

**Genetic Analysis of the Chocolate-Mule Mtn., Clark Mtn.,
Centennial and Slate Range feral burro herds**

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A total of 183 blood samples were received at the University of Kentucky from the Chocolate-Mule Mtn., Clark Mtn., Centennial and Slate Range, CA feral burro herds over several sampling periods in 2002. Each sample was tested for variation at nine microsatellite systems by use of PCR and fragment separation by an automated DNA sequencer. The systems examined were *AHT4*, *AHT5*, *ASB17*, *ASB23*, *HMS3*, *HMS6*, *HMS7*, *HTG10*, and *LEX33*. Measures of genetic variability calculated were observed heterozygosity (*Ho*), expected heterozygosity (*He*), estimated inbreeding level ($Fis=1-Ho/He$), effective number of alleles (*Ae*), total number of variants (*TNV*), and percentage of rare alleles (*Ar*). Data from these herds were compared to that of other feral herds and to four domestic breeds. Genetic similarity of the CA herds to domestic and other feral herds also was calculated.

Values for measures of genetic variation for each herd are shown in Table 1. Also given are data from four domestic donkey breeds and mean values for the domestic donkey and for other feral burro populations.

Chocolate-Mule Mtn. Genetic variability in this population is among the lowest observed for a burro population, especially *Ho* which is about .10 below the feral average. Allelic diversity also is low even though the number of variants is slightly above the mean. This is partially due to high sample size. *He* is well above *Ho* which may be an indication of inbreeding. There is no genetic evidence of population subdivision.

Clark Mtn. This population has even lower variation than the Chocolate-Mule herd. This is the lowest *Ho* seen in a feral burro herd. Again, allelic diversity is low but number of variants is high. There is a high proportion of rare variants in this herd. *He* is greater than *Ho*. There is some suggestion of genetic subdivision within the herd but this could simply represent family groups. Inbreeding is a strong possibility within this population.

Centennial. This herd also shows lower *Ho* than the feral burro average but *He* is higher than the mean. Allelic diversity is about average for a feral burro population but the percentage of rare alleles is relatively high. There is some suggestion of population subdivision but it is not consistent across all loci and, as above, many represent family variation. The pattern of variation does indicate some degree of inbreeding.

Slate Range. Variation in this herd is above the feral mean in all categories. No feral population tested has a higher number of variants present and diversity is high. Population subdivision is a strong possibility in this herd. Inbreeding also is a possibility but at a lower level than seen in the other three herds.

Genetic similarity

Except for the Centennial herd these feral populations have highest genetic similarity to the Poitou among the domestic breeds. This could represent a sampling limitation within the domestic breeds or low variation rather than actual relationship. The Centennial herd is most like the Standard donkey. For the most part differences in similarity among the breeds is not great. The summary of similarity shown in Figure 1 shows the Centennial and Slate Range herds are more like each other than other herds. The Clark Mtn. herd is within this same cluster which is all California herds. The Chocolate-Mule Mtn. herd pairs with the Picacho, CA herd.

Recommendations

The Chocolate-Mule Mtn., Clark Mtn., and Centennial herds all have low variation and should be closely monitored. The Slate Range herd has variation near the feral mean but this level is still low when compared to domestic donkey breeds and especially low when compared to horses. Thus, all herds should be considered to have low variation. At this point, the best way to increase variation would be to allow interchange of individuals among herds. We do not yet

have much data about genetic variation in burro or donkey populations and how well observed variation correlates to fitness. However, the values seen here do appear to be low and caution should be exercised. As with horses, population size is a key to maintenance of variation.

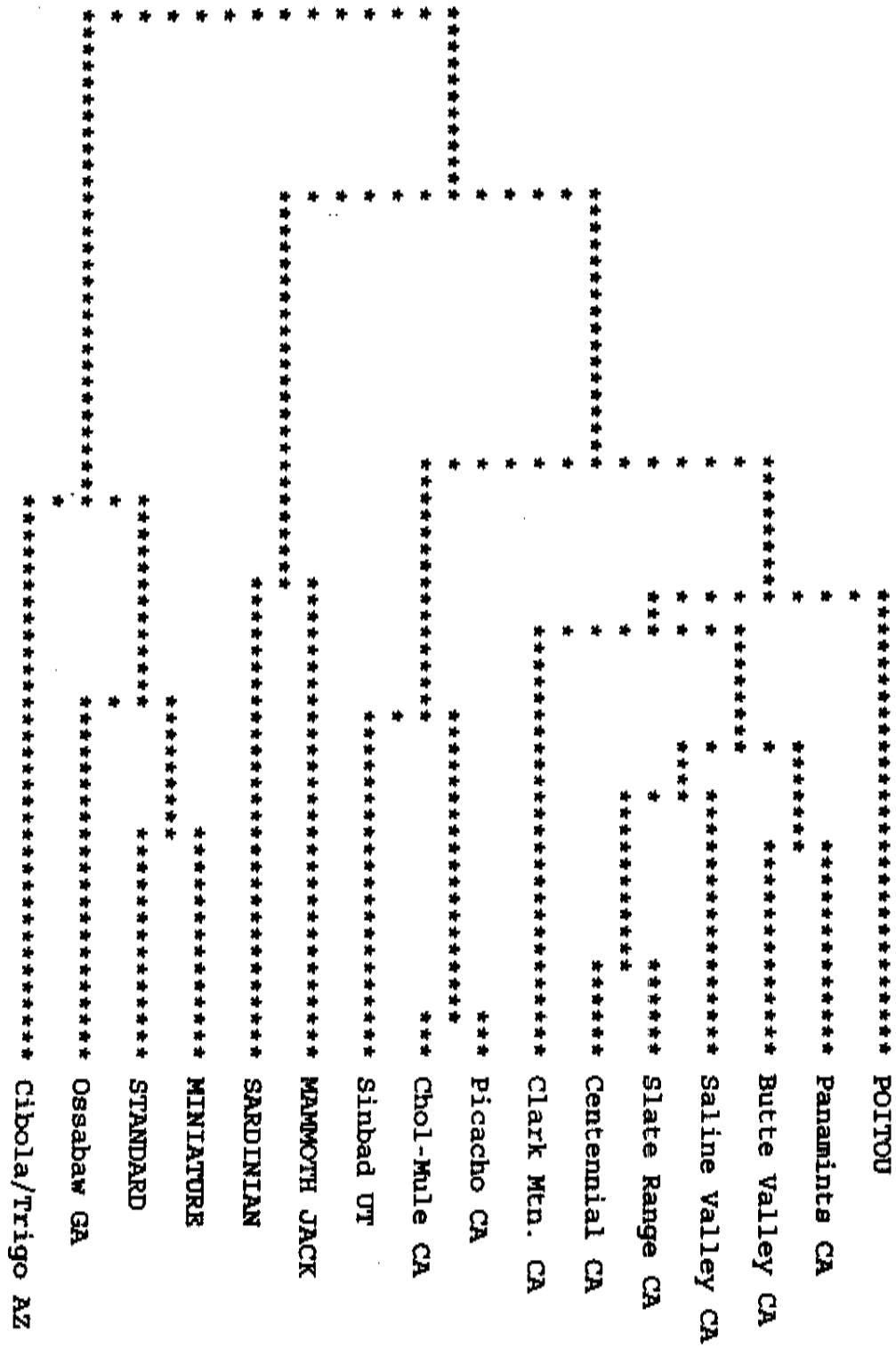
Table 1. Genetic variation measures

	<i>N</i>	<i>H_o</i>	<i>H_e</i>	<i>F_{is}</i>	<i>A_e</i>	<i>TNV</i>	<i>A_r</i>
Chocolate-Mule Mtn.	55	.298	.394	.243	1.971	31	.29
Clark Mtn.	85	.291	.391	.256	1.909	36	.41
Centennial	21	.360	.473	.240	2.157	33	.30
Slate Range	22	.429	.506	.151	2.352	37	.27
Poitou Donkey	33	.533	.515	-.036	2.501	42	.38
Mammoth Jack	45	.585	.602	.028	2.602	35	.37
Miniature Donkey	55	.546	.566	.019	3.015	51	.33
Standard Donkey	44	.562	.623	.099	3.483	57	.40
Domestic Mean		.539	.565	.046	2.900	40.6	.30
Feral Mean		.398	.445	.104	2.198	30.6	.20

Table 2. Matrix of genetic similarity among domestic donkey and feral burro populations.

	PU	MJ	MD	SD	ID	OS	c/t	pl	pa	bv	sv	cm	co	sr	ce	sl
Poitou	---															
Mammoth	.705	---														
Miniature	.652	.704	---													
Standard	.684	.748	.835	---												
Italian	.695	.741	.599	.630	---											
Ossabaw	.641	.651	.771	.777	.520	---										
Cibola/Trigo	.615	.685	.735	.787	.593	.718	---									
Picacho	.653	.559	.603	.673	.621	.621	.610	---								
Panamints	.793	.702	.675	.694	.681	.632	.658	.725	---							
Butte Valley	.746	.646	.677	.695	.642	.621	.659	.732	.826	---						
Saline Valley	.754	.655	.695	.692	.630	.659	.636	.716	.794	.796	---					
Clark Mtn.	.714	.633	.608	.667	.678	.620	.579	.770	.746	.774	.731	---				
Choc. Mule	.636	.541	.568	.632	.598	.583	.596	.907	.715	.721	.679	.744	---			
Slate Range	.762	.666	.683	.734	.649	.669	.671	.761	.831	.824	.828	.800	.727	---		
Centennial	.687	.615	.680	.697	.585	.644	.631	.734	.772	.766	.819	.733	.696	.885	---	
Sinbad	.723	.593	.613	.676	.637	.621	.635	.793	.719	.732	.714	.697	.765	.733	.689	---

Figure 1. Dendrogram of genetic similarity among domestic and feral burro populations.



Appendix 1. DNA data for the Clark Mountains CA feral burro herd.

ID	LOC	Microsatellite Loci															
		V	H	A	H	H	A	H	A	H	H	H	A	A	L		
		H	T	H	M	T	H	M	S	T	T	M	M	S	S	E	
		L	G	T	S	G	T	S	B	G	G	S	S	B	B	X	
		2	4	4	7	6	5	6	2	1	7	3	2	1	2	3	
		0								0				7	3	3	
01-09221	cm14	**	**	MR	HH	**	KR	JK	**	PP	**	OO	**	CC	NN	GH	**
01-09222	cm14	**	**	JJ	HH	**	KR	JJ	**	NP	**	OO	**	CC	NN	HH	**
01-09224	cm14	**	**	JJ	HH	**	RR	JJ	**	IP	**	PQ	**	CC	NN	HH	**
01-09225	cm14	**	**	LM	HH	**	RR	JK	**	IP	**	OP	**	CC	NN	FG	**
01-09227	cm14	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
01-09228	cm14	**	**	JJ	HH	**	KK	JJ	**	NN	**	OO	**	CC	NR	**	**
01-09229	cm14	**	**	**	HH	**	KK	JJ	**	**	**	PP	**	CC	**	**	**
01-09230	cm14	**	**	JJ	HH	**	KK	JJ	**	NN	**	OO	**	CC	NR	GG	**
01-09231	cm14	**	**	**	HH	**	KK	**	**	NN	**	OO	**	CC	NR	**	**
01-09232	cm14	**	**	JJ	HH	**	KK	JJ	**	NN	**	PP	**	CC	NQ	HH	**
01-09233	cm14	**	**	JJ	HH	**	KK	JJ	**	NP	**	OP	**	CC	NN	GG	**
01-09236	cm14	**	**	JM	HH	**	KK	JJ	**	NP	**	OQ	**	CC	NN	**	**
01-09237	cm14	**	**	JJ	HH	**	KK	JJ	**	NN	**	OP	**	CC	NR	**	**
01-09238	cm14	**	**	JJ	HH	**	KK	JJ	**	GG	**	OO	**	CC	NN	GG	**
01-09239	cm14	**	**	JJ	HH	**	KK	JJ	**	NN	**	OR	**	CC	NR	GG	**
01-09240	cm14	**	**	JJ	HH	**	KK	JJ	**	NN	**	MO	**	CC	NR	GG	**
01-09241	cm14	**	**	JJ	HH	**	KK	JJ	**	NN	**	MO	**	CC	NN	GG	**
01-09242	cm14	**	**	JJ	HH	**	KK	JJ	**	NP	**	NO	**	CC	NR	**	**
01-09243	cm14	**	**	MM	HH	**	IR	JK	**	GP	**	MP	**	CC	NN	HH	**
01-09244	cm14	**	**	JM	HH	**	IK	JK	**	LP	**	OO	**	CC	NR	GG	**
01-09245	cm14	**	**	JJ	HH	**	KK	JJ	**	NP	**	OQ	**	CC	NR	GG	**
01-09246	cm14	**	**	LM	HH	**	RR	JJ	**	IP	**	PP	**	CC	NN	GG	**
01-09247	cm14	**	**	MM	HH	**	KR	JK	**	GI	**	OP	**	CC	NN	GG	**
01-09248	cm14	**	**	MM	HH	**	IK	JK	**	**	**	PP	**	CC	NR	**	**
01-09249	cm14	**	**	JM	HH	**	IR	JJ	**	NP	**	QQ	**	CC	NR	GG	**
01-09250	cm14	**	**	MM	HH	**	KR	JK	**	PP	**	PP	**	CC	NN	GG	**
01-09251	cm14	**	**	**	HH	**	IK	**	**	KP	**	PQ	**	CC	NN	**	**
01-09252	cm14	**	**	MM	HH	**	KR	JJ	**	PP	**	QQ	**	CD	NN	GG	**
01-09253	cm14	**	**	JJ	HH	**	KK	JJ	**	NN	**	PQ	**	CC	NR	GG	**
01-09254	cm14	**	**	JJ	HH	**	KK	JJ	**	NN	**	PQ	**	CC	NN	GG	**
01-09255	cm14	**	**	LM	HH	**	II	JK	**	LN	**	PP	**	CC	RR	GG	**
01-09256	cm14	**	**	JJ	HH	**	KR	JJ	**	GN	**	OO	**	CC	NN	GG	**
01-09257	cm14	**	**	MM	HH	**	KK	JJ	**	NP	**	PQ	**	CC	RR	GG	**
01-09258	cm14	**	**	JM	HH	**	KR	JK	**	GL	**	NN	**	CC	NR	GG	**
01-09259	cm14	**	**	JM	HH	**	KR	JK	**	**	**	NP	**	CC	NR	**	**
01-09260	cm14	**	**	**	HH	**	KK	**	**	**	**	**	**	CC	NR	**	**
01-09261	cm14	**	**	**	HH	**	**	**	**	NN	**	OP	**	CC	**	GG	**
01-09262	cm14	**	**	LM	HH	**	IR	JJ	**	NN	**	OP	**	CC	NR	**	**
01-09263	cm14	**	**	JM	HH	**	KK	JJ	**	KN	**	OQ	**	CC	NN	GG	**
01-09264	cm14	**	**	JL	HH	**	KT	JJ	**	**	**	MM	**	CC	RR	**	**
01-09265	cm14	**	**	JJ	HH	**	KK	JJ	**	NN	**	PP	**	CC	NR	HH	**
01-09266	cm14	**	**	JJ	HH	**	KK	JJ	**	GP	**	MP	**	CC	NR	HH	**
01-09267	cm14	**	**	JJ	HH	**	KK	JJ	**	NN	**	OO	**	CC	NR	HH	**
01-09268	cm14	**	**	JL	HH	**	KT	JK	**	GP	**	OP	**	CC	NR	GG	**
01-09269	cm14	**	**	JJ	HH	**	KR	JJ	**	PP	**	OP	**	CC	NN	HH	**
01-09270	cm14	**	**	JJ	HH	**	RR	JJ	**	NN	**	MO	**	CC	NN	HH	**
01-09271	cm14	**	**	JJ	HH	**	RR	JJ	**	NN	**	PP	**	CC	RR	HH	**
01-09272	cm14	**	**	JM	HH	**	II	JJ	**	NP	**	PP	**	CC	NR	HH	**
01-09273	cm14	**	**	JM	HH	**	RR	JJ	**	NN	**	PP	**	CC	NN	HH	**
01-09274	cm14	**	**	JJ	HH	**	KK	JJ	**	NN	**	OP	**	CC	NN	HH	**

01-09275	cm14	**	**	JJ	HH	**	KR	JJ	**	NP	**	OO	**	CC	NN	HH	
01-09276	cm14	**	**	JM	HH	**	KR	JJ	**	NN	**	MO	**	CC	NN	HH	
01-09277	cm14	**	**	JJ	HH	**	KR	JJ	**	GN	**	NP	**	CC	NN	HH	
01-09278	cm14	**	**	JJ	HH	**	KR	JJ	**	GN	**	NP	**	CC	NN	HH	
01-09279	cm14	**	**	JJ	HH	**	KK	JJ	**	NN	**	PP	**	CC	NN	HH	
01-09280	cm14	**	**	JJ	HH	**	KR	JN	**	GN	**	OP	**	CC	NN	HH	
01-09281	cm14	**	**	JM	HH	**	KK	JJ	**	KN	**	PP	**	CC	NN	HH	**
01-09282	cm14	**	**	MM	HH	**	KK	JJ	**	NP	**	PP	**	CC	NN	HH	**
01-09283	cm14	**	**	MM	HH	**	KR	JJ	**	PP	**	PP	**	CC	NN	HH	**
01-09284	cm14	**	**	JL	HH	**	KK	JN	**	NN	**	OO	**	CC	NN	GH	**
01-09285	cm14	**	**	JL	HH	**	KK	JJ	**	GK	**	PP	**	CC	NN	HH	**
01-09286	cm14	**	**	JJ	HH	**	KR	JJ	**	NP	**	OO	**	CC	NN	HH	**
01-09287	cm14	**	**	JM	HH	**	IK	JJ	**	NN	**	OP	**	CC	NN	HH	**
01-09288	cm14	**	**	JJ	HH	**	KK	JJ	**	NN	**	PP	**	CC	RR	HH	**
01-09289	cm14	**	**	JM	HH	**	KR	JJ	**	NP	**	OP	**	CC	RR	HH	**
01-09290	cm14	**	**	LM	HH	**	IK	JJ	**	PP	**	PP	**	CC	RR	GH	**
01-09291	cm14	**	**	JM	HH	**	KK	JJ	**	NN	**	PP	**	CC	RR	HH	**
01-09292	cm14	**	**	JM	HH	**	KK	JJ	**	FP	**	OP	**	CC	NN	HH	**
01-09293	cm14	**	**	JM	HH	**	KR	JJ	**	NN	**	OO	**	CC	RR	HH	**
01-09294	cm14	**	**	JJ	HH	**	IK	JJ	**	NN	**	OO	**	CC	NN	HH	**
01-09295	cm14	**	**	MM	HH	**	IK	JJ	**	NN	**	OP	**	CC	NR	HH	**
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01-09299	cm14	**	**	JJ	HH	**	KK	JJ	**	NN	**	OO	**	CC	NR	HH	**
01-09300	cm14	**	**	MM	HK	**	KR	JN	**	GI	**	PP	**	CC	NN	HH	**
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01016-02	cm14	**	**	LM	HH	**	KR	JJ	**	GO	**	PQ	**	CC	NR	HH	
01017-02	cm14	**	**	LM	HH	**	IR	JJ	**	GO	**	PQ	**	CC	NO	HH	
01018-02	cm14	**	**	LL	HH	**	IR	JJ	**	GO	**	PQ	**	CC	NN	HH	
01019-02	cm14	**	**	JM	HH	**	IR	JK	**	GN	**	PP	**	CC	NN	HH	
01020-02	cm14	**	**	JJ	HH	**	IK	JJ	**	NP	**	OQ	**	CC	NN	HH	
01021-02	cm14	**	**	**	**	**	KR	**	**	GN	**	PP	**	CC	**	**	**
01022-02	cm14	**	**	JM	HH	**	IK	JJ	**	NN	**	NQ	**	CC	NN	HH	
01023-02	cm14	**	**	LM	HH	**	IR	JK	**	GL	**	PP	**	CC	NN	HH	

Appendix 1. DNA data for the Chocolate-Mule CA feral burro herd.

ID	LOC	Microsatellite Loci															
		V	H	A	H	H	A	H	A	H	H	H	A	A	L		
		H	T	H	M	T	H	M	S	T	T	M	M	S	S	E	
		L	G	T	S	G	T	S	B	G	G	S	S	B	B	X	
		2	4	4	7	6	5	6	2	1	7	3	2	1	2	3	
		0							0					7	3	3	
01-09301	col5	**	**	MM	HH	**	IJ	NN	**	IN	**	NN	**	CC	**	GH	**
01-09302	col5	**	**	**	HH	**	IJ	NN	**	NN	**	OO	**	CC	**	GH	**
01-09303	col5	**	**	JM	HH	**	JJ	JN	**	IP	**	OO	**	CC	NQ	GH	**
01-09304	col5	**	**	JJ	HH	**	JR	JN	**	IP	**	MO	**	CC	KN	GH	**
01-09305	col5	**	**	JJ	HH	**	JR	JN	**	PP	**	NP	**	CC	KO	HH	**
01-09306	col5	**	**	JJ	HH	**	JJ	JJ	**	II	**	NN	**	CC	NN	HH	**
01-09307	col5	**	**	JJ	HH	**	JJ	JJ	**	IP	**	MO	**	CC	NQ	GH	**
01-09308	col5	**	**	JJ	HH	**	JJ	JJ	**	II	**	OP	**	CC	NQ	GH	**
01-09309	col5	**	**	JJ	HH	**	JR	JJ	**	IN	**	MO	**	CC	NQ	GH	**
01-09310	col5	**	**	JJ	HH	**	JJ	JJ	**	NP	**	NP	**	CC	NN	GH	**
01-09311	col5	**	**	JJ	HH	**	JJ	JJ	**	PP	**	OO	**	CC	NQ	GH	**
01-09312	col5	**	**	JM	HH	**	II	JJ	**	IN	**	MM	**	CC	QQ	HH	**
01-09313	col5	**	**	JJ	HH	**	JJ	JJ	**	II	**	OO	**	CC	NQ	HH	**
01-09314	col5	**	**	JJ	HI	**	JJ	JJ	**	IP	**	MO	**	CC	NO	GH	**
01-09315	col5	**	**	JJ	HH	**	JJ	JJ	**	IP	**	MO	**	CC	NO	HH	**
01-09316	col5	**	**	JJ	HH	**	JJ	JJ	**	NP	**	OO	**	CC	NQ	HH	**
01-09317	col5	**	**	JJ	HH	**	IR	JJ	**	NQ	**	MM	**	CC	QQ	GG	**
01-09318	col5	**	**	JJ	HH	**	IJ	JN	**	IQ	**	MO	**	CC	QQ	HH	**
01-09319	col5	**	**	JJ	HH	**	JR	JJ	**	IN	**	OO	**	CC	NO	**	**
01-09320	col5	**	**	JJ	HH	**	JR	JJ	**	II	**	OO	**	CC	NN	HH	**
01-09321	col5	**	**	JJ	HH	**	JR	JJ	**	II	**	NP	**	CC	NQ	GH	**
01-09322	col5	**	**	MM	HH	**	JJ	JJ	**	IP	**	OO	**	CC	NQ	GG	**
01-09323	col5	**	**	JJ	HH	**	JJ	JJ	**	NN	**	MO	**	CC	QQ	GG	**
01-09324	col5	**	**	JM	HH	**	JJ	JJ	**	II	**	OO	**	CC	NQ	GH	**
01-09325	col5	**	**	JJ	HH	**	JR	JJ	**	NP	**	MO	**	CC	NQ	GH	**
01-09326	col5	**	**	JJ	HI	**	JJ	JJ	**	IP	**	OO	**	CC	OO	GG	**
01-09327	col5	**	**	JJ	HH	**	JJ	JJ	**	IP	**	PP	**	CC	NN	HH	**
01-09328	col5	**	**	JJ	HH	**	JR	JN	**	II	**	OO	**	CC	NQ	GH	**
01-09329	col5	**	**	JJ	HH	**	JJ	JN	**	IP	**	MM	**	CC	NN	GH	**
01-09330	col5	**	**	JJ	HH	**	JJ	NN	**	IP	**	MM	**	CC	NN	GG	**
01-09331	col5	**	**	JJ	HH	**	JJ	NN	**	PO	**	NN	**	CC	NS	GG	**
03054-02	col5	**	**	JJ	HH	**	JJ	JJ	**	IP	**	MP	**	CC	QR	HH	**
03055-02	col5	**	**	**	**	**	JJ	JJ	**	PP	**	PP	**	**	**	HH	**
03056-02	col5	**	**	JJ	HH	**	JJ	JJ	**	NN	**	PP	**	CC	OQ	GG	**
03057-02	col5	**	**	JJ	HH	**	JJ	JJ	**	PP	**	PP	**	**	OQ	GH	**
03058-02	col5	**	**	JJ	HH	**	JR	JJ	**	II	**	NP	**	CD	KQ	GH	**
03059-02	col5	**	**	JJ	HH	**	JJ	JJ	**	NP	**	OP	**	CC	NQ	GH	**
03060-02	col5	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
03061-02	col5	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
03062-02	col5	**	**	**	HH	**	JR	JJ	**	II	**	NO	**	CC	NN	**	**
03063-02	col5	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
03064-02	col5	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
03054-02	col5	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
03222-02	col5	**	**	JJ	IJ	**	RR	JJ	**	II	**	MO	**	CC	NN	HH	**
03223-02	col5	**	**	JJ	HI	**	JJ	JJ	**	NP	**	PQ	**	CC	NQ	GH	**
03224-02	col5	**	**	JJ	HH	**	JR	JJ	**	II	**	NP	**	CC	NN	GH	**
03225-02	col5	**	**	JJ	HH	**	JJ	JJ	**	PP	**	PP	**	**	NN	GG	**
03226-02	col5	**	**	JJ	HH	**	JJ	JJ	**	NP	**	PP	**	CC	NN	HH	**
03227-02	col5	**	**	JJ	II	**	JJ	JJ	**	PP	**	PP	**	**	NR	HH	**
03228-02	col5	**	**	JJ	II	**	JS	JJ	**	II	**	NP	**	CC	KQ	GH	**

03229-02 co15 ** ** JJ HH ** JJ JJ ** II ** NN ** CC NN GH
03230-02 co15 ** ** JJ IJ ** IJ JJ ** ** ** ** ** ** ** ** ** ** ** QQ **
03231-02 co15 ** ** JJ II ** JJ JJ ** PP ** PP ** ** OQ GH
03232-02 co15 ** ** JJ IJ ** JJ JJ ** IP ** NN ** CC NN HH
03233-02 co15 ** ** JJ HH ** JJ JJ ** NP ** NP ** CC NN GG

Appendix 1. DNA data for the Slate Range CA feral burro herd.

ID	LOC	Microsatellite Loci															
		V	H	A	H	H	A	H	A	H	H	H	H	A	A	L	
		H	T	H	M	T	H	M	S	T	T	M	M	S	S	E	
		L	G	T	S	G	T	S	B	G	G	S	S	B	B	X	
		2	4	4	7	6	5	6	2	1	7	3	2	1	2	3	
		0								0				7	3	3	
01-09223	sr16	**	**	JJ	HH	**	KR	JJ	**	LN	**	PP	**	CC	NO	**	**
01-09226	sr16	**	**	JJ	HH	**	IT	JK	**	NN	**	OP	**	CC	OQ	FF	**
01-09234	sr16	**	**	MM	HI	**	II	JK	**	KK	**	OP	**	CC	OO	FG	**
01-09235	sr16	**	**	JJ	HH	**	**	JK	**	KK	**	OP	**	CC	NO	**	**
01-09353	sr16	**	**	MM	HH	**	RR	KK	**	KN	**	PP	**	CD	OO	HH	**
01-09354	sr16	**	**	JJ	HK	**	RR	JJ	**	IN	**	OP	**	CC	**	HH	**
01-09355	sr16	**	**	JM	HK	**	IO	JN	**	IN	**	OP	**	CC	NN	HH	**
01-09356	sr16	**	**	**	**	**	**	NN	**	**	**	PP	**	CC	**	**	**
01-09357	sr16	**	**	LL	HH	**	II	JJ	**	KN	**	MN	**	CC	NQ	GH	**
01-09358	sr16	**	**	**	HH	**	II	JJ	**	LN	**	OP	**	CC	NO	HH	**
01-09359	sr16	**	**	MM	HH	**	II	JK	**	KN	**	OP	**	CC	NO	HH	**
01-09360	sr16	**	**	MM	HH	**	IR	JK	**	LN	**	OO	**	CC	NN	GH	**
01-09361	sr16	**	**	LM	HH	**	IL	JJ	**	KN	**	MO	**	CC	RR	GH	**
01-09362	sr16	**	**	LL	HH	**	LL	JJ	**	KN	**	MP	**	CC	OR	GH	**
01-09363	sr16	**	**	JJ	HH	**	LT	JJ	**	NN	**	PP	**	CC	OQ	GH	**
01-09364	sr16	**	**	JJ	HH	**	RT	JJ	**	KN	**	PQ	**	CC	OQ	**	**
01-09365	sr16	**	**	LL	HH	**	II	JK	**	KN	**	OP	**	CC	NO	GG	**
01-09366	sr16	**	**	**	HH	**	JR	JK	**	IN	**	LO	**	CC	NN	GG	**
01-09367	sr16	**	**	JM	HK	**	II	JJ	**	NN	**	NO	**	CC	NR	GH	**
01-09368	sr16	**	**	MM	HH	**	IR	JJ	**	LN	**	OP	**	CC	OO	HI	**
01-09369	sr16	**	**	JL	HH	**	IT	JK	**	NN	**	OO	**	CC	RR	GH	**
01-09370	sr16	**	**	JJ	HH	**	IR	JK	**	LN	**	PR	**	CC	NN	GH	**

Appendix 1. DNA data for the Centennial CA feral burro herd.

ID	LOC	Microsatellite Loci															
		V	H	A	H	H	A	H	A	H	H	H	A	A	L		
		H	T	H	M	T	H	M	S	T	T	M	M	S	S	E	
		L	G	T	S	G	T	S	B	G	G	S	S	B	B	X	
		2	4	4	7	6	5	6	2	1	7	3	2	1	2	3	
		0								0				7	3	3	
01-09332	ce17	**	**	**	HH	**	II	**	**	KK	**	**	**	CC	**	**	**
01-09333	ce17	**	**	MM	HL	**	JJ	JK	**	KN	**	PP	**	CC	NR	GG	**
01-09334	ce17	**	**	MM	HH	**	OT	JK	**	KN	**	OO	**	CC	NN	**	**
01-09335	ce17	**	**	JL	HH	**	IR	JN	**	KN	**	NP	**	CC	NO	GG	**
01-09336	ce17	**	**	LL	HH	**	II	JK	**	NN	**	OO	**	CC	NO	GG	**
01-09337	ce17	**	**	LL	HH	**	II	JN	**	KK	**	MO	**	CC	OR	GG	**
01-09338	ce17	**	**	LL	HH	**	II	KK	**	MN	**	OP	**	CC	OO	GG	**
01-09339	ce17	**	**	LM	HH	**	II	JJ	**	KN	**	OP	**	CC	NN	HH	**
01-09340	ce17	**	**	MM	HH	**	JJ	JK	**	NN	**	NO	**	CC	KO	GG	**
01-09341	ce17	**	**	MM	HI	**	II	JJ	**	NN	**	MP	**	CC	OR	GG	**
01-09342	ce17	**	**	MM	HH	**	II	JN	**	LN	**	OO	**	CC	OO	HH	**
01-09343	ce17	**	**	LL	HH	**	JJ	JK	**	KN	**	NN	**	CC	OO	HH	**
01-09344	ce17	**	**	JL	HL	**	JJ	JN	**	KN	**	PP	**	CC	NQ	HH	**
01-09345	ce17	**	**	**	HH	**	IR	JJ	**	KK	**	OP	**	CC	NO	HH	**
01-09346	ce17	**	**	JL	HH	**	IR	JN	**	NN	**	PP	**	CC	NO	GG	**
01-09347	ce17	**	**	LL	HH	**	IL	JJ	**	NN	**	**	**	CC	OQ	**	**
01-09348	ce17	**	**	**	HH	**	IR	JN	**	KL	**	PP	**	CC	NO	GH	**
01-09349	ce17	**	**	LL	HH	**	II	JJ	**	NN	**	MO	**	CC	QR	GG	**
01-09350	ce17	**	**	LM	HH	**	IL	JJ	**	KN	**	NO	**	CC	OR	HH	**
01-09351	ce17	**	**	JM	HK	**	IR	JJ	**	NN	**	PP	**	CC	NQ	HH	**
01-09352	ce17	**	**	MM	HH	**	II	JK	**	KN	**	PP	**	CC	OO	GH	**

Appendix 1. DNA data for the Centennial CA feral burro herd.

ID	LOC	Microsatellite Loci																
		V	H	A	H	H	A	H	A	H	H	H	A	A	L			
		H	T	H	M	T	H	M	S	T	T	M	M	S	S	B	B	X
		L	G	T	S	G	T	S	B	G	G	S	S	B	B			
		2	4	4	7	6	5	6	2	1	7	3	2	1	2	3	3	
		0							0					7	3	3		
01-09332	ce17	**	**	**	HH	**	II	**	**	KK	**	**	**	CC	**	**	**	**
01-09333	ce17	**	**	MM	HL	**	JJ	JK	**	KN	**	PP	**	CC	NR	GG	**	**
01-09334	ce17	**	**	MM	HH	**	OT	JK	**	KN	**	OO	**	CC	NN	**	**	**
01-09335	ce17	**	**	JL	HH	**	IR	JN	**	KN	**	NP	**	CC	NO	GG	**	**
01-09336	ce17	**	**	LL	HH	**	II	JK	**	NN	**	OO	**	CC	NO	GG	**	**
01-09337	ce17	**	**	LL	HH	**	II	JN	**	KK	**	MO	**	CC	OR	GG	**	**
01-09338	ce17	**	**	LL	HH	**	II	KK	**	MN	**	OP	**	CC	OO	GG	**	**
01-09339	ce17	**	**	LM	HH	**	II	JJ	**	KN	**	OP	**	CC	NN	HH	**	**
01-09340	ce17	**	**	MM	HH	**	JJ	JK	**	NN	**	NO	**	CC	KO	GG	**	**
01-09341	ce17	**	**	MM	HI	**	II	JJ	**	NN	**	MP	**	CC	OR	GG	**	**
01-09342	ce17	**	**	MM	HH	**	II	JN	**	LN	**	OO	**	CC	OO	HH	**	**
01-09343	ce17	**	**	LL	HH	**	JJ	JK	**	KN	**	NN	**	CC	OO	HH	**	**
01-09344	ce17	**	**	JL	HL	**	JJ	JN	**	KN	**	PP	**	CC	NQ	HH	**	**
01-09345	ce17	**	**	**	HH	**	IR	JJ	**	KK	**	OP	**	CC	NO	HH	**	**
01-09346	ce17	**	**	JL	HH	**	IR	JN	**	NN	**	PP	**	CC	NO	GG	**	**
01-09347	ce17	**	**	LL	HH	**	IL	JJ	**	NN	**	**	**	CC	OQ	**	**	**
01-09348	ce17	**	**	**	HH	**	IR	JN	**	KL	**	PP	**	CC	NO	GH	**	**
01-09349	ce17	**	**	LL	HH	**	II	JJ	**	NN	**	MO	**	CC	OR	GG	**	**
01-09350	ce17	**	**	LM	HH	**	IL	JJ	**	KN	**	NO	**	CC	OR	HH	**	**
01-09351	ce17	**	**	JM	HK	**	IR	JJ	**	NN	**	PP	**	CC	NQ	HH	**	**
01-09352	ce17	**	**	MM	HH	**	II	JK	**	KN	**	PP	**	CC	OO	GH	**	**