM182733	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate MC50		D-Loop	
456	AM182732	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate MC44		D-Loop	
457	AM182731	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate MC42		D-Loop	
458	AM182730	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate MC41		D-Loop	
459	AM182729	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate MC34		D-Loop	
460	AM182728	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate MC32		D-Loop	
461	AM182727	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate MC31		D-Loop	
462	AM182726	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate MC29		D-Loop	
463	AM182725	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate MC28		D-Loop	
464	AM182724	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate MC22		D-Loop	
465	AM182723	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate MC21		D-Loop	
466	AM182722	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate MC17		D-Loop	
467	AM182721	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate MC14		D-Loop	
468	AM182720	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate MC10		D-Loop	
469	AM182719	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate MC09		D-Loop	

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470	AM182718	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate MC07		D-Loop	
471	AM182717	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate MC06		D-Loop	
472	AM182716	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate MC05		D-Loop	
473	AM182715	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate MC02		D-Loop	
474	AM182714	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate K61		D-Loop	
475	AM182713	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate K50		D-Loop	
476	AM182712	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate K49		D-Loop	
477	AM182711	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate K43		D-Loop	
478	AM182710	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate K40		D-Loop	
479	AM182709	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate K38		D-Loop	
480	AM182708	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate K36		D-Loop	
481	AM182707	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate K29		D-Loop	
482	AM182706	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate K23		D-Loop	
483	AM182705	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate K21		D-Loop	
484	AM182704	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate K20		D-Loop	
485	AM182703	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate K10		D-Loop	
486	AM182702	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate K07		D-Loop	
487	AM182701	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate K03		D-Loop	
488	AM182700	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate K01		D-Loop	
489	AM182699	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate AL71		D-Loop	
490	AM182698	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate AL65		D-Loop	
491	AM182697	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate AL63		D-Loop	
492	AM182696	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate AL61		D-Loop	
493	AM182695	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate AL47		D-Loop	
494	AM182694	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate AL46		D-Loop	
495	AM182693	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate AL45		D-Loop	
496	AM182692	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate AL43		D-Loop	
497	AM182691	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate AL36		D-Loop	
498	AM182690	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate AL33		D-Loop	
499	AM182689	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate AL29		D-Loop	
500	AM182688	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate AL25		D-Loop	
501	AM182687	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate AL24		D-Loop	
502	AM182686	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate AL21		D-Loop	
503	AM182685	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate AL10		D-Loop	
504	AM182684	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate AL09		D-Loop	
505	AM182683	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate AL08		D-Loop	
506	AM182682	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate AL07		D-Loop	
507	AM182681	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate AL06		D-Loop	
508	AM182680	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate AL05		D-Loop	
509	AM182679	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate AL02		D-Loop	
510	AM182678	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate AL01		D-Loop	



No.	Accession Number (ID)	Genus	Species	Subspecies	Isolate	Haplotype	Gene	Clone
511	AM182677	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate D55		D-Loop	
512	AM182676	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate D54		D-Loop	
513	AM182675	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate D53		D-Loop	
514	AM182674	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate D51		D-Loop	
515	AM182673	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate D50		D-Loop	
516	AM182672	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate D49		D-Loop	
517	AM182671	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate D46		D-Loop	
518	AM182670	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate D42		D-Loop	
519	AM182669	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate D39		D-Loop	
520	AM182668	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate D36		D-Loop	
521	AM182667	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate D34		D-Loop	
522	AM182666	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate D33		D-Loop	
523	AM182665	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate D32		D-Loop	
524	AM182664	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate D31		D-Loop	
525	AM182663	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate D30		D-Loop	
526	AM182662	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate D29		D-Loop	
527	AM182661	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate D27		D-Loop	
528	AM182660	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate D22		D-Loop	
529	AM182659	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate D20		D-Loop	
530	AM182658	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate D19		D-Loop	
531	AM182657	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate D18		D-Loop	
532	AM182656	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate D16		D-Loop	
533	AM182655	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate D15		D-Loop	
534	AM182654	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate D14		D-Loop	
535	AM182653	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate D11		D-Loop	
536	AM182652	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate D10		D-Loop	
537	AM182651	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate D09		D-Loop	
538	AM182650	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate D07		D-Loop	
539	AM182649	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate D05		D-Loop	
540	AM182648	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	isolate D03		D-Loop	
541	AJ843871	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
542	AJ843870	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
543	AJ843869	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
544	AJ843868	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
545	AJ843867	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
546	AJ843866	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
547	AJ843865	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
548	AJ843864	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
549	AJ843863	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
550	AJ843862	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
551	AJ843861	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	

No.	Accession Number (ID)	Genus	Species	Subspecies	Isolate	Haplotype	Gene	Clone
552	AJ843860	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
553	AJ843859	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
554	AJ843858	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
555	AJ843857	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
556	AJ843856	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
557	AJ843855	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
558	AJ843854	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
559	AJ843853	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
560	AJ843852	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
561	AJ843851	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
562	AJ843850	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
563	AJ843849	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
564	AJ843848	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
565	AJ843847	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
566	AJ843846	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
567	AJ843845	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
568	AJ843844	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
569	AJ843843	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
570	AJ843842	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
571	AJ843841	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
572	AJ843840	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
573	AJ843839	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
574	AJ843838	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
575	AJ843837	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
576	AJ843836	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
577	AJ843835	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
578	AJ843834	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
579	AJ843833	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
580	AJ843832	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
581	AJ843831	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
582	AJ843830	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
583	AJ843829	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
584	AJ843828	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
585	AJ843827	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
586	AJ843826	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
587	AJ843825	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
588	AJ843824	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
589	AJ843823	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
590	AJ843822	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
591	AJ843821	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
592	AY560832	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		ap29	D-Loop	

No.	Accession Number (ID)	Genus	Species	Subspecies	Isolate	Haplotype	Gene	Clone
593	AY560831	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		ap28	D-Loop	
594	AY560829	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		ap26	D-Loop	
595	AY560830	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		ap27	D-Loop	
596	AY560828	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		ap25	D-Loop	
597	AY560827	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		ap24	D-Loop	
598	AY560826	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		ap23	D-Loop	
599	AY560825	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		ap22	D-Loop	
600	AY560824	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		ap21	D-Loop	
601	AY560823	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		ap20	D-Loop	
602	AY560822	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		ap19	D-Loop	
603	AY560821	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		ap18	D-Loop	
604	AY560820	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		ap17	D-Loop	
605	AY560819	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		ap16	D-Loop	
606	AY560818	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		ap15	D-Loop	
607	AY560817	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		ap14	D-Loop	
608	AY560816	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		ap13	D-Loop	
609	AY560815	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		ap12	D-Loop	
610	AY560814	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		ap11	D-Loop	
611	AY560813	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		ap10	D-Loop	
612	AY560812	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		ap9	D-Loop	
613	AY560811	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		ap8	D-Loop	
614	AY560810	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		ap7	D-Loop	
615	AY560809	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		ap6	D-Loop	
616	AY560808	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		ap5	D-Loop	
617	AY560807	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		ap4	D-Loop	
618	AY560806	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		ap3	D-Loop	
619	AY560805	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		ap2	D-Loop	
620	AY560804	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		ap1	D-Loop	
621	AJ286321	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
622	AJ286320	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
623	AJ286319	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
624	AJ286318	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
625	AJ286317	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
626	AJ313383	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		LISB.1	D-Loop	
627	AJ313382	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		SELV.1	D-Loop	
628	AJ313381	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		AZZE.1	D-Loop	
629	AJ313380	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		DARS.1	D-Loop	
630	AJ313379	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		PORT.4	D-Loop	
631	AJ313378	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		PORT.3	D-Loop	
632	AJ313377	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		PORT.2	D-Loop	
633	AJ313376	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		PORT.1	D-Loop	

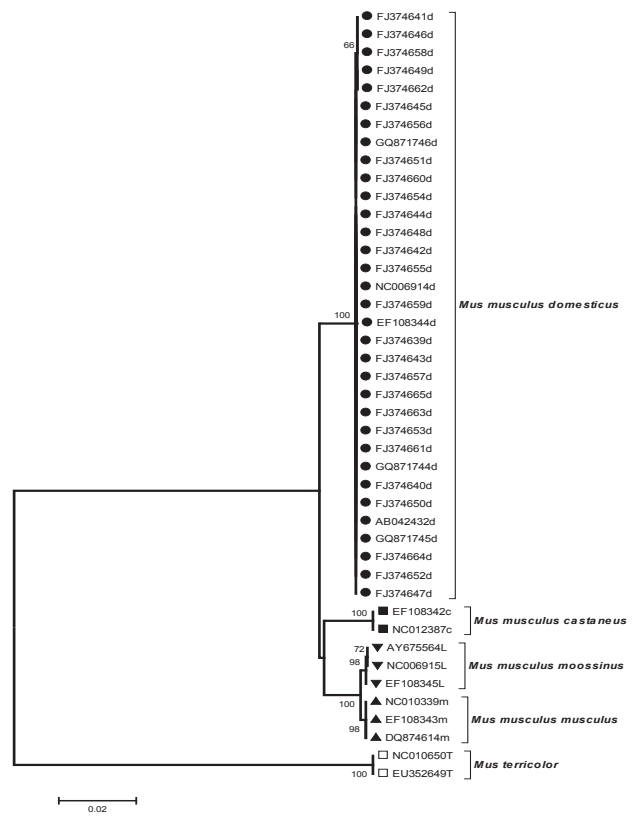
No.	Accession Number (ID)	Genus	Species	Subspecies	Isolate	Haplotype	Gene	Clone
634	AJ313375	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		MADE.15	D-Loop	
635	AJ313374	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		MADE.14	D-Loop	
636	AJ313373	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		MADE.13	D-Loop	
637	AJ313372	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		MADE.12	D-Loop	
638	AJ313371	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		MADE.11	D-Loop	
639	AJ313370	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		MADE.10	D-Loop	
640	AJ313369	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		MADE.9	D-Loop	
641	AJ313368	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		MADE.8	D-Loop	
642	AJ313367	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		MADE.7	D-Loop	
643	AJ313366	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		MADE.6	D-Loop	
644	AJ313365	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		MADE.5	D-Loop	
645	AJ313364	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		MADE.4	D-Loop	
646	AJ313363	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		MADE.3	D-Loop	
647	AJ313362	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		MADE.2	D-Loop	
648	AJ313361	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>		MADE.1	D-Loop	
649	AB042432	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			D-Loop	
650	AY091524	<i>Mus</i>	<i>musculus</i>	<i>gentilulus</i>		MDG 8	D-loop	
651	AY091523	<i>Mus</i>	<i>musculus</i>	<i>gentilulus</i>		MDG 2	D-loop	
652	AY091522	<i>Mus</i>	<i>musculus</i>	<i>gentilulus</i>		MDG 5	D-loop	
653	AY091521	<i>Mus</i>	<i>musculus</i>	<i>gentilulus</i>		MDG 7	D-loop	
654	AY091520	<i>Mus</i>	<i>musculus</i>	<i>gentilulus</i>		MDG 1	D-loop	
655	AY091518	<i>Mus</i>	<i>musculus</i>	<i>gentilulus</i>		MDG 3	D-loop	
656	AY091517	<i>Mus</i>	<i>musculus</i>	<i>gentilulus</i>		MDG 6	D-loop	
657	AY675564	<i>Mus</i>	<i>musculus</i>	<i>molossinus</i>			D-loop (mtDNA extracted)	
658	EF108345	<i>Mus</i>	<i>musculus</i>	<i>molossinus</i>			D-loop (mtDNA extracted)	
659	NC006915	<i>Mus</i>	<i>musculus</i>	<i>molossinus</i>			D-loop (mtDNA extracted)	
660	DQ266060	<i>Mus</i>	<i>musculus</i>	<i>musculus</i>	isolate mus8		D-loop	
661	DQ266059	<i>Mus</i>	<i>musculus</i>	<i>musculus</i>	isolate mus7		D-loop	
662	DQ266058	<i>Mus</i>	<i>musculus</i>	<i>musculus</i>	isolate mus5		D-loop	
663	DQ266057	<i>Mus</i>	<i>musculus</i>	<i>musculus</i>	isolate mus4		D-loop	
664	DQ266056	<i>Mus</i>	<i>musculus</i>	<i>musculus</i>	isolate mus3		D-loop	
665	DQ266055	<i>Mus</i>	<i>musculus</i>	<i>musculus</i>	isolate mus2		D-loop	
666	AF506182	<i>Mus</i>	<i>musculus</i>	<i>musculus</i>		Georgia 11	D-loop	
667	AF506181	<i>Mus</i>	<i>musculus</i>	<i>musculus</i>		Georgia 13	D-loop	
668	AF506180	<i>Mus</i>	<i>musculus</i>	<i>musculus</i>		Georgia 12	D-loop	
669	AY091526	<i>Mus</i>	<i>musculus</i>	<i>musculus</i>		HUN 1	D-loop	
670	FM211645	<i>Mus</i>	<i>musculus</i>	<i>musculus</i>		musNZ.1	D-loop	
671	EF108342	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>	strain CAST/EiJ		ND1,2,3,4L,4,5,6	
672	NC012387	<i>Mus</i>	<i>musculus</i>	<i>castaneus</i>			ND1,2,3,4L,4,5,6	
673	AB042432	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			ND1,2,3,4L,4,5,6	

No.	Accession Number (ID)	Genus	Species	Subspecies	Isolate	Haplotype	Gene	Clone
674	GQ871744	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain B10.D1-H2q/SgJ		ND1,2,3,4L,4,5,6	
675	GQ871745	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain DBA/1J		ND1,2,3,4L,4,5,6	
676	GQ871746	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain FVB/NJ		ND1,2,3,4L,4,5,6	
677	EF108344	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain WSB/EiJ		ND1,2,3,4L,4,5,6	
678	FJ374639	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain 129P3/J		ND1,2,3,4L,4,5,6	
679	FJ374640	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain BPH/2J		ND1,2,3,4L,4,5,6	
680	FJ374641	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain BPL/1J		ND1,2,3,4L,4,5,6	
681	FJ374642	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain BPN/3J		ND1,2,3,4L,4,5,6	
682	FJ374643	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain BUB/BnJ		ND1,2,3,4L,4,5,6	
683	FJ374644	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain C57BL/10J		ND1,2,3,4L,4,5,6	
684	FJ374645	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain CE/J		ND1,2,3,4L,4,5,6	
685	FJ374646	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain I/LnJ		ND1,2,3,4L,4,5,6	
686	FJ374647	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain LG/J		ND1,2,3,4L,4,5,6	
687	FJ374648	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain LP/J		ND1,2,3,4L,4,5,6	
688	FJ374649	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain LT/SvEi		ND1,2,3,4L,4,5,6	
689	FJ374650	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain MA/MyJ		ND1,2,3,4L,4,5,6	
690	FJ374651	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain MRL/MpJ		ND1,2,3,4L,4,5,6	
691	FJ374652	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain NOR/LtJ		ND1,2,3,4L,4,5,6	
692	FJ374653	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain P/J		ND1,2,3,4L,4,5,6	
693	FJ374654	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain PL/J		ND1,2,3,4L,4,5,6	
694	FJ374655	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain RF/J		ND1,2,3,4L,4,5,6	
695	FJ374656	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain RIIS/J		ND1,2,3,4L,4,5,6	
696	FJ374657	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain SB/LeJ		ND1,2,3,4L,4,5,6	
697	FJ374658	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain SEA/GnJ		ND1,2,3,4L,4,5,6	
698	FJ374659	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain SJL/J		ND1,2,3,4L,4,5,6	
699	FJ374660	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain SM/J		ND1,2,3,4L,4,5,6	
700	FJ374661	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain SOD1/EiJ		ND1,2,3,4L,4,5,6	
701	FJ374662	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain STR/ort		ND1,2,3,4L,4,5,6	
702	FJ374663	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain SWR/J		ND1,2,3,4L,4,5,6	
703	FJ374664	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain TALLYHO/Jng.		ND1,2,3,4L,4,5,6	
704	FJ374665	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>	strain YBR/EiJ		ND1,2,3,4L,4,5,6	
705	NC006914	<i>Mus</i>	<i>musculus</i>	<i>domesticus</i>			ND1,2,3,4L,4,5,6	
706	AY675564	<i>Mus</i>	<i>musculus</i>	<i>molossinus</i>			ND1,2,3,4L,4,5,6	
707	EF108345	<i>Mus</i>	<i>musculus</i>	<i>molossinus</i>			ND1,2,3,4L,4,5,6	
708	NC006915	<i>Mus</i>	<i>musculus</i>	<i>molossinus</i>			ND1,2,3,4L,4,5,6	
709	EF108343	<i>Mus</i>	<i>musculus</i>	<i>musculus</i>	strain PWD/PhJ		ND1,2,3,4L,4,5,6	
710	NC010339	<i>Mus</i>	<i>musculus</i>	<i>musculus</i>			ND1,2,3,4L,4,5,6	
711	DQ874614	<i>Mus</i>	<i>musculus</i>	<i>musculus</i>	strain PWD/Ph		ND1,2,3,4L,4,5,6	
712	NC010650	<i>Mus</i>	<i>terricolor</i>				ND1,2,3,4L,4,5,6	
713	EU352649	<i>Mus</i>	<i>terricolor</i>				ND1,2,3,4L,4,5,6	



**Figure 1.** Neighbor-joining tree based on Tamura-3-parameter distance using Cytochrome b sequences. The numbers on each branch correspond to bootstrap support for all major lineages (percentages lower than 50 are not shown). The tree was rooted with two *M. macedonicus* sequences. The geometric shapes on tips of branches correspond to the different subspecies of mice: solid triangle, *Mus musculus musculus*; inverted solid triangle, *M. m. molossinus*; solid circle, *M. m. domesticus*; solid square, *M. m. castaneus* and open square, *M. macedonicus* as outgroups).

**Cytochrome oxidase:** As the gene genealogy of cytochrome oxidase clearly shows (Fig. 2), this gene complex has more successfully separated the house mouse subspecies than cytochrome *b* (Fig. 1). Another point of interest is the high conformity between the morphological identification of the subspecies as identified using NCBI and their grouping based on cytochrome oxidase



**Figure 2.** Neighbor-joining tree based on Tamura-3-parameter distance using Cytochrome oxidase sequences. The numbers on each branch correspond to bootstrap support for all major lineages (percentages lower than 50 are not shown). The tree was rooted with two *M. terricolor* sequences. The geometric shapes on tips of branches correspond to the different subspecies of mice: solid triangle, *Mus musculus musculus*; inverted solid triangle, *M. m. molossinus*; solid circle, *M. m. domesticus*; solid square, *M. m. castaneus* and open square, *M. terricolor* as outgroups).

gene complex which could be considered as an advantage in conducting biosystematic studies.

**NADH dehydrogenase complex:** NADH dehydrogenase complex also shows an excellent ability to separate the house mouse subspecies properly (Fig. 3; all bootstrap values are higher than 87%) Analyses based on this gene complex, as seen with cytochrome oxidase,



Figure 3. Neighbor-joining tree based on Tamura-3-parameter distance using NADH dehydrogenase sequences. The numbers on each branch correspond to bootstrap support for all major lineages (percentages lower than 50 are not shown). The tree was rooted with two *M. terricolor* sequences. The geometric shapes on tips of branches correspond to the different subspecies of mice: solid triangle, *Mus musculus musculus*; inverted solid triangle, *M. m. molossinus*; solid circle, *M. m. domesticus*; solid square, *M. m. castaneus* and open square, *M. terricolor* as outgroups).

yields a phylogenetic grouping in complete conformity with the primary morphological identification presented on NCBI; in other words, the individuals possessed the NADH dehydrogenase gene complexes belonging to their own subspecies.

**D-loop:** The coalescent NJ tree generated for all data set used in this analysis, is displayed in Figure 4. D-loop sequence also demonstrates satisfactory efficiency in proper separation of house mouse subspecies, though bootstrap values are not as high as those of cytochrome oxidase, cytochrome *b*, NADH dehydrogenase, and complete mitochondrial genome sequences. High diversity is present within *Mus musculus castaneus* subspecies which could be grouped into three particularly distinct groups; this is consistent with the results of a study by Hassan Rajabi-Maham and his co-workers (34) Here also

there are some individuals for whom the D-loop grouping does not comply with their morphologically identified subspecies as presented in NCBI. This is particularly evident between *Mus musculus musculus* and *M. m. domesticus* which is not unexpected because they have a recognized hybrid zone in Central and Western Europe (2). Since the many individuals were present in the analysis, haplotype trees could be derived. A haplotype tree was depicted after identifying the haplotypes: D-loop haplotype tree in Fig. 5 also shows good efficiency of this gene in separating different house mouse species. In this tree too, at least three distinct groups can be observed within *M. m. castaneus*. A close relationship between *Mus musculus castaneus* and *M. m. musculus* is observable. Additionally, the closest subspecies to *M. m. domesticus* is clearly *M. m. gentilulus*.

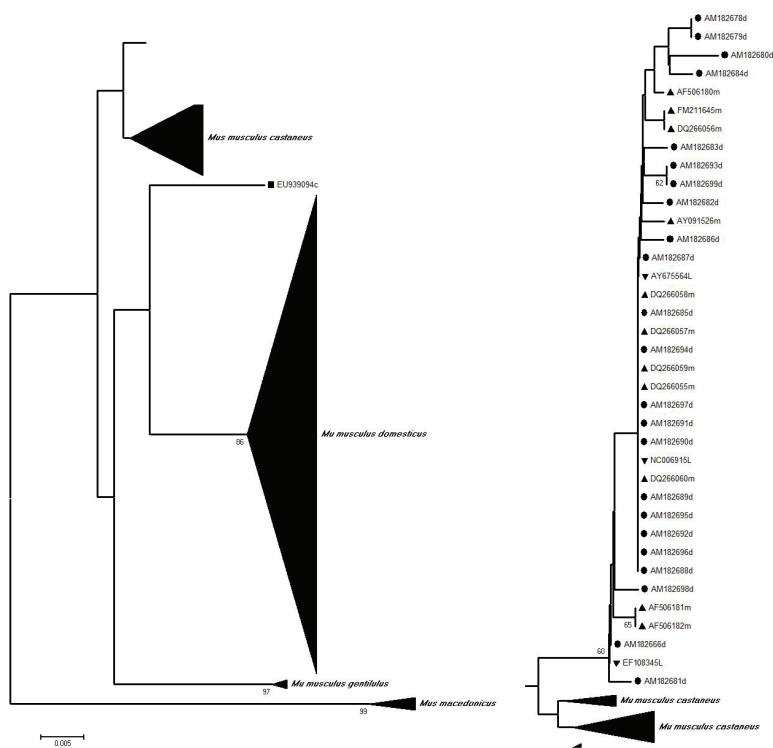


Figure 4. Neighbor-joining tree based on Tamura-3-parameter distance using D-loop sequences. The numbers on each branch correspond to bootstrap support for all major lineages (percentages lower than 50 are not shown). The tree was rooted with a single *M. macedonicus* sequences. The geometric shapes on tips of branches correspond to the different subspecies of mice: solid triangle, *Mus musculus musculus*; inverted solid triangle, *M. m. molossinus*; solid circle, *M. m. domesticus*; solid square, *M. m. castaneus* and as outgroup, *M. macedonicus*).

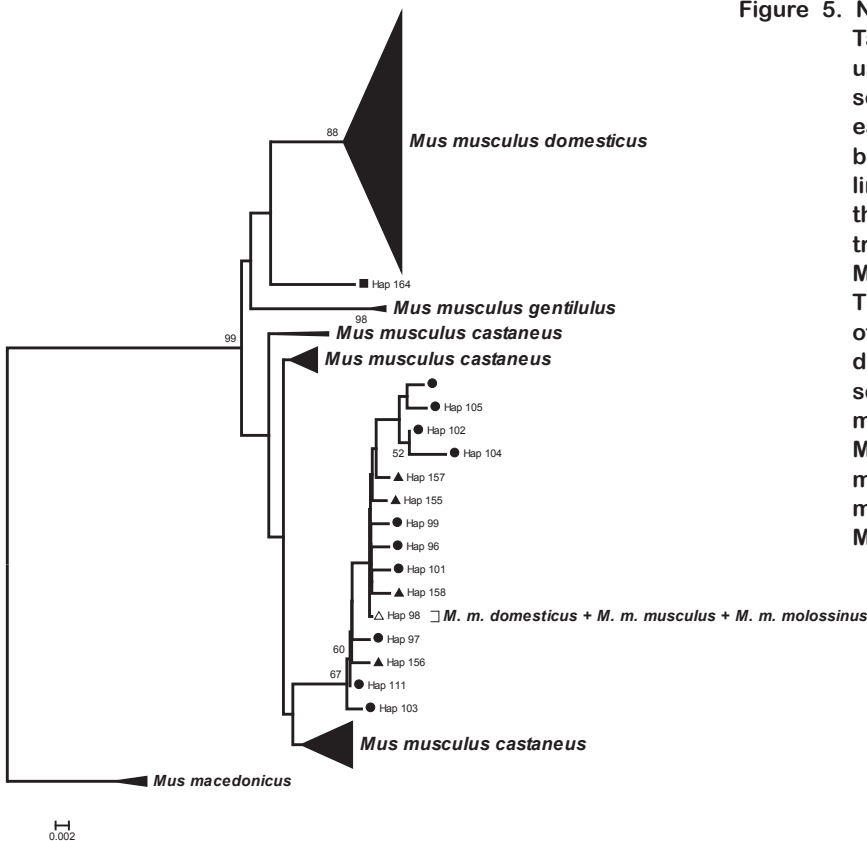
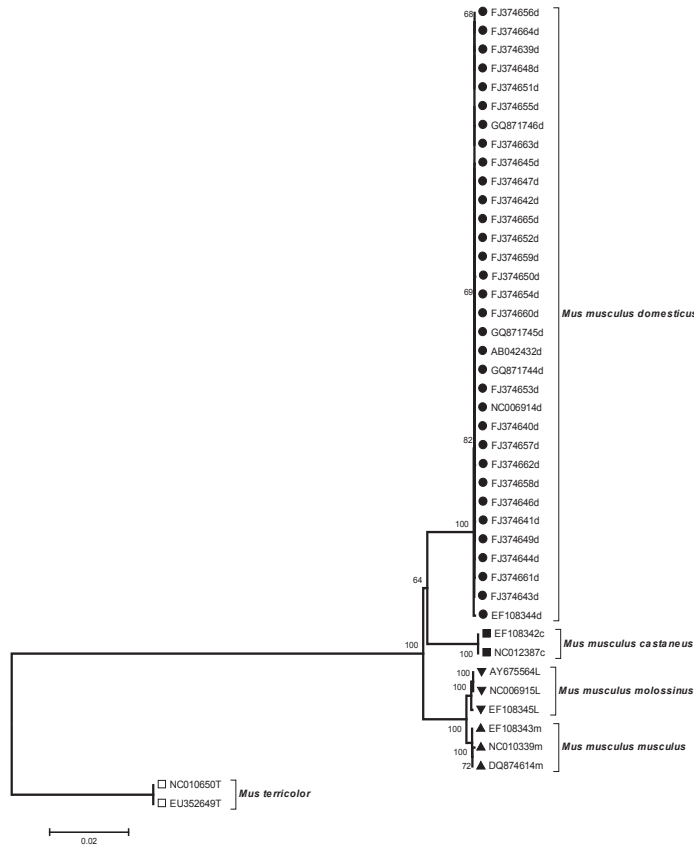


Figure 5. Neighbor-joining tree based on Tamura-3-parameter distance using D-loop haplotype sequences. The numbers on each branch correspond to bootstrap support for all major lineages (percentages lower than 50 are not shown). The tree was rooted with a single *M. macedonicus* sequences. The geometric shapes on tips of branches correspond to the different subspecies of mice: solid triangle, *Mus musculus musculus*; inverted solid triangle, *M. m. molossinus*; solid circle, *M. m. domesticus*; solid square, *M. m. castaneus* and open square, *M. macedonicus* as outgroup).



**Complete mitochondrial genome:** As expected, obtained trees using the complete mitochondrial genome sequence demonstrated

the best separation pattern among subspecies (Fig. 6)



**Figure 6.** Neighbor-joining tree based on Tamura-3-parameter distance using complete mitochondrial genome sequences. The numbers on each branch correspond to bootstrap support for all major lineages (percentages lower than 50 are not shown). The tree was rooted with two *M. terricolor* sequences. The geometric shapes on tips of branches correspond to the different subspecies of mice: solid triangle, *Mus musculus musculus*; inverted solid triangle, *M. m. molossinus*; solid circle, *M. m. domesticus*; solid square, *M. m. castaneus* and open square, *M. terricolor* as outgroups).

### Overall mean distance

Results of the overall mean distance measurements showed that considering the length of the sequences, the greatest rate mutation is observed in D-loop and cytochrome *b* which make these genes appropriate for use in phylogeographic studies (mtDNA complete genome = 0.14, Cytochrome oxidase = 0.14, Cytochrome *b* = 0.22, NADH dehydrogenase = 0.25, D-loop = 0.25).

### Discussion

Results of this comparative analysis reveals that the best tool of genome typing for to

be used for distinguishing house mouse subspecies is the complete mitochondrial genome. The sequences of the NADH dehydrogenase complex and cytochrome oxidase genes are the best alternative, followed by D-loop and cytochrome *b* gene sequences. As a common rule, the more nucleotide site sequences are used, the better the differentiation of subspecies; NADH dehydrogenase complex gene which harbors the second highest number of nucleotide site (6332 sites) among the sequences tested, demonstrates a remarkable efficiency in distinction of individuals at the subspecies level.

We propose cytochrome oxidase gene with a length of about 3017bp as the most economical and efficient gene for biosystematic studies; it had a high resolution for house mouse subspecies differentiation. Within this gene complex, the proper part is COX2 with a length of 684 bp and 93 informative nucleotide sites in this analysis. Except D-loop region gene, all parts of the mitochondrial genome studied here are coding regions. The coding sequences are sensitive to natural selection and therefore nucleotide changes are not preserved and passed to the next generations. However, the D-loop is a non-coding region and possesses hypervariable segments; mutations therein are preserved through generations and thus can be used as an efficient evolutionary marker to trace matrilineal coalescent in population genetic and phylogeographic studies.

Hence, the wide exploitation of D-loop in phylogeographic studies of *Mus musculus* complex is understandable with regards to its relatively short length of about 900bp (with respect to costs of sequencing) and its appropriateness for being used in an array of different studies. Individuals of *M. m. domesticus* and *M. m. musculus* were observed

close to each other probably due to the Central and Western Europe hybrid zone (2) which allows genetic flow between these two subspecies; ergo, genetic similarities between these two subspecies is not unexpected. However, low introgression of NADH dehydrogenase and cytochrome oxidase gene complexes among subspecies indicated the probable incompatibility constrains in hybrid formation among subspecies. These genes seem to be subspecies-specific and like many other autosomal and sexual chromosome genes which are subject to natural selection, sequence variations in the gene are uncommon.

Coexistence of *M. m. molossinus* and *M. m. musculus* in all genealogic trees indicates their genetic vicinity and the greater mitochondrial similarity between them (35). As d-loop coalescent trees show, three completely distinct groups are identifiable within the heterogeneous *M. m. castaneus* group. This could be due the wide geographical distribution of this subspecies. Furthermore, proximity of them to the origin of house mouse could also justify such diversity.

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