Genetic Variation among Channel Island Foxes

2022-11-11
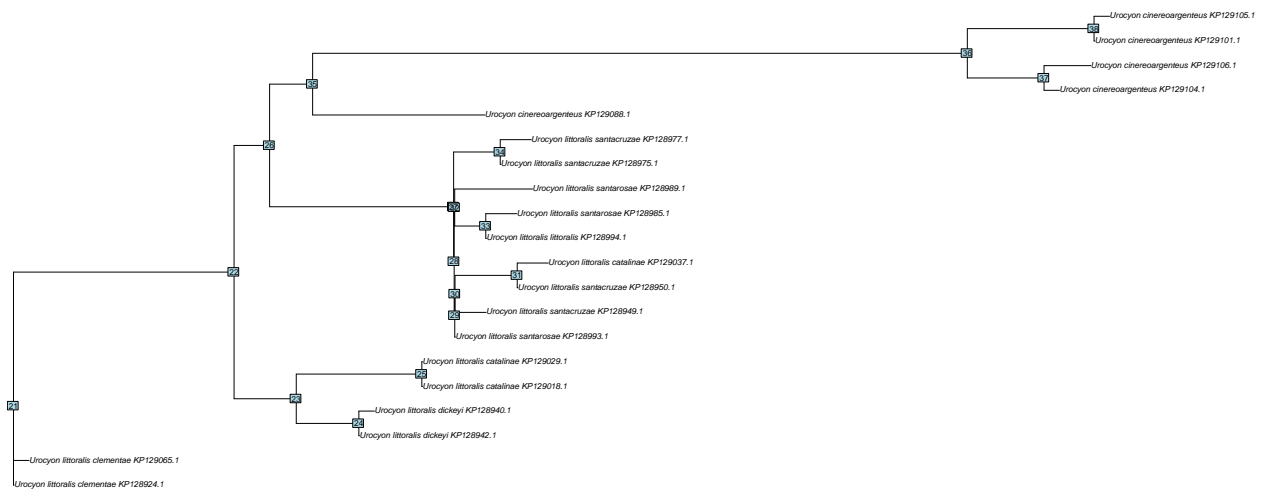
```r
##ISLAND FOXES

#plot phylogenetic tree
phy = read.tree("islandmito.fasta.treefile")
plot(phy)
nodelabels(phy$node.label)
```



```r
snp_island <- fasta2genlight('islandmito.fasta', snpOnly=T)
```

```
##
##  Converting FASTA alignment into a genlight object...
##
##
##  Looking for polymorphic positions...
## ...................................................................................................
##  Extracting SNPs from the alignment...
## ...................................................................................................
##  Building final object...
##
## ...done.
```

```r
position1 = position(snp_island)
allele1 = alleles(snp_island)
location1 = locNames(snp_island)

D = data.frame(position1, allele1, location1)

kable(D)
```

| position1	allele1	location1
403	C/T	403.C/T
1650	A/G	1650.A/G
2718	C/T	2718.C/T
2787	T/C	2787.T/C
2856	G/T	2856.G/T
2862	A/G	2862.A/G
3535	A/G	3535.A/G
3609	G/A	3609.G/A
3762	C/T	3762.C/T
3829	A/G	3829.A/G
4062	G/A	4062.G/A
4372	T/C	4372.T/C
4406	T/C	4406.T/C
4474	A/G	4474.A/G
4777	G/A	4777.G/A
4830	C/T	4830.C/T
7076	A/G	7076.A/G
7315	C/T	7315.C/T
7997	G/A	7997.G/A
8121	A/G	8121.A/G
8308	G/A	8308.G/A
8400	T/C	8400.T/C
8437	G/A	8437.G/A
8559	T/C	8559.T/C
8842	G/A	8842.G/A
8979	A/C	8979.A/C
9013	A/G	9013.A/G
9199	A/G	9199.A/G
9680	T/C	9680.T/C
10956	C/T	10956.C/T
11159	G/A	11159.G/A
11642	T/C	11642.T/C
11665	T/C	11665.T/C
11816	G/A	11816.G/A
11952	A/G	11952.A/G
12778	C/T	12778.C/T
12844	A/G	12844.A/G
13339	G/A	13339.G/A
13360	T/C	13360.T/C
13542	G/T	13542.G/T
13546	C/T	13546.C/T
13655	T/C	13655.T/C
13789	T/C	13789.T/C
13947	A/G	13947.A/G
15159	C/T	15159.C/T
15306	C/T	15306.C/T
15597	A/G	15597.A/G
15620	T/A	15620.T/A
15663	G/A	15663.G/A
15829	C/T	15829.C/T
15832	T/C	15832.T/C
15878	A/G	15878.A/G

position1	allele1	location1
15881	A/G	15881.A/G
15912	G/A	15912.G/A

```
## plot positions of polymorphic sites
temp <- density(position1, bw=10)
plot(temp, xlab="Position in the alignment", lwd=2, main="Location of the SNPs")
points(position1, rep(0, nLoc(snp_island)), pch="|", col="red")

polygon(c(temp$x,rev(temp$x)), c(temp$y, rep(0,length(temp$x))),
col=transp("blue",.3))
points(position1, rep(0, nLoc(snp_island)), pch="|", col="blue")
```

Location of the SNPs
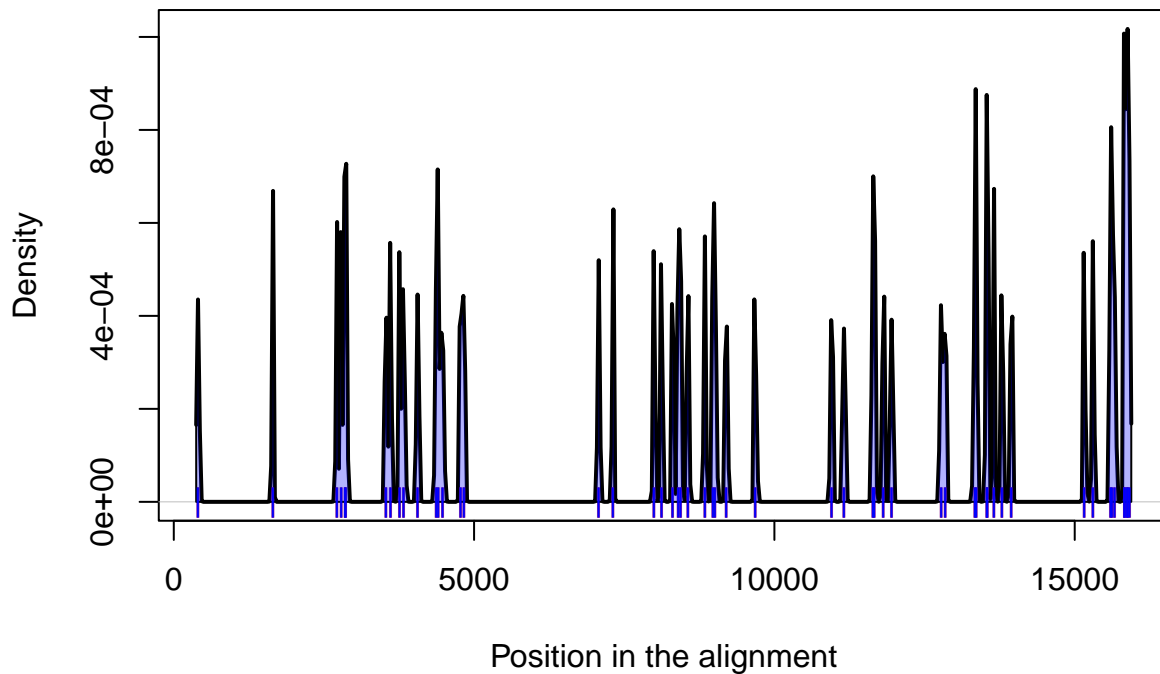

```
#density by codon position
snpposi.plot(position1, genome.size=1700, codon=FALSE)
```

```
## Warning: Removed 52 rows containing non-finite values (`stat_density()`).
```

Distribution of SNPs in the genome
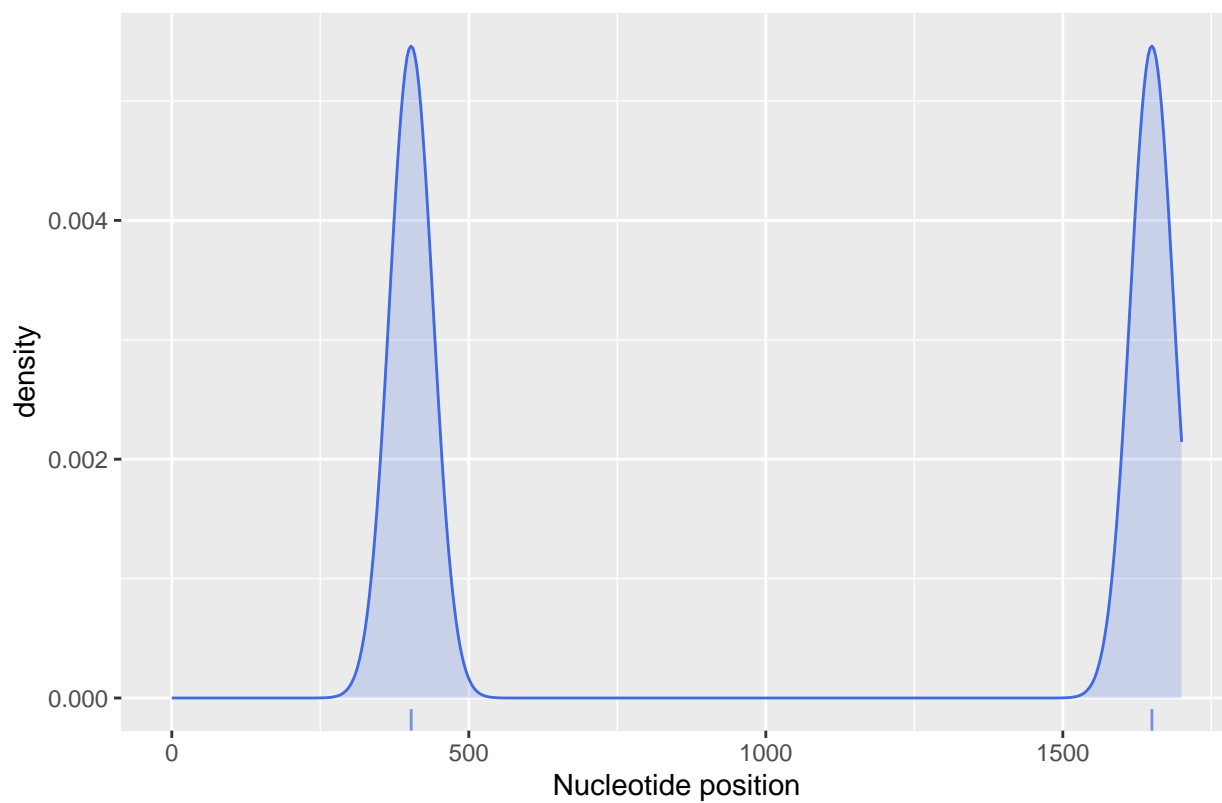

```
myFreq <- glMean(snp_island)
hist(myFreq, proba=TRUE, col="gold", xlab="Allele frequencies",
main="Distribution of (second) allele frequencies")
temp <- density(myFreq)
lines(temp$x, temp$y*1.8,lwd=3)
```

Distribution of (second) allele frequencies
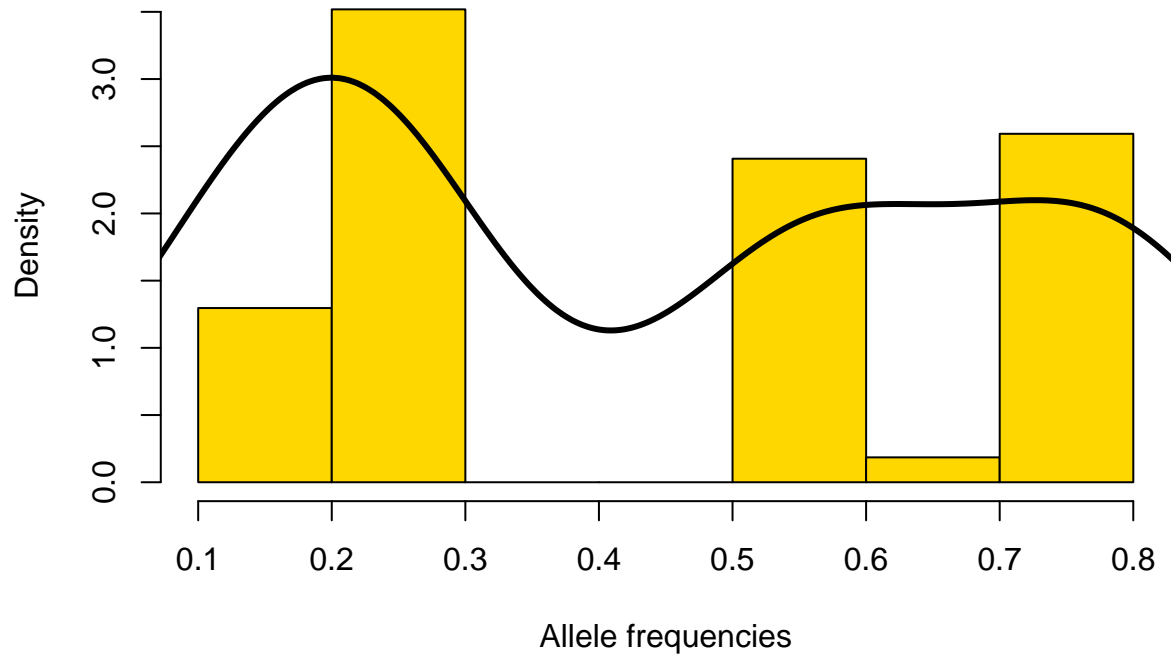

```
myFreq <- glMean(snp_island)
myFreq <- c(myFreq, 1-myFreq)
hist(myFreq, proba=TRUE, col="darkseagreen3", xlab="Allele frequencies",
main="Distribution of allele frequencies", nclass=20)
temp <- density(myFreq, bw=.05)
lines(temp$x, temp$y*2,lwd=3)
```

Distribution of allele frequencies
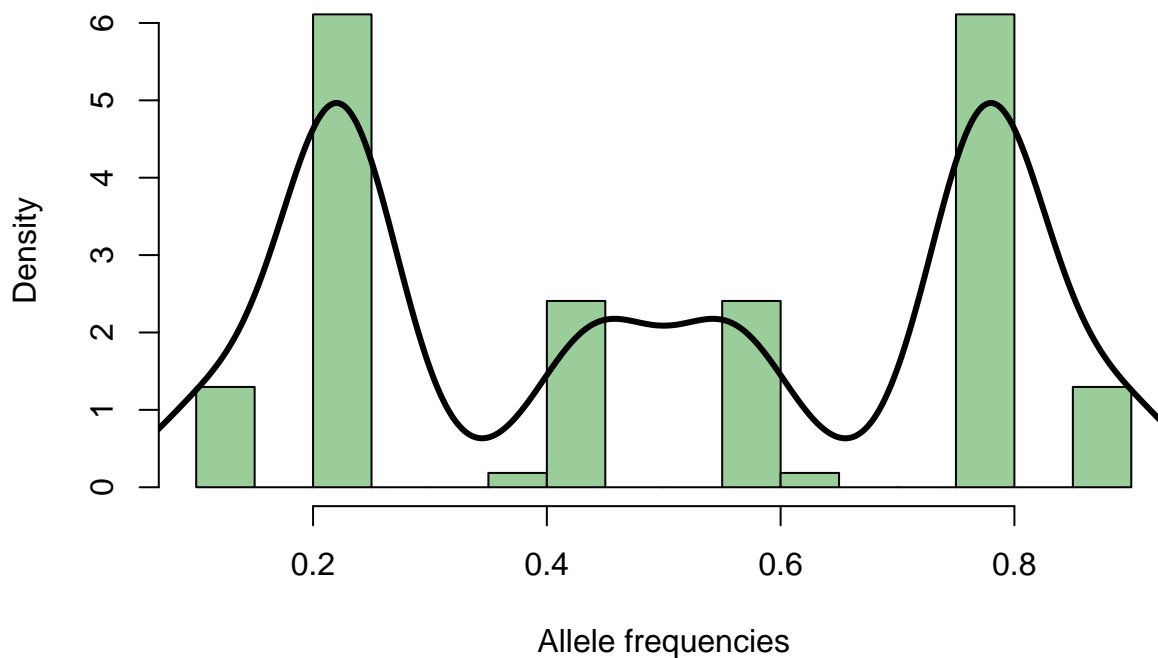

```
##MAINLAND FOXES


# Read sequences from FASTA file
sequence <- readAAStringSet("mainland.fasta")

## Perform multiple sequence alignment
my_alignment <- msa(sequence)

## use default substitution matrix
## Compute distance matrix
my_alignment_sequence <- msaConvert(my_alignment, type="seqinr::alignment")
distance_alignment <- dist.alignment(my_alignment_sequence)

## compute phylogenetic tree using neighbor joining
Tree <- bionjs(distance_alignment)

## display phylogenetic tree
plot(Tree)
```
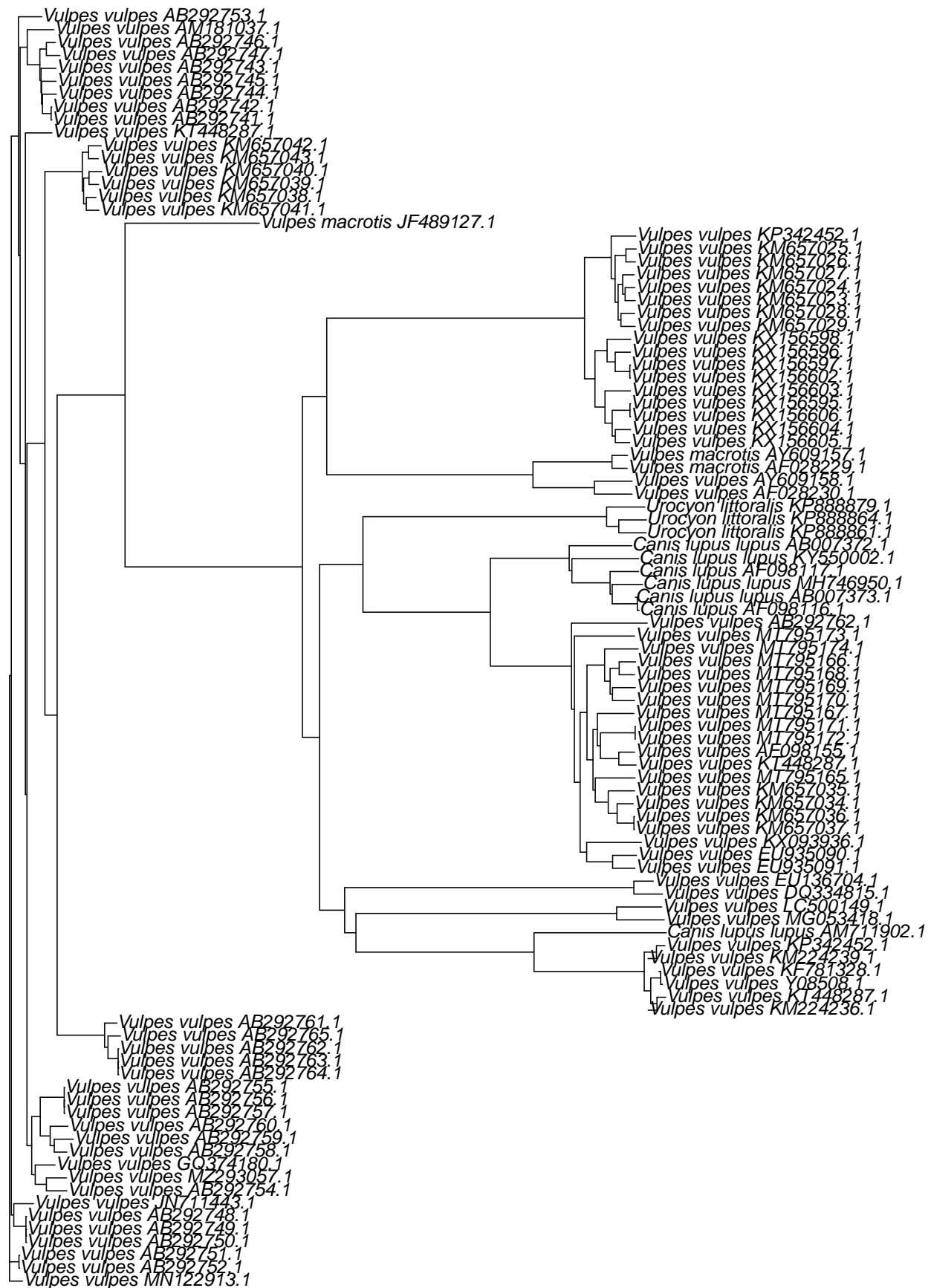
```r
snp_mainland <- fasta2genlight('mainland2.fasta', snpOnly=T)
```

```
##
##  Converting FASTA alignment into a genlight object...
##
##
##  Looking for polymorphic positions...
## ...........................................................................................................
##  Extracting SNPs from the alignment...
## ...........................................................................................................
##  Building final object...
##
## ...done.
```

```r
position2 = position(snp_mainland)
allele2 = alleles(snp_mainland)
location2 = locNames(snp_mainland)

D2 = data.frame(position2, allele2, location2)

kable(D2)
```

position2	allele2	location2
16	C/T	16.C/T
19	A/G	19.A/G
51	C/T	51.C/T
54	C/T	54.C/T
55	G/A	55.G/A
70	T/C	70.T/C
85	A/G	85.A/G
100	T/C	100.T/C
101	T/C	101.T/C
108	G/A	108.G/A
157	A/G	157.A/G
159	C/T	159.C/T
161	G/A	161.G/A
162	T/C	162.T/C
193	T/C	193.T/C
224	A/G	224.A/G
262	A/G	262.A/G
273	T/C	273.T/C
281	C/T	281.C/T
282	C/T	282.C/T
291	T/G	291.T/G
339	A/G	339.A/G
352	T/C	352.T/C
370	C/T	370.C/T
374	G/A	374.G/A
378	T/A	378.T/A
379	T/C	379.T/C
380	T/A	380.T/A
381	A/T	381.A/T
383	C/T	383.C/T
385	C/A	385.C/A

position2	allele2	location2
426	T/C	426.T/C
436	A/T	436.A/T
439	C/T	439.C/T
455	T/A	455.T/A
459	A/T	459.A/T
460	A/T	460.A/T
466	C/T	466.C/T
501	A/G	501.A/G
528	G/A	528.G/A
532	A/G	532.A/G
548	T/C	548.T/C
561	G/A	561.G/A
573	T/C	573.T/C
660	A/G	660.A/G
664	T/C	664.T/C
673	T/A	673.T/A
706	C/T	706.C/T
717	A/G	717.A/G
728	A/G	728.A/G
736	T/C	736.T/C
739	A/G	739.A/G
740	T/C	740.T/C
770	A/G	770.A/G
772	G/A	772.G/A
799	C/T	799.C/T
801	C/T	801.C/T
802	C/T	802.C/T
810	T/C	810.T/C
813	C/T	813.C/T
819	T/A	819.T/A
832	T/C	832.T/C
835	A/G	835.A/G
940	A/G	940.A/G
941	C/A	941.C/A
942	A/G	942.A/G
943	A/G	943.A/G
950	C/A	950.C/A
959	C/T	959.C/T
960	T/C	960.T/C
961	T/A	961.T/A
962	A/C	962.A/C
964	C/T	964.C/T
965	T/C	965.T/C
973	A/G	973.A/G
982	C/T	982.C/T
1027	T/C	1027.T/C
1043	C/T	1043.C/T
1044	T/A	1044.T/A
1050	G/A	1050.G/A
1057	C/T	1057.C/T
1077	T/G	1077.T/G
1079	C/T	1079.C/T

position2	allele2	location2
1081	T/A	1081.T/A
1085	G/A	1085.G/A
1097	A/G	1097.A/G
1111	C/T	1111.C/T
1112	T/C	1112.T/C
1113	A/G	1113.A/G
1116	C/T	1116.C/T
1117	C/T	1117.C/T
1118	C/T	1118.C/T
1122	C/T	1122.C/T
1125	T/A	1125.T/A
1127	A/C	1127.A/C
1130	G/C	1130.G/C
1131	T/C	1131.T/C
1135	A/G	1135.A/G
1137	A/G	1137.A/G
1138	C/T	1138.C/T
1139	C/T	1139.C/T
1141	T/C	1141.T/C
1146	T/C	1146.T/C
1153	T/C	1153.T/C
1159	T/C	1159.T/C
1163	A/C	1163.A/C
1166	A/T	1166.A/T
1190	T/C	1190.T/C
1202	G/T	1202.G/T
1218	T/C	1218.T/C
1239	C/T	1239.C/T
1242	A/C	1242.A/C
1244	C/A	1244.C/A
1249	T/C	1249.T/C
1250	T/A	1250.T/A
1267	C/A	1267.C/A
1272	C/G	1272.C/G
1290	A/G	1290.A/G
1296	C/T	1296.C/T
1302	C/T	1302.C/T
1306	T/C	1306.T/C
1330	C/T	1330.C/T
1331	T/A	1331.T/A
1354	C/T	1354.C/T
1357	A/G	1357.A/G
1380	A/G	1380.A/G
1388	A/G	1388.A/G
1409	G/A	1409.G/A
1411	G/A	1411.G/A
1429	T/A	1429.T/A
1499	A/C	1499.A/C
1501	A/C	1501.A/C
1502	A/G	1502.A/G
1504	A/T	1504.A/T
1507	T/C	1507.T/C

position2	allele2	location2
1508	T/C	1508.T/C
1528	G/A	1528.G/A
1534	G/A	1534.G/A
1547	C/T	1547.C/T
1553	A/G	1553.A/G
1554	T/C	1554.T/C
1555	C/A	1555.C/A
1560	T/C	1560.T/C
1581	T/A	1581.T/A
1585	C/T	1585.C/T
1589	T/C	1589.T/C
1592	C/A	1592.C/A
1605	T/C	1605.T/C
1618	C/T	1618.C/T
1636	C/A	1636.C/A
1653	A/G	1653.A/G
1654	T/C	1654.T/C
1670	A/G	1670.A/G
1675	C/G	1675.C/G
1676	T/C	1676.T/C
1678	C/T	1678.C/T
1691	T/C	1691.T/C
1695	C/T	1695.C/T
1703	C/T	1703.C/T
1751	C/T	1751.C/T
1752	C/T	1752.C/T
1761	T/C	1761.T/C
1780	G/A	1780.G/A
1809	T/C	1809.T/C
1810	C/T	1810.C/T
1816	T/A	1816.T/A
1818	T/C	1818.T/C
1831	G/A	1831.G/A
1835	T/C	1835.T/C
1843	C/T	1843.C/T
1874	T/C	1874.T/C
1893	G/A	1893.G/A
1916	C/T	1916.C/T
1956	T/A	1956.T/A
1958	T/C	1958.T/C
1982	G/A	1982.G/A
1989	C/T	1989.C/T
1990	T/C	1990.T/C
1991	T/C	1991.T/C
1995	T/A	1995.T/A
2083	A/G	2083.A/G
2097	C/T	2097.C/T
2099	C/T	2099.C/T
2140	C/T	2140.C/T
2142	C/T	2142.C/T
2178	C/T	2178.C/T
2181	A/G	2181.A/G

position2	allele2	location2
2190	C/T	2190.C/T
2194	G/A	2194.G/A
2195	A/G	2195.A/G
2198	C/T	2198.C/T
2200	A/T	2200.A/T
2203	T/A	2203.T/A
2204	A/C	2204.A/C
2207	T/C	2207.T/C
2210	A/T	2210.A/T
2211	A/G	2211.A/G
2214	C/A	2214.C/A
2223	A/C	2223.A/C
2224	C/T	2224.C/T
2230	A/T	2230.A/T
2231	T/G	2231.T/G
2239	T/C	2239.T/C
2241	A/G	2241.A/G
2242	G/A	2242.G/A
2304	C/T	2304.C/T
2307	A/C	2307.A/C
2317	A/G	2317.A/G
2318	C/T	2318.C/T
2320	A/C	2320.A/C
2326	C/T	2326.C/T
2345	T/C	2345.T/C
2357	G/A	2357.G/A
2394	C/T	2394.C/T
2549	T/A	2549.T/A
2553	A/G	2553.A/G
2554	C/T	2554.C/T
2555	C/T	2555.C/T
2558	C/T	2558.C/T
2578	G/A	2578.G/A
2581	T/A	2581.T/A
2582	G/A	2582.G/A
2583	T/C	2583.T/C
2593	C/T	2593.C/T
2595	C/T	2595.C/T
2610	A/G	2610.A/G
2627	C/T	2627.C/T
2630	A/G	2630.A/G
2651	T/C	2651.T/C
2656	T/A	2656.T/A
2663	G/A	2663.G/A
2698	T/C	2698.T/C
2701	C/T	2701.C/T
2709	A/G	2709.A/G
2724	A/C	2724.A/C
2725	T/C	2725.T/C
2754	A/C	2754.A/C
2772	T/C	2772.T/C
2773	A/C	2773.A/C

position2	allele2	location2
2778	T/C	2778.T/C
2784	T/C	2784.T/C
2785	A/G	2785.A/G
2799	T/C	2799.T/C
2808	C/T	2808.C/T
2817	C/T	2817.C/T
2820	T/C	2820.T/C
2829	A/G	2829.A/G
2836	T/C	2836.T/C
2844	T/C	2844.T/C
2865	T/C	2865.T/C
2877	C/T	2877.C/T
2883	C/T	2883.C/T
2886	C/T	2886.C/T
2892	T/C	2892.T/C
2904	A/C	2904.A/C
2907	C/T	2907.C/T
2922	C/T	2922.C/T
2934	T/C	2934.T/C
2940	A/T	2940.A/T
2943	A/C	2943.A/C
2961	A/G	2961.A/G
2967	C/T	2967.C/T
2976	C/A	2976.C/A
2985	A/G	2985.A/G
2988	T/C	2988.T/C
2995	C/T	2995.C/T
3000	C/T	3000.C/T
3006	T/C	3006.T/C
3009	G/A	3009.G/A
3015	T/C	3015.T/C
3018	C/A	3018.C/A
3024	A/C	3024.A/C
3027	A/G	3027.A/G
3045	T/C	3045.T/C
3051	C/T	3051.C/T
3052	T/C	3052.T/C
3054	G/A	3054.G/A
3057	A/G	3057.A/G
3066	C/T	3066.C/T
3070	C/T	3070.C/T
3075	A/C	3075.A/C
3078	A/G	3078.A/G
3093	G/A	3093.G/A
3099	C/T	3099.C/T
3102	C/T	3102.C/T
3117	A/G	3117.A/G
3123	A/G	3123.A/G
3126	C/T	3126.C/T
3132	A/G	3132.A/G
3159	A/C	3159.A/C
3165	T/C	3165.T/C

position2	allele2	location2
3180	T/C	3180.T/C
3186	A/C	3186.A/C
3189	G/A	3189.G/A
3195	A/G	3195.A/G
3198	T/C	3198.T/C
3201	T/C	3201.T/C
3207	A/T	3207.A/T
3210	A/T	3210.A/T
3211	G/A	3211.G/A
3213	C/T	3213.C/T
3214	C/T	3214.C/T
3216	C/G	3216.C/G
3228	G/A	3228.G/A
3234	T/C	3234.T/C
3246	G/A	3246.G/A
3249	A/C	3249.A/C
3264	A/G	3264.A/G
3274	T/C	3274.T/C
3279	C/T	3279.C/T
3282	T/C	3282.T/C
3285	G/T	3285.G/T
3294	C/T	3294.C/T
3312	C/T	3312.C/T
3333	T/A	3333.T/A
3339	A/G	3339.A/G
3348	C/T	3348.C/T
3360	A/G	3360.A/G
3363	A/G	3363.A/G
3369	C/A	3369.C/A
3375	A/G	3375.A/G
3384	A/G	3384.A/G
3393	A/G	3393.A/G
3405	A/C	3405.A/C
3408	T/A	3408.T/A
3411	T/C	3411.T/C
3414	T/C	3414.T/C
3426	T/C	3426.T/C
3438	C/T	3438.C/T
3450	T/C	3450.T/C
3459	C/T	3459.C/T
3474	T/C	3474.T/C
3475	C/T	3475.C/T
3479	T/C	3479.T/C
3498	C/T	3498.C/T
3505	A/T	3505.A/T
3513	A/G	3513.A/G
3522	T/C	3522.T/C
3525	T/C	3525.T/C
3534	T/C	3534.T/C
3537	A/T	3537.A/T
3540	A/G	3540.A/G
3546	C/T	3546.C/T

position2	allele2	location2
3547	T/C	3547.T/C
3549	A/G	3549.A/G
3550	T/C	3550.T/C
3560	G/C	3560.G/C
3561	C/T	3561.C/T
3564	C/T	3564.C/T
3582	A/C	3582.A/C
3591	A/G	3591.A/G
3600	C/T	3600.C/T
3603	T/C	3603.T/C
3616	T/C	3616.T/C
3618	A/C	3618.A/C
3619	T/C	3619.T/C
3630	T/C	3630.T/C
3633	T/C	3633.T/C
3639	C/A	3639.C/A
3640	T/C	3640.T/C
3648	A/G	3648.A/G
3654	A/G	3654.A/G
3666	T/C	3666.T/C
3669	T/C	3669.T/C
3673	T/C	3673.T/C
3678	C/T	3678.C/T
3681	T/C	3681.T/C
3687	C/T	3687.C/T
3693	T/C	3693.T/C
3696	C/T	3696.C/T
3699	A/G	3699.A/G
3702	C/T	3702.C/T
3725	T/C	3725.T/C
3752	A/C	3752.A/C
3766	T/C	3766.T/C
3791	T/C	3791.T/C
3804	T/C	3804.T/C
3835	C/T	3835.C/T
3842	T/C	3842.T/C
3908	C/T	3908.C/T
3927	A/G	3927.A/G
3930	C/T	3930.C/T
3933	C/T	3933.C/T
3936	T/C	3936.T/C
3939	C/T	3939.C/T
3943	A/G	3943.A/G
3944	T/C	3944.T/C
3948	C/T	3948.C/T
3949	A/C	3949.A/C
3957	T/C	3957.T/C
3958	A/G	3958.A/G
3963	G/A	3963.G/A
3966	A/T	3966.A/T
3972	C/T	3972.C/T
3981	C/A	3981.C/A

position2	allele2	location2
3985	C/T	3985.C/T
3993	G/C	3993.G/C
3999	A/G	3999.A/G
4000	T/C	4000.T/C
4002	A/G	4002.A/G
4005	G/A	4005.G/A
4014	T/C	4014.T/C
4026	A/G	4026.A/G
4029	C/T	4029.C/T
4033	C/T	4033.C/T
4044	C/T	4044.C/T
4053	C/A	4053.C/A
4062	G/A	4062.G/A
4064	A/T	4064.A/T
4086	C/A	4086.C/A
4089	T/C	4089.T/C
4095	A/G	4095.A/G
4101	T/C	4101.T/C
4104	T/C	4104.T/C
4113	T/A	4113.T/A
4122	A/G	4122.A/G
4126	T/C	4126.T/C
4155	C/T	4155.C/T
4158	T/C	4158.T/C
4167	C/T	4167.C/T
4170	A/G	4170.A/G
4173	G/A	4173.G/A
4174	G/A	4174.G/A
4186	A/G	4186.A/G
4191	A/G	4191.A/G
4194	C/T	4194.C/T
4200	C/A	4200.C/A
4206	C/A	4206.C/A
4208	T/C	4208.T/C
4209	C/T	4209.C/T
4218	C/T	4218.C/T
4220	C/T	4220.C/T
4239	A/G	4239.A/G
4242	C/T	4242.C/T
4245	A/G	4245.A/G
4248	T/C	4248.T/C
4254	C/T	4254.C/T
4266	T/C	4266.T/C
4269	C/T	4269.C/T
4281	G/A	4281.G/A
4285	G/A	4285.G/A
4288	A/T	4288.A/T
4290	G/A	4290.G/A
4294	A/T	4294.A/T
4295	T/C	4295.T/C
4305	A/G	4305.A/G
4309	C/T	4309.C/T

position2	allele2	location2
4314	A/G	4314.A/G
4329	C/T	4329.C/T
4335	T/A	4335.T/A
4342	A/G	4342.A/G
4344	C/T	4344.C/T
4347	A/C	4347.A/C
4350	T/C	4350.T/C
4353	A/G	4353.A/G
4359	T/A	4359.T/A
4368	T/C	4368.T/C
4371	C/T	4371.C/T
4375	A/G	4375.A/G
4377	C/T	4377.C/T
4381	C/A	4381.C/A
4383	T/A	4383.T/A
4385	T/C	4385.T/C
4390	A/G	4390.A/G
4392	A/G	4392.A/G
4399	A/G	4399.A/G
4401	A/G	4401.A/G
4404	C/T	4404.C/T
4407	T/C	4407.T/C
4411	G/A	4411.G/A
4412	T/C	4412.T/C
4419	C/A	4419.C/A
4431	A/T	4431.A/T
4437	A/G	4437.A/G
4464	C/T	4464.C/T
4470	C/T	4470.C/T
4473	T/C	4473.T/C
4476	C/A	4476.C/A
4479	C/T	4479.C/T
4492	G/A	4492.G/A
4494	C/G	4494.C/G
4497	T/A	4497.T/A
4500	C/T	4500.C/T
4505	C/T	4505.C/T
4509	T/C	4509.T/C
4511	A/G	4511.A/G
4515	T/C	4515.T/C
4525	A/T	4525.A/T
4533	C/T	4533.C/T
4534	T/C	4534.T/C
4536	A/G	4536.A/G
4537	A/T	4537.A/T
4539	T/C	4539.T/C
4540	T/C	4540.T/C
4542	A/G	4542.A/G
4545	T/C	4545.T/C
4549	C/T	4549.C/T
4557	A/C	4557.A/C
4563	T/A	4563.T/A

position2	allele2	location2
4566	C/A	4566.C/A
4569	C/T	4569.C/T
4576	T/A	4576.T/A
4578	T/C	4578.T/C
4579	A/T	4579.A/T
4584	A/G	4584.A/G
4585	A/C	4585.A/C
4586	A/G	4586.A/G
4588	T/G	4588.T/G
4593	C/T	4593.C/T
4599	G/A	4599.G/A
4603	C/T	4603.C/T
4608	T/C	4608.T/C
4609	T/C	4609.T/C
4611	A/C	4611.A/C
4614	C/A	4614.C/A
4619	T/C	4619.T/C
4630	T/A	4630.T/A
4632	T/C	4632.T/C
4641	C/T	4641.C/T
4642	A/G	4642.A/G
4649	T/C	4649.T/C
4650	A/C	4650.A/C
4654	T/C	4654.T/C
4657	A/C	4657.A/C
4660	T/C	4660.T/C
4671	C/T	4671.C/T
4674	A/G	4674.A/G
4680	A/G	4680.A/G
4683	A/T	4683.A/T
4686	C/A	4686.C/A
4690	T/C	4690.T/C
4695	T/C	4695.T/C
4701	C/T	4701.C/T
4704	C/T	4704.C/T
4707	C/T	4707.C/T
4713	A/G	4713.A/G
4729	T/C	4729.T/C
4734	G/A	4734.G/A
4741	A/G	4741.A/G
4743	C/T	4743.C/T
4750	A/G	4750.A/G
4753	A/G	4753.A/G
4755	T/C	4755.T/C
4764	A/T	4764.A/T
4767	G/A	4767.G/A
4770	T/C	4770.T/C
4776	C/T	4776.C/T
4779	T/A	4779.T/A
4785	T/C	4785.T/C
4789	T/C	4789.T/C
4794	T/C	4794.T/C

position2	allele2	location2
4801	C/A	4801.C/A
4803	G/A	4803.G/A
4815	T/C	4815.T/C
4818	C/T	4818.C/T
4827	T/C	4827.T/C
4830	C/T	4830.C/T
4836	T/C	4836.T/C
4839	A/G	4839.A/G
4843	A/G	4843.A/G
4869	G/A	4869.G/A
4872	C/T	4872.C/T
4875	A/G	4875.A/G
4876	T/C	4876.T/C
4888	G/A	4888.G/A
4889	C/T	4889.C/T
4894	C/T	4894.C/T
4896	A/G	4896.A/G
4897	T/C	4897.T/C
4905	C/T	4905.C/T
4906	T/C	4906.T/C
4908	A/G	4908.A/G
4916	C/T	4916.C/T
4923	T/C	4923.T/C
4935	A/C	4935.A/C
4936	C/A	4936.C/A
4938	A/C	4938.A/C
4940	C/T	4940.C/T
4944	T/C	4944.T/C
4948	T/A	4948.T/A
4954	G/A	4954.G/A
4956	C/T	4956.C/T
4957	T/C	4957.T/C
4967	A/G	4967.A/G
4978	G/A	4978.G/A
4981	C/G	4981.C/G
4987	A/G	4987.A/G
5016	A/G	5016.A/G
5017	T/C	5017.T/C
5033	T/C	5033.T/C
5034	A/C	5034.A/C
5037	T/A	5037.T/A
5040	C/G	5040.C/G
5041	C/T	5041.C/T
5047	G/A	5047.G/A
5053	A/G	5053.A/G
5058	C/T	5058.C/T
5063	T/C	5063.T/C
5106	C/T	5106.C/T
5110	C/T	5110.C/T
5111	C/A	5111.C/A
5123	A/G	5123.A/G
5133	T/C	5133.T/C

position2	allele2	location2
5140	A/G	5140.A/G
5184	C/G	5184.C/G
5197	C/T	5197.C/T
5202	A/G	5202.A/G
5203	A/G	5203.A/G
5236	G/A	5236.G/A
5280	G/A	5280.G/A
5281	G/A	5281.G/A
5282	A/G	5282.A/G
5289	C/T	5289.C/T
5304	A/C	5304.A/C
5310	T/C	5310.T/C
5311	A/T	5311.A/T
5312	T/A	5312.T/A
5313	C/T	5313.C/T
5314	T/C	5314.T/C
5332	T/C	5332.T/C
5366	C/T	5366.C/T
5375	G/A	5375.G/A
5381	C/T	5381.C/T
5387	T/C	5387.T/C
5393	G/A	5393.G/A
5396	T/C	5396.T/C
5399	T/C	5399.T/C
5410	A/G	5410.A/G
5411	C/T	5411.C/T
5414	A/G	5414.A/G
5420	T/C	5420.T/C
5423	A/G	5423.A/G
5435	T/C	5435.T/C
5451	T/C	5451.T/C
5453	G/A	5453.G/A
5462	C/A	5462.C/A
5465	C/T	5465.C/T
5475	C/T	5475.C/T
5477	A/G	5477.A/G
5483	G/A	5483.G/A
5489	T/C	5489.T/C
5492	T/C	5492.T/C
5496	C/T	5496.C/T
5501	T/G	5501.T/G
5510	A/G	5510.A/G
5519	T/C	5519.T/C
5522	C/A	5522.C/A
5534	C/A	5534.C/A
5540	T/C	5540.T/C
5561	A/G	5561.A/G
5567	G/A	5567.G/A
5573	C/T	5573.C/T
5585	C/A	5585.C/A
5591	A/G	5591.A/G
5598	C/T	5598.C/T

position2	allele2	location2
5600	A/G	5600.A/G
5606	G/C	5606.G/C
5607	T/C	5607.T/C
5609	A/G	5609.A/G
5621	T/C	5621.T/C
5624	G/A	5624.G/A
5630	G/A	5630.G/A
5636	C/T	5636.C/T
5639	C/T	5639.C/T
5642	A/G	5642.A/G
5648	T/C	5648.T/C
5654	G/A	5654.G/A
5666	C/A	5666.C/A
5672	T/C	5672.T/C
5702	T/C	5702.T/C
5705	G/A	5705.G/A
5714	A/G	5714.A/G
5720	A/G	5720.A/G
5726	G/T	5726.G/T
5729	A/G	5729.A/G
5741	C/T	5741.C/T
5748	C/T	5748.C/T
5750	G/A	5750.G/A
5756	C/T	5756.C/T
5759	T/C	5759.T/C
5765	C/T	5765.C/T
5771	A/T	5771.A/T
5780	C/A	5780.C/A
5802	T/C	5802.T/C
5804	A/G	5804.A/G
5808	T/C	5808.T/C
5810	A/G	5810.A/G
5825	T/A	5825.T/A
5834	G/A	5834.G/A
5837	A/T	5837.A/T
5864	C/T	5864.C/T
5873	C/T	5873.C/T
5876	T/C	5876.T/C
5879	A/C	5879.A/C
5888	G/A	5888.G/A
5891	T/C	5891.T/C
5897	T/C	5897.T/C
5903	G/A	5903.G/A
5909	A/G	5909.A/G
5918	A/C	5918.A/C
5933	T/C	5933.T/C
5937	C/T	5937.C/T
5939	C/A	5939.C/A
5940	T/C	5940.T/C
5948	C/A	5948.C/A
5951	G/A	5951.G/A
5954	T/A	5954.T/A

position2	allele2	location2
5975	A/T	5975.A/T
5978	A/G	5978.A/G
5982	T/C	5982.T/C
5984	A/G	5984.A/G
5993	G/T	5993.G/T
5996	T/C	5996.T/C
6002	T/C	6002.T/C
6005	A/G	6005.A/G
6020	C/T	6020.C/T
6032	A/G	6032.A/G
6035	C/T	6035.C/T
6041	C/T	6041.C/T
6042	C/T	6042.C/T
6047	T/C	6047.T/C
6054	C/T	6054.C/T
6056	A/G	6056.A/G
6059	C/T	6059.C/T
6071	G/A	6071.G/A
6074	T/C	6074.T/C
6083	T/C	6083.T/C
6090	C/T	6090.C/T
6092	T/A	6092.T/A
6096	C/T	6096.C/T
6101	C/T	6101.C/T
6104	A/G	6104.A/G
6107	C/T	6107.C/T
6110	A/T	6110.A/T
6116	T/C	6116.T/C
6119	T/C	6119.T/C
6125	T/C	6125.T/C
6128	C/T	6128.C/T
6131	T/C	6131.T/C
6134	C/T	6134.C/T
6137	C/T	6137.C/T
6143	G/A	6143.G/A
6146	A/G	6146.A/G
6155	T/C	6155.T/C
6158	C/T	6158.C/T
6164	T/C	6164.T/C
6167	A/G	6167.A/G
6173	A/G	6173.A/G
6179	A/G	6179.A/G
6188	A/G	6188.A/G
6194	T/C	6194.T/C
6197	G/A	6197.G/A
6200	T/C	6200.T/C
6227	T/C	6227.T/C
6230	G/A	6230.G/A
6233	T/C	6233.T/C
6236	C/T	6236.C/T
6251	A/G	6251.A/G
6254	C/T	6254.C/T

position2	allele2	location2
6269	T/C	6269.T/C
6275	C/T	6275.C/T
6278	C/T	6278.C/T
6281	T/C	6281.T/C
6299	A/T	6299.A/T
6302	G/A	6302.G/A
6305	A/G	6305.A/G
6308	A/T	6308.A/T
6317	T/C	6317.T/C
6324	C/T	6324.C/T
6326	G/A	6326.G/A
6332	A/G	6332.A/G
6335	T/C	6335.T/C
6341	A/G	6341.A/G
6362	A/G	6362.A/G
6368	G/A	6368.G/A
6378	T/C	6378.T/C
6383	G/T	6383.G/T
6393	T/C	6393.T/C
6398	T/C	6398.T/C
6407	C/T	6407.C/T
6410	G/C	6410.G/C
6411	T/C	6411.T/C
6416	A/G	6416.A/G
6419	T/C	6419.T/C
6422	T/C	6422.T/C
6425	C/T	6425.C/T
6426	C/T	6426.C/T
6431	T/C	6431.T/C
6434	T/C	6434.T/C
6437	G/A	6437.G/A
6446	C/T	6446.C/T
6461	T/C	6461.T/C
6464	A/G	6464.A/G
6467	T/C	6467.T/C
6470	T/C	6470.T/C
6473	T/C	6473.T/C
6482	T/C	6482.T/C
6485	T/C	6485.T/C
6491	T/C	6491.T/C
6494	G/T	6494.G/T
6497	T/C	6497.T/C
6512	T/A	6512.T/A
6518	C/T	6518.C/T
6521	T/C	6521.T/C
6524	G/A	6524.G/A
6527	A/C	6527.A/C
6530	A/G	6530.A/G
6548	T/C	6548.T/C
6549	T/C	6549.T/C
6560	T/C	6560.T/C
6563	T/C	6563.T/C

position2	allele2	location2
6569	T/A	6569.T/A
6572	C/T	6572.C/T
6575	T/C	6575.T/C
6578	T/C	6578.T/C
6584	A/G	6584.A/G
6587	G/A	6587.G/A
6590	T/C	6590.T/C
6605	G/A	6605.G/A
6611	G/A	6611.G/A
6614	A/G	6614.A/G
6617	A/G	6617.A/G
6620	T/C	6620.T/C
6641	T/C	6641.T/C
6645	C/T	6645.C/T
6651	T/C	6651.T/C
6656	T/G	6656.T/G
6659	A/T	6659.A/T
6662	A/G	6662.A/G
6665	T/C	6665.T/C
6674	C/T	6674.C/T
6695	T/C	6695.T/C
6698	T/C	6698.T/C
6701	C/T	6701.C/T
6716	C/A	6716.C/A
6725	A/C	6725.A/C
6728	G/A	6728.G/A
6731	T/C	6731.T/C
6737	G/A	6737.G/A
6746	G/A	6746.G/A
6749	G/A	6749.G/A
6752	G/A	6752.G/A
6761	T/C	6761.T/C
6764	T/C	6764.T/C
6767	G/A	6767.G/A
6770	T/C	6770.T/C
6782	T/C	6782.T/C
6785	A/T	6785.A/T
6788	C/T	6788.C/T
6794	A/G	6794.A/G
6797	A/G	6797.A/G
6800	T/C	6800.T/C
6803	T/A	6803.T/A
6815	T/C	6815.T/C
6833	G/A	6833.G/A
6837	C/T	6837.C/T
6842	T/C	6842.T/C
6851	C/T	6851.C/T
6857	A/G	6857.A/G
6866	G/A	6866.G/A
6869	C/T	6869.C/T
6875	A/G	6875.A/G
6881	A/G	6881.A/G

position2	allele2	location2
6887	G/C	6887.G/C
6927	T/C	6927.T/C
6941	A/G	6941.A/G
6943	G/C	6943.G/C
6944	T/C	6944.T/C
6953	T/C	6953.T/C
6969	C/T	6969.C/T
6975	G/A	6975.G/A
7009	T/C	7009.T/C
7012	A/G	7012.A/G
7014	T/C	7014.T/C
7051	A/T	7051.A/T
7075	A/G	7075.A/G
7114	C/T	7114.C/T
7120	A/C	7120.A/C
7129	T/C	7129.T/C
7143	G/A	7143.G/A
7144	T/C	7144.T/C
7147	T/A	7147.T/A
7156	C/T	7156.C/T
7159	T/C	7159.T/C
7162	C/T	7162.C/T
7175	T/C	7175.T/C
7177	G/A	7177.G/A
7183	A/C	7183.A/C
7186	A/G	7186.A/G
7187	T/C	7187.T/C
7195	T/C	7195.T/C
7201	C/T	7201.C/T
7213	A/G	7213.A/G
7219	A/G	7219.A/G
7222	G/A	7222.G/A
7231	A/C	7231.A/C
7240	T/C	7240.T/C
7246	C/A	7246.C/A
7264	A/G	7264.A/G
7267	C/T	7267.C/T
7273	G/T	7273.G/T
7279	C/T	7279.C/T
7282	C/A	7282.C/A
7288	C/T	7288.C/T
7291	T/C	7291.T/C
7294	T/C	7294.T/C
7303	C/T	7303.C/T
7318	C/A	7318.C/A
7321	T/A	7321.T/A
7322	T/C	7322.T/C
7330	G/A	7330.G/A
7345	C/T	7345.C/T
7354	C/T	7354.C/T
7363	T/C	7363.T/C
7366	A/G	7366.A/G

position2	allele2	location2
7369	T/C	7369.T/C
7384	C/T	7384.C/T
7385	T/C	7385.T/C
7387	A/G	7387.A/G
7405	A/G	7405.A/G
7408	C/T	7408.C/T
7411	A/T	7411.A/T
7426	G/A	7426.G/A
7453	A/C	7453.A/C
7465	T/C	7465.T/C
7468	C/T	7468.C/T
7477	A/G	7477.A/G
7486	C/T	7486.C/T
7487	A/G	7487.A/G
7501	C/T	7501.C/T
7516	T/A	7516.T/A
7517	T/C	7517.T/C
7522	T/C	7522.T/C
7543	A/G	7543.A/G
7546	T/C	7546.T/C
7547	C/T	7547.C/T
7558	C/T	7558.C/T
7561	T/C	7561.T/C
7564	T/C	7564.T/C
7574	C/T	7574.C/T
7579	C/T	7579.C/T
7585	C/T	7585.C/T
7591	T/A	7591.T/A
7597	C/G	7597.C/G
7600	A/G	7600.A/G
7609	A/G	7609.A/G
7612	G/A	7612.G/A
7618	T/C	7618.T/C
7624	G/A	7624.G/A
7636	C/T	7636.C/T
7645	T/C	7645.T/C
7657	T/C	7657.T/C
7681	T/C	7681.T/C
7684	C/A	7684.C/A
7687	A/G	7687.A/G
7690	T/C	7690.T/C
7696	T/C	7696.T/C
7699	G/A	7699.G/A
7711	C/T	7711.C/T
7712	T/G	7712.T/G
7717	A/G	7717.A/G
7720	A/T	7720.A/T
7725	C/A	7725.C/A
7731	T/A	7731.T/A
7734	T/A	7734.T/A
7736	T/C	7736.T/C
7745	A/G	7745.A/G

position2	allele2	location2
7760	A/G	7760.A/G
7784	G/A	7784.G/A
7790	T/A	7790.T/A
7823	T/C	7823.T/C
7829	C/A	7829.C/A
7832	C/T	7832.C/T
7838	T/A	7838.T/A
7839	A/G	7839.A/G
7847	C/T	7847.C/T
7848	T/C	7848.T/C
7857	T/A	7857.T/A
7862	C/A	7862.C/A
7865	C/T	7865.C/T
7868	C/G	7868.C/G
7871	C/T	7871.C/T
7875	C/T	7875.C/T
7880	T/C	7880.T/C
7883	A/G	7883.A/G
7889	A/G	7889.A/G
7890	A/G	7890.A/G
7892	T/A	7892.T/A
7898	T/A	7898.T/A
7903	A/G	7903.A/G
7907	C/T	7907.C/T
7913	A/G	7913.A/G
7915	A/G	7915.A/G
7919	C/A	7919.C/A
7921	A/G	7921.A/G
7923	A/C	7923.A/C
7925	C/T	7925.C/T
7929	T/C	7929.T/C
7932	G/A	7932.G/A
7933	C/T	7933.C/T
7934	T/C	7934.T/C
7935	A/C	7935.A/C
7937	A/G	7937.A/G
7938	A/T	7938.A/T
7939	T/C	7939.T/C
7941	C/A	7941.C/A
7943	C/T	7943.C/T
7945	A/G	7945.A/G
7950	T/C	7950.T/C
7955	T/C	7955.T/C
7982	C/T	7982.C/T
7990	T/C	7990.T/C
8000	G/A	8000.G/A
8005	C/T	8005.C/T
8006	T/A	8006.T/A
8014	A/G	8014.A/G
8017	T/C	8017.T/C
8023	T/A	8023.T/A
8026	T/C	8026.T/C

position2	allele2	location2
8028	T/C	8028.T/C
8029	G/T	8029.G/T
8032	A/G	8032.A/G
8033	C/T	8033.C/T
8035	G/A	8035.G/A
8036	A/G	8036.A/G
8041	C/A	8041.C/A
8050	T/A	8050.T/A
8053	C/T	8053.C/T
8057	T/C	8057.T/C
8066	A/T	8066.A/T
8071	C/T	8071.C/T
8073	G/A	8073.G/A
8074	T/C	8074.T/C
8077	C/A	8077.C/A
8083	C/T	8083.C/T
8086	T/C	8086.T/C
8092	G/A	8092.G/A
8095	A/G	8095.A/G
8098	C/T	8098.C/T
8101	C/T	8101.C/T
8104	T/C	8104.T/C
8107	G/A	8107.G/A
8110	A/G	8110.A/G
8114	C/T	8114.C/T
8123	C/T	8123.C/T
8125	A/C	8125.A/C
8126	A/C	8126.A/C
8131	A/C	8131.A/C
8137	A/G	8137.A/G
8144	G/A	8144.G/A
8152	T/C	8152.T/C
8161	G/A	8161.G/A
8176	T/C	8176.T/C
8179	C/T	8179.C/T
8182	A/G	8182.A/G
8185	T/G	8185.T/G
8194	A/G	8194.A/G
8198	C/T	8198.C/T
8212	A/G	8212.A/G
8219	C/T	8219.C/T
8221	A/C	8221.A/C
8224	T/C	8224.T/C
8227	C/A	8227.C/A
8228	C/T	8228.C/T
8230	A/G	8230.A/G
8236	T/C	8236.T/C
8245	T/C	8245.T/C
8248	G/A	8248.G/A
8257	A/C	8257.A/C
8261	C/T	8261.C/T
8262	T/C	8262.T/C

position2	allele2	location2
8263	C/G	8263.C/G
8275	C/A	8275.C/A
8287	C/T	8287.C/T
8293	A/G	8293.A/G
8317	T/G	8317.T/G
8324	T/C	8324.T/C
8326	T/C	8326.T/C
8329	G/A	8329.G/A
8332	C/T	8332.C/T
8335	A/G	8335.A/G
8338	A/C	8338.A/C
8341	C/T	8341.C/T
8342	T/C	8342.T/C
8353	T/C	8353.T/C
8356	A/G	8356.A/G
8386	A/C	8386.A/C
8389	A/G	8389.A/G
8396	G/A	8396.G/A
8404	A/G	8404.A/G
8407	T/A	8407.T/A
8414	C/T	8414.C/T
8419	T/C	8419.T/C
8422	T/C	8422.T/C
8425	A/G	8425.A/G
8428	C/T	8428.C/T
8431	A/G	8431.A/G
8434	T/C	8434.T/C
8435	C/T	8435.C/T
8437	A/G	8437.A/G
8440	C/T	8440.C/T
8443	T/C	8443.T/C
8452	C/A	8452.C/A
8458	T/C	8458.T/C
8464	T/C	8464.T/C
8476	C/A	8476.C/A
8477	C/T	8477.C/T
8482	C/T	8482.C/T
8485	T/C	8485.T/C
8486	T/C	8486.T/C
8488	G/A	8488.G/A
8500	T/C	8500.T/C
8503	C/T	8503.C/T
8504	T/C	8504.T/C
8509	T/C	8509.T/C
8512	T/A	8512.T/A
8518	T/C	8518.T/C
8521	T/C	8521.T/C
8524	C/T	8524.C/T
8527	G/T	8527.G/T
8534	G/A	8534.G/A
8536	T/C	8536.T/C
8537	T/C	8537.T/C

position2	allele2	location2
8542	C/T	8542.C/T
8551	T/A	8551.T/A
8558	A/G	8558.A/G
8560	C/T	8560.C/T
8561	C/T	8561.C/T
8572	C/T	8572.C/T
8575	G/C	8575.G/C
8581	T/C	8581.T/C
8584	T/C	8584.T/C
8587	T/C	8587.T/C
8590	C/T	8590.C/T
8591	T/C	8591.T/C
8599	A/G	8599.A/G
8605	T/C	8605.T/C
8608	T/C	8608.T/C
8614	C/A	8614.C/A
8615	T/C	8615.T/C
8623	G/A	8623.G/A
8644	C/T	8644.C/T
8664	T/C	8664.T/C
8667	C/T	8667.C/T
8676	C/T	8676.C/T
8685	C/T	8685.C/T
8688	A/G	8688.A/G
8700	G/A	8700.G/A
8703	G/A	8703.G/A
8709	A/G	8709.A/G
8715	T/A	8715.T/A
8724	C/A	8724.C/A
8739	T/C	8739.T/C
8743	A/G	8743.A/G
8760	T/C	8760.T/C
8766	G/A	8766.G/A
8772	C/T	8772.C/T
8773	C/T	8773.C/T
8778	T/C	8778.T/C
8781	A/T	8781.A/T
8782	T/C	8782.T/C
8788	T/C	8788.T/C
8790	C/T	8790.C/T
8796	C/T	8796.C/T
8800	C/A	8800.C/A
8801	T/C	8801.T/C
8802	G/A	8802.G/A
8803	T/C	8803.T/C
8808	C/T	8808.C/T
8811	A/G	8811.A/G
8814	C/T	8814.C/T
8817	G/A	8817.G/A
8823	G/A	8823.G/A
8829	T/C	8829.T/C
8832	G/A	8832.G/A

position2	allele2	location2
8833	A/G	8833.A/G
8835	C/T	8835.C/T
8847	A/G	8847.A/G
8850	C/T	8850.C/T
8859	T/C	8859.T/C
8862	T/C	8862.T/C
8868	T/C	8868.T/C
8870	T/C	8870.T/C
8874	A/G	8874.A/G
8892	C/T	8892.C/T
8899	G/A	8899.G/A
8901	T/C	8901.T/C
8904	T/A	8904.T/A
8913	A/C	8913.A/C
8922	A/T	8922.A/T
8925	T/C	8925.T/C
8928	C/T	8928.C/T
8931	T/C	8931.T/C
8934	A/T	8934.A/T
8943	C/T	8943.C/T
8952	T/C	8952.T/C
8958	C/T	8958.C/T
8970	C/T	8970.C/T
8973	T/A	8973.T/A
8976	T/C	8976.T/C
8979	T/C	8979.T/C
8985	T/C	8985.T/C
9000	T/A	9000.T/A
9003	T/C	9003.T/C
9006	C/T	9006.C/T
9012	T/C	9012.T/C
9023	A/T	9023.A/T
9024	C/T	9024.C/T
9026	C/G	9026.C/G
9027	A/C	9027.A/C
9028	T/C	9028.T/C
9030	A/T	9030.A/T
9036	G/C	9036.G/C
9054	A/T	9054.A/T
9069	C/A	9069.C/A
9072	A/G	9072.A/G
9075	A/C	9075.A/C
9078	T/A	9078.T/A
9081	T/C	9081.T/C
9084	T/C	9084.T/C
9093	T/C	9093.T/C
9096	T/C	9096.T/C
9099	T/C	9099.T/C
9100	T/C	9100.T/C
9111	T/C	9111.T/C
9120	A/G	9120.A/G
9123	T/C	9123.T/C

position2	allele2	location2
9136	T/C	9136.T/C
9141	C/T	9141.C/T
9147	A/T	9147.A/T
9154	T/C	9154.T/C
9165	T/C	9165.T/C
9168	T/C	9168.T/C
9171	G/A	9171.G/A
9175	T/C	9175.T/C
9177	A/T	9177.A/T
9180	G/A	9180.G/A
9186	C/T	9186.C/T
9192	C/T	9192.C/T
9204	T/C	9204.T/C
9207	T/C	9207.T/C
9219	T/C	9219.T/C
9222	G/A	9222.G/A
9225	A/C	9225.A/C
9228	C/T	9228.C/T
9231	A/G	9231.A/G
9234	T/C	9234.T/C
9237	C/A	9237.C/A
9240	T/C	9240.T/C
9246	A/G	9246.A/G
9249	C/T	9249.C/T
9252	T/C	9252.T/C
9258	T/C	9258.T/C
9265	T/C	9265.T/C
9267	A/G	9267.A/G
9270	C/T	9270.C/T
9279	T/C	9279.T/C
9285	T/C	9285.T/C
9294	C/T	9294.C/T
9297	C/T	9297.C/T
9300	G/C	9300.G/C
9306	C/T	9306.C/T
9307	C/A	9307.C/A
9309	C/G	9309.C/G
9315	G/A	9315.G/A
9318	A/G	9318.A/G
9319	T/C	9319.T/C
9336	A/T	9336.A/T
9339	C/T	9339.C/T
9348	C/T	9348.C/T
9360	C/T	9360.C/T
9369	A/G	9369.A/G
9372	T/C	9372.T/C
9381	T/C	9381.T/C
9384	T/C	9384.T/C
9393	C/A	9393.C/A
9396	G/A	9396.G/A
9403	T/C	9403.T/C
9405	G/A	9405.G/A

position2	allele2	location2
9411	A/T	9411.A/T
9414	T/C	9414.T/C
9417	T/C	9417.T/C
9432	C/T	9432.C/T
9435	T/C	9435.T/C
9449	C/T	9449.C/T
9472	G/A	9472.G/A
9478	C/T	9478.C/T
9488	C/T	9488.C/T
9492	G/A	9492.G/A
9504	A/T	9504.A/T
9508	G/A	9508.G/A
9510	T/A	9510.T/A
9514	T/C	9514.T/C
9520	T/C	9520.T/C
9522	G/A	9522.G/A
9528	T/C	9528.T/C
9532	G/A	9532.G/A
9534	A/T	9534.A/T
9535	A/T	9535.A/T
9536	C/T	9536.C/T
9537	C/A	9537.C/A
9540	A/G	9540.A/G
9543	A/T	9543.A/T
9547	T/C	9547.T/C
9552	T/C	9552.T/C
9556	C/A	9556.C/A
9567	C/T	9567.C/T
9573	T/C	9573.T/C
9576	C/T	9576.C/T
9579	G/A	9579.G/A
9588	C/T	9588.C/T
9591	T/C	9591.T/C
9592	A/G	9592.A/G
9594	A/C	9594.A/C
9600	G/A	9600.G/A
9606	C/T	9606.C/T
9609	C/T	9609.C/T
9621	T/C	9621.T/C
9633	G/A	9633.G/A
9639	T/G	9639.T/G
9645	C/T	9645.C/T
9646	C/T	9646.C/T
9651	T/A	9651.T/A
9654	C/T	9654.C/T
9672	A/G	9672.A/G
9678	C/A	9678.C/A
9681	C/T	9681.C/T
9687	T/C	9687.T/C
9690	G/A	9690.G/A
9693	T/C	9693.T/C
9696	C/T	9696.C/T

position2	allele2	location2
9700	C/T	9700.C/T
9708	T/C	9708.T/C
9711	A/C	9711.A/C
9720	C/T	9720.C/T
9723	A/G	9723.A/G
9726	T/A	9726.T/A
9732	A/G	9732.A/G
9735	G/A	9735.G/A
9747	C/T	9747.C/T
9759	A/T	9759.A/T
9762	A/G	9762.A/G
9771	A/G	9771.A/G
9780	A/T	9780.A/T
9785	T/A	9785.T/A
9786	C/T	9786.C/T
9790	C/A	9790.C/A
9792	C/T	9792.C/T
9795	A/G	9795.A/G
9801	G/A	9801.G/A
9810	G/A	9810.G/A
9819	G/A	9819.G/A
9822	C/T	9822.C/T
9828	G/A	9828.G/A
9831	G/C	9831.G/C
9843	C/T	9843.C/T
9864	G/A	9864.G/A
9867	A/T	9867.A/T
9892	G/A	9892.G/A
9904	T/A	9904.T/A
9918	C/T	9918.C/T
9939	T/C	9939.T/C
9945	T/C	9945.T/C
9954	C/T	9954.C/T
9960	T/A	9960.T/A
9963	T/A	9963.T/A
9964	C/T	9964.C/T
9969	A/G	9969.A/G
9972	T/C	9972.T/C
9978	T/C	9978.T/C
9979	G/A	9979.G/A
9981	T/C	9981.T/C
9984	T/C	9984.T/C
9990	A/C	9990.A/C
10005	G/A	10005.G/A
10008	A/G	10008.A/G
10015	T/C	10015.T/C
10020	G/A	10020.G/A
10026	A/G	10026.A/G
10030	T/C	10030.T/C
10032	A/G	10032.A/G
10041	T/C	10041.T/C
10044	A/G	10044.A/G

position2	allele2	location2
10047	A/G	10047.A/G
10056	A/G	10056.A/G
10062	T/C	10062.T/C
10065	C/G	10065.C/G
10068	C/T	10068.C/T
10086	C/T	10086.C/T
10092	G/A	10092.G/A
10101	C/T	10101.C/T
10107	A/G	10107.A/G
10116	T/C	10116.T/C
10119	T/C	10119.T/C
10137	A/G	10137.A/G
10141	C/T	10141.C/T
10155	T/C	10155.T/C
10170	C/T	10170.C/T
10173	C/T	10173.C/T
10176	G/A	10176.G/A
10182	T/C	10182.T/C
10183	T/C	10183.T/C
10185	C/T	10185.C/T
10188	A/G	10188.A/G
10204	T/C	10204.T/C
10223	C/T	10223.C/T
10226	C/T	10226.C/T
10232	T/C	10232.T/C
10233	A/G	10233.A/G
10234	T/C	10234.T/C
10235	C/T	10235.C/T
10241	A/T	10241.A/T
10244	C/T	10244.C/T
10250	T/A	10250.T/A
10258	T/C	10258.T/C
10287	A/T	10287.A/T
10289	G/C	10289.G/C
10294	C/T	10294.C/T
10298	T/C	10298.T/C
10299	G/A	10299.G/A
10301	T/C	10301.T/C
10302	T/C	10302.T/C
10310	C/T	10310.C/T
10314	T/C	10314.T/C
10316	A/G	10316.A/G
10319	C/T	10319.C/T
10322	C/T	10322.C/T
10325	A/G	10325.A/G
10327	T/C	10327.T/C
10328	C/T	10328.C/T
10331	C/T	10331.C/T
10337	C/T	10337.C/T
10343	A/G	10343.A/G
10346	T/C	10346.T/C
10349	T/C	10349.T/C

position2	allele2	location2
10352	T/C	10352.T/C
10355	A/C	10355.A/C
10356	T/C	10356.T/C
10358	G/A	10358.G/A
10364	C/G	10364.C/G
10371	A/C	10371.A/C
10376	T/C	10376.T/C
10382	T/C	10382.T/C
10385	T/C	10385.T/C
10394	G/A	10394.G/A
10404	T/C	10404.T/C
10406	A/G	10406.A/G
10412	T/C	10412.T/C
10427	G/A	10427.G/A
10430	C/A	10430.C/A
10437	C/T	10437.C/T
10439	T/G	10439.T/G
10452	C/T	10452.C/T
10453	A/C	10453.A/C
10458	T/C	10458.T/C
10469	A/G	10469.A/G
10472	C/T	10472.C/T
10473	T/C	10473.T/C
10477	C/T	10477.C/T
10478	T/C	10478.T/C
10496	T/C	10496.T/C
10511	T/A	10511.T/A
10518	T/C	10518.T/C
10520	G/A	10520.G/A
10524	C/T	10524.C/T
10535	T/C	10535.T/C
10541	T/C	10541.T/C
10545	T/A	10545.T/A
10547	T/A	10547.T/A
10551	C/T	10551.C/T
10553	C/A	10553.C/A
10559	T/C	10559.T/C
10562	T/C	10562.T/C
10565	C/T	10565.C/T
10568	C/T	10568.C/T
10574	T/C	10574.T/C
10580	A/T	10580.A/T
10583	A/C	10583.A/C
10586	G/A	10586.G/A
10592	G/C	10592.G/C
10595	C/T	10595.C/T
10598	G/T	10598.G/T
10601	C/T	10601.C/T
10607	T/C	10607.T/C
10613	A/G	10613.A/G
10616	A/G	10616.A/G
10619	A/T	10619.A/T

position2	allele2	location2
10625	A/G	10625.A/G
10628	T/C	10628.T/C
10646	A/G	10646.A/G
10649	C/A	10649.C/A
10656	T/C	10656.T/C
10658	A/G	10658.A/G
10664	T/C	10664.T/C
10666	C/A	10666.C/A
10667	T/C	10667.T/C
10670	A/G	10670.A/G
10672	T/C	10672.T/C
10679	C/T	10679.C/T
10682	C/A	10682.C/A
10688	C/T	10688.C/T
10691	A/C	10691.A/C
10697	T/A	10697.T/A
10700	C/T	10700.C/T
10703	T/G	10703.T/G
10709	C/T	10709.C/T
10712	C/A	10712.C/A
10716	T/A	10716.T/A
10721	G/A	10721.G/A
10727	C/T	10727.C/T
10733	T/C	10733.T/C
10736	T/C	10736.T/C
10745	T/C	10745.T/C
10757	C/T	10757.C/T
10766	G/A	10766.G/A
10769	A/G	10769.A/G
10771	A/G	10771.A/G
10784	T/C	10784.T/C
10790	C/T	10790.C/T
10796	A/G	10796.A/G
10797	C/T	10797.C/T
10799	G/A	10799.G/A
10805	C/T	10805.C/T
10808	A/G	10808.A/G
10811	A/G	10811.A/G
10814	A/T	10814.A/T
10826	G/A	10826.G/A
10832	T/C	10832.T/C
10862	A/G	10862.A/G
10868	C/T	10868.C/T
10892	C/T	10892.C/T
10895	A/G	10895.A/G
10904	C/A	10904.C/A
10907	T/C	10907.T/C
10913	C/T	10913.C/T
10928	C/T	10928.C/T
10931	T/C	10931.T/C
10934	C/T	10934.C/T
10937	G/A	10937.G/A

position2	allele2	location2
10946	T/C	10946.T/C
10961	T/C	10961.T/C
10967	G/A	10967.G/A
10971	A/G	10971.A/G
10973	T/C	10973.T/C
10974	T/C	10974.T/C
10976	C/G	10976.C/G
10981	C/T	10981.C/T
10995	A/T	10995.A/T
10998	T/C	10998.T/C
11000	A/G	11000.A/G
11003	T/A	11003.T/A
11009	A/G	11009.A/G
11018	C/T	11018.C/T
11021	A/G	11021.A/G
11024	A/T	11024.A/T
11027	C/T	11027.C/T
11033	C/T	11033.C/T
11037	C/T	11037.C/T
11039	C/A	11039.C/A
11048	A/G	11048.A/G
11051	T/C	11051.T/C
11060	C/T	11060.C/T
11066	T/C	11066.T/C
11075	C/T	11075.C/T
11081	T/C	11081.T/C
11084	T/C	11084.T/C
11090	G/A	11090.G/A
11096	G/T	11096.G/T
11099	T/C	11099.T/C
11102	C/T	11102.C/T
11111	T/A	11111.T/A
11117	T/C	11117.T/C
11126	A/G	11126.A/G
11135	T/C	11135.T/C
11141	T/G	11141.T/G
11159	T/C	11159.T/C
11177	C/A	11177.C/A
11180	A/C	11180.A/C
11193	T/C	11193.T/C
11204	C/A	11204.C/A
11207	T/C	11207.T/C
11218	T/C	11218.T/C
11222	T/C	11222.T/C
11225	C/T	11225.C/T
11249	A/C	11249.A/C
11252	T/C	11252.T/C
11264	T/C	11264.T/C
11270	A/G	11270.A/G
11276	A/T	11276.A/T
11279	C/T	11279.C/T
11289	T/C	11289.T/C

position2	allele2	location2
11294	A/G	11294.A/G
11297	C/T	11297.C/T
11301	A/G	11301.A/G
11306	T/C	11306.T/C
11309	G/A	11309.G/A
11312	T/C	11312.T/C
11315	C/T	11315.C/T
11318	T/C	11318.T/C
11330	T/C	11330.T/C
11331	C/T	11331.C/T
11333	T/A	11333.T/A
11336	C/T	11336.C/T
11339	A/G	11339.A/G
11342	A/G	11342.A/G
11345	A/G	11345.A/G
11348	T/C	11348.T/C
11354	G/A	11354.G/A
11358	T/G	11358.T/G
11378	C/T	11378.C/T
11384	T/A	11384.T/A
11393	A/G	11393.A/G
11402	T/A	11402.T/A
11408	T/C	11408.T/C
11410	C/T	11410.C/T
11414	C/T	11414.C/T
11420	C/T	11420.C/T
11423	A/T	11423.A/T
11426	C/T	11426.C/T
11427	T/A	11427.T/A
11429	A/C	11429.A/C
11432	T/A	11432.T/A
11439	T/C	11439.T/C
11444	C/T	11444.C/T
11447	C/T	11447.C/T
11456	T/C	11456.T/C
11459	T/C	11459.T/C
11463	T/C	11463.T/C
11466	T/A	11466.T/A
11477	C/T	11477.C/T
11483	T/C	11483.T/C
11492	A/G	11492.A/G
11495	A/C	11495.A/C
11498	C/T	11498.C/T
11504	A/G	11504.A/G
11507	A/G	11507.A/G
11510	T/C	11510.T/C
11519	G/A	11519.G/A
11523	T/C	11523.T/C
11525	G/C	11525.G/C
11529	C/T	11529.C/T
11531	A/G	11531.A/G
11534	G/A	11534.G/A

position2	allele2	location2
11538	C/T	11538.C/T
11540	A/G	11540.A/G
11543	C/T	11543.C/T
11549	A/G	11549.A/G
11553	C/A	11553.C/A
11555	T/C	11555.T/C
11556	A/G	11556.A/G
11557	A/C	11557.A/C
11561	T/A	11561.T/A
11564	A/G	11564.A/G
11565	A/T	11565.A/T
11567	T/G	11567.T/G
11573	C/G	11573.C/G
11576	T/G	11576.T/G
11588	T/C	11588.T/C
11590	A/G	11590.A/G
11611	T/C	11611.T/C
11621	G/A	11621.G/A
11625	A/G	11625.A/G
11627	C/T	11627.C/T
11642	C/T	11642.C/T
11651	T/C	11651.T/C
11665	C/T	11665.C/T
11681	T/C	11681.T/C
11699	G/A	11699.G/A
11740	G/A	11740.G/A
11754	C/T	11754.C/T
11763	T/C	11763.T/C
11775	A/G	11775.A/G
11776	G/A	11776.G/A
11797	T/C	11797.T/C
11798	T/G	11798.T/G
11800	T/C	11800.T/C
11803	A/C	11803.A/C
11809	A/G	11809.A/G
11815	A/T	11815.A/T
11819	C/T	11819.C/T
11820	T/A	11820.T/A
11823	T/C	11823.T/C
11824	T/C	11824.T/C
11825	A/T	11825.A/T
11827	T/A	11827.T/A
11830	T/C	11830.T/C
11833	T/C	11833.T/C
11834	T/C	11834.T/C
11836	G/A	11836.G/A
11839	C/A	11839.C/A
11849	T/A	11849.T/A
11857	T/C	11857.T/C
11860	A/G	11860.A/G
11863	T/C	11863.T/C
11872	A/C	11872.A/C

position2	allele2	location2
11873	T/A	11873.T/A
11876	C/T	11876.C/T
11881	C/T	11881.C/T
11887	C/T	11887.C/T
11899	C/A	11899.C/A
11902	T/A	11902.T/A
11905	T/C	11905.T/C
11908	T/C	11908.T/C
11909	T/C	11909.T/C
11914	G/A	11914.G/A
11917	C/T	11917.C/T
11935	C/T	11935.C/T
11936	A/G	11936.A/G
11944	A/G	11944.A/G
11953	C/T	11953.C/T
11956	G/T	11956.G/T
11967	C/T	11967.C/T
11968	A/G	11968.A/G
11969	A/G	11969.A/G
11971	T/A	11971.T/A
11972	A/G	11972.A/G
11974	T/C	11974.T/C
11977	A/G	11977.A/G
11986	T/C	11986.T/C
11995	A/G	11995.A/G
12004	T/C	12004.T/C
12013	A/G	12013.A/G
12016	C/T	12016.C/T
12019	G/A	12019.G/A
12022	T/C	12022.T/C
12025	C/T	12025.C/T
12029	T/C	12029.T/C
12034	C/T	12034.C/T
12049	C/T	12049.C/T
12058	T/C	12058.T/C
12061	A/G	12061.A/G
12064	C/T	12064.C/T
12065	C/T	12065.C/T
12067	T/G	12067.T/G
12076	G/A	12076.G/A
12082	T/C	12082.T/C
12085	C/T	12085.C/T
12088	A/G	12088.A/G
12091	A/G	12091.A/G
12115	C/A	12115.C/A
12118	T/C	12118.T/C
12121	T/C	12121.T/C
12127	T/C	12127.T/C
12133	G/A	12133.G/A
12139	C/T	12139.C/T
12142	G/A	12142.G/A
12145	C/T	12145.C/T

position2	allele2	location2
12148	T/C	12148.T/C
12151	C/T	12151.C/T
12152	T/A	12152.T/A
12157	C/T	12157.C/T
12160	C/T	12160.C/T
12173	G/A	12173.G/A
12175	C/T	12175.C/T
12181	T/G	12181.T/G
12199	C/T	12199.C/T
12203	C/T	12203.C/T
12205	A/G	12205.A/G
12211	T/C	12211.T/C
12214	T/C	12214.T/C
12226	T/A	12226.T/A
12238	A/T	12238.A/T
12259	G/A	12259.G/A
12265	C/T	12265.C/T
12270	C/G	12270.C/G
12271	C/A	12271.C/A
12274	T/C	12274.T/C
12298	C/T	12298.C/T
12299	G/A	12299.G/A
12301	C/T	12301.C/T
12313	T/A	12313.T/A
12325	A/C	12325.A/C
12328	C/A	12328.C/A
12334	T/C	12334.T/C
12338	A/G	12338.A/G
12340	C/T	12340.C/T
12352	T/C	12352.T/C
12353	C/T	12353.C/T
12359	A/C	12359.A/C
12362	T/C	12362.T/C
12367	C/T	12367.C/T
12368	A/G	12368.A/G
12370	A/G	12370.A/G
12388	C/T	12388.C/T
12391	C/T	12391.C/T
12394	T/A	12394.T/A
12395	A/T	12395.A/T
12397	G/A	12397.G/A
12398	A/G	12398.A/G
12406	T/C	12406.T/C
12409	T/C	12409.T/C
12410	T/C	12410.T/C
12418	G/T	12418.G/T
12421	A/C	12421.A/C
12422	C/T	12422.C/T
12425	C/T	12425.C/T
12430	C/T	12430.C/T
12433	A/T	12433.A/T
12434	C/T	12434.C/T

position2	allele2	location2
12445	T/C	12445.T/C
12451	T/C	12451.T/C
12460	T/C	12460.T/C
12469	C/A	12469.C/A
12475	T/C	12475.T/C
12478	C/A	12478.C/A
12493	C/T	12493.C/T
12496	A/G	12496.A/G
12499	A/G	12499.A/G
12502	C/T	12502.C/T
12505	C/A	12505.C/A
12508	T/C	12508.T/C
12511	T/C	12511.T/C
12526	T/C	12526.T/C
12532	A/C	12532.A/C
12535	C/T	12535.C/T
12538	A/T	12538.A/T
12547	A/C	12547.A/C
12553	A/G	12553.A/G
12562	T/A	12562.T/A
12565	T/A	12565.T/A
12568	C/T	12568.C/T
12571	C/T	12571.C/T
12574	T/C	12574.T/C
12577	T/C	12577.T/C
12580	A/C	12580.A/C
12589	G/A	12589.G/A
12592	T/A	12592.T/A
12595	C/T	12595.C/T
12597	A/C	12597.A/C
12604	T/C	12604.T/C
12617	T/C	12617.T/C
12622	C/T	12622.C/T
12623	T/C	12623.T/C
12632	A/G	12632.A/G
12634	T/C	12634.T/C
12640	A/G	12640.A/G
12643	A/G	12643.A/G
12649	C/T	12649.C/T
12670	G/A	12670.G/A
12673	C/T	12673.C/T
12676	T/C	12676.T/C
12679	C/T	12679.C/T
12691	A/T	12691.A/T
12694	G/A	12694.G/A
12718	C/A	12718.C/A
12727	A/C	12727.A/C
12742	T/C	12742.T/C
12748	G/A	12748.G/A
12751	C/T	12751.C/T
12757	A/G	12757.A/G
12763	C/T	12763.C/T

position2	allele2	location2
12764	T/C	12764.T/C
12766	A/G	12766.A/G
12778	T/C	12778.T/C
12787	T/C	12787.T/C
12799	A/G	12799.A/G
12800	C/T	12800.C/T
12808	A/G	12808.A/G
12814	A/C	12814.A/C
12829	C/T	12829.C/T
12831	G/A	12831.G/A
12832	C/T	12832.C/T
12833	C/T	12833.C/T
12835	A/T	12835.A/T
12838	C/T	12838.C/T
12844	A/G	12844.A/G
12862	G/A	12862.G/A
12865	T/C	12865.T/C
12868	C/A	12868.C/A
12879	T/C	12879.T/C
12889	C/T	12889.C/T
12895	A/G	12895.A/G
12907	T/C	12907.T/C
12910	C/T	12910.C/T
12923	T/C	12923.T/C
12925	A/G	12925.A/G
12934	G/A	12934.G/A
12937	T/A	12937.T/A
12943	T/C	12943.T/C
12949	A/C	12949.A/C
12955	C/T	12955.C/T
12970	C/T	12970.C/T
12977	T/A	12977.T/A
12982	T/C	12982.T/C
13021	A/C	13021.A/C
13025	G/A	13025.G/A
13036	C/T	13036.C/T
13037	C/A	13037.C/A
13038	T/C	13038.T/C
13042	C/T	13042.C/T
13045	T/C	13045.T/C
13057	C/T	13057.C/T
13064	A/C	13064.A/C
13072	T/C	13072.T/C
13075	T/A	13075.T/A
13079	C/T	13079.C/T
13093	T/C	13093.T/C
13095	C/T	13095.C/T
13102	T/C	13102.T/C
13104	T/C	13104.T/C
13106	A/T	13106.A/T
13108	C/A	13108.C/A
13109	C/T	13109.C/T

position2	allele2	location2
13111	T/C	13111.T/C
13130	C/T	13130.C/T
13131	T/A	13131.T/A
13153	A/C	13153.A/C
13156	C/A	13156.C/A
13160	A/C	13160.A/C
13165	A/G	13165.A/G
13171	A/G	13171.A/G
13174	T/C	13174.T/C
13184	A/G	13184.A/G
13198	C/T	13198.C/T
13201	C/T	13201.C/T
13204	A/T	13204.A/T
13222	G/A	13222.G/A
13225	A/G	13225.A/G
13237	A/C	13237.A/C
13243	A/G	13243.A/G
13249	G/A	13249.G/A
13250	A/G	13250.A/G
13252	A/T	13252.A/T
13258	T/C	13258.T/C
13259	G/A	13259.G/A
13289	C/T	13289.C/T
13306	C/A	13306.C/A
13308	C/T	13308.C/T
13309	A/G	13309.A/G
13315	A/G	13315.A/G
13324	T/C	13324.T/C
13328	T/C	13328.T/C
13329	A/C	13329.A/C
13331	C/T	13331.C/T
13332	C/T	13332.C/T
13337	A/C	13337.A/C
13339	T/C	13339.T/C
13342	C/T	13342.C/T
13345	T/C	13345.T/C
13348	A/G	13348.A/G
13351	C/T	13351.C/T
13354	C/A	13354.C/A
13356	G/A	13356.G/A
13369	C/T	13369.C/T
13372	T/C	13372.T/C
13375	A/C	13375.A/C
13381	T/C	13381.T/C
13384	G/A	13384.G/A
13390	C/T	13390.C/T
13393	C/G	13393.C/G
13394	A/G	13394.A/G
13399	T/C	13399.T/C
13408	T/C	13408.T/C
13409	T/C	13409.T/C
13412	A/T	13412.A/T

position2	allele2	location2
13413	C/T	13413.C/T
13414	C/T	13414.C/T
13417	T/A	13417.T/A
13420	C/T	13420.C/T
13423	G/A	13423.G/A
13435	T/C	13435.T/C
13441	T/C	13441.T/C
13444	G/A	13444.G/A
13447	C/T	13447.C/T
13453	C/T	13453.C/T
13457	C/A	13457.C/A
13464	A/G	13464.A/G
13465	C/T	13465.C/T
13466	A/G	13466.A/G
13468	C/T	13468.C/T
13474	C/A	13474.C/A
13484	T/G	13484.T/G
13488	A/T	13488.A/T
13489	T/C	13489.T/C
13490	T/C	13490.T/C
13492	C/T	13492.C/T
13504	T/C	13504.T/C
13507	T/C	13507.T/C
13513	T/A	13513.T/A
13514	A/G	13514.A/G
13531	T/C	13531.T/C
13537	C/T	13537.C/T
13540	A/G	13540.A/G
13546	T/C	13546.T/C
13550	C/T	13550.C/T
13552	A/C	13552.A/C
13555	G/A	13555.G/A
13559	A/G	13559.A/G
13562	C/A	13562.C/A
13567	T/C	13567.T/C
13570	A/G	13570.A/G
13571	A/G	13571.A/G
13572	T/C	13572.T/C
13576	C/A	13576.C/A
13579	T/C	13579.T/C
13582	A/C	13582.A/C
13583	C/T	13583.C/T
13584	T/C	13584.T/C
13588	C/T	13588.C/T
13602	A/T	13602.A/T
13608	T/C	13608.T/C
13614	G/A	13614.G/A
13620	C/T	13620.C/T
13626	G/A	13626.G/A
13630	A/G	13630.A/G
13641	T/C	13641.T/C
13644	G/A	13644.G/A

position2	allele2	location2
13647	T/A	13647.T/A
13652	T/C	13652.T/C
13655	C/T	13655.C/T
13656	C/T	13656.C/T
13661	A/G	13661.A/G
13662	C/T	13662.C/T
13668	T/A	13668.T/A
13674	A/G	13674.A/G
13680	C/T	13680.C/T
13682	G/A	13682.G/A
13683	A/C	13683.A/C
13686	C/T	13686.C/T
13722	G/A	13722.G/A
13728	C/T	13728.C/T
13737	G/A	13737.G/A
13740	C/A	13740.C/A
13743	T/C	13743.T/C
13746	A/G	13746.A/G
13749	C/T	13749.C/T
13752	T/C	13752.T/C
13769	A/G	13769.A/G
13773	T/C	13773.T/C
13794	C/T	13794.C/T
13797	A/G	13797.A/G
13806	A/G	13806.A/G
13809	A/G	13809.A/G
13815	C/T	13815.C/T
13818	T/C	13818.T/C
13826	A/G	13826.A/G
13829	A/G	13829.A/G
13830	A/G	13830.A/G
13836	A/G	13836.A/G
13848	T/C	13848.T/C
13850	G/A	13850.G/A
13851	A/T	13851.A/T
13857	C/T	13857.C/T
13863	T/A	13863.T/A
13866	A/C	13866.A/C
13869	T/C	13869.T/C
13872	C/A	13872.C/A
13875	C/T	13875.C/T
13890	A/T	13890.A/T
13896	C/T	13896.C/T
13905	T/C	13905.T/C
13917	T/A	13917.T/A
13923	T/C	13923.T/C
13935	C/T	13935.C/T
13938	A/G	13938.A/G
13947	A/G	13947.A/G
13950	T/C	13950.T/C
13953	T/C	13953.T/C
13956	C/T	13956.C/T

position2	allele2	location2
13962	T/C	13962.T/C
13965	A/G	13965.A/G
13968	A/G	13968.A/G
13971	A/T	13971.A/T
13974	C/T	13974.C/T
13985	G/A	13985.G/A
13986	A/T	13986.A/T
13992	C/A	13992.C/A
14010	G/A	14010.G/A
14019	T/C	14019.T/C
14021	G/A	14021.G/A
14025	A/C	14025.A/C
14027	G/A	14027.G/A
14046	T/G	14046.T/G
14049	T/C	14049.T/C
14052	A/C	14052.A/C
14055	G/A	14055.G/A
14056	G/A	14056.G/A
14061	A/T	14061.A/T
14070	A/G	14070.A/G
14085	G/A	14085.G/A
14093	A/G	14093.A/G
14124	T/C	14124.T/C
14208	A/G	14208.A/G
14211	C/T	14211.C/T
14223	C/T	14223.C/T
14229	T/C	14229.T/C
14235	T/C	14235.T/C
14236	A/G	14236.A/G
14247	T/C	14247.T/C
14250	C/T	14250.C/T
14253	C/T	14253.C/T
14256	A/C	14256.A/C
14257	G/A	14257.G/A
14259	G/A	14259.G/A
14262	G/A	14262.G/A
14265	T/A	14265.T/A
14268	C/T	14268.C/T
14271	C/T	14271.C/T
14277	T/C	14277.T/C
14292	A/G	14292.A/G
14296	T/C	14296.T/C
14298	A/G	14298.A/G
14311	T/C	14311.T/C
14313	G/T	14313.G/T
14326	C/G	14326.C/G
14327	T/C	14327.T/C
14335	T/C	14335.T/C
14340	C/T	14340.C/T
14346	T/C	14346.T/C
14349	G/A	14349.G/A
14361	G/T	14361.G/T

position2	allele2	location2
14370	C/T	14370.C/T
14373	A/T	14373.A/T
14379	T/C	14379.T/C
14385	A/T	14385.A/T
14391	C/T	14391.C/T
14415	C/T	14415.C/T
14430	C/T	14430.C/T
14433	T/C	14433.T/C
14436	G/A	14436.G/A
14439	C/T	14439.C/T
14445	T/C	14445.T/C
14448	C/A	14448.C/A
14451	T/A	14451.T/A
14454	C/T	14454.C/T
14460	C/T	14460.C/T
14472	A/C	14472.A/C
14476	C/A	14476.C/A
14478	A/G	14478.A/G
14481	T/C	14481.T/C
14484	A/G	14484.A/G
14494	C/T	14494.C/T
14499	T/C	14499.T/C
14502	C/T	14502.C/T
14508	C/T	14508.C/T
14510	A/C	14510.A/C
14532	C/T	14532.C/T
14542	G/A	14542.G/A
14544	A/C	14544.A/C
14545	C/T	14545.C/T
14550	A/G	14550.A/G
14562	A/G	14562.A/G
14574	C/T	14574.C/T
14583	T/C	14583.T/C
14586	A/T	14586.A/T
14587	C/T	14587.C/T
14592	A/G	14592.A/G
14607	A/G	14607.A/G
14610	T/C	14610.T/C
14622	T/C	14622.T/C
14628	C/T	14628.C/T
14631	T/A	14631.T/A
14640	C/A	14640.C/A
14646	C/T	14646.C/T
14649	C/T	14649.C/T
14652	T/C	14652.T/C
14664	T/C	14664.T/C
14667	C/T	14667.C/T
14668	T/C	14668.T/C
14676	A/G	14676.A/G
14682	C/T	14682.C/T
14700	G/A	14700.G/A
14728	G/A	14728.G/A

position2	allele2	location2
14736	T/C	14736.T/C
14739	C/T	14739.C/T
14742	C/T	14742.C/T
14745	C/T	14745.C/T
14748	T/A	14748.T/A
14758	G/A	14758.G/A
14763	T/A	14763.T/A
14764	C/T	14764.C/T
14769	A/G	14769.A/G
14772	A/G	14772.A/G
14775	A/T	14775.A/T
14778	C/T	14778.C/T
14782	C/T	14782.C/T
14790	A/C	14790.A/C
14799	C/A	14799.C/A
14811	C/T	14811.C/T
14814	T/C	14814.T/C
14823	C/T	14823.C/T
14829	A/C	14829.A/C
14847	A/G	14847.A/G
14856	T/C	14856.T/C
14868	C/T	14868.C/T
14871	G/A	14871.G/A
14874	T/C	14874.T/C
14885	C/T	14885.C/T
14886	C/T	14886.C/T
14892	C/T	14892.C/T
14898	C/T	14898.C/T
14899	C/T	14899.C/T
14900	T/C	14900.T/C
14902	A/G	14902.A/G
14904	C/T	14904.C/T
14919	T/C	14919.T/C
14920	T/C	14920.T/C
14925	T/C	14925.T/C
14931	T/A	14931.T/A
14934	C/T	14934.C/T
14937	A/T	14937.A/T
14952	T/C	14952.T/C
14955	C/T	14955.C/T
14960	C/T	14960.C/T
14964	T/C	14964.T/C
14973	C/T	14973.C/T
14976	A/C	14976.A/C
14978	A/G	14978.A/G
14982	C/T	14982.C/T
14985	T/C	14985.T/C
14994	T/C	14994.T/C
15000	T/C	15000.T/C
15003	G/A	15003.G/A
15006	A/G	15006.A/G
15009	T/C	15009.T/C

position2	allele2	location2
15012	T/C	15012.T/C
15018	C/T	15018.C/T
15027	T/C	15027.T/C
15030	C/T	15030.C/T
15033	A/C	15033.A/C
15036	A/G	15036.A/G
15042	T/C	15042.T/C
15048	T/C	15048.T/C
15052	T/C	15052.T/C
15060	T/A	15060.T/A
15063	A/C	15063.A/C
15066	C/A	15066.C/A
15069	C/T	15069.C/T
15075	A/G	15075.A/G
15081	C/A	15081.C/A
15093	G/A	15093.G/A
15097	T/C	15097.T/C
15099	C/T	15099.C/T
15102	T/C	15102.T/C
15105	A/C	15105.A/C
15107	T/A	15107.T/A
15111	C/A	15111.C/A
15117	A/C	15117.A/C
15120	T/A	15120.T/A
15123	G/A	15123.G/A
15129	C/T	15129.C/T
15130	A/G	15130.A/G
15132	C/G	15132.C/G
15144	G/A	15144.G/A
15153	C/T	15153.C/T
15172	T/C	15172.T/C
15175	G/A	15175.G/A
15176	T/C	15176.T/C
15180	C/A	15180.C/A
15183	T/C	15183.T/C
15186	T/C	15186.T/C
15192	T/C	15192.T/C
15198	A/T	15198.A/T
15204	T/C	15204.T/C
15210	A/G	15210.A/G
15213	A/G	15213.A/G
15216	A/G	15216.A/G
15219	T/A	15219.T/A
15228	T/C	15228.T/C
15231	C/T	15231.C/T
15237	T/C	15237.T/C
15240	C/T	15240.C/T
15247	G/A	15247.G/A
15249	C/T	15249.C/T
15252	T/C	15252.T/C
15255	A/C	15255.A/C
15258	A/C	15258.A/C

position2	allele2	location2
15259	T/C	15259.T/C
15261	A/G	15261.A/G
15267	C/T	15267.C/T
15268	A/G	15268.A/G
15270	C/T	15270.C/T
15282	C/T	15282.C/T
15288	A/G	15288.A/G
15294	A/C	15294.A/C
15295	G/A	15295.G/A
15301	G/A	15301.G/A
15315	C/T	15315.C/T
15318	T/C	15318.T/C
15336	T/C	15336.T/C
15347	C/T	15347.C/T
15349	T/A	15349.T/A
15353	C/A	15353.C/A
15380	G/T	15380.G/T
15384	C/T	15384.C/T
15385	C/A	15385.C/A
15386	G/A	15386.G/A
15387	C/T	15387.C/T
15388	C/T	15388.C/T
15394	T/C	15394.T/C
15410	A/G	15410.A/G
15413	T/A	15413.T/A
15415	T/A	15415.T/A
15416	T/C	15416.T/C
15419	T/C	15419.T/C
15425	A/G	15425.A/G
15429	G/A	15429.G/A
15450	C/T	15450.C/T
15459	T/C	15459.T/C
15476	T/G	15476.T/G
15477	A/C	15477.A/C
15478	C/A	15478.C/A
15490	T/C	15490.T/C
15491	A/C	15491.A/C
15494	T/G	15494.T/G
15499	A/T	15499.A/T
15501	C/A	15501.C/A
15504	C/G	15504.C/G
15510	G/A	15510.G/A
15512	G/C	15512.G/C
15514	T/C	15514.T/C
15518	T/C	15518.T/C
15520	A/G	15520.A/G
15521	G/C	15521.G/C
15523	A/C	15523.A/C
15529	G/A	15529.G/A
15530	G/A	15530.G/A
15534	C/T	15534.C/T
15539	C/G	15539.C/G

position2	allele2	location2
15561	A/C	15561.A/C
15564	G/C	15564.G/C
15566	T/A	15566.T/A
15575	G/A	15575.G/A
15576	C/A	15576.C/A
15582	A/G	15582.A/G
15597	T/C	15597.T/C
15599	A/T	15599.A/T
15603	T/A	15603.T/A
15604	C/A	15604.C/A
15612	G/A	15612.G/A
15618	A/G	15618.A/G
15620	C/T	15620.C/T
15622	A/T	15622.A/T
15623	C/G	15623.C/G
15625	C/T	15625.C/T
15630	C/T	15630.C/T
15631	T/A	15631.T/A
15634	T/A	15634.T/A
15635	T/A	15635.T/A
15636	T/A	15636.T/A
15637	C/A	15637.C/A
15640	T/C	15640.T/C
15641	G/C	15641.G/C
15645	G/A	15645.G/A
15649	A/G	15649.A/G
15651	G/A	15651.G/A
15652	A/G	15652.A/G
15655	G/T	15655.G/T
15656	T/A	15656.T/A
15657	A/C	15657.A/C
15661	A/T	15661.A/T
15662	A/G	15662.A/G
15663	A/G	15663.A/G
15664	C/T	15664.C/T
15669	T/C	15669.T/C
15670	A/G	15670.A/G
15683	A/G	15683.A/G
15690	C/A	15690.C/A
15693	A/T	15693.A/T
15720	C/T	15720.C/T
15727	C/T	15727.C/T
15729	T/G	15729.T/G
15734	G/A	15734.G/A
15748	T/C	15748.T/C
15760	C/T	15760.C/T
15761	T/C	15761.T/C
15762	A/G	15762.A/G
15774	A/T	15774.A/T
15783	A/G	15783.A/G
15821	A/T	15821.A/T
15822	A/T	15822.A/T

position2	allele2	location2
15823	C/T	15823.C/T
15824	T/A	15824.T/A
15828	T/G	15828.T/G
15830	A/T	15830.A/T
15849	T/C	15849.T/C
15853	G/T	15853.G/T
15932	T/C	15932.T/C
15935	A/T	15935.A/T
15936	A/T	15936.A/T
15940	T/G	15940.T/G
15941	T/G	15941.T/G
15951	T/C	15951.T/C
15952	C/T	15952.C/T
15965	T/G	15965.T/G
15969	C/T	15969.C/T
15994	T/C	15994.T/C
15999	T/C	15999.T/C
16004	T/A	16004.T/A
16012	G/A	16012.G/A
16031	T/C	16031.T/C
16032	A/G	16032.A/G
16034	T/C	16034.T/C
16042	A/G	16042.A/G
16045	A/G	16045.A/G
16046	C/A	16046.C/A
16086	C/T	16086.C/T
16087	A/G	16087.A/G
16088	T/C	16088.T/C
16090	A/C	16090.A/C
16091	G/A	16091.G/A
16092	A/C	16092.A/C
16142	G/A	16142.G/A
16143	T/C	16143.T/C
16150	G/A	16150.G/A
16151	T/C	16151.T/C
16154	G/A	16154.G/A
16155	T/C	16155.T/C
16158	A/G	16158.A/G
16159	C/T	16159.C/T
16166	A/G	16166.A/G
16167	C/T	16167.C/T
16170	A/G	16170.A/G
16171	C/T	16171.C/T
16174	A/G	16174.A/G
16175	C/T	16175.C/T

```
## plot positions of polymorphic sites
temp2 <- density(position2, bw=10)
plot(temp2, xlab="Position in the alignment", lwd=2, main="Location of the SNPs")
points(position2, rep(0, nLoc(snp_mainland)), pch="|", col="red")

polygon(c(temp$x,rev(temp$x)), c(temp$y, rep(0,length(temp$x))),
```

```
col=transp("blue",.3))
points(position2, rep(0, nLoc(snp_mainland)), pch="|", col="blue")
```
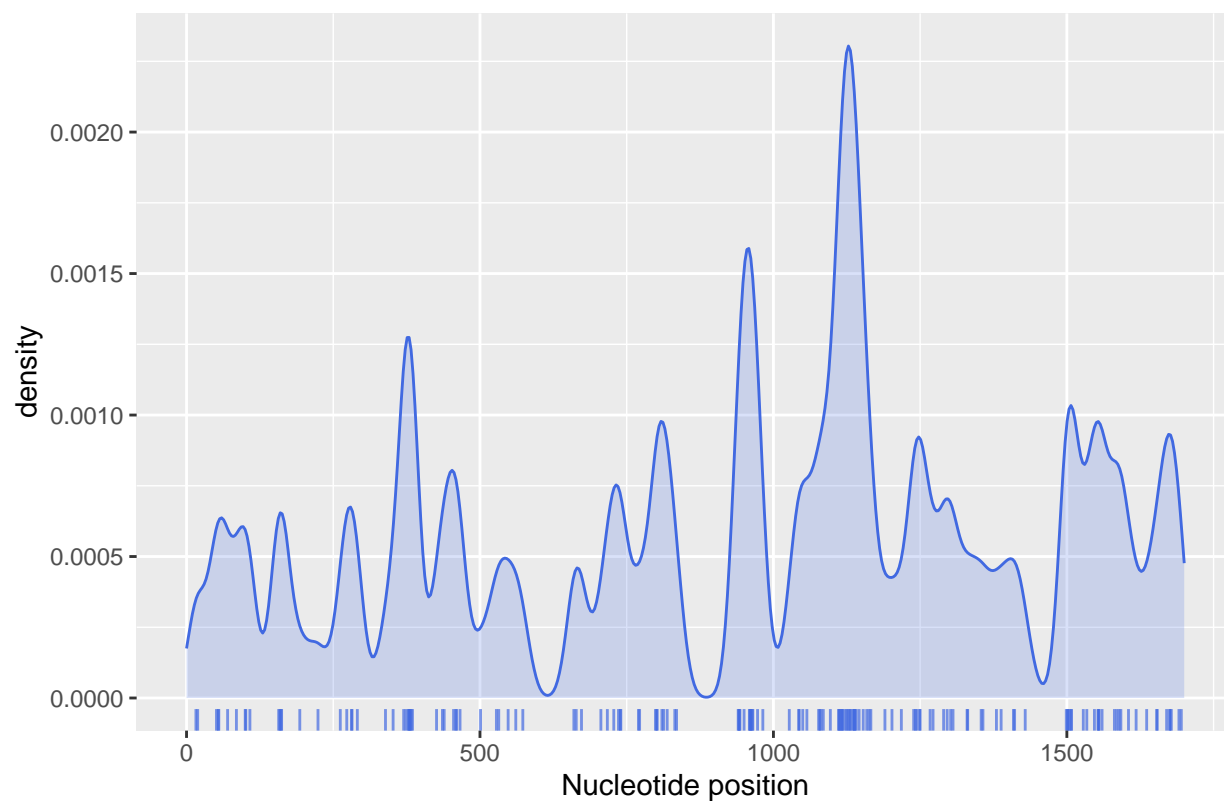
Location of the SNPs

Position in the alignment
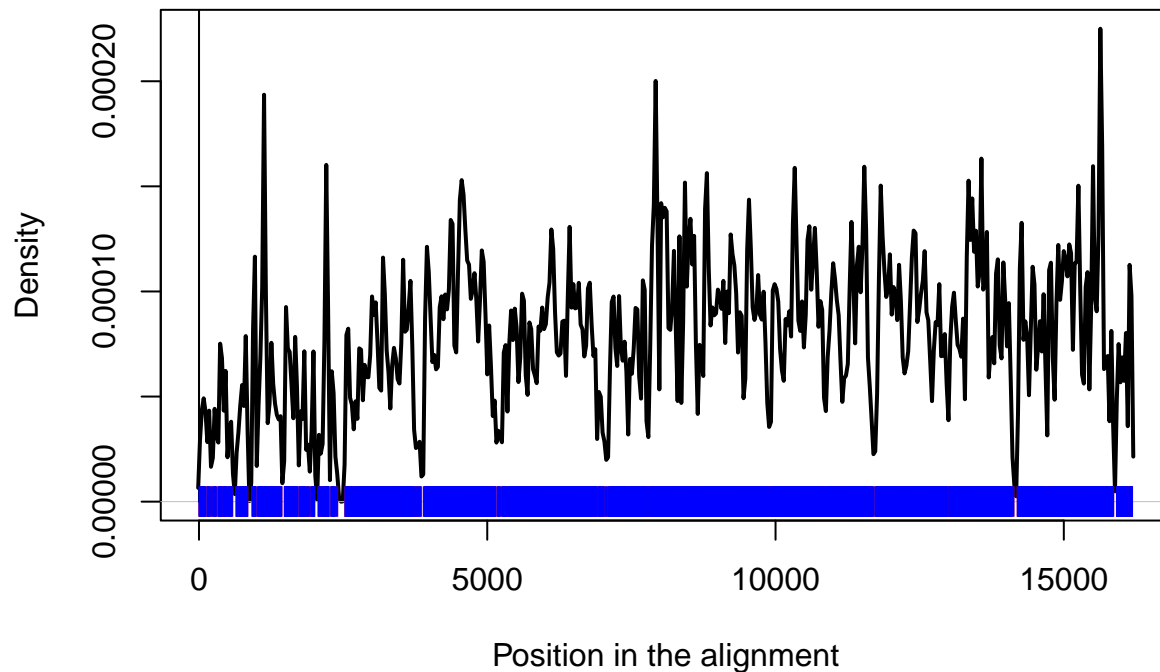
```
#density by codon position
snpposi.plot(position2, genome.size=1700, codon=FALSE)
```
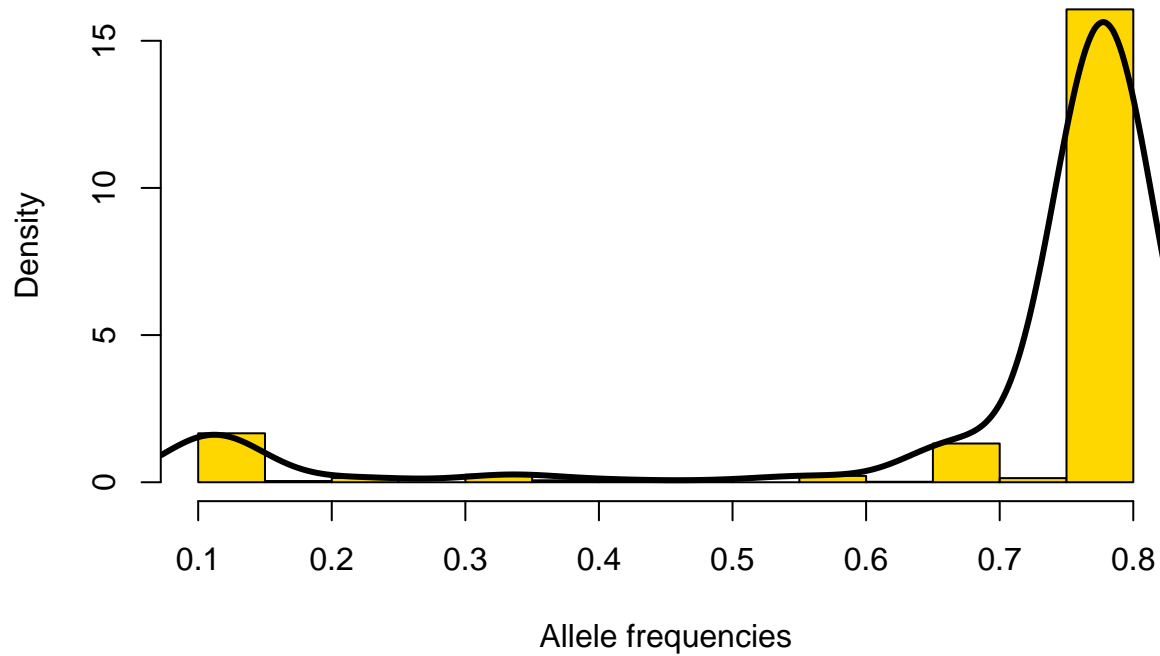
```
## Warning: Removed 2258 rows containing non-finite values (`stat_density()`).
```

## Distribution of SNPs in the genome


```
myFreq2 <- glMean(snp_mainland)
hist(myFreq2, proba=TRUE, col="gold", xlab="Allele frequencies",
main="Distribution of (second) allele frequencies")
temp2 <- density(myFreq2)
lines(temp2$x, temp2$y*1.8,lwd=3)
```

Distribution of (second) allele frequencies

Allele frequencies

```
myFreq2 <- glMean(snp_mainland)
myFreq2 <- c(myFreq2, 1-myFreq2)
hist(myFreq2, proba=TRUE, col="darkseagreen3", xlab="Allele frequencies",
main="Distribution of allele frequencies", nclass=20)
temp2 <- density(myFreq2, bw=.05)
lines(temp2$x, temp2$y*2,lwd=3)
```

Distribution of allele frequencies

Allele frequencies
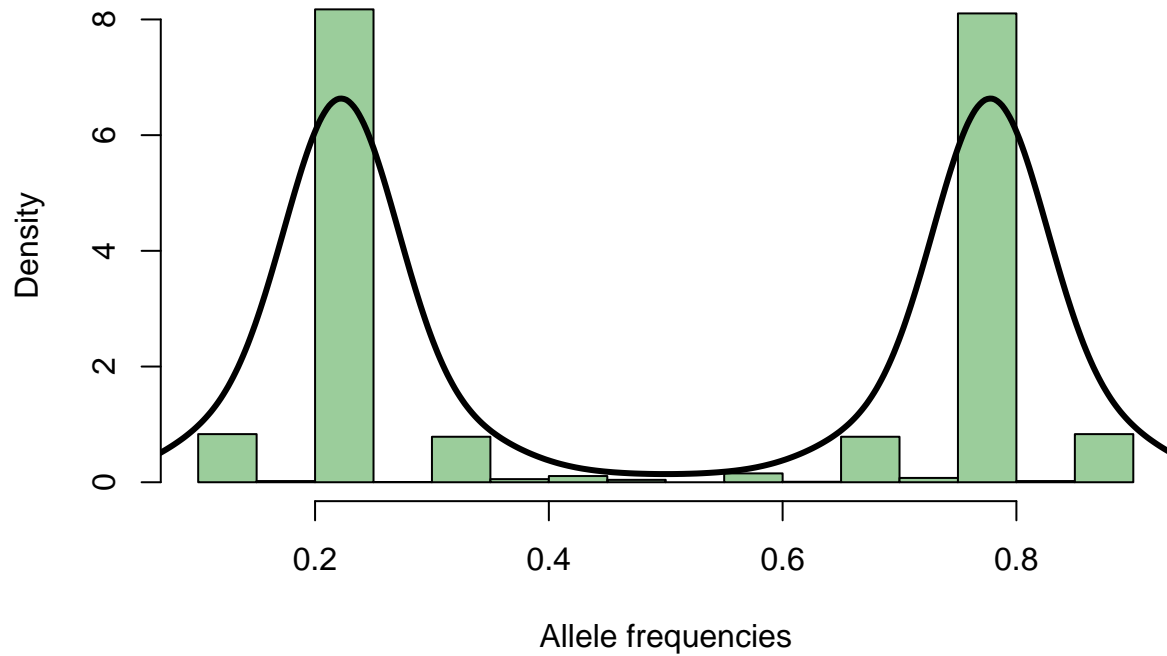
```
tree_island = "((((Urocyon_littoralis_clementae, Urocyon_littoralis_catalinae), Urocyon_littoralis_dicke
    check_tree = read.tree( text=tree_island)
plot( check_tree )
```