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Nuclear and plastid SNP markers for tracing *Cedrela* timber in the tropics

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Abstract

Illegal logging and trade of timber are major worldwide concerns, resulting in biodiversity and economic losses. Tropical tree species in the genus *Cedrela*, which have historically been heavily exploited, are still often illegally traded and there is an urgent need to develop tools to verify the origin of *Cedrela* products. A set of 351 SNP loci for *Cedrela* species from Bolivia, Brazil, Costa Rica, Cuba, Ecuador, French Guiana, Mexico, and Peru was developed using restriction associated DNA sequencing (RADSeq) and low coverage MiSeq genome sequencing, and adapted for MassARRAY genotyping. After screening of 94 individuals covering most of the distribution of *Cedrela*, a final set of 136 SNP loci which included 92 nuclear SNPs, 22 chloroplast markers (20 SNPs and 2 INDELs), and 22 mitochondrial markers (19 SNPs and 3 INDELs) was selected and tested for potential to verify *Cedrela* timber origin.

Keywords: *Cedrela*, tropical timber, SNP, MassARRAY, MiSeq, RADSeq, tracing origin

Illegal logging and trade of timber are global problems, resulting in biodiversity and economic losses. The genus *Cedrela* (Meliaceae) includes some of the most economically valuable tropical timbers, which are often harvested and traded illegally (Mostacedo and Fredericksen 1999; Richter and Dallwitz 2000). *Cedrela* is distributed across the Neotropics from the Pacific Coast of Mexico, through Central America and the Caribbean to Argentina (Chaplin 1980; Francis and Lowe 2000; Toledo et al. 2008). Its wood is used in carpentry, joinery, musical instruments, carvings, and plywood (Toledo et al. 2008). Due to illegal logging and overexploitation, several *Cedrela* species are cited in the Convention on International Trade in Endangered Species of Wild Fauna and Flora in Appendix III (Compt and Christy 2008). As a result, timber from protected species can be traded internationally only if the appropriate permits have been obtained and presented for clearance at the port of entry or exit (CITES 2017). To combat fraud in timber logging and trade effectively, there is an urgent need for objective methods to validate species and origin claims for commodities traded in both local and international markets (UNODC 2016).

DNA fingerprinting offers the potential to verify identity and trace the origins of *Cedrela* timber (Chaves et al. 2018; Honorio Coronado et al. 2019; Meyer-Sand et al. 2018; Paredes-Villanueva et al. 2019). Patterns of spatial genetic structure mean that a probability of geographic origin can be assigned to samples and can assist in testing declarations throughout the chain of custody (Degen et al. 2006, 2013; Lowe et al. 2016). To develop DNA fingerprinting methods for *Cedrela*, we analysed a large reference collection from across Latin America, comprising cambium or leaves from 94 individuals sampled from natural forests in Bolivia, Brazil, Costa Rica, Cuba, Ecuador, French Guiana, Mexico, and Peru. Herbarium specimens were also included when confirmation of species identity was needed (Table 1). DNA was isolated from all cambium and leaves samples according to Dumolin et al. (1995) at the Thünen Institute (Germany), at the São Paulo State University (UNESP), or at the Peruvian Amazon Research Institute (LBGM-IIAP). We selected three individuals for development of nuclear SNP markers (Miller et al. 2007) using restriction site associated DNA sequencing (RADSeq) and six individuals for genome skimming of chloroplast and mitochondrial SNPs and INDELs using Illumina MiSeq genome sequencing (Straub et al. 2012) (Table 2). We selected loci that showed no variation in the 50bp flanking regions and contrasting patterns of allele frequency for genotyping using a MassARRAY® iPLEX™ (Agena Bioscience™, San Diego, USA) (Table 1). This collection was screened with 351 nuclear and plastid SNPs (Online Resource 1). Primers were designed with Assay Design Suite and allele calling was done with Typer Viewer v.4.0.24.71 (Agena Bioscience).

Bayesian clustering was applied in separate analyses of nuclear and plastid markers using STRUCTURE v.2.3.4 (Pritchard et al. 2000) to assess genetic structure in the collection. In both analyses, samples were grouped in three main clusters, subdivided into 10 sub-clusters in the nuclear (Online Resource 2) and 9 sub-clusters in the plastid markers (Online Resource 3). GDA-NT (Degen unpublished) was used, considering genetic groups as populations, to estimate the pairwise population genetic differentiation (Gregorius 1987). A total of 167 SNP/INDEL loci with the highest average genetic differentiation in either one or both marker sets (i.e. nuclear and plastid) were selected. Percentage of amplification per locus was 62-100% for plastid and 66-100% for nuclear loci. Mean genetic differentiation (D_j) (Gregorius 1987) ranged from 0.137 to 0.533 for plastid and from 0.065 to 0.558 for nuclear SNPs (Online Resource 4). After MassARRAY design, the final set comprised 136 informative loci with 92 nuclear, 22 chloroplast and 22 mitochondrial loci in four multiplexes (Online Resource 5). This set of loci can be used for genotyping with the MassARRAY® iPLEX™ platform for genetic cluster assignment and tracing *Cedrela* timber origin.

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Table 1: Country, sampling site, coordinates, and genetic clusters to which *Cedrela* trees used in the initial MassARRAY genotyping were assigned

#	Country	Region (sSampling location)	Species	Herbarium identification	Latitude	Longitude	Nuclear		Plastid	
							Cluster	Sub cluster	Cluster	Sub cluster
1	Bolivia	Cobija, road to Bella Vista	*Cedrela fissilis*	*Cedrela fissilis* Vell.	-11.164478	-68.555158	2	2.2	2	2.2
2	Bolivia	Cobija, road to Bella Vista	*Cedrela fissilis*	*Cedrela fissilis* Vell.	-11.133583	-68.398039	2	2.2	2	2.2
3	Bolivia	Cobija, road to Bella Vista	*Cedrela fissilis*		-11.139192	-68.358647	2	2.2	2	2.2
4	Bolivia	Cobija, road to Bella Vista	*Cedrela fissilis*		-11.193103	-68.282661	2	2.2	2	2.2
5	Bolivia	Cobija, road to Bella Vista	*Cedrela fissilis*		-11.193567	-68.2856	2	2.2	2	2.2
6	Bolivia	Cobija, road to Bella Vista	*Cedrela odorata*		-11.198392	-68.283928	1	1.2.1	3	3.4
7	Bolivia	Cobija, road to Bella Vista	*Cedrela odorata*		-11.198283	-68.279903	1	1.2.1	3	3.4
8	Bolivia	Cobija, road to Bella Vista	*Cedrela odorata*		-11.199111	-68.284444	1	1.2.1	3	3.4
9	Bolivia	Cobija, Villa Fatima	*Cedrela odorata*		-11.103198	-69.108638	1	1.2.1	3	3.4
10	Bolivia	Cobija, Villa Fatima	*Cedrela odorata*		-11.097269	-69.116675	1	1.2.1	3	3.4
11	Bolivia	Cobija, Villa Fatima	*Cedrela odorata*	*Cedrela odorata* L.	-11.09416	-69.12216	1	1.2.1	3	3.4
12	Bolivia	Cobija, Villa Fatima	*Cedrela odorata*		-11.078857	-69.135597	1	1.2.1	3	3.4
13	Bolivia	Rurrenabaque, El Paraiso	*Cedrela fissilis*	*Cedrela fissilis* Vell.	-14.304358	-67.724775	2	2.2	3	3.1
14	Bolivia	Rurrenabaque, El Paraiso	*Cedrela fissilis*	*Cedrela fissilis* Vell.	-14.303914	-67.724858	2	2.2	3	3.1
15	Bolivia	Rurrenabaque, El Paraiso	*Cedrela fissilis*	*Cedrela fissilis* Vell.	-14.303772	-67.725403	2	2.2	3	3.1
16	Bolivia	Rurrenabaque, El Paraiso	*Cedrela fissilis*		-14.613908	-67.319506	2	2.2	3	3.1
17	Bolivia	Rurrenabaque, San Martin de Agua Rica	*Cedrela odorata*		-14.602536	-67.277525	2	2.2	3	3.1
18	Bolivia	Rurrenabaque, San Martin de Agua Rica	*Cedrela odorata*	*Cedrela fissilis* Vell.	-15.526889	-67.26865	2	2.2	3	3.1
19	Bolivia	Rurrenabaque, San Martin de Agua Rica	*Cedrela odorata*		-15.527256	-67.270053	2	2.4	3	3.1
20	Bolivia	Rurrenabaque, San Martin de Agua Rica	*Cedrela odorata*		-15.525622	-67.269258	2	2.2	3	3.1
21	Bolivia	San Ramon-San Javier	*Cedrela fissilis*	*Cedrela fissilis* Vell.	-16.253463	-62.528596	2	2.2	2	2.5
22	Bolivia	San Ramon-San Javier	*Cedrela fissilis*	*Cedrela fissilis* Vell.	-16.264451	-62.523159	2	2.2	2	2.5
23	Bolivia	San Ramon-San Javier	*Cedrela fissilis*	*Cedrela fissilis* Vell.	-16.275331	-62.463642	2	2.2	2	2.2
24	Bolivia	San Ramon-San Javier	*Cedrela fissilis*	*Cedrela fissilis* Vell.	-16.278899	-62.45459	2	2.2	2	2.3
25	Bolivia	San Ramon-San Javier	*Cedrela fissilis*	*Cedrela fissilis* Vell.	-16.28915	-62.405922	2	2.2	2	2.3
26	Bolivia	San Ramon-San Javier	*Cedrela fissilis*	*Cedrela fissilis* Vell.	-16.274438	-62.350391	2	2.2	2	2.5
27	Brazil	(Flona do Caraja/Pará) Parauapebas	*Cedrela fissilis*		-6.184117	-49.844967	2	2.2	2	2.2

28	Brazil	(Flona do Caraja/Pará) Parauapebas	*Cedrela fissilis*	-6.168767	-49.831333	2	2.2	2	2.2
29	Brazil	(Flona do Caraja /Pará) Parauapebas	*Cedrela odorata*	-6.1843	-49.844433	1	1.2.1	2	2.2
30	Brazil	(Flona do Caraja /Pará) Parauapebas	*Cedrela odorata*	-6.048733	-50.080617	1	1.2.1	2	2.2
31	Brazil	(Flona do Caraja /Pará) Parauapebas	*Cedrela odorata*	-6.061483	-50.05885	1	1.2.1	2	2.2
32	Brazil	Guaratuba PR	*Cedrela fissilis*	-25.53972	-48.40304	2	2.1	2	2.2
33	Brazil	Guaratuba PR	*Cedrela fissilis*	-25.53536	-48.40427	2	2.1	2	2.2
34	Brazil	Guaratuba PR	*Cedrela fissilis*	-25.54975	-48.42234	2	2.1	2	2.2
35	Brazil	Guaratuba PR	*Cedrela fissilis*	-25.55813	-48.43748	2	2.1	2	2.2
36	Brazil	Guaratuba PR	*Cedrela fissilis*	-25.57027	-48.43064	2	2.1	2	2.2
37	Brazil	Guaratuba PR	*Cedrela fissilis*	-25.57717	-48.41797	2	2.1	2	2.2
38	Brazil	k. A.	*Cedrela odorata*	-6.048733	-50.080617	1	1.2.1	2	2.2
39	Brazil	k. A.	*Cedrela odorata*	-6.061483	-50.05885	1	1.2.1	2	2.2
40	Brazil	RESEX Tapajós - Arapiuns – Pará	*Cedrela odorata*	-3.062317	-55.299817	1	1.2.1	2	2.2
41	Brazil	RESEX Tapajós - Arapiuns - Pará	*Cedrela odorata*	-3.0549	-55.30005	1	1.2.1	2	2.2
42	Brazil	RESEX Tapajós - Arapiuns - Pará	*Cedrela odorata*	-3.05485	-55.301417	1	1.2.1	2	2.2
43	Brazil	RESEX Tapajós - Arapiuns - Pará	*Cedrela odorata*	-3.053983	-55.303633	1	1.2.1	2	2.2
44	Brazil	RESEX Tapajós - Arapiuns - Pará	*Cedrela odorata*	-3.05375	-55.303583	1	1.2.1	2	2.2
45	Brazil	Rorainópolis	*Cedrela odorata*	0.57774	-60.17809	1	1.1	2	2.4
46	Brazil	Rorainópolis	*Cedrela odorata*	0.5778	-60.17806	1	1.1	2	2.4
47	Brazil	São João da Baliza RR	*Cedrela odorata*	0.57531	-59.55223	1	1.1	2	2.4
48	Brazil	São João da Baliza RR	*Cedrela odorata*	0.57475	-59.55216	1	1.1	2	2.4
49	Brazil	São João da Baliza RR	*Cedrela odorata*	0.57664	-59.55242	1	1.1	2	2.4
50	Costa Rica	Upala	*Cedrela odorata*	10.80695	-85.01587	1	1.3	2	2.1
51	Costa Rica	Upala	*Cedrela odorata*	10.81822	-85.02286	1	1.3	2	2.1
52	Costa Rica	Upala	*Cedrela odorata*	10.80909	-85.02307	1	1.3	2	2.1
53	Costa Rica	Upala	*Cedrela odorata*	10.88624	-85.02145	1	1.3	2	2.1
54	Costa Rica	Upala	*Cedrela odorata*	10.89303	-84.98864	1	1.3	2	2.1
55	Cuba	Escambray	*Cedrela odorata*	21.93	-80.02	3	3	1	

56	Cuba	Escambray	*Cedrela odorata*	21.93	-80.02	3	3	1	
57	Cuba	Guisa	*Cedrela odorata*	20.16	-76.68	3	3	1	
58	Cuba	Guisa	*Cedrela odorata*	20.16	-76.68	1	1.4	2	2.1
59	Cuba	Guisa	*Cedrela odorata*	20.16	-76.68	3	3	1	
60	Cuba	Moa-Sagua	*Cedrela odorata*	20.61	-74.93	3	3	1	
61	Cuba	Moa-Sagua	*Cedrela odorata*	20.61	-74.93	3	3	1	
62	Ecuador		*Cedrela odorata*	0	-79.814722			2	2.1
63	Ecuador		*Cedrela odorata*	0	-79.814722	1	1.3	2	2.1
64	Ecuador		*Cedrela odorata*	0	-79.814722			2	2.1
65	Ecuador		*Cedrela odorata*	0	-79.814722			2	2.1
66	French Guiana	Amshoff	*Cedrela odorata*	3.75	-53.0333	1	1.4	1	
67	French Guiana	Grenand	*Cedrela odorata*	3.75	-53.0333	1	1.1	2	2.4
68	French Guiana	Mori	*Cedrela odorata*	3.6166	-53.2	1	1.1	2	2.4
69	French Guiana	Stahel	*Cedrela odorata*	3.75	-53.0333	1	1.4	2	2.4
70	Mexico	Escarcega	*Cedrela odorata*	18.616667	-90.716667	3	3	1	
71	Mexico	Escarcega	*Cedrela odorata*	18.616667	-90.716667	3	3	1	
72	Mexico	Escarcega	*Cedrela odorata*	18.233	-91.533	3	3	1	
73	Mexico	Escarcega	*Cedrela odorata*	18.233	-91.533	3	3	1	
74	Mexico		*Cedrela odorata*	19	-90.716667	3	3	1	
75	Peru	Dpto. Loreto, Prov. Ucayali, Dist. Contamana, Contamana	*Cedrela fissilis*	-7.30774	-75.00145	2	2.2	3	3.2
76	Peru	Dpto. Loreto, Prov. Ucayali, Dist. Contamana, Contamana	*Cedrela fissilis*	-7.22189	-74.95517	2	2.2	3	3.2
77	Peru	Dpto. Loreto, Prov. Ucayali, Dist. Contamana, Contamana	*Cedrela fissilis*	-7.3232	-75.00805	2	2.2	3	3.2
78	Peru	Dpto. Loreto, Prov. Ucayali, Dist. Contamana, Contamana	*Cedrela odorata*	-7.23248	-74.97092	1	1.2.2	2	2.3
79	Peru	Dpto. Loreto, Prov. Ucayali, Dist. Contamana, Contamana	*Cedrela odorata*	-7.22909	-74.96307	1		3	3.3
80	Peru	Dpto. Loreto, Prov. Ucayali, Dist. Contamana, Contamana	*Cedrela odorata*	-7.21662	-74.94912	1	1.1	3	3.3

81	Peru	Dpto. Ucayali, Prov. Atalaya, Dist. Raymondi, Comunidad San Juan de Inuya	*Cedrela fissilis*			-10.5518	-73.0551	2	2.3	3	3.2
82	Peru	Dpto. Ucayali, Prov. Atalaya, Dist. Raymondi, Comunidad San Juan de Inuya	*Cedrela fissilis*			-10.57993	-73.06489	2	2.2	3	3.2
83	Peru	Dpto. Ucayali, Prov. Atalaya, Dist. Raymondi, Comunidad San Juan de Inuya	*Cedrela fissilis*			-10.59285	-73.07602	2	2.3	2	2.5
84	Peru	Dpto. Ucayali, Prov. Atalaya, Dist. Raymondi, Comunidad San Juan de Inuya	*Cedrela fissilis*			-10.56369	-73.06862	2	2.2	3	3.2
85	Peru	Dpto. Ucayali, Prov. Atalaya, Dist. Raymondi, Comunidad San Juan de Inuya	*Cedrela odorata*			-10.58688	-73.075002	1	1.2.2	2	2.3
86	Peru	Dpto. Ucayali, Prov. Atalaya, Dist. Raymondi, Comunidad San Juan de Inuya	*Cedrela odorata*			-10.56134	-73.00214	1	1.2.2	2	2.5
87	Peru	Dpto. Ucayali, Prov. Atalaya, Dist. Raymondi, Comunidad San Juan de Inuya	*Cedrela odorata*			-10.56369	-73.0016	1	1.2.2	2	2.5
88	Peru	Dpto. Ucayali, Prov. Atalaya, Dist. Raymondi, Comunidad San Juan de Inuya	*Cedrela odorata*			-10.56976	-72.9869	1	1.2.2	2	2.5
89	Peru	Shucushuyacu	*Cedrela fissilis*	*Cedrela odorata*	L.	-5.99868	-75.82296	1	1.2.2	2	2.3
90	Peru	Shucushuyacu	*Cedrela fissilis*			-5.99743	-75.83429	2	2.2	3	3.2
91	Peru	Shucushuyacu	*Cedrela fissilis*			-5.99588	-75.83574	2	2.2	3	3.2
92	Peru	Shucushuyacu	*Cedrela odorata*			-6.0193	-75.84509	1	1.2.2	2	2.3
93	Peru	Shucushuyacu	*Cedrela odorata*			-6.00285	-75.82127	1	1.2.2	2	2.3
94	Peru	Shucushuyacu	*Cedrela odorata*			-6.00066	-75.82297	1	1.2.2	2	2.3

Table 2: Origin and sequencing approach applied to nine *Cedrela* trees used for SNP development.

Sample code	Sequencing approach	Country	Species	Region (sampling location)	Latitude	Longitude
CEODO_959	RADSeq	Bolivia	*Cedrela odorata*	Cobija, road to Filadelfia	-11.671315	-68.79578
CEODO_994	RADSeq	Bolivia	*Cedrela odorata*	Rurrenabaque, Área Protegida Madidi	-14.094739	-67.916319
CEODO_183	RADSeq	Cuba	*Cedrela odorata*	Escambray	21.93	-80.02
CEFIS_8	MiSeq & genome skimming	Bolivia	*Cedrela fissilis*	San Ramon-San Javier	-16.604269	-62.491435
CEFIS_36	MiSeq & genome skimming	Bolivia	*Cedrela fissilis*	Buena Vista	-17.49728	-63.642191
CEFIS_37	MiSeq & genome skimming	Bolivia	*Cedrela fissilis*	Buena Vista	-17.498273	-63.64152
CEODO_980	MiSeq & genome skimming	Bolivia	*Cedrela odorata*	Rurrenabaque, road to Tumupasa	-14.403706	-67.604569
CEODO_993	MiSeq & genome skimming	Bolivia	*Cedrela odorata*	Rurrenabaque, Área Protegida Madidi	-14.162561	-67.839097
CEODO_205	MiSeq & genome skimming	Cuba	*Cedrela odorata*	Guisa	20.16	-76.68

Nuclear and plastid SNP markers for tracing *Cedrela* timber in the tropics

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Online Resource 1: Multiplex allocation for prescreening (Well), locus description, primer sequences and alleles for genotyping of *Cedrela* on a MassARRAY. Locus description includes coding for nuclear (ced00), mitochondrial (cedMt), and chloroplast (cedCp) SNPs. INDELS are indicated with a hyphen (-).

Well	Locus	2nd-PCRP	1st-PCRP	EXT-primer	Alleles
W1	ced0003568	ACGTTGGATGTTTGCGCCAGTTCCATTTCC	ACGTTGGATGAATACGATTGGCCGCCATTG	CCTCACTCTCTCCGC	T,C
W1	ced0004583	ACGTTGGATGTGCAGCAGAAAATGCTGCAC	ACGTTGGATGGCCTCAGCTTGTGATTTTTC	TGCACTTTCGAGGTC	G,A
W1	ced0004344	ACGTTGGATGTCCTAACATCGAGTCTGCTG	ACGTTGGATGCTTATGCCTGAAGCATGGAG	CTGTCCTCCTCTCCTA	G,C
W1	ced0000015	ACGTTGGATGTCATCTGGGCCTCACAAATC	ACGTTGGATGGGTATGTGAGGGCATACTTC	CAGGGAGTGCTTGCCA	C,T
W1	cedMt57_8024	ACGTTGGATGGCATAGGACCTTCGATCAAC	ACGTTGGATGGCAACATGAGAAGAGAAGGG	gGATCAACCATGGGGC	T,C
W1	ced0004707	ACGTTGGATGTGACCTGATCCCTCTACTAC	ACGTTGGATGCAAATGATAAGCGGTTGTCG	GCCGTTTGATCTCCACC	G,A
W1	cedMt26_11413	ACGTTGGATGATCTCACTCTTCGAAGCACC	ACGTTGGATGCAGGTAAACGGATCCAAAGC	CCCTGATTTTAGGCCTT	G,A
W1	cedCp4_18157	ACGTTGGATGAGACTCATAGCGGTTAGTGG	ACGTTGGATGCAAATCCAAGATCAATAAACC	ATCGGGGAACGAGAATT	T,A
W1	ced0000998	ACGTTGGATGCCCATACTCAAGTAGTTGTC	ACGTTGGATGTGAAAGGCAGGGTTTGAAGG	GAGACTACACTGGATACC	C,T
W1	ced0003670	ACGTTGGATGCATGAGATATGAGGCCCAAG	ACGTTGGATGGAACTGTATGCATTCCTCCC	GGATGCTACCAGATTCAG	C,T
W1	ced0003256	ACGTTGGATGGGCGATTGATGGCATTGACG	ACGTTGGATGGGCATATCACATGTGGCTTC	cttcCGCCGATTACCGTTT	C,A
W1	ced0004478	ACGTTGGATGGTGAGGCTCTGAAGAAGTTG	ACGTTGGATGATGCTCTTCCCACTCAGTAG	CTGAAGAAGTTGAGGAATG	C,G
W1	ced0002962	ACGTTGGATGCTTCAGAAACACACTGTCTC	ACGTTGGATGTGGGAATTGTTCTTGTGGAG	cacaAGAGCAATGCATCACC	A,T
W1	ced0000131	ACGTTGGATGCCAGTATTGGAGATGATGCC	ACGTTGGATGGGAAGAACCTTGTAGCATCG	tagtcTTGCTAGGGGTTGCC	T,A
W1	cedMt26_28302	ACGTTGGATGGCGAACACCTGTCTTCTATC	ACGTTGGATGCTCGAAACCAGTAGAGTCGC	cccccGCCAGTTCGTGAACTC	G,T
W1	ced0003101	ACGTTGGATGTGCACTATTTCCCATATCCC	ACGTTGGATGGTTTCTAACATAAATGCAAG	cttcCCCATATCCCTCCAGAAA	C,T
W1	ced0003135	ACGTTGGATGAAACCAGAGACACCGATTGC	ACGTTGGATGGTGGCTTATATGGTCAAACG	AACACAATGCCTTTCGAATAAC	G,A
W1	cedMt118_8578	ACGTTGGATGAAGAAAGAACGTAGCTCCGC	ACGTTGGATGAGCCGATACTGGAACCTTTC	acttcGCTCCGCCGTATAAAAG	T,C
W1	ced0004300	ACGTTGGATGTGCATACTGTGGCATTGAGG	ACGTTGGATGTAAGGACTAGACTGGGTTGG	ggggaACCGAGTCTAGTCTACC	T,C
W1	ced0003519	ACGTTGGATGGTCCCCAAATACAAACCACG	ACGTTGGATGCGCGCTGAGTTCCCTTATTG	ggaaaCACGTTGATCGTTCAGTA	C,T
W1	ced0000555	ACGTTGGATGTGATACAAAGAAAGGGTGGG	ACGTTGGATGTGAAGCAAGCTGTTGATTCC	aaatGGTTACCGTATAAAGTGAC	A,G
W1	cedMt94_70	ACGTTGGATGTGGTGTAACGTGTATCCCCC	ACGTTGGATGTCATTCTTAAACAAAAATCC	agttTATCCCCCCCTGTTCCGGTC	G,T
W1	ced0004582	ACGTTGGATGATCCTTGTGTGGATCCTCTG	ACGTTGGATGTATTGTTCATCCACCACCAG	cttttTGGATCCTCTGAACCAGAA	G,C
W1	ced0002028	ACGTTGGATGGTTGTGCATACAATACCACC	ACGTTGGATGTGAGTCTGGAGAGGTTAGAG	cccttATGATTTCACTCATCTTGTC	G,A
W1	cedMt94_9725	ACGTTGGATGTTACCCATCCGCTTCCTTTG	ACGTTGGATGGCCGAGATTGCTAGGTTTTC	aagcaGCTTCCTTTGAACATTGATT	- ,TGAC
W1	ced0001600	ACGTTGGATGTGAAAAGCGTGAAAGTTGGG	ACGTTGGATGGCTTTCACCTATTGGGATGC	ggccaTTGGGTTCCATTGTACTTAC	A,G
W1	ced0004284	ACGTTGGATGCTCCCAATGGTTTAGACAAG	ACGTTGGATGGATTGTGCAAGCTAGCAACC	tACAAGTTGATCTTGGGATAGATAC	A,G
W1	cedMt88_14142	ACGTTGGATGTGAGCACTGACTCCTATTCC	ACGTTGGATGTCCGTGGAGAAGAGAAATGG	tctaACTGACTCCTATTCCACTACTA	G,T

W1	cedMt93_4619	ACGTTGGATGTGCCTGTGGCCTATTCTTTG	ACGTTGGATGCAAGTCATTATAGTCCCCCC	ttctgGTTGAGGAAGATAGCACATTA	C,T
W1	ced0001689	ACGTTGGATGGGTATCAAATAGTTGATAAAG	ACGTTGGATGGAGCGTGTTTACTGGTATATG	aaacGATAAAGTAAGAAAAGCAACAA	T,C
W1	cedCp111_4410	ACGTTGGATGTTCACCATAGCGGCTTGCTC	ACGTTGGATGGATTTCATTGAAATTGAGTC	agcATAATAACCTATTTTTACCCAATC	T,C
W1	cedMt26_42549	ACGTTGGATGGGATAACCAATCCATTTTC	ACGTTGGATGTCCCATGTTCCGATCTTTCC	ttccgCCATTTTCAAATATAGTTGGGA	A,G
W1	ced0000021	ACGTTGGATGCAGCATTACCAGACAGAAAA	ACGTTGGATGTCAACTGTCCTAATCCTTAG	ccccCATGACTCAAAGACAAAATTTAAT	T,C
W1	ced0001786	ACGTTGGATGTCGAAGGTCGGAAAATAGGC	ACGTTGGATGCTGCATCTGTTTCTCTCTCG	ggttaGGAAAATAGGCCTCGTCCGCTAC	G,T
W1	ced0000885	ACGTTGGATGTGTCTGGTATTCTTCCTTTC	ACGTTGGATGCAGACCAAGTCAAACTCCAG	gatgGATACATTACAGTGGATATTTAAC	T,C
W1	cedCp17_10080	ACGTTGGATGGGGCGTAATCAAGATAGGAC	ACGTTGGATGTCAGGACTCCTGACAAAGAC	ATTATGAAATGAAAAAAATTAGAGATTA	T,C
W2	cedMt94_619	ACGTTGGATGGAGATCCAGGCAAAAATCCG	ACGTTGGATGTCTTGCCCGCGCCTATAAAC	TCGAGTTGACCCCTA	C,A
W2	ced0001740	ACGTTGGATGCCTTAGTAAGCCAGAAGGTG	ACGTTGGATGTCGCTCATGCAATCCAACAG	AGCAGCAAGATGGAC	T,A
W2	cedMt93_40008	ACGTTGGATGTACGAACACCTTCCTACTGC	ACGTTGGATGAGAAGTTGGACTAGCTGCTC	CCCTTGCCCTAGAATC	G,T
W2	cedCp8_1659	ACGTTGGATGAATAGGTCCCTGGTTCGTTC	ACGTTGGATGGGAACCCGTGAATACAGAAG	TCCGCCATCCCACCCAA	G,A
W2	ced0000725	ACGTTGGATGAGGCTCTAGAATTCATACCC	ACGTTGGATGTGCCTTCTCAGACTTCTCAC	TCAAAAGACCCCTTGAA	C,T
W2	ced0004454	ACGTTGGATGTTGTAGACCTTGATGGTATG	ACGTTGGATGCTAGCACCAAAATGTTTGGC	TCAAGAGACTTTGGCGA	T,A
W2	cedCp8_40297	ACGTTGGATGGGGCGTTGAGAACAAAGAAA	ACGTTGGATGCCTTCCTGCAAAAGATCTTTC	CTAGTACCAGTACCAACA	C,T
W2	ced0003981	ACGTTGGATGGCAGGTTACAAAGCTCATGG	ACGTTGGATGGTGTCCATTCCTTTTCTGTG	gAGCTCATGGAAAGAGTG	G,T
W2	ced0003772	ACGTTGGATGGCAGTTCATTGATGGGTCTG	ACGTTGGATGTCAGCTTTAGCCTGTTCGTC	TCCAGAATGCTAATTCCAC	G,A
W2	ced0002367	ACGTTGGATGTCACCATTTGTCGTGTCAGC	ACGTTGGATGTCAGCAACATTGCTTACAGG	gagGCTGCAGGTGACTTCT	C,T
W2	ced0000954	ACGTTGGATGCTATCCATGGCAGATGCTTG	ACGTTGGATGGTTGCAACACATTGTACTGG	ctttAGCATTGTTACCCACA	G,A
W2	ced0003331	ACGTTGGATGTCAACAGGTGCACCACTAAG	ACGTTGGATGGTTGTCCAGGGAAAACAAAG	gaagGCTGACCGCCAGGTTC	G,T
W2	ced0000450	ACGTTGGATGCAAGAACAGGTTTGAGACAG	ACGTTGGATGTTAGAAGCTTTGTAGTGGAC	gGGTTTGAGACAGACGAAAT	T,C
W2	ced0000718	ACGTTGGATGGTTGGGCTGAACCAAATCTC	ACGTTGGATGTTAAGTCCTGCTACTGTCAC	tctcCATCCACTTCTGGTAGT	C,T
W2	cedCp111_10566	ACGTTGGATGAGATAATCATAGTCGGTGAG	ACGTTGGATGTTATTTGTGGCCCTGAGGAG	CATAGTCGGTGAGAACATTAC	A,T
W2	cedMt291_9799	ACGTTGGATGCATTCCTATCCCATCCTTAG	ACGTTGGATGTTGCCCAAATGCCACATCAG	actcTCCCATCCTTAGGTCAAT	C,A
W2	ced0002080	ACGTTGGATGATCCCCAACAACAGGAACAG	ACGTTGGATGGCTTCAGTTAGTTGGTTTGG	gtagtAACAGAAACCTCCTCAT	T,A
W2	cedCp111_11105	ACGTTGGATGATGATCAGGCAGTACTCCCC	ACGTTGGATGTCGTTCCTGATAGTCATTTC	ccctcTCCAGAGTATGCTCCTAT	G,A
W2	ced0004353	ACGTTGGATGCCCCAACCTTCAAAATGTTC	ACGTTGGATGGTGCGATCTCTTTGTATGCC	TCTCTATTCCTTCTAGACAAACA	T,C
W2	ced0003369	ACGTTGGATGAACTGCCTGAGCTGATCAAC	ACGTTGGATGTGACTACAGCGAGTTCTCAG	agaTGATCAACCATGTAACCAGG	C,T
W2	ced0002818	ACGTTGGATGGAAGTATAACGCACATGAAG	ACGTTGGATGGATGAACCTGATATGCAGCG	ggggcCGCACATGAAGACTTAAT	C,T
W2	ced0000193	ACGTTGGATGTGCTGCAAAGATCTATCTGG	ACGTTGGATGGGTTCTCTGTCACTCATAAG	tccatATCTATCTGGCAAATCGTT	A,T
W2	ced0002835	ACGTTGGATGAATACCTGCCCCCTGAAAAC	ACGTTGGATGCCGTTTCCAATTGTTGCACC	ggtaAGGAGCAAATGGAGTGCCAC	G,A
W2	ced0003019	ACGTTGGATGAAGAACTCACTTTTCATGGC	ACGTTGGATGGGAAGGTGATGAGAACTTTG	ggtacCATAAGAGGATGAAACAGG	T,C

W2	cedCp8_20798	ACGTTGGATGAAACCAAATTCTTCTTGGC	ACGTTGGATGCCCGACATTCGGTATAAAAAG	ttcgTCTTGGCAATTATGTTATGTA	G,A
W2	cedCp8_36576	ACGTTGGATGCTATCGAATATCGAAACTCC	ACGTTGGATGCGGTTGTCATTTTTGAGATAG	aaacAACTCCATAAAGGATAAGCGT	T,C
W2	cedMt213_7964	ACGTTGGATGGCAGGTTCGGGATAAACTTC	ACGTTGGATGTCGCACTGCCTTTGATTAGC	ccccgCTAATCCAATGGATCAAACTT	G,T
W2	ced0002853	ACGTTGGATGGTCGAGTTCTGGTTGATCAAA	ACGTTGGATGGGGTGGCAATTTGTATTGTT	cctggTATTACCAGTACCTCAATACA	G,T
W2	ced0000165	ACGTTGGATGAGCACACTGGAGTGAACAAC	ACGTTGGATGGCTGCATATTTGTGACGAAG	aagcgCTGGAGTGAACAACCTAAAAA	G,A
W2	ced0002205	ACGTTGGATGTGCTATCAGAGAACAAAGGG	ACGTTGGATGGCAACAGGAAAACCAAAAGC	gctagCAGAGAACAAAGGGAAATTAC	C,T
W2	ced0001585	ACGTTGGATGTATTGGAAAAAGTGACCACC	ACGTTGGATGGGGAGCTAAATTGATAATC	ccaccGGAAAAAGTGACCACCAAAAAC	C,T
W2	ced0004562	ACGTTGGATGTGGACTTACCCTGGTCATAC	ACGTTGGATGGCTTTTTCCTTTATTTTCTGG	gccgtCTGAATGTTAACCTTCTTGATA	A,G
W2	ced0001818	ACGTTGGATGCCTGTACAAGCTCTTCATCC	ACGTTGGATGGAGAACCCAGGCAGACATTC	cttccTCCTCAGATGCACACTTAGGCTT	T,C
W2	ced0000242	ACGTTGGATGGGCCTGAGAGAAAAAAGAGC	ACGTTGGATGGCTATACTCCATTTCGGGTG	tgaatAGCAAAGTGTCTCTACAATATAA	C,T
W2	ced0001118	ACGTTGGATGGGCTGGAAGAATTGCTGAAG	ACGTTGGATGTCCTAGCAGAAGCATGAATG	aagggCTTAGGCTTAATCCTCAAGATGC	A,G
W2	ced0003366	ACGTTGGATGACTCCACGCTGTGCAATTTG	ACGTTGGATGGGTTGCCTATTTGGGCAAAG	ggggtTGTGCAATTTGCTGATACAGGCT	T,C
W3	cedCp8_41102	ACGTTGGATGCTGTCTTTGGGATCTGATGC	ACGTTGGATGCTTATGTAATAAAGTCGATCC	CACCGCTGCTCAATA	G,A
W3	ced0001676	ACGTTGGATGCCTGATCATGGACATTTTCG	ACGTTGGATGTCTTCAGCAGAATGCGCATC	TCGGGTACAGTTGGT	A,G
W3	ced0001914	ACGTTGGATGTCCTGGATTTGGGTTCAACG	ACGTTGGATGATGGGTAGATCCGAGTTGTG	cCGGTGGACCGTACTC	C,T
W3	ced0000161	ACGTTGGATGTCAGAGCCATGCGAAATCTC	ACGTTGGATGGGTTTGTCAACTTCTGATGC	aTCCTCTGCCTTCTCTT	A,G
W3	cedMt26_65234	ACGTTGGATGTGAGTAGTGAATGCCTCCTG	ACGTTGGATGGCCACGGCATGTTTTCATTC	AATGCCTCCTGATCTTG	G,A
W3	ced0004402	ACGTTGGATGTTACAGGAGAAGCATCGGAC	ACGTTGGATGTTGCAAGGGCCCAACAAATG	tgCGGACAAGTGTCGCA	A,G
W3	ced0002414	ACGTTGGATGGTGTTGAGATATGCTGGTTC	ACGTTGGATGTGAACCAGCAAGAAATTACC	TCTGGCTGATTCATTCTC	A,G
W3	ced0000254	ACGTTGGATGATGTGAAGCATGTTAGCCCG	ACGTTGGATGGAAGGGAGAGAGATGAATGG	gCCGTGGCTGGTTGAATT	G,T
W3	ced0002704	ACGTTGGATGGCCTTCCACTTCTATTCCTC	ACGTTGGATGGGTAGATAAATTGGATTGAG	TGTCAACAAAGGAGCTTTC	G,A
W3	ced0002939	ACGTTGGATGCTCTTGGAATTGCAGAAGTC	ACGTTGGATGGTAGCCATTGGAGCACAGTC	TCAATTGAATCTTCTACCCC	A,G
W3	ced0002078	ACGTTGGATGACGCGGTGAAAAAGATTCTG	ACGTTGGATGGAGTACACTACAATCAATTAG	ctcgAGTCATCCAAATGGCG	G,C
W3	ced0004321	ACGTTGGATGTGGCATCTTTGCTAGCACTG	ACGTTGGATGCTGCATGGCTTGGAAGTTTC	TGAATTTGTGTGAATAGTGC	G,A
W3	cedCp15_9864	ACGTTGGATGCTATTTTCTCTCCTATTTAC	ACGTTGGATGGGTTATCCTGCACTTGGAAG	cccaTCCTATTTACTACGGCG	T,C
W3	ced0002406	ACGTTGGATGGAAGGTCAGCAATACGTGTG	ACGTTGGATGATGTAGAAACGAACGAATG	aTGTATGTGTATATACGGCAA	A,T
W3	ced0001696	ACGTTGGATGGAGATACCTTCATTCCAGGC	ACGTTGGATGCAGAAGAGACTTTAGCAGAG	cccaaTCAACAGCAGTTCCAGT	A,G
W3	ced0003469	ACGTTGGATGGTGTATCTTTTTTGTTTCCC	ACGTTGGATGGAGCCATACTCTTCTAAACC	gcATTCTAATGCATGAATGTCT	G,A
W3	ced0000470	ACGTTGGATGGAATCAGCAAGCAGGTCAAC	ACGTTGGATGGCATTCAAAGTTACCAGCTTC	ccccAACCCTTCTTATTCTAGCA	A,G
W3	cedCp8_25519	ACGTTGGATGAATAACTCACTCAGAACGCC	ACGTTGGATGTACCTGAAGGTTCACAAGGG	ctcccAGATTACGTGGTACGATT	A,G
W3	ced0001839	ACGTTGGATGACCTGATAATAGTGCAGGCG	ACGTTGGATGTTTTGAGATCCATCCAGCAC	GAAGCAATGATCTAATTGAGTCT	C,T
W3	cedCp4_9296	ACGTTGGATGGGAATTAATCATTCCCCTTC	ACGTTGGATGATGTATAGACTCCCGCAACC	tgttATTCCCCTTCTTTATCTTTC	T,C

W3	ced0000303	ACGTTGGATGCCCTACTCTGGAAACTTACC	ACGTTGGATGACTAAACCCATTAATGGTGC	tccccGCTGTCCAGTCCTTGGATT	T,C
W3	ced0003124	ACGTTGGATGATGAGGCTTTGCATAGGTGG	ACGTTGGATGCTGCAAGATACATAGGGAGC	TGGATCTTGATGTTTTATTTTACG	C,T
W3	cedCp2_10280	ACGTTGGATGCTCAAAAGGTGCTGAGTTGG	ACGTTGGATGTCCTGGTTCTCCTGTAGCTG	gggTGGAATCCCATTCTAACTAAG	T,C
W3	ced0003454	ACGTTGGATGGGTAGCCTACTTAAGCCATC	ACGTTGGATGCTTTCTATCATTAGCAGAAAC	tTGTAAATATCTTTTGCCATCTTAC	G,A
W3	ced0001723	ACGTTGGATGCAATGTTTTTGGCTTTTGG	ACGTTGGATGGTGGATAAAACCACATGAT	tccgCTTAATTTGTCATTGGTCTCT	A,G
W3	ced0002243	ACGTTGGATGCTTAAGGCATGCAAACGAAG	ACGTTGGATGCTAGCTCTTCAACTTCACTG	ggacGGCATGCAAACGAAGATCTGT	C,T
W3	ced0001948	ACGTTGGATGATGCACATTCTTGAAACAGG	ACGTTGGATGCTAGGAGTTTCTTCCATTCG	GGAAATAAGGATTAACATAGAAATA	C,T
W3	cedCp25_1913	ACGTTGGATGTTAGTCCTTTTATGGTAGGC	ACGTTGGATGCGTCGGCTCTAATTGTTACC	ccagGGTAGGCATTATTTTTTTTCTT	- ,A
W3	ced0001263	ACGTTGGATGGTAGACCTTTCTTCTAGGTG	ACGTTGGATGAAGTACCCATCGAGGAAGAG	ttTTTCTTCTAGGTGATTGTGGCTCT	A,G
W3	ced0001941	ACGTTGGATGACTCTCTGTTGCTTAGTGCC	ACGTTGGATGGGTTTAACATAGTAGGATAGG	cccctCCAACTGCTGTAAAAATTTTAT	G,C
W3	ced0003493	ACGTTGGATGCAAATCCTGGTTGCAGTTGG	ACGTTGGATGCGCTAAGCCTGATGTTAGAC	acatATCGAGATTAAAAATGTTGTTTA	G,A
W3	ced0000686	ACGTTGGATGCTCAAGTCTATGGGAGTCAG	ACGTTGGATGATTGTCCCATGATATCTCAC	ggttcGAATATTTGGACTTGATGAACC	T,C
W3	ced0003127	ACGTTGGATGGTCTATCTTATTACTCATTG	ACGTTGGATGCATACTCATCCATCTGCAAC	acccTCTTATTACTCATTGTGACTAAAT	C,A
W3	ced0003866	ACGTTGGATGAAGCAGAACAACTTGACTT	ACGTTGGATGCTGCTAGATACAGCTCTCAA	ccgGCATAATTGAACTAATCTGTTTTTC	G,A
W3	ced0003775	ACGTTGGATGCGTGAATAATGACTTTCTGG	ACGTTGGATGGTGTACAATAACAAGGCAAG	catacTGACTTTCTGGATATTATCAATA	T,C
W3	ced0002332	ACGTTGGATGAAAATATAGTTGGTGTTCC	ACGTTGGATGAAGGATGAGACAACAACGCC	ggggcAATATAGTTGGTGTTCCGAAATC	C,A
W4	cedMt593_1887	ACGTTGGATGATGTTATTGCCTTTGCCCCC	ACGTTGGATGGTCGATCAACCAGTAGAGAG	GCTGGCTCTCCCATC	C,T
W4	ced0002980	ACGTTGGATGCTACTATCATCACGTTCCCG	ACGTTGGATGGTCTGCGAGAAAGTACTCTG	ACGTTCCCGTTCAAC	T,C
W4	ced0004130	ACGTTGGATGTTACTGAAAGTAACCGGTGC	ACGTTGGATGGTTAGGTCCACGTTCAACAC	ACCGGTGCGAGTAGC	G,T
W4	cedCp8_38825	ACGTTGGATGCCCTTTCCTTAACTTACGTG	ACGTTGGATGCTCGTCAGACTTAAACCTAAC	ACGAACCCGTTTGTTA	C,A
W4	ced0004542	ACGTTGGATGGGCTGCCTAACAACCAAATG	ACGTTGGATGGCATTTCAATACCCTCGCAC	GCCCATTCTCCACATCT	T,A
W4	ced0004222	ACGTTGGATGTGGATAAAGCCCAGTGAAGG	ACGTTGGATGTAAACAAGCCTGGTGGCAAG	TGGCTCTTTGAGATTGG	G,A
W4	ced0000982	ACGTTGGATGAGCCAAATTGATTTGCTCCC	ACGTTGGATGTGTCTGGCAGTTTGTTTGGG	CTCCCTGTCATGAACATA	C,T
W4	ced0001453	ACGTTGGATGGAAGGCCACCAGAGAATATC	ACGTTGGATGATGGCTGAAGATCTCAGTGG	tcGCAAGCATGTCTGCTC	C,T
W4	ced0003595	ACGTTGGATGTGTCCTTGAACCCACCACTC	ACGTTGGATGTGCAGAGCCAGTGACAGCAA	aCTCTCCCACATTTCTCTT	A,G
W4	ced0002101	ACGTTGGATGCTGTTTTCTTGCTTTCGTGG	ACGTTGGATGGTGATTACTGCTGTCTCTAAC	ctgTCGTGGCTTTTCTGAG	C,A
W4	ced0003071	ACGTTGGATGGGCTCTTCCTCAATCTCTTC	ACGTTGGATGGGACGCTTACCTGTATTTGG	gTCAACTTGAGTTGCAAAG	T,C
W4	cedMt114_3097	ACGTTGGATGCCTCAATCTTCACTTTACGC	ACGTTGGATGTGGTATGGAGATTCCCCTTG	ccccTTACGCCACGCCGACT	G,A
W4	ced0002021	ACGTTGGATGAAGTGCTGGCACGGGAAGTT	ACGTTGGATGCAAGGAAAGTCTCAACCAAC	ccctCCCAAAGCATCTGACG	C,T
W4	ced0002212	ACGTTGGATGTCACTATTTGCTGCAAGTGG	ACGTTGGATGGCAATTTCTCTTTTGGCATC	acgGCTGCAAGTGGTATCTG	A,T
W4	ced0002540	ACGTTGGATGCCTGTTATCAGTATTTAGAG	ACGTTGGATGGAAATATGACCATGTAAAG	TTCTGCCATTTTGTCAAGAAC	C,T
W4	ced0002329	ACGTTGGATGTCCCAACCAAAAGGAATCGC	ACGTTGGATGTGATGATCTGTACACGGTGG	tAAGACCTGCTGCTGTTATTA	C,T

W4	cedMtIN_26_20208	ACGTTGGATGTGCTTCCTTTGGTTTCATGC	ACGTTGGATGACAGAAGCAGCACTCTTGTC	TCATGCTTCTTCCTTTTCTTTT	CTTTT, -
W4	ced0001219	ACGTTGGATGTCTTTTCAGCTTCAGAAGGC	ACGTTGGATGTGTGCCAATGGCAATAGCTC	gggaTTCAGAAGGCTTAACCAT	C,T
W4	ced0002027	ACGTTGGATGTGCAGCCGAGATTACTTCTG	ACGTTGGATGGCACAGACAGTAGTGTGATG	CTGCAATTCTACTGAACACCATA	C,T
W4	ced0003061	ACGTTGGATGGTTCAATCCAGTGTGTTGCC	ACGTTGGATGGCTGATTCCACATGGGATTG	cctgTCAGAAGTACTTATGAGGC	C,T
W4	ced0001302	ACGTTGGATGGCAGCTTTGCCGGATCAATT	ACGTTGGATGGCTCTTTCACAGAAAGAAGC	gggagATCTTCCAAACACTGGAT	T,C
W4	cedCp111_2602	ACGTTGGATGGATATAAATCATAGGATGAC	ACGTTGGATGCAAACAAAAATACTTAGTTC	cccacAGGATGACTCATACCTTTC	C,G
W4	cedMt347_496	ACGTTGGATGTGGATTTTGTGACTCGCACC	ACGTTGGATGGCTAGCTTGCTTCCCACTG	cctccCCTACGGCGACCCTTCGCCC	G,C
W4	ced0001749	ACGTTGGATGTGGCCGTGCATCTCATCAAG	ACGTTGGATGTTTACACGACCGAGCATGAG	tcACAAACCATAATGACTTCATTTT	G,A
W4	cedCp25_1817	ACGTTGGATGTAAATACGAGCGATGCCGTC	ACGTTGGATGTATCCGTGAACGTATTGAGC	gggCGGTACCTATATTTACAATCTT	G,T
W4	ced0002462	ACGTTGGATGGGCGAGCTCTACAAGTTGTG	ACGTTGGATGAAGATCCACGAATACCCTTG	gTGTGTATATGATTGAAATTGAAAT	T,C
W4	ced0002867	ACGTTGGATGTCCAATTCAAATTCCAAGCC	ACGTTGGATGGTTTTCTATTATGATTCAGAC	atcacATTCCAAGCCACTGATCTTAT	C,A
W4	ced0001527	ACGTTGGATGCAAGCCACATGGTAACTGC	ACGTTGGATGCGAGGTTAGAATAGTAAAGG	taaagGCATATGCAAGAAAGCCATAC	G,A
W4	ced0000392	ACGTTGGATGCAAGGACATGCTCAAAGAAG	ACGTTGGATGTATGGTGAATCTGCTGCTCC	gaacaAAGTCCATAGAGACTGCTGAT	A,G
W4	cedCp4_24163	ACGTTGGATGTGTCTTTTCTTCTCCCTATG	ACGTTGGATGGGATCCGACTTGTATCATTG	gtctgCTCCCTATGAATCAAACTTTTC	C,T
W4	cedMtIN_902_9344	ACGTTGGATGCGATCATGACGAGAATGGAC	ACGTTGGATGTGGTCGAGAAGGGAGAAAGC	cccacCTTCTCCGTAATGTAATGTAAT	- ,GTAAT
W4	ced0002452	ACGTTGGATGGGCCAATCCAGAATGTCTAC	ACGTTGGATGTAGCAGAACGTTGCTTGTCC	ggaagTCCAGAATGTCTACAAAAGTGA	C,T
W4	ced0003069	ACGTTGGATGCTTTATTCTGAGCTCAAGCG	ACGTTGGATGCTAAAGTGTGTTATAGCTATC	taatCGTAATCATGCAATTATCTACTTA	T,C
W4	ced0001602	ACGTTGGATGTGTTCCAACGCCATATCACC	ACGTTGGATGTATTCCTACAGGATAGTTC	gggaACCCTGGGTAATTATTCATTCCTT	T,C
W4	ced0002496	ACGTTGGATGTCCCTTTGAGACTGCATTGG	ACGTTGGATGCTTCCTTGCTCCTTATAAAC	gtccaTTTGAGACTGCATTGGAGAGTTT	T,C
W4	cedCp25_3673	ACGTTGGATGGCGCTTTTATTTGCGAATCC	ACGTTGGATGTCGAAAAAGCAAGAAACACG	ccAAAATTACTTCTTTTTTTCTCTTATTT	G,T
W5	ced0004538	ACGTTGGATGTCATAATTATCCGATCCCCC	ACGTTGGATGATTGGAGATGATAGTGTCTG	TCCCCCAATCCTTCT	T,C
W5	cedMt93_73927	ACGTTGGATGCTAAATCTGAGTTATAGGCG	ACGTTGGATGGGGAGTCTAGAGAAGCTTG	GGCGCAATTACCACT	G,A
W5	ced0004518	ACGTTGGATGAGGCGATTCTCTGATAAGTC	ACGTTGGATGCAATTTTCTGACGGGAGAAG	GTGAAAACTGCCCCA	T,C
W5	ced0003134	ACGTTGGATGCGTCACTAGTTTCATCAGAC	ACGTTGGATGAAAGAAGGCATCTGCTGTGG	CTCCATCTTGGCCCAC	C,T
W5	ced0001858	ACGTTGGATGATTTCTCCTATGATGCGCAC	ACGTTGGATGGAGAATAGTTGTGGCGGTTG	GCACATAATGGCCAGA	C,T
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W5	ced0004033	ACGTTGGATGGTTAGAATCCCCTGCTGATG	ACGTTGGATGATGCACCTTAGCAGGAACAG	GCTGATGTACGGAAAGA	G,A
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W5	ced0000784	ACGTTGGATGGTGGTCTCATCCCTTCATTG	ACGTTGGATGTAAGGAAAGCTAGCAGCAGG	cgtGTTCCCAGATCCTGC	C,A
W5	ced0001462	ACGTTGGATGTCAAGGGAGATGTGAACTCG	ACGTTGGATGGAAACCTTGCTATTCACATC	TGAACGTGAATCTGTGAA	A,T
W5	cedCp8_4446	ACGTTGGATGGGGTCTGCAACCATTATGGG	ACGTTGGATGCGAGCTATTCGTAGAAGTGG	GGTTACATCCCGTACGAAA	G,C
W5	cedMt122_20991	ACGTTGGATGTCTAGAACGGAAGTGATGGG	ACGTTGGATGTTCAATAGGAGCATCCACCC	GCCTTCTCTCTCCTTAGTAA	C,A

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W5	ced0001370	ACGTTGGATGATTTGTCCACCACCACTACC	ACGTTGGATGTATTCGAGCAGTGCTTGCAG	ggtgTGTTTTGAGGAGAAGAAATTA	G,A
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W5	ced0002691	ACGTTGGATGCTTCTAGGAAGTGCTATTAG	ACGTTGGATGCATAACCAAGATGAGCCATAG	ggttaCCTACATTTTCTGATCAATTTT	C,A
W5	ced0001943	ACGTTGGATGGGTACAAACTTAATTCCCGC	ACGTTGGATGAAGAACTTACCATGAACTGC	cccctCCGCTATTACACATGAACTGACA	G,A
W5	ced0000446	ACGTTGGATGGTGCATCAGTTATATGAAG	ACGTTGGATGGACACCTTTGCGCTTAACTC	catcCTTTTCATTTATCCTTCATGGTAT	T,C
W5	ced0003242	ACGTTGGATGGAGAGAAGGTTTTCAGTTAC	ACGTTGGATGGAAAAACATTAACGGTAAC	cagCTCGTTTTTAGATCAATAATGTTAT	G,A
W5	ced0003104	ACGTTGGATGCTGACTTTTGTAAAAGGGTG	ACGTTGGATGCTTGCAACCAAAAAGATTCC	tttcACCAAGAATTAATGTTTTTGAAAT	A,G
W5	cedCp17_3501	ACGTTGGATGTTACTCGAATGTATCAACCG	ACGTTGGATGAGTTGTGCCCAAAAAAATTG	gggagCGAATGTATCAACCGATTTATTT	C,A
W6	ced0000522	ACGTTGGATGAATGCTGGGCAACCAACAAC	ACGTTGGATGGTGTTACCTATGATTGCTCTC	ACACCCACCTGGCCG	T,A
W6	cedCp17_3227	ACGTTGGATGAGAGGAGGCATCTTTTACCC	ACGTTGGATGGATGTACTAATACCCCACCC	CCCAGTAGCGAAGGG	A,G
W6	cedMt93_90661	ACGTTGGATGAGACTGACTTCTGACCAACC	ACGTTGGATGCCAGCAACTTCCGTACACAG	AGGGTTGTGAGGTTG	A,G
W6	ced0002588	ACGTTGGATGGACTGACAACAAACACTCCC	ACGTTGGATGATGCAGGGGACTTTGACAAG	TGATTCAGGAACCCCA	A,T
W6	ced0004361	ACGTTGGATGACGTCTGATTTCACACCAAG	ACGTTGGATGGTGCTGCATGACATCAACTG	TTCACACCAAGCATTCC	T,A
W6	ced0002985	ACGTTGGATGCAATTTCCTGGCGTAAACGG	ACGTTGGATGAAACCACCTGGTGCTATGTC	gaTAAACGGGCTTGGAC	G,A
W6	ced0001250	ACGTTGGATGCTTATCTGCAACGTACTGCC	ACGTTGGATGACTGCATTCACAGTCCAACG	AACGTACTGCCATCTGTC	A,T
W6	ced0002325	ACGTTGGATGAGAAGTACAGCCACCCAACG	ACGTTGGATGTGTTTCCGTTCGGACGTTTC	GTCAGATCCTAAAGGAGT	G,T

W6	ced0001876	ACGTTGGATGCCGTCAATTCTCCGTGAAAG	ACGTTGGATGGGAACAAGCATCAGGTGTTG	ctcACTCTCTGCACCTGAT	T,A
W6	ced0002971	ACGTTGGATGCACTCTAGTTATAGCCCAAG	ACGTTGGATGGCCATTTTGCTTAATCAGAG	gagTGATGCACTTTAGGCT	C,T
W6	cedMt3607_1346	ACGTTGGATGCACGGGCAAAGATGTCGATG	ACGTTGGATGGAAAGACTGGTGAATCAGGC	TGCGAGTTATGAATTCAAG	A,G
W6	cedMt5715_363	ACGTTGGATGTTCAACAAGGCTTGCTTCTC	ACGTTGGATGGGTATAGTCTCCCTTTTTGG	AGAATCTCTTCCTTAGACAC	C,T
W6	ced0004482	ACGTTGGATGGCACTTCTTGGTTAGCTCAG	ACGTTGGATGTCTCAGATGAGCGAAAAGAG	GGAGAATATTTCCCTCCATT	C,T
W6	ced0000430	ACGTTGGATGTTAATTGCCTGATGCGTGCC	ACGTTGGATGCACCTTAAAGGAGCTATGGG	gggGCGTGCCTGAGATTGTA	A,T
W6	ced0002578	ACGTTGGATGTTAGTCACCTCATCAATGGG	ACGTTGGATGCTGATCTGTACCTATAGAAGC	ggCAAAAAATTTCCTGTGAGC	G,A
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W6	cedCp243_133	ACGTTGGATGATATTCACTGGGCCAAGAGC	ACGTTGGATGTCATGCAATTTGGGATCCTC	ccccGCACCTCCTCGAGAAAAA	T,C
W6	ced0001255	ACGTTGGATGCTCTATGCTGGTGGTCAAAG	ACGTTGGATGGCATCCCAACTGTCATAATA	ccgagTTAGGAACAGCACCAAT	A,T
W6	ced0001428	ACGTTGGATGACCCAGTAGAATGCGACATC	ACGTTGGATGTTCATCGCGCTTCACAGCAG	aATTAAAAAGTGAGGATAGACC	A,T
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W6	cedCp4_17567	ACGTTGGATGGACGGAAAGATCCTTCCGAT	ACGTTGGATGCGACTGCCATCATACTATGC	ccccaATCCTTCCGATCTAGTCAT	G,T
W6	cedMt93_57209	ACGTTGGATGGTTTCAGTAAGAACTAGCAC	ACGTTGGATGGGTGGAAGCACAAACAAAAG	ccccgAAGAACTAGCACTAGACTT	C,A
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W6	ced0003180	ACGTTGGATGGGGCTGCTGAATCACAAATC	ACGTTGGATGTCATTTCTCCTCCTGATCCC	cccgATCATCAATCTTCTCATCAAT	T,A
W6	ced0001425	ACGTTGGATGACTGGAAAAGGTACACAGAC	ACGTTGGATGGGAGCACCTTTTTTCTTTTTG	gcacGGTACACAGACATAAACCATA	T,A
W6	ced0004494	ACGTTGGATGTTTGAAGGAACGCGATTTGG	ACGTTGGATGGACCAGAGGCTTCTAAAATC	gTGGTCATTTGACAGCTAATATAGT	G,T
W6	ced0003333	ACGTTGGATGTATGTATCCGAAAAGACTGC	ACGTTGGATGCAAAGAAGGAAAATCAAGTC	gggagAAGAGAGTGCGGAAAATTAT	C,T
W6	ced0001416	ACGTTGGATGCGCCATGGTTGAAGAGTTTC	ACGTTGGATGTTATAGTCTTAGCCATTGC	tttccTTTCTGAACGTGACATTCATT	T,C
W6	ced0000500	ACGTTGGATGCCCTGCGTACATGAAGAAAG	ACGTTGGATGCTAGGTGATCTGTTAGCTTA	gacGTGATGTCAAAAAATAGTTAAGA	G,C
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W6	ced0000455	ACGTTGGATGACTTTATGAGCAGTCGCTCG	ACGTTGGATGTTGAGCAAATTGAGCGTTGG	ggttaTTCTTCTTCGATGGATGCCTTA	A,G
W6	ced0002228	ACGTTGGATGCATCTTCCTTTATCTTTGTC	ACGTTGGATGCCTCTACTTTTCCAGTTCAG	CCTTTATCTTTGTCTATCTATTTATTTC	C,T
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W6	ced0002043	ACGTTGGATGCTTACCCAAATAGTAAAGCC	ACGTTGGATGACATCTGCTGCCTTCTCATC	gcgccTAAAGCCAATAAGAATGTGCTAA	C,T
W6	cedCp111_17175	ACGTTGGATGGGATGTGGAAAAATAAAGACC	ACGTTGGATGTTTCTCTACGTGCTTTTTCG	agagtATTATACACACAAAAAGACAAAA	T,C
W7	ced0003295	ACGTTGGATGAAGCATGACAGCATCAGCAC	ACGTTGGATGTTGTTCATCCGACTCCAACC	ATCAGCACCCTCTCG	C,G
W7	cedCp4_4664	ACGTTGGATGAATGGATCTATGTCCAACGG	ACGTTGGATGTATGTGACTACGGGTCGAAC	AACGGATCACACCTG	G,A
W7	cedCp4_6862	ACGTTGGATGATAGATGTAGCAGTGGCTTG	ACGTTGGATGCACTTCGGAATGGCATATAC	GGCTTGCTGGAAACC	C,T
W7	cedMt26_66569	ACGTTGGATGCTTCTGCGTATGCAGATTCG	ACGTTGGATGCAGATCATCCAGTTTTCCCG	GTATGCCGGGCCGGGA	T,A
W7	ced0000316	ACGTTGGATGATGATATGATGTAGGGGCGG	ACGTTGGATGAGATCAACGCGTGCGTTGG	CGGCGGTGGCTCCATCG	C,T

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W7	cedCp2_7220	ACGTTGGATGGGAATGATTGGGCGTAAAGC	ACGTTGGATGTCCAGCTTGGTAGTTTCCAC	ccGCGTAAAGCGTCTGTA	A,G
W7	ced0000144	ACGTTGGATGAAGGAATCAGCTGCAAGTGG	ACGTTGGATGGTACTCAAAACTAGGCACCG	gcGTGGTGGAAGCAAGAC	T,C
W7	cedMt93_75682	ACGTTGGATGACCATCGGGTCTGCTTTTTC	ACGTTGGATGGTGGGCTACATTAGATATGG	CCAAACATCATCGTTATCT	C,T
W7	ced0001103	ACGTTGGATGTTCCATGGCATGGGAGATTG	ACGTTGGATGGTTGGATTAGGTATTGGAGC	ctcTTGATCCACAGTGTCC	T,C
W7	ced0004043	ACGTTGGATGATACATGTCCCAATGCAAGG	ACGTTGGATGGCCTAACATAAAGCAGAAAAG	GGAAGATTCTGGCCTTTTA	C,T
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W7	cedCp8_38633	ACGTTGGATGTTATCGTTGCAAACCCCGAG	ACGTTGGATGTCAGGGTGGGATGAATCAAG	gaAAGGGATGACCAAAAATC	G,T
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W7	cedMtIN_94_9725	ACGTTGGATGTTACCCATCCGCTTCCTTTG	ACGTTGGATGGCCGAGATTGCTAGGTTTTC	CCGCTTCCTTTGAACATTGATT	- ,TGAC
W7	ced0000017	ACGTTGGATGAGTTTCCTTCATACTGAACC	ACGTTGGATGCAAACCTCTGAAGGCTTTCC	ccCCTTCATACTGAACCTCTACC	G,T
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W7	ced0003513	ACGTTGGATGCGCACTGGAAGATGACAATA	ACGTTGGATGTTACAGGGTAATACATCTGG	ccCATTTTTAAAGGTCAGCATAG	A,T
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W7	ced0000850	ACGTTGGATGCAGACAGACCAGAGAAAGAG	ACGTTGGATGTGATGCTCCTGACTAGTACC	gggaATCTTTACATTGGTGTGTGT	A,G
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W7	ced0003211	ACGTTGGATGCAGGCTATTCTTCTATTCACC	ACGTTGGATGCGGTTCAATCTAAGACGTTC	ataaCAAATTTACTGTCAAAATTCAATT	G,C
W7	cedCp111_15161	ACGTTGGATGGGGTTGATTGGATGGGAATG	ACGTTGGATGATTCTGGGAAGAACCAAGGC	gaggcAGAAATACTAAGTCGTCCTATAT	G,A
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W8	cedMt347_13824	ACGTTGGATGAATAGCTCTCCTGCTCCTAC	ACGTTGGATGCCCTCCATTCAATCATGACG	cAACCCCCTTCCGCTG	G,A
W8	ced0001067	ACGTTGGATGGTCTTGACAACAGATACCAC	ACGTTGGATGTGAAGATGTGAACGGTGGTG	cCCGAGCCATGGTTCA	T,C
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W8	cedCp111_13025	ACGTTGGATGTCTGTGCACCAATATCTGCC	ACGTTGGATGAAGGGCTAGCTATATCAGAG	acAAAAGGGCCAAGCCA	C,T
W8	ced0003546	ACGTTGGATGTAAACAGGAGGTGGTTTTCG	ACGTTGGATGGGTAGAATATTCACACCCAG	GGTGGTTTTCGTGAATC	G,A
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W8	ced0002075	ACGTTGGATGCTTCCCAGTCAAGTTACTCC	ACGTTGGATGCTGAATTCAGAAATTGCTGAC	gggCCGACTGCAAGTGGG	G,T
W8	ced0002110	ACGTTGGATGACCATCCTCTGCAGAGCTTC	ACGTTGGATGTGCTTTCACTGAATCCCTTC	CAGAGCTTCCAAATACAGA	G,A
W8	ced0003485	ACGTTGGATGTGATCAAGAGCAGATCGTGG	ACGTTGGATGCGATCACTGAAAGGTGACTC	ctcGCAGCAGGTCCAATAG	A,G
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W8	ced0000979	ACGTTGGATGGAAAAATGGCCTAGCAATGG	ACGTTGGATGACAAGTTCACAGAAGGAGGG	CCTAGCAATGGAAGAGAATA	C,A
W8	ced0001005	ACGTTGGATGGCAGCATGCTTCCATTTGTG	ACGTTGGATGCCCGTGCTCTTGATGCTTTC	tcTCCATTTGTGACTTGCAAC	A,T
W8	ced0001033	ACGTTGGATGTCAGCGAGACCAAAACCTAC	ACGTTGGATGGGCGTCTCTCTTTTGAGTAG	gggaaAGATGCACAGACGGCG	T,A
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W8	ced0004611	ACGTTGGATGCAAATTCATTGGATACAAC	ACGTTGGATGCTTGTTCTCATTTGTATCTG	cagTCATTGGATACAACATTAACC	A,T
W8	ced0002278	ACGTTGGATGTGGAGTATCATCAGGACTGC	ACGTTGGATGCCCTTTATCAGCATATTTGAG	ggaggCAAGAAACCAGAAACAGAT	C,T
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W8	cedMt902_21859	ACGTTGGATGTGCGAAGCAAGCCTACATAG	ACGTTGGATGCCAAGACATGAAAAAGAACG	gggatCCTACATAGGGTAGAAGATC	G,T
W8	ced0002592	ACGTTGGATGGCTTGAGCATTAGAGAAGCC	ACGTTGGATGTCGGGTGAACAATCAACTGC	ccctcAGAGAAGCCTCTCTTACAGAA	C,A
W8	ced0002327	ACGTTGGATGTCCTCATTGACTTGTGCTTG	ACGTTGGATGCAGTGCAATTAAAGAAAGAGC	GCTTGAATTTAATTGTGTTTTACTAC	C,A
W8	ced0003879	ACGTTGGATGACTTGGCATGAGTGCACATC	ACGTTGGATGGTGAGGAAGGTGTTTTTTGG	ggataTAAGGTGGAATAAGAATGTAC	A,T
W8	cedCp4_3841	ACGTTGGATGTTATAATCCTGATCCAGAC	ACGTTGGATGGTGGACATTTCCTCACAATA	ggaggATCCTGATCCAGACAGTAAGAT	G,A
W8	cedCpIN_111_5881	ACGTTGGATGCATGGAATTGCTTTTTTCA	ACGTTGGATGATCAGTGGACAAGGTCGAAG	aGCTTTTTTCATTTTTTTTTGTTTTATT	- ,TTTTA
W8	ced0003904	ACGTTGGATGCCTTTTTATCCCTCCTAAGAC	ACGTTGGATGAATCACTATACTACCATGCC	gtcaCTCCTAAGACAAGAATATTCTAAT	C,T

W8	ced0002797	ACGTTGGATGAGTAAGGTACTCTTTGGAGC	ACGTTGGATGGCCCAATCAACCACCATAAC	aaaagACTCTTTGGAGCATTTAGATTGA	G,T
W8	ced0000673	ACGTTGGATGACAAGAACATGGTACCACCG	ACGTTGGATGCCTTGCTGTTTTCTTCACTG	ggggtCGAATCCAAAGATGTGTTAGATA	G,T
W9	ced0001418	ACGTTGGATGTCAGTGTAGAAAATTTATTC	ACGTTGGATGTTCCCAAGGAACTAGGGTAG	TCATGAGAAGCCCGA	C,T
W9	ced0003945	ACGTTGGATGCTCTTTCTTCTTGTCGCGAG	ACGTTGGATGGAAGAAATGCGAAGGCCTAC	TTCCCAGTCTCTTTGC	G,T
W9	ced0004029	ACGTTGGATGGTCAAGATGGTTGTGTGTTC	ACGTTGGATGGTACCCATCATGAACTTCGC	GTGTGTTCCTCCTTCC	G,T
W9	ced0003975	ACGTTGGATGGATTCAGTAGTACTGCCAAC	ACGTTGGATGTCATGCGTTATTGCCCATTG	TCACCAGGGTTTCAAA	G,T
W9	ced0000345	ACGTTGGATGTGACGAGTAATGGACCAATG	ACGTTGGATGTGAGTTTGCTGTGCACTACC	GGACCAATGGGGTTTG	G,A
W9	ced0001098	ACGTTGGATGGATTTTTTCGCTGGCCTTCC	ACGTTGGATGATAAGCACCTCCTAGCAAAG	TCCATGCACCACAATTAT	G,T
W9	cedCp25_3221	ACGTTGGATGGTAACCGATTCTTTCGTTTC	ACGTTGGATGCGGTATTAAACCCGAAACTC	TTCGTTTCTTTGGTTCAC	T,A
W9	ced0004362	ACGTTGGATGTCTCCAAGCAGAATTCAAGG	ACGTTGGATGCCTGCATTATCTGGCAAGTC	cAATTCAAGGAAGCAGCA	T,C
W9	ced0004706	ACGTTGGATGAGTATGGAAGGGATGGGATG	ACGTTGGATGCATCATTGATTGAGGGCCAG	tATGCGAGGTCAAGTGGGT	C,T
W9	ced0004161	ACGTTGGATGTACGGGCTCTTCTTCATAGG	ACGTTGGATGCCCAGACAGAATCTGTATGC	tccccGCGATGTGTGCACTC	G,T
W9	ced0003064	ACGTTGGATGAGGAAAAACTGTTGGCCTCC	ACGTTGGATGATGACCCAAAGTTGCATGAC	cattGATCCTAAGTGCAGCA	C,T
W9	ced0000542	ACGTTGGATGCAGAAGTTTAGAAGCTCAAG	ACGTTGGATGCGGAGCTTCCTAATTTGGAG	TTGATACTTATCAGGAAAGC	C,T
W9	ced0004460	ACGTTGGATGTTCAAAGGCCTCAGACATCG	ACGTTGGATGAGACCCAAAAGCTGTGGATG	gatgGCTCAGTCAATGGGATT	G,C
W9	ced0000573	ACGTTGGATGTGGAAGGAAAGGAGGAAACC	ACGTTGGATGAGAGCTGCCATGGTTTTCTG	ggTCAGAATATGGGACTGAAG	A,G
W9	ced0004283	ACGTTGGATGACCAGGGTTCAAAAACCTGC	ACGTTGGATGGCAATAGTTAGTCCAACGGC	ctctTGATGATCGTCTGTTCAC	G,T
W9	cedMt93_44287	ACGTTGGATGCCATTGTCACTGACTCATAC	ACGTTGGATGGGTACTAGTTTCAGTGGGAG	TGACTCATACATTCTCTGTGGA	A,G
W9	ced0001116	ACGTTGGATGCAGGATCCCCAAAGTGTTAG	ACGTTGGATGGATGTTGTTGCTATTTGTAAG	gggatAATGCCATGAAAAAGGG	T,C
W9	cedCp4_17783	ACGTTGGATGTTGGGAAGTGATTGGTCCGA	ACGTTGGATGAGGGATACGCCTATCTCATC	ccacGTGATTGGTCCGACATAAA	C,A
W9	ced0001353	ACGTTGGATGAGGTCTGGTTAAGATTTGGG	ACGTTGGATGCATAAATTTTAACACGAGAGG	AAAAGTCAGGTAGTAAATTATCA	T,A
W9	cedCp4_7076	ACGTTGGATGACCATCGTTCCTGACCTTTC	ACGTTGGATGATTCCGCTGAGTAGGATTCG	cccttCTGACCTTTCTACGCGAAT	G,A
W9	ced0000441	ACGTTGGATGTGCATCAGGTTCTCGATCTC	ACGTTGGATGTGAAGTCGCTGGCCAAAATC	cccccGGTTCTCGATCTCTTTAGT	A,G
W9	ced0001666	ACGTTGGATGGCATAAACTCCTTGCTTTCC	ACGTTGGATGAGGGAGAGGTAAGACCTTTG	ggttgCCTATTCTACAGCCAAAAG	T,A
W9	ced0001429	ACGTTGGATGCATTCCCATCTTTGCAGAGC	ACGTTGGATGTTCGTCGTTGCCTGGAATTG	ccccaATCTTTGCAGAGCTCAAGTT	G,T
W9	ced0003464	ACGTTGGATGTGAGCGTTTGTGAGATGATG	ACGTTGGATGATGAGACTGGCAGCTCTTAC	tgGCCTTTCATAGATGAAATTGGTA	C,A
W9	cedCp111_12788	ACGTTGGATGCCAACAATGCCTACTCCTTC	ACGTTGGATGAATCGGGGTTGTTGAATATC	ggggTCGTTCTAAAAAAATAGGGTT	G,T
W9	ced0000270	ACGTTGGATGCATCACCCCTTGTATGATCG	ACGTTGGATGCGTAGAAAAAACATAACCCAG	ccaTTTATTTGTTCATGAAGATCATT	T,A
W9	ced0004185	ACGTTGGATGGTTGGAAGTTGAAAAGCAAG	ACGTTGGATGCATTAGAAGGCTTTGAACTG	AAAAGCAAGAACAAAAACATAATAAG	C,A
W9	ced0003410	ACGTTGGATGAGGTGATGTCCATTGGATTC	ACGTTGGATGCATGGATTATTTCTGATTG	cccctCATTGGATTCATCACAAAAAAC	A,T
W9	ced0002433	ACGTTGGATGACCAGTTTCATTGACTACAG	ACGTTGGATGTCGAAAACAAGGTTTTGAC	gggATTGACTACAGAATCATTGTAAGA	C,G
W9	cedCp4_15976	ACGTTGGATGCGGACTAGAATCAGCAGTAG	ACGTTGGATGGATAGTATGATCGAAAGATTC	ccccATCAGCAGTAGCCTATGAGATCCG	G,T

W9	cedCp111_6682	ACGTTGGATGGATTCCGGCTAAAAGCATAC	ACGTTGGATGTACATGGTTACCAGACACCC	ccccgAAAAGCATACAAGTACTGTAATG	C,T
W9	ced0001885	ACGTTGGATGGCTCGCGGATATTTTCTCTG	ACGTTGGATGTTCTTTGAGCGGCTTGCTAC	ttttaGCGGATATTTTCTCTGTAGTTGC	A,G
W9	cedCp4_22589	ACGTTGGATGCCCATGTCCGAATAAAAGTG	ACGTTGGATGGAATAGAATGCATCATAGGG	caaggGGTAAAAGTTGGAAATACGTCAT	TCA, -
W10	cedCp15_6740	ACGTTGGATGCGCCAAGATCTCTTCGTTAG	ACGTTGGATGCCAAATCCAATTCTCTCTCG	AATCCGCACGAATCG	C,A
W10	ced0003681	ACGTTGGATGACACTCGGGAAAGAAGACTG	ACGTTGGATGCCTTTGACGTGCTTTTGCTG	AAAGAGGGAAGCAGC	T,C
W10	cedMt57_7336	ACGTTGGATGGCAAGCAACAACGGCTTTTC	ACGTTGGATGAGAGAAGGTTGCTCATCCAG	CATCGCACTGCCGCAT	G,T
W10	ced0002802	ACGTTGGATGAGCCCTCATCACTTCCTAAC	ACGTTGGATGCCTTTTCTTGGCAGTTGGAC	CTTTCTGTGAGGAGCA	T,A
W10	ced0000763	ACGTTGGATGACCTCTTGATGATATCCCAG	ACGTTGGATGACACTCTGGCCCAATACAAG	ttcTCGGACCGTTCCTTC	A,G
W10	ced0003571	ACGTTGGATGTTCCTATGGTAGTCGTCGTG	ACGTTGGATGCCACTTCCCCATTCAAGAGC	TTTTGCAAATATTCGCCT	T,C
W10	ced0001877	ACGTTGGATGCACCAATTTACTCACCTGCG	ACGTTGGATGGAAGACACTAAACCGTCCAG	gaTGCGAGAGCTCCAAGC	A,G
W10	ced0000987	ACGTTGGATGTTTAGAGGTTGTGGCCAAGC	ACGTTGGATGTCGCCTTCATCAGCAAAACC	TCTCAAATTTTTCCATGGG	C,G
W10	ced0001622	ACGTTGGATGATGGATACTAGCGAGGATGG	ACGTTGGATGTTCCGACTACTAGATCGAGC	ggGAGGATGGTACTCCACC	C,A
W10	ced0001133	ACGTTGGATGCCCATTTCCAGCATTGCATC	ACGTTGGATGGCATCGAGAATGGAATCCAC	cacTGCATCCCTAACATCAC	C,T
W10	ced0002082	ACGTTGGATGCTGTCTGGTCCAATACCTTC	ACGTTGGATGGCTTGTTGCTTTGCAACATC	GGAATTGGAAACCTAAACAA	T,C
W10	ced0001393	ACGTTGGATGTGCCTATAAGGACACTCAGC	ACGTTGGATGAACAGAGCACATGTTTGCAG	gcctaTTGTGCATTCACCCCG	C,A
W10	ced0000324	ACGTTGGATGGCAATTAAGTAAATCAATGC	ACGTTGGATGCAGGTGTGATGCTTCTAGTA	ATTGAAGTACTAATACCACAC	A,T
W10	cedCp2_2763	ACGTTGGATGAGGGCCGTTATGCTCATTAC	ACGTTGGATGGATGATCGATTCAACCTCTG	ACTTGTTGAAGAGATGAAATA	G,T
W10	ced0001352	ACGTTGGATGGCTCAGGATTTTATTGCCAG	ACGTTGGATGTTGACAGCCTTGGGAAAGTG	TTTGTGAAAGATCCTAGGACTT	G,A
W10	ced0004370	ACGTTGGATGATGTCCCTACAACATCAGGA	ACGTTGGATGGGGTTCTTTCCTCAGTAATC	tttagTCAGGAATTCTTGTGGC	T,C
W10	ced0001314	ACGTTGGATGGGAGGTAAGCCTTGAAAATAG	ACGTTGGATGATCAGAAGTTTAGAAGCTC	cccTGGCTTTCCTGATAAGTATC	T,C
W10	cedCp111_2068	ACGTTGGATGCTGAATAGATAGATCGACCG	ACGTTGGATGAAATCTTCGCCGTATGTGGG	ggagAGATCGACCGAAAAAATCA	G,T
W10	cedCp8_41296	ACGTTGGATGGTTATTCTTCTGACGGTGGG	ACGTTGGATGGCATGAGTTTCAAACTTGAC	GGGAGAAAAGATAAAATGAAAAC	G,T
W10	ced0000625	ACGTTGGATGCATGATGTCCATTCACAGAAC	ACGTTGGATGTGTTCACTGCCAAGATCTTC	cctcCACAGAACAAAGAACTACTG	T,A
W10	ced0003752	ACGTTGGATGATGCATGTCTGAGCCATGAG	ACGTTGGATGTCAAGCGCCAAAAAGAACGG	tggtaCATGAGCTTTACCAATGAA	T,C
W10	cedCp4_781	ACGTTGGATGCAGAAATCTACAAATACAGG	ACGTTGGATGTTACAATTCCCCAATATCG	ggggcACAGGATATACGACCAAGAG	T,C
W10	ced0003422	ACGTTGGATGCTTCAATGCCTGAGGTCAAG	ACGTTGGATGTGATCTCCTCCAAATTGACG	ccgtTCAAGAACTATTCTCTTTCTAC	A,G
W10	ced0001009	ACGTTGGATGCGCAACCTATTGAGTACCAG	ACGTTGGATGCCCAAGGAAGTAAACAGCAG	aacccATTGAGTACCAGTACTACAAA	T,C
W10	ced0003477	ACGTTGGATGGGAAGCCATTGCAAATGCTC	ACGTTGGATGTGTGCAACAACAGGTGCAG	tgataAGATCTTGTGTTTATAACAGC	C,T
W10	ced0000657	ACGTTGGATGCAGTTCTCAGAATGATAGGG	ACGTTGGATGCCTTGTCCAAAGACACGTTC	gtttAGCAGTTCTTGGATAATGTTCA	T,C
W10	ced0002665	ACGTTGGATGAGGATGTTAAAGATGTCTC	ACGTTGGATGAGCATAGCAGGCAATTAAGC	ccctcCAAAATGTATCAGATCCATCAA	T,A
W10	ced0004719	ACGTTGGATGAAAATTGGAAGAAGTTCCG	ACGTTGGATGTCCAGGATGGACCAAGTTTG	GGAAGAAGTTCCGTTAAAATAAATATA	T,C
W10	ced0002160	ACGTTGGATGTCCTTCTTGAAATGCTTAG	ACGTTGGATGAAGGATGGCCACTTCAGAAC	ccccTTTAATCAATGATAGTTTGGACTT	C,A

W10	ced0004149	ACGTTGGATGGATTCACCTATTTTTCTTTTC	ACGTTGGATGGCACAAACATATCTAGTACA	TCATATGTATTTAACATTTAAAAATGTC	A,G
W10	cedCp4_12908	ACGTTGGATGGGGATATGCAAGAACAAACC	ACGTTGGATGCCATTTACTATAGAGGTTCCC	ggatgTTTATTGGAAACATTCCTCTAAT	C,A
W10	cedMt902_4768	ACGTTGGATGCATCTCAGGAGCGTTACAAC	ACGTTGGATGTTTCCTTCTTGGCCTTCACC	gttaaAACGAAGCAGATAGATAGGAAAT	C,A

Online Resource 2: Bayesian clustering for nuclear markers in STRUCTURE v.2.3.4 (Pritchard et al. 2000). Ten independent runs were performed with different number of groups ($K = 2$ through 8), each with 10,000 iterations in the burning period and 10,000 in Monte Carlo Markov Chain (MCMC) iterations with admixture models with correlated allele frequency models and a threshold Q>0.8. The co-ancestry values were estimated with CLUMPACK (Kopelman et al. 2015) and the optimal number of clusters was chosen to minimize the number of admixed individuals.

ID	Country	Region (Sampling location)	Latitude	Longitude	K1	K2	K3	Cluster	K1.1	K1.2	K1.3	K1.4	K2.1	K2.2	K2.3	K2.4	K1.2.1	K1.2.2	Sub cluster
CEODO_1682_1	Brazil	Rorainópolis	0.57774	-60.17809	1	0	0	1	0.9979	0.0008	0.0008	0.0006							1.1
CEODO_1683_1	Brazil	Rorainópolis	0.5778	-60.17806	1	0	0	1	0.9978	0.0007	0.001	0.0006							1.1
CEODO_1684_1	Brazil	São João da Baliza RR	0.57531	-59.55223	0.999	0	0.001	1	0.9912	0.001	0.0027	0.0051							1.1
CEODO_544_2	French Guiana	Grenand	3.75	-53.0333	0.999	0	0.001	1	0.9878	0.0023	0.0037	0.0062							1.1
CEODO_537_2	French Guiana	Mori	3.6166	-53.2	0.9998	0.0002	0	1	0.9452	0.0017	0.0224	0.0307							1.1
CEODO_1685_1	Brazil	São João da Baliza RR	0.57475	-59.55216	1	0	0	1	0.9881	0.0039	0.0064	0.0016							1.1
CEODO_1686_1	Brazil	São João da Baliza RR	0.57664	-59.55242	0.9991	0.0009	0	1	0.9823	0.0016	0.0127	0.0034							1.1
CEODO_1286_1	Peru	Dpto. Loreto, Prov. Ucayali, Dist. Contamana, Contamana	-7.21662	-74.94912	0.9983	0.0009	0.0008	1	0.6762	0.001	0.0016	0.3212							1.1
CEODO_125_2	Ecuador		0	-79.814722	0.9986	0.001	0.0004	1	0.0026	0.0602	0.9254	0.0119							1.3
CEODO_78_1	Costa Rica	Upala	10.80695	-85.01587	0.9995	0.0005	0	1	0.0007	0.001	0.9981	0.0002							1.3
CEODO_79_1	Costa Rica	Upala	10.81822	-85.02286	0.9995	0.0005	0	1	0.0003	0.0008	0.9987	0.0002							1.3
CEODO_81_1	Costa Rica	Upala	10.80909	-85.02307	0.9994	0.0006	0	1	0.0007	0.0008	0.9981	0.0004							1.3
CEODO_89_1	Costa Rica	Upala	10.89303	-84.98864	0.9991	0.0009	0	1	0.0006	0.001	0.997	0.0014							1.3
CEODO_85_1	Costa Rica	Upala	10.88624	-85.02145	0.9993	0.0007	0	1	0.0007	0.0007	0.9982	0.0004							1.3
CEODO_538_2	French Guiana	Amshoff	3.75	-53.0333	0.671	0.0339	0.2951	1	0.0016	0.0026	0.0016	0.9943							1.4
CEODO_540_2	French Guiana	Stahel	3.75	-53.0333	0.8609	0.0026	0.1365	1	0.0424	0.0335	0.0062	0.9178							1.4
CEODO_202_2	Cuba	Guisa	20.16	76.68	0.7962	0.0308	0.173	1	0.001	0.1391	0.1014	0.7585							1.4
CEODO_1151_1	Brazil	RESEX Tapajós - Arapiuns - Pará	-3.05375	-55.303583	0.9982	0.001	0.0008	1	0.0014	0.9921	0.0048	0.0017					0.9567	0.0433	1.2.1
CEODO_934_1	Bolivia	Cobija, Villa Fatima	-11.078857	-69.135597	0.9983	0.0009	0.0008	1	0.0009	0.9969	0.0011	0.0011					0.9584	0.0416	1.2.1
CEODO_930_1	Bolivia	Cobija, Villa Fatima	-11.09416	-69.12216	0.9991	0.0008	0.0001	1	0.0009	0.9958	0.0014	0.0019					0.8621	0.1379	1.2.1
CEODO_1150_1	Brazil	RESEX Tapajós - Arapiuns - Pará	-3.053983	-55.303633	0.9989	0.001	0.0001	1	0.0007	0.9979	0.0012	0.0002					0.9888	0.0112	1.2.1
CEODO_1148_1	Brazil	RESEX Tapajós - Arapiuns - Pará	-3.05485	-55.301417	0.9983	0.001	0.0007	1	0.0006	0.998	0.001	0.0004					0.9754	0.0246	1.2.1
CEODO_1146_1	Brazil	RESEX Tapajós - Arapiuns - Pará	-3.0549	-55.30005	0.9982	0.0008	0.001	1	0.0006	0.997	0.0009	0.0016					0.924	0.076	1.2.1

CEODO_1141_1	Brazil	RESEX Tapajós - Arapiuns - Pará	-3.062317	-55.299817	0.9989	0.001	0.0001	1	0.0003	0.9984	0.0009	0.0003					0.989	0.011	1.2.1
CEODO_793_1	Brazil	(Flona do Caraja/Pará) Parauapebas	-6.061483	-50.05885	0.999	0.001	0	1	0.0004	0.998	0.0012	0.0003					0.985	0.015	1.2.1
CEODO_1263_1	Brazil	k. A.	-6.048733	-50.080617	0.9992	0.0008	0	1	0.0009	0.9964	0.0014	0.0012					0.9873	0.0127	1.2.1
CEODO_1264_1	Brazil	k. A.	-6.061483	-50.05885	0.999	0.001	0	1	0.0006	0.9979	0.001	0.0006					0.9871	0.0129	1.2.1
CEODO_791_1	Brazil	(Flona do Caraja/Pará) Parauapebas	-6.1843	-49.844433	0.9956	0.003	0.0014	1	0.0011	0.9959	0.0009	0.0021					0.835	0.165	1.2.1
CEODO_792_1	Brazil	(Flona do Caraja/Pará) Parauapebas	-6.048733	-50.080617	0.9993	0.0007	0	1	0.001	0.9969	0.0011	0.001					0.9857	0.0143	1.2.1
CEODO_786_1	Bolivia	Cobija, Road - Bella Vista (Oscar Kerdi)	-11.199111	-68.284444	0.9986	0.0011	0.0003	1	0.0008	0.9971	0.001	0.0011					0.697	0.303	1.2.1
CEODO_785_1	Bolivia	Cobija, Road - Bella Vista (Oscar Kerdi)	-11.198283	-68.279903	0.9988	0.0012	0	1	0.0008	0.9978	0.0008	0.0007					0.7815	0.2185	1.2.1
CEODO_784_1	Bolivia	Cobija, Road - Bella Vista (Oscar Kerdi)	-11.198392	-68.283928	0.9944	0.0054	0.0002	1	0.0008	0.9918	0.0014	0.006					0.5667	0.4333	1.2.1
CEODO_929_1	Bolivia	Cobija, Villa Fatima	-11.097269	-69.116675	0.9993	0.0007	0	1	0.0006	0.9979	0.001	0.0006					0.7617	0.2383	1.2.1
CEODO_926_1	Bolivia	Cobija, Villa Fatima	-11.103198	-69.108638	0.9986	0.001	0.0004	1	0.0007	0.9976	0.0008	0.001					0.7778	0.2222	1.2.1
CEFIS_342_1	Peru	Shucushuyacu	-5.99868	-75.82296	0.998	0.0019	0.0001	1	0.0008	0.9972	0.0009	0.0011					0.0486	0.9514	1.2.2
CEODO_1544_1	Peru	Shucushuyacu	-6.00285	-75.82127	0.9986	0.0012	0.0002	1	0.0006	0.9972	0.0011	0.0011					0.0214	0.9786	1.2.2
CEODO_1545_1	Peru	Shucushuyacu	-6.00066	-75.82297	0.9989	0.001	0.0001	1	0.0006	0.9972	0.0012	0.001					0.0177	0.9823	1.2.2
CEODO_1541_1	Peru	Shucushuyacu	-6.0193	-75.84509	0.9989	0.001	0.0001	1	0.0009	0.9967	0.0014	0.001					0.0167	0.9833	1.2.2
CEODO_1217_1	Peru	Dpto. Ucayali, Prov. Atalaya, Dist. Raymondi, Comunidad San Juan de Inuya	-10.56134	-73.00214	0.999	0.0009	0.0001	1	0.0017	0.9912	0.0032	0.0039					0.0314	0.9686	1.2.2
CEODO_1218_1	Peru	Dpto. Ucayali, Prov. Atalaya, Dist. Raymondi, Comunidad San Juan de Inuya	-10.56369	-73.0016	0.9987	0.0011	0.0002	1	0.0009	0.9972	0.0011	0.0008					0.1182	0.8818	1.2.2
CEODO_1207_1	Peru	Dpto. Ucayali, Prov. Atalaya, Dist. Raymondi, Comunidad San Juan de Inuya	-10.58688	-73.075002	0.999	0.0008	0.0002	1	0.0007	0.9973	0.0012	0.0008					0.0677	0.9323	1.2.2
CEODO_1220_1	Peru	Dpto. Ucayali, Prov. Atalaya, Dist. Raymondi, Comunidad San Juan de Inuya	-10.56976	-72.9869	0.999	0.001	0	1	0.0024	0.9718	0.0057	0.0201					0.0124	0.9876	1.2.2
CEODO_1282_1	Peru	Dpto. Loreto, Prov. Ucayali, Dist. Contamana, Contamana	-7.23248	-74.97092	0.9987	0.0011	0.0002	1	0.0009	0.9969	0.0009	0.0013					0.1041	0.8959	1.2.2
CEODO_1285_1	Peru	Dpto. Loreto, Prov. Ucayali, Dist. Contamana, Contamana	-7.22909	-74.96307	0.9997	0.0003	0	1	0.4849	0.0019	0.3965	0.1167							
CEFIS_361_1	Brazil	Guaratuba PR	-25.55813	-48.43748	0.3275	0.6717	0.0008	2					0.9763	0.0023	0.0153	0.006			2.1
CEFIS_362_1	Brazil	Guaratuba PR	-25.57027	-48.43064	0.4257	0.5735	0.0008	2					0.994	0.0015	0.0028	0.0017			2.1
CEFIS_359_1	Brazil	Guaratuba PR	-25.54975	-48.42234	0.3306	0.6677	0.0017	2					0.995	0.0017	0.0012	0.0022			2.1
CEFIS_346_1	Brazil	Guaratuba PR	-25.53972	-48.40304	0.3279	0.6711	0.001	2					0.9888	0.0038	0.003	0.0043			2.1
CEFIS_354_1	Brazil	Guaratuba PR	-25.53536	-48.40427	0.3423	0.6567	0.001	2					0.9788	0.001	0.0152	0.005			2.1

CEFIS_364_1	Brazil	Guaratuba PR	-25.57717	-48.41797	0.3698	0.6286	0.0016	2		0.9903	0.002	0.0032	0.0045	2.1
CEFIS_128_1	Bolivia	Rurrenabaque, El Paraiso	-14.303914	-67.724858	0.0003	0.9997	0	2		0.0022	0.823	0.1683	0.0065	2.2
CEFIS_127_1	Bolivia	Rurrenabaque, El Paraiso	-14.304358	-67.724775	0.001	0.9986	0.0004	2		0.0023	0.8125	0.1768	0.0083	2.2
CEODO_1023_1	Bolivia	Rurrenabaque, San Martin de Agua Rica	-15.525622	-67.269258	0.0006	0.9994	0	2		0.0017	0.9522	0.0207	0.0255	2.2
CEODO_1014_1	Bolivia	Rurrenabaque, San Martin de Agua Rica	-15.526889	-67.26865	0.0003	0.9997	0	2		0.0033	0.946	0.0122	0.0385	2.2
CEODO_1011_1	Bolivia	Rurrenabaque, San Martin de Agua Rica	-14.602536	-67.277525	0.0001	0.9999	0	2		0.0012	0.9142	0.0302	0.0545	2.2
CEFIS_226_1	Peru	Dpto. Loreto, Prov. Ucayali, Dist. Contamana, Contamana	-7.22189	-74.95517	0.0003	0.9997	0	2		0.0012	0.9855	0.0058	0.0075	2.2
CEFIS_217_1	Peru	Dpto. Loreto, Prov. Ucayali, Dist. Contamana, Contamana	-7.30774	-75.00145	0.001	0.999	0	2		0.0033	0.9795	0.0037	0.0135	2.2
CEFIS_232_1	Peru	Dpto. Loreto, Prov. Ucayali, Dist. Contamana, Contamana	-7.3232	-75.00805	0.0009	0.9991	0	2		0.0015	0.9403	0.009	0.0492	2.2
CEFIS_344_1	Peru	Shucushuyacu	-5.99588	-75.83574	0.002	0.998	0	2		0.0015	0.9335	0.0042	0.0608	2.2
CEFIS_343_1	Peru	Shucushuyacu	-5.99743	-75.83429	0.0032	0.9968	0	2		0.0013	0.8869	0.0155	0.0962	2.2
CEFIS_129_1	Bolivia	Rurrenabaque, El Paraiso	-14.303772	-67.725403	0.0007	0.9993	0	2		0.0023	0.8267	0.1668	0.0042	2.2
CEFIS_95_1	Brazil	(Flona do Caraja/Pará) Parauapebas	-6.168767	-49.831333	0.0033	0.996	0.0007	2		0.0112	0.9558	0.0062	0.0269	2.2
CEFIS_94_1	Brazil	(Flona do Caraja/Pará) Parauapebas	-6.184117	-49.844967	0.0012	0.9988	0	2		0.0067	0.9707	0.004	0.0187	2.2
CEFIS_130_1	Bolivia	Rurrenabaque, El Paraiso	-14.613908	-67.319506	0.0018	0.9965	0.0017	2		0.0157	0.8644	0.0193	0.1006	2.2
CEFIS_75_1	Bolivia	Cobija, Road - Bella Vista (Oscar Kerdi)	-11.164478	-68.555158	0.0008	0.9991	0.0001	2		0.003	0.945	0.0178	0.0342	2.2
CEFIS_180_1	Peru	Dpto. Ucayali, Prov. Atalaya, Dist. Raymondi, Comunidad San Juan de Inuya	-10.57993	-73.06489	0.0006	0.9994	0	2		0.0027	0.9838	0.0053	0.0082	2.2
CEFIS_191_1	Peru	Dpto. Ucayali, Prov. Atalaya, Dist. Raymondi, Comunidad San Juan de Inuya	-10.56369	-73.06862	0.0005	0.9995	0	2		0.0017	0.9875	0.0042	0.0067	2.2
CEFIS_76_1	Bolivia	Cobija, Road - Bella Vista (Oscar Kerdi)	-11.133583	-68.398039	0.0004	0.9996	0	2		0.0018	0.9867	0.0062	0.0053	2.2
CEFIS_83_1	Bolivia	Cobija, Road - Bella Vista (Oscar Kerdi)	-11.193567	-68.2856	0.0002	0.9998	0	2		0.0022	0.9865	0.0058	0.0055	2.2
CEFIS_77_1	Bolivia	Cobija, Road - Bella Vista (Oscar Kerdi)	-11.139192	-68.358647	0.0005	0.9995	0	2		0.0015	0.989	0.0042	0.0053	2.2
CEFIS_80_1	Bolivia	Cobija, Road - Bella Vista (Oscar Kerdi)	-11.193103	-68.282661	0.0014	0.9986	0	2		0.0037	0.9223	0.011	0.063	2.2
CEFIS_10_2	Bolivia	San Ramon-San Javier	-16.253463	-62.528596	0.001	0.999	0	2		0.0072	0.971	0.0085	0.0133	2.2
CEFIS_11_1	Bolivia	San Ramon-San Javier	-16.264451	-62.523159	0.0015	0.9983	0.0002	2		0.0227	0.8903	0.0052	0.0818	2.2
CEFIS_22_2	Bolivia	San Ramon-San Javier	-16.274438	-62.350391	0.0004	0.9996	0	2		0.0012	0.9878	0.0048	0.0062	2.2
CEFIS_13_2	Bolivia	San Ramon-San Javier	-16.275331	-62.463642	0.0012	0.9988	0	2		0.0032	0.951	0.018	0.0278	2.2
CEFIS_14_2	Bolivia	San Ramon-San Javier	-16.278899	-62.45459	0.0014	0.9978	0.0008	2		0.001	0.9812	0.0095	0.0083	2.2

CEFIS_18_2	Bolivia	San Ramon-San Javier	-16.28915	-62.405922	0.0027	0.9973	0	2	0.0017	0.963	0.018	0.0173	2.2
CEFIS_181_1	Peru	Dpto. Ucayali, Prov. Atalaya, Dist. Raymondi, Comunidad San Juan de Inuya	-10.59285	-73.07602	0.0253	0.9733	0.0014	2	0.006	0.0042	0.9713	0.0185	2.3
CEFIS_177_1	Peru	Dpto. Ucayali, Prov. Atalaya, Dist. Raymondi, Comunidad San Juan de Inuya	-10.5518	-73.0551	0.0084	0.9852	0.0064	2	0.0068	0.0048	0.973	0.0153	2.3
CEODO_1018_1	Bolivia	Rurrenabaque, San Martin de Agua Rica	-15.527256	-67.270053	0.1038	0.8948	0.0014	2	0.0045	0.0092	0.0135	0.9728	2.4
CEODO_531_2	Mexico		19	-90.716667	0.0004	0.0004	0.9992	3					3
CEODO_171_2	Cuba	Escambray	21.93	80.02	0	0	1	3					3
CEODO_172_2	Cuba	Escambray	21.93	80.02	0.0008	0.0006	0.9986	3					3
CEODO_188_2	Cuba	Moa-Sagua	20.61	74.93	0.3337	0.0022	0.6641	3					3
CEODO_21_2	Mexico	Escarcega	18.233	-91.533	0	0	1	3					3
CEODO_215_2	Cuba	Guisa	20.16	76.68	0.0007	0.0009	0.9984	3					3
CEODO_13_2	Mexico	Escarcega	18.616667	-90.716667	0	0	1	3					3
CEODO_199_2	Cuba	Guisa	20.16	76.68	0	0	1	3					3
CEODO_12_2	Mexico	Escarcega	18.616667	-90.716667	0.0002	0.0001	0.9997	3					3
CEODO_17_2	Mexico	Escarcega	18.233	-91.533	0.0001	0	0.9999	3					3
CEODO_194_2	Cuba	Moa-Sagua	20.61	74.93	0.0005	0.0004	0.9991	3					3
CEODO_124_2	Ecuador		0	-79.814722	0.3692	0.2787	0.3522						
CEODO_128_2	Ecuador		0	-79.814722	0.4063	0.2404	0.3532						
CEODO_129_2	Ecuador		0	-79.814722	0.3928	0.2399	0.3673						
CEODO_NK_1													
tneg1													

Online Resource 3: Bayesian clustering for plastid markers in STRUCTURE v.2.3.4 (Pritchard et al. 2000). Ten independent runs were performed with different number of groups ($K = 2$ through 8), each with 10,000 iterations in the burning period and 10,000 in Monte Carlo Markov Chain (MCMC) iterations with admixture models with correlated allele frequency models and a threshold Q>0.8. The co-ancestry values were estimated with CLUMPACK (Kopelman et al. 2015) and the optimal number of clusters was chosen to minimize the number of admixed individuals.

ID	Country	Region (Sampling location)	Latitude	Longitude	K1	K2	K3	Cluster	K2.1	K2.2	K2.3	K2.4	K2.5	K3.1	K3.2	K3.3	K3.4	Sub cluster
CEODO_531_2	Mexico		19	-90.716667	1	0	0	1										
CEODO_538_2	French Guiana	Amshoff	3.75	-53.0333	0.765	0.2338	0.0012	1										
CEODO_171_2	Cuba	Escambray	21.93	80.02	1	0	0	1										
CEODO_172_2	Cuba	Escambray	21.93	80.02	1	0	0	1										
CEODO_188_2	Cuba	Moa-Sagua	20.61	74.93	1	0	0	1										
CEODO_21_2	Mexico	Escarcega	18.233	-91.533	1	0	0	1										
CEODO_215_2	Cuba	Guisa	20.16	76.68	1	0	0	1										
CEODO_13_2	Mexico	Escarcega	18.616667	-90.716667	1	0	0	1										
CEODO_199_2	Cuba	Guisa	20.16	76.68	0.9969	0.0019	0.0012	1										
CEODO_12_2	Mexico	Escarcega	18.616667	-90.716667	1	0	0	1										
CEODO_17_2	Mexico	Escarcega	18.233	-91.533	1	0	0	1										
CEODO_194_2	Cuba	Moa-Sagua	20.61	74.93	1	0	0	1										
CEODO_124_2	Ecuador		0	-79.814722	0	0.999	0.001	2	0.9885	0.0045	0.002	0.003	0.002					2.1
CEODO_125_2	Ecuador		0	-79.814722	0	0.9407	0.0593	2	0.8785	0.0835	0.0245	0.003	0.0105					2.1
CEODO_128_2	Ecuador		0	-79.814722	0.0102	0.9888	0.001	2	0.992	0.003	0.0015	0.0025	0.001					2.1
CEODO_129_2	Ecuador		0	-79.814722	0	0.999	0.001	2	0.9875	0.004	0.002	0.005	0.0015					2.1
CEODO_78_1	Costa Rica	Upala	10.80695	-85.01587	0.0002	0.9981	0.0017	2	0.9895	0.0025	0.0015	0.005	0.0015					2.1
CEODO_79_1	Costa Rica	Upala	10.81822	-85.02286	0	0.9991	0.0009	2	0.9875	0.002	0.0015	0.0075	0.0015					2.1
CEODO_81_1	Costa Rica	Upala	10.80909	-85.02307	0	0.999	0.001	2	0.9845	0.004	0.002	0.0085	0.001					2.1
CEODO_89_1	Costa Rica	Upala	10.89303	-84.98864	0	0.999	0.001	2	0.99	0.0025	0.0015	0.005	0.001					2.1
CEODO_85_1	Costa Rica	Upala	10.88624	-85.02145	0	0.999	0.001	2	0.984	0.004	0.002	0.009	0.001					2.1
CEODO_202_2	Cuba	Guisa	20.16	76.68	0	0.9991	0.0009	2	0.9885	0.0045	0.002	0.0035	0.0015					2.1
CEODO_1151_1	Brazil	RESEX Tapajós - Arapiuns - Pará	-3.05375	-55.303583	0	0.9988	0.0012	2	0.0035	0.988	0.0025	0.0035	0.0025					2.2
CEFIS_361_1	Brazil	Guaratuba PR	-25.55813	-48.43748	0	0.999	0.001	2	0.003	0.9875	0.005	0.002	0.0025					2.2

CEFIS_362_1	Brazil	Guaratuba PR	-25.57027	-48.43064	0	0.9989	0.0011	2	0.0035	0.985	0.0035	0.004	0.004	2.2
CEFIS_359_1	Brazil	Guaratuba PR	-25.54975	-48.42234	0	0.999	0.001	2	0.002	0.989	0.0045	0.003	0.0015	2.2
CEFIS_346_1	Brazil	Guaratuba PR	-25.53972	-48.40304	0	0.9987	0.0013	2	0.003	0.988	0.0025	0.004	0.0025	2.2
CEFIS_354_1	Brazil	Guaratuba PR	-25.53536	-48.40427	0	0.9989	0.0011	2	0.003	0.9885	0.004	0.002	0.0025	2.2
CEODO_1150_1	Brazil	RESEX Tapajós - Arapiuns - Pará	-3.053983	-55.303633	0	0.9988	0.0012	2	0.003	0.987	0.0045	0.003	0.0025	2.2
CEODO_1148_1	Brazil	RESEX Tapajós - Arapiuns - Pará	-3.05485	-55.301417	0	0.999	0.001	2	0.0025	0.986	0.004	0.005	0.0025	2.2
CEODO_1146_1	Brazil	RESEX Tapajós - Arapiuns - Pará	-3.0549	-55.30005	0	0.999	0.001	2	0.002	0.9885	0.004	0.0025	0.003	2.2
CEODO_1141_1	Brazil	RESEX Tapajós - Arapiuns - Pará	-3.062317	-55.299817	0	0.9989	0.0011	2	0.003	0.986	0.004	0.004	0.003	2.2
CEODO_793_1	Brazil	(Flona do Caraja/Pará) Parauapebas	-6.061483	-50.05885	0	0.9989	0.0011	2	0.0025	0.9875	0.0035	0.004	0.0025	2.2
CEFIS_95_1	Brazil	(Flona do Caraja /Pará) Parauapebas	-6.168767	-49.831333	0	0.9988	0.0012	2	0.003	0.9865	0.003	0.0045	0.003	2.2
CEODO_1263_1	Brazil	k. A.	-6.048733	-50.080617	0	0.999	0.001	2	0.0035	0.984	0.0055	0.0045	0.0025	2.2
CEODO_1264_1	Brazil	k. A.	-6.061483	-50.05885	0	0.999	0.001	2	0.004	0.9845	0.004	0.004	0.0035	2.2
CEFIS_94_1	Brazil	(Flona do Caraja /Pará) Parauapebas	-6.184117	-49.844967	0	0.9987	0.0013	2	0.0025	0.987	0.0045	0.004	0.002	2.2
CEODO_791_1	Brazil	(Flona do Caraja /Pará) Parauapebas	-6.1843	-49.844433	0	0.999	0.001	2	0.003	0.987	0.0035	0.003	0.0035	2.2
CEODO_792_1	Brazil	(Flona do Caraja /Pará) Parauapebas	-6.048733	-50.080617	0	0.999	0.001	2	0.002	0.9865	0.004	0.0035	0.004	2.2
CEFIS_75_1	Bolivia	Cobija, Road - Bella Vista (Oscar Kerdi)	-11.164478	-68.555158	0	0.9989	0.0011	2	0.0025	0.9875	0.0035	0.0035	0.003	2.2
CEFIS_364_1	Brazil	Guaratuba PR	-25.57717	-48.41797	0	0.9989	0.0011	2	0.0025	0.9845	0.006	0.004	0.003	2.2
CEFIS_76_1	Bolivia	Cobija, Road - Bella Vista (Oscar Kerdi)	-11.133583	-68.398039	0	0.9988	0.0012	2	0.0015	0.988	0.0045	0.0035	0.0025	2.2
CEFIS_83_1	Bolivia	Cobija, Road - Bella Vista (Oscar Kerdi)	-11.193567	-68.2856	0	0.9988	0.0012	2	0.003	0.989	0.003	0.0035	0.0015	2.2
CEFIS_77_1	Bolivia	Cobija, Road - Bella Vista (Oscar Kerdi)	-11.139192	-68.358647	0	0.999	0.001	2	0.003	0.986	0.004	0.004	0.003	2.2
CEFIS_80_1	Bolivia	Cobija, Road - Bella Vista (Oscar Kerdi)	-11.193103	-68.282661	0	0.9989	0.0011	2	0.0025	0.988	0.005	0.0025	0.002	2.2
CEFIS_13_2	Bolivia	San Ramon-San Javier	-16.275331	-62.463642	0	0.9987	0.0013	2	0.0035	0.985	0.006	0.0025	0.003	2.2
CEFIS_342_1	Peru	Shucushuyacu	-5.99868	-75.82296	0	0.999	0.001	2	0.001	0.0045	0.984	0.002	0.0085	2.3
CEODO_1544_1	Peru	Shucushuyacu	-6.00285	-75.82127	0	0.999	0.001	2	0.002	0.0035	0.987	0.0025	0.005	2.3
CEODO_1545_1	Peru	Shucushuyacu	-6.00066	-75.82297	0	0.999	0.001	2	0.001	0.0035	0.986	0.002	0.0075	2.3
CEODO_1541_1	Peru	Shucushuyacu	-6.0193	-75.84509	0	0.999	0.001	2	0.002	0.0055	0.9845	0.001	0.007	2.3
CEODO_1207_1	Peru	Dpto. Ucayali, Prov. Atalaya, Dist. Raymondi, Comunidad San Juan de Inuya	-10.58688	-73.075002	0	0.999	0.001	2	0.001	0.005	0.987	0.002	0.005	2.3
CEODO_1282_1	Peru	Dpto. Loreto, Prov. Ucayali, Dist. Contamana, Contamana	-7.23248	-74.97092	0	0.999	0.001	2	0.002	0.005	0.9845	0.002	0.0065	2.3
CEFIS_14_2	Bolivia	San Ramon-San Javier	-16.278899	-62.45459	0	0.999	0.001	2	0.0015	0.004	0.981	0.002	0.0115	2.3
CEFIS_18_2	Bolivia	San Ramon-San Javier	-16.28915	-62.405922	0	0.9989	0.0011	2	0.0015	0.0055	0.9795	0.003	0.0105	2.3
CEODO_1682_1	Brazil	Rorainópolis	0.57774	-60.17809	0	0.999	0.001	2	0.004	0.003	0.002	0.99	0.001	2.4

CEODO_1683_1	Brazil	Rorainópolis	0.5778	-60.17806	0	0.999	0.001	2	0.003	0.0055	0.0025	0.9875	0.0015					2.4
CEODO_1684_1	Brazil	São João da Baliza RR	0.57531	-59.55223	0	0.999	0.001	2	0.0025	0.0045	0.0015	0.9895	0.002					2.4
CEODO_540_2	French Guiana	Stahel	3.75	-53.0333	0	0.999	0.001	2	0.1354	0.0025	0.002	0.8581	0.002					2.4
CEODO_544_2	French Guiana	Grenand	3.75	-53.0333	0	0.999	0.001	2	0.002	0.004	0.002	0.991	0.001					2.4
CEODO_537_2	French Guiana	Mori	3.6166	-53.2	0	0.999	0.001	2	0.004	0.003	0.0015	0.99	0.0015					2.4
CEODO_1685_1	Brazil	São João da Baliza RR	0.57475	-59.55216	0	0.999	0.001	2	0.003	0.0045	0.0015	0.9895	0.0015					2.4
CEODO_1686_1	Brazil	São João da Baliza RR	0.57664	-59.55242	0	0.999	0.001	2	0.0055	0.0045	0.002	0.986	0.002					2.4
CEFIS_181_1	Peru	Dpto. Ucayali, Prov. Atalaya, Dist. Raymondi, Comunidad San Juan de Inuya	-10.59285	-73.07602	0.0001	0.9989	0.001	2	0.001	0.0025	0.0085	0.002	0.986					2.5
CEODO_1217_1	Peru	Dpto. Ucayali, Prov. Atalaya, Dist. Raymondi, Comunidad San Juan de Inuya	-10.56134	-73.00214	0	0.9991	0.0009	2	0.001	0.002	0.01	0.002	0.985					2.5
CEODO_1218_1	Peru	Dpto. Ucayali, Prov. Atalaya, Dist. Raymondi, Comunidad San Juan de Inuya	-10.56369	-73.0016	0	0.999	0.001	2	0.0015	0.003	0.009	0.0015	0.985					2.5
CEODO_1220_1	Peru	Dpto. Ucayali, Prov. Atalaya, Dist. Raymondi, Comunidad San Juan de Inuya	-10.56976	-72.9869	0	0.9991	0.0009	2	0.002	0.003	0.004	0.0025	0.9885					2.5
CEFIS_10_2	Bolivia	San Ramon-San Javier	-16.253463	-62.528596	0	0.9992	0.0008	2	0.0015	0.0025	0.005	0.0015	0.9895					2.5
CEFIS_11_1	Bolivia	San Ramon-San Javier	-16.264451	-62.523159	0	0.999	0.001	2	0.002	0.003	0.0065	0.002	0.9865					2.5
CEFIS_22_2	Bolivia	San Ramon-San Javier	-16.274438	-62.350391	0	0.9991	0.0009	2	0.0015	0.003	0.009	0.0015	0.985					2.5
CEFIS_128_1	Bolivia	Rurrenabaque, El Paraiso	-14.303914	-67.724858	0	0.001	0.999	3						0.9962	0.001	0.0015	0.0013	3.1
CEFIS_127_1	Bolivia	Rurrenabaque, El Paraiso	-14.304358	-67.724775	0	0.001	0.999	3						0.9965	0.001	0.0015	0.001	3.1
CEODO_1023_1	Bolivia	Rurrenabaque, San Martin de Agua Rica	-15.525622	-67.269258	0	0.001	0.999	3						0.9963	0.001	0.0015	0.0012	3.1
CEODO_1018_1	Bolivia	Rurrenabaque, San Martin de Agua Rica	-15.527256	-67.270053	0	0.001	0.999	3						0.9962	0.001	0.0017	0.0012	3.1
CEODO_1014_1	Bolivia	Rurrenabaque, San Martin de Agua Rica	-15.526889	-67.26865	0	0.0012	0.9988	3						0.996	0.0012	0.0018	0.001	3.1
CEODO_1011_1	Bolivia	Rurrenabaque, San Martin de Agua Rica	-14.602536	-67.277525	0	0.0011	0.9989	3						0.9965	0.0008	0.0015	0.0012	3.1
CEFIS_129_1	Bolivia	Rurrenabaque, El Paraiso	-14.303772	-67.725403	0	0.0012	0.9988	3						0.9965	0.001	0.0015	0.001	3.1
CEFIS_130_1	Bolivia	Rurrenabaque, El Paraiso	-14.613908	-67.319506	0	0.001	0.999	3						0.9958	0.001	0.002	0.0012	3.1
CEFIS_226_1	Peru	Dpto. Loreto, Prov. Ucayali, Dist. Contamana, Contamana	-7.22189	-74.95517	0	0.001	0.999	3						0.001	0.9898	0.0025	0.0067	3.2
CEFIS_217_1	Peru	Dpto. Loreto, Prov. Ucayali, Dist. Contamana, Contamana	-7.30774	-75.00145	0	0.001	0.999	3						0.001	0.9898	0.0023	0.0068	3.2
CEFIS_232_1	Peru	Dpto. Loreto, Prov. Ucayali, Dist. Contamana, Contamana	-7.3232	-75.00805	0	0.001	0.999	3						0.001	0.9888	0.0018	0.0083	3.2
CEFIS_344_1	Peru	Shucushuyacu	-5.99588	-75.83574	0	0.001	0.999	3						0.001	0.9905	0.0018	0.0067	3.2
CEFIS_343_1	Peru	Shucushuyacu	-5.99743	-75.83429	0	0.001	0.999	3						0.001	0.9888	0.0025	0.0077	3.2
CEFIS_180_1	Peru	Dpto. Ucayali, Prov. Atalaya, Dist. Raymondi, Comunidad San Juan de Inuya	-10.57993	-73.06489	0	0.001	0.999	3						0.001	0.9908	0.002	0.0062	3.2
CEFIS_177_1	Peru	Dpto. Ucayali, Prov. Atalaya, Dist. Raymondi, Comunidad San Juan de Inuya	-10.5518	-73.0551	0	0.001	0.999	3						0.001	0.9893	0.0025	0.0072	3.2

CEFIS_191_1	Peru	Dpto. Ucayali, Prov. Atalaya, Dist. Raymondi, Comunidad San Juan de Inuya	-10.56369	-73.06862	0	0.001	0.999	3	0.001	0.9908	0.0025	0.0057	3.2
CEODO_1285_1	Peru	Dpto. Loreto, Prov. Ucayali, Dist. Contamana, Contamana	-7.22909	-74.96307	0	0.0065	0.9935	3	0.0022	0.0027	0.9917	0.0035	3.3
CEODO_1286_1	Peru	Dpto. Loreto, Prov. Ucayali, Dist. Contamana, Contamana	-7.21662	-74.94912	0	0.0071	0.9929	3	0.0017	0.0027	0.9922	0.0035	3.3
CEODO_934_1	Bolivia	Cobija, Villa Fatima	-11.078857	-69.135597	0	0.0013	0.9987	3	0.0012	0.0075	0.0042	0.9872	3.4
CEODO_930_1	Bolivia	Cobija, Villa Fatima	-11.09416	-69.12216	0	0.0014	0.9986	3	0.001	0.008	0.0035	0.9875	3.4
CEODO_786_1	Bolivia	Cobija, Road - Bella Vista (Oscar Kerdi)	-11.199111	-68.284444	0	0.0019	0.9981	3	0.0012	0.007	0.0043	0.9875	3.4
CEODO_785_1	Bolivia	Cobija, Road - Bella Vista (Oscar Kerdi)	-11.198283	-68.279903	0	0.0011	0.9989	3	0.0013	0.006	0.003	0.9897	3.4
CEODO_784_1	Bolivia	Cobija, Road - Bella Vista (Oscar Kerdi)	-11.198392	-68.283928	0	0.0012	0.9988	3	0.0012	0.0062	0.0037	0.989	3.4
CEODO_929_1	Bolivia	Cobija, Villa Fatima	-11.097269	-69.116675	0	0.001	0.999	3	0.001	0.0077	0.0037	0.9877	3.4
CEODO_926_1	Bolivia	Cobija, Villa Fatima	-11.103198	-69.108638	0	0.0013	0.9987	3	0.0015	0.006	0.003	0.9895	3.4
CEODO_NK_1													
tneg1													

Online Resource 4: Percentage of amplification per locus (% Data) and mean genetic differentiation (Mean Dif) for plastid and nuclear SNPs in *Cedrela*.

Locus	% Data_Plastid	% Data_Nuclear	Mean Dif_Plastid	Mean Dif_Nuclear	Selection_Plastid	Selection_Nuclear	Final selection
cedCp17_10080	100	100	0.2	0.065	x		x
cedCp25_1913	100	100	0.2	0.065	x		x
cedCp111_2068	100	100	0.2	0.065	x		x
cedCpIN_8_4018	100	100	0.2	0.065	x		x
cedMt26_28302	100	100	0.2	0.065	x		x
cedMt347_13824	95	93.75	0.2	0.095	x		x
cedCp4_7076	98.57	99.26	0.356	0.136	x		x
ced0001740	92.56	93.54	0.204	0.144	x		x
cedCp8_20798	96.25	95.31	0.356	0.144	x		x
cedCp111_17175	98.33	98.15	0.356	0.146	x		x
ced0003177	96.07	93.75	0.249	0.148	x		x
cedCp17_3501	100	100	0.351	0.15	x		x
ced0000540	96.49	95.83	0.234	0.171	x		x
ced0002802	95.24	94.27	0.222	0.176	x		x
ced0003135	93.39	97.7	0.2	0.177	x		x
ced0002939	95.24	94.27	0.235	0.179	x		x
ced0004494	96.07	93.52	0.222	0.18	x		x
cedCp111_6682	98.57	99.26	0.533	0.183	x		x
cedCp111_12788	98.57	99.26	0.533	0.183	x		x
cedCp25_3673	93.57	89.58	0.533	0.19	x		x
cedCp17_3227	98.75	98.61	0.533	0.19	x		x
cedCp2_2763	100	100	0.533	0.19	x		x
cedCp4_781	100	100	0.533	0.19	x		x
cedCp4_24163	100	100	0.533	0.19	x		x
cedCp111_10566	100	100	0.533	0.19	x		x
ced0003104	80.81	83.37	0.16	0.2		x	x
ced0003493	94.07	93.75	0.15	0.201		x	x
ced0002243	92.38	92.32	0.294	0.21	x	x	x
ced0002853	94.24	94.27	0.186	0.214		x	x

ced0002628	97.5	98.44	0.191	0.214		x	x
ced0003546	96.67	95.83	0.256	0.214	x	x	x
ced0001219	97.74	95.83	0.198	0.221		x	x
ced0000542	91.13	92.97	0.269	0.223	x	x	x
ced0000015	97.5	98.44	0.218	0.224	x	x	x
ced0000555	93.99	94.27	0.185	0.226		x	x
ced0001552	87.63	82.62	0.323	0.226	x	x	x
ced0003485	97.32	100	0.167	0.227		x	x
cedMtIN_94_972	5 92.92	86.17	0.18	0.227		x	x
ced0001353	90.3	89.12	0.182	0.227		x	x
ced0003879	93.99	93.54	0.182	0.227		x	x
ced0001067	76.79	74.3	0.249	0.229	x	x	x
ced0002278	96.49	95.83	0.213	0.231	x	x	x
ced0001585	95.42	94.27	0.334	0.231	x	x	x
ced0000979	86.13	81.23	0.219	0.236	x	x	x
ced0000627	90.99	95.37	0.34	0.236	x	x	x
ced0000441	95.48	97.18	0.158	0.237		x	x
ced0001666	91.81	93.54	0.273	0.237	x	x	x
ced0001723	95.65	94.36	0.344	0.238	x	x	x
ced0003772	93.49	95.83	0.171	0.239		x	x
ced0004029	93.21	96.97	0.175	0.239		x	x
ced0002835	94.82	98.44	0.175	0.239		x	x
ced0003568	94.82	98.44	0.175	0.239		x	x
ced0001858	93.39	93.01	0.191	0.239		x	x
ced0003519	97.5	93.75	0.191	0.239		x	x
ced0002129	95.24	94.44	0.191	0.239		x	x
ced0001818	96.49	95.83	0.191	0.239		x	x
ced0000763	93.99	93.81	0.223	0.239	x	x	x
ced0001314	96.49	94.44	0.181	0.24		x	x
ced0001839	93.15	95.89	0.206	0.24	x	x	x
ced0004344	94.24	91.67	0.343	0.241	x	x	x
ced0003101	95.65	94.7	0.211	0.246	x	x	x

ced0004283	94.64	97.7	0.148	0.247		x	x
cedMt5715_363	98.75	98.61	0.183	0.25		x	x
cedMt93_44287	98.57	99.26	0.183	0.25		x	x
cedMt26_42549	100	100	0.183	0.25		x	x
cedMt93_75682	100	100	0.183	0.25		x	x
cedMt114_3097	100	100	0.183	0.25		x	x
cedMt118_12231	100	100	0.183	0.25		x	x
cedMt291_9799	100	100	0.183	0.25		x	x
cedMt347_496	100	100	0.183	0.25		x	x
cedMt902_4768	97.5	87.5	0.2	0.25	x	x	x
cedMt94_619	93.75	88.18	0.2	0.25	x	x	x
ced0000446	89.4	89.91	0.2	0.25	x	x	x
ced0001602	93.99	92.88	0.2	0.25	x	x	x
cedCp15_9864	98.33	94.36	0.2	0.25	x	x	x
cedMt3607_1346	97.92	94.44	0.2	0.25	x	x	x
cedCpIN_111_58	81 98.75	95.1	0.2	0.25	x	x	x
cedMt88_14142	99.17	95.83	0.2	0.25	x	x	x
cedMt93_4619	99.17	95.83	0.2	0.25	x	x	x
cedMt118_8578	99.17	95.83	0.2	0.25	x	x	x
cedMt564_3667	99.17	95.83	0.2	0.25	x	x	x
cedMt593_1887	99.17	95.83	0.2	0.25	x	x	x
ced0004740	96.07	98.44	0.298	0.25	x	x	x
ced0000254	96.9	97.92	0.3	0.25	x	x	x
ced0000161	96.49	95.83	0.356	0.25	x	x	x
ced0002665	92.14	91.45	0.357	0.25	x	x	x
ced0004454	84.35	83.69	0.425	0.25	x	x	x
cedCp4_4031	100	100	0.356	0.254	x	x	x
cedCp8_41296	100	100	0.356	0.254	x	x	x
cedCp15_6740	100	100	0.356	0.254	x	x	x
ced0001689	61.86	65.53	0.368	0.257	x	x	x
ced0003061	93.81	94.44	0.22	0.258	x	x	x
ced0000982	97.32	100	0.193	0.26		x	x

ced0003477	95.06	94.44	0.208	0.26	x	x	x
ced0000144	97.5	98.44	0.227	0.262	x	x	x
ced0004460	93.39	97.7	0.183	0.266		x	x
ced0000677	92.74	93.81	0.259	0.267	x	x	x
ced0001749	93.81	94.44	0.3	0.268	x	x	x
ced0004161	93.57	91.45	0.168	0.27		x	x
ced0003411	93.81	93.54	0.274	0.27	x	x	x
ced0001116	91.73	94.23	0.192	0.276		x	x
ced0001429	94.64	99.26	0.188	0.281		x	x
ced0001223	97.32	98.44	0.199	0.286		x	x
cedCp2_9211	99.17	98.53	0.2	0.286	x	x	x
cedCp4_182	100	100	0.2	0.286	x	x	x
cedCp4_12908	100	100	0.2	0.286	x	x	x
cedCp8_1659	100	100	0.2	0.286	x	x	x
cedMt57_8024	100	100	0.2	0.286	x	x	x
cedMtIN_902_93	44 100.00	100	0.2	0.286	x	x	x
ced0004205	87.71	91.16	0.391	0.286	x	x	x
ced0001676	96.25	93.29	0.175	0.292		x	x
ced0002179	96.67	94.27	0.3	0.293	x	x	x
ced0004405	92.32	93.34	0.217	0.299	x	x	x
ced0004482	93.57	97.05	0.254	0.304	x	x	x
ced0001786	96.07	100	0.296	0.305	x	x	x
ced0002228	85.12	82.76	0.268	0.31	x	x	x
ced0003422	90.99	93.54	0.273	0.319	x	x	x
ced0004043	88.57	95.31	0.181	0.321		x	x
ced0000165	92.56	93.54	0.22	0.339	x	x	x
ced0002075	95.24	94.27	0.335	0.353	x	x	x
ced0002496	82.02	78.64	0.137	0.365		x	x
ced0000017	88.04	86.93	0.31	0.369	x	x	x
ced0000114	96.07	98.61	0.358	0.377	x	x	x
ced0001941	95.06	93.54	0.336	0.379	x	x	x
ced0001885	95.89	99.26	0.262	0.392	x	x	x

ced0003366	93.57	93.81	0.324	0.403	x	x	x
ced0001418	76.61	74.95	0.284	0.404	x	x	x
ced0000021	87.38	85.67	0.366	0.405	x	x	x
ced0003180	96.07	98.61	0.347	0.406	x	x	x
ced0003410	92.38	92.8	0.356	0.409	x	x	x
ced0004354	97.74	95.83	0.393	0.409	x	x	x
ced0000522	93.57	90.8	0.393	0.411	x	x	x
ced0000193	93.99	94.27	0.393	0.411	x	x	x
ced0003127	79.05	74.43	0.413	0.413	x	x	x
ced0003069	95.24	94.27	0.25	0.415	x	x	x
ced0003211	94.82	92.36	0.266	0.415	x	x	x
ced0001527	97.32	98.61	0.395	0.417	x	x	x
ced0000998	97.92	95.83	0.316	0.419	x	x	x
cedCp111_203	97.5	94.44	0.356	0.424	x	x	x
ced0002704	89.98	95.14	0.403	0.425	x	x	x
ced0001914	94.4	90.81	0.347	0.426	x	x	x
ced0001943	76.19	74.27	0.376	0.432	x	x	x
ced0004033	97.5	100	0.381	0.432	x	x	x
ced0000187	96.67	94.27	0.364	0.438	x	x	x
ced0003464	93.81	95.1	0.303	0.448	x	x	x
ced0000954	95.06	94.44	0.384	0.45	x	x	x
ced0000430	93.81	93.71	0.314	0.452	x	x	x
ced0003752	93.07	100	0.378	0.464	x	x	x
ced0002414	93.07	92.19	0.431	0.474	x	x	x
cedMt213_7964	100	100	0.389	0.482	x	x	x
ced0001657	92.56	92.15	0.406	0.486	x	x	x
ced0004185	92.74	93.07	0.406	0.486	x	x	x
ced0003469	97.5	93.75	0.356	0.488	x	x	x
ced0002325	92.32	90.8	0.377	0.5	x	x	x
ced0000850	94.64	97.7	0.461	0.501	x	x	x
ced0000987	96.07	93.75	0.368	0.507	x	x	x
cedMtIN_26_202	08 85.18	87.96	0.451	0.53	x	x	x

cedCp4_4664	98.75	95.83	0.356	0.536	x	x	x
cedCp25_1817	98.75	95.83	0.356	0.536	x	x	x
ced0001416	94.82	92.36	0.369	0.536	x	x	x
ced0003256	95.24	94.27	0.374	0.536	x	x	x
ced0004300	96.49	95.83	0.375	0.536	x	x	x
ced0004706	91.13	92.8	0.524	0.536	x	x	x
cedMt122_20991	100	100	0.467	0.554	x	x	x
ced0002332	87.8	86.4	0.434	0.556	x	x	x
ced0000467	96.92	94.7	0.448	0.558	x	x	x
ced0002691	90.96		0.315		x		x

Online Resource 5: Selected loci for final screening: Multiplex allocation (Well), locus description, primer sequences and alleles for genotyping of *Cedrela* on a MassARRAY. Locus description includes coding for nuclear (ced00), mitochondrial (cedMt), and chloroplast (cedCp) SNPs. INDELS are indicated with a hyphen (-).

Well	Locus	2nd-PCRP	1st-PCRP	EXT-primer	Alleles
W3	ced0000015	ACGTTGGATGTCATCTGGGCCTCACAAATC	ACGTTGGATGGGTATGTGAGGGCATACTTC	ggtaCAGGGAGTGCTTGCCA	C,T
W2	ced0000017	ACGTTGGATGAGTTTCCTTCATACTGAACC	ACGTTGGATGCAAACCTCTGAAGGCTTTCC	ctcaTTCATACTGAACCTCTACC	G,T
W4	ced0000021	ACGTTGGATGCAGCATTACCAGACAGAAAA	ACGTTGGATGTCAACTGTCCTAATCCTTAG	tgaATGACTCAAAGACAAAATTTAAT	T,C
W3	ced0000114	ACGTTGGATGTTCGAAGGCCACGGATTTTC	ACGTTGGATGTACATCATCTCCAGTGGCCC	ATTTTCTCAAATTTGGACTTTAC	G,A
W1	ced0000161	ACGTTGGATGTCAGAGCCATGCGAAATCTC	ACGTTGGATGGGTTTGTCAACTTCTGATGC	aTCCTCTGCCTTCTCTT	A,G
W3	ced0000165	ACGTTGGATGAGCACACTGGAGTGAACAAC	ACGTTGGATGGCTGCATATTTGTGACGAAG	TGGAGTGAACAACCTAAAAA	G,A
W2	ced0000193	ACGTTGGATGTGCTGCAAAGATCTATCTGG	ACGTTGGATGGGTTCTCTGTCACTCATAAG	gaatATCTATCTGGCAAATCGTT	A,T
W4	ced0000254	ACGTTGGATGGAAGGGAGAGAGATGAATGG	ACGTTGGATGATGTGAAGCATGTTAGCCCG	ggggATGGCTGGTATGTTTGATAC	G,T
W2	ced0000430	ACGTTGGATGTTAATTGCCTGATGCGTGCC	ACGTTGGATGCACCTTAAAGGAGCTATGGG	CGTGCCTGAGATTGTA	A,T
W3	ced0000441	ACGTTGGATGTGCATCAGGTTCTCGATCTC	ACGTTGGATGTGAAGTCGCTGGCCAAAATC	gtccGGTTCTCGATCTCTTTAGT	A,G
W4	ced0000446	ACGTTGGATGGACACCTTTGCGCTTAACTC	ACGTTGGATGGTGCATCAGTTATATGAAG	cctaTTAACTCTTAAGAATCCAGACTA	C,T
W2	ced0000467	ACGTTGGATGAGGCAAGCAATTAGCATCAC	ACGTTGGATGAATGCTGGCAGCTCAAAACC	taatcAGGTGAGTACTATTGAGGAAT	T,C
W3	ced0000540	ACGTTGGATGAAACATATGTAGGCTTCTG	ACGTTGGATGAGGAAACAAGCCTGATCAAC	ggaGTAGGCTTCTGTTACAATG	C,T
W4	ced0000555	ACGTTGGATGTGATACAAAGAAAGGGTGGG	ACGTTGGATGTGAAGCAAGCTGTTGATTCC	GGGGTTACCGTATAAAGTGAC	A,G
W4	ced0000627	ACGTTGGATGTGCGTAGTAAAGCATGGAGG	ACGTTGGATGCTATCAAAGAACATGTGCCC	TTGGTGGTTGCTAACTTATTCA	C,A
W3	ced0000763	ACGTTGGATGACCTCTTGATGATATCCCAG	ACGTTGGATGACACTCTGGCCCAATACAAG	aaaTCGGACCGTTCCTTC	A,G
W4	ced0000850	ACGTTGGATGCAGACAGACCAGAGAAAGAG	ACGTTGGATGTGATGCTCCTGACTAGTACC	ggaggACATCTTTACATTGGTGTGTGT	A,G
W2	ced0000979	ACGTTGGATGACAAGTTCACAGAAGGAGGG	ACGTTGGATGGAAAAATGGCCTAGCAATGG	ggacAGAAGATGTGGACGTTTATCA	C,A
W1	ced0000982	ACGTTGGATGAGCCAAATTGATTTGCTCCC	ACGTTGGATGTGTCTGGCAGTTTGTTTGGG	cccccCTCCCTGTCATGAACATA	C,T
W4	ced0000987	ACGTTGGATGTTTAGAGGTTGTGGCCAAGC	ACGTTGGATGTCGCCTTCATCAGCAAAACC	gaacGCTCTCAAATTTTTCCATGGG	C,G
W3	ced0000998	ACGTTGGATGCCCATACTCAAGTAGTTGTC	ACGTTGGATGTGAAAGGCAGGGTTTGAAGG	TGAGACTACACTGGATACC	C,T
W4	ced0001067	ACGTTGGATGGTCTTGACAACAGATACCAC	ACGTTGGATGTGAAGATGTGAACGGTGGTG	CCGAGCCATGGTTCA	T,C
W1	ced0001219	ACGTTGGATGTCTTTTCAGCTTCAGAAGGC	ACGTTGGATGTGTGCCAATGGCAATAGCTC	TCAGAAGGCTTAACCAT	C,T
W4	ced0001223	ACGTTGGATGCCCAGTGAACTTGATGAAAG	ACGTTGGATGCATACCTGAAAGGTTCCACG	cccaCTTCATCTATGGTTCGACCT	G,A
W3	ced0001314	ACGTTGGATGATCAGAAGTTTAGAAGCTC	ACGTTGGATGGGAGGTAAGCCTTGAAAATAG	ccccAAGCTCAAAATATTTTCTGAATTG	C,T
W1	ced0001416	ACGTTGGATGTTATAGTCTTAGCCATTGC	ACGTTGGATGCGCCATGGTTGAAGAGTTTC	ccccTAGTCTTAGCCATTGCTTTCCAT	C,T
W1	ced0001418	ACGTTGGATGTTCCCAAGGAACTAGGGTAG	ACGTTGGATGTCAGTGTAGAAAATTTATTC	ttcccATATGTTTTTCCCAAGTATAGTC	T,C

W2	ced0001429	ACGTTGGATGCATTCCCATCTTTGCAGAGC	ACGTTGGATGTTCGTCGTTGCCTGGAATTG	ccctCCATCTTTGCAGAGCTCAAGTT	G,T
W4	ced0001527	ACGTTGGATGCAAGCCACATGGTAACTGC	ACGTTGGATGCGAGGTTAGAATAGTAAAGG	ctacCTGCATATGCAAGAAAGCCATAC	G,A
W3	ced0001552	ACGTTGGATGTCCCCTATTACCATGGCTTC	ACGTTGGATGTGCTACCAATCGTGTTGCAG	tttcAGGGAAAGGCCTCTC	T,C
W2	ced0001585	ACGTTGGATGTATTGGAAAAAGTGACCACC	ACGTTGGATGGGGAGCTAAATTGATAATC	ggagAAGTGACCACCAAAAAC	C,T
W3	ced0001602	ACGTTGGATGTGTTCCAACGCCATATCACC	ACGTTGGATGTATTCCTACAGGATAGTTC	ctccaCCTGGGTAATTATTCATTCCTT	T,C
W3	ced0001666	ACGTTGGATGGCATAAACTCCTTGCTTTCC	ACGTTGGATGAGGGAGAGGTAAGACCTTTG	TTCCTATTCTACAGCCAAAAG	T,A
W4	ced0001689	ACGTTGGATGGGTATCAAATAGTTGATAAAG	ACGTTGGATGGAGCGTGTTTACTGGTATATG	TGATAAAGTAAGAAAAGCAACAA	T,C
W4	ced0001723	ACGTTGGATGGTGGATAAAACCACATGAT	ACGTTGGATGCAATGTTTTTGGCTTTTGG	tAAAAAATATATACAAGCAACCTG	G,A
W3	ced0001740	ACGTTGGATGCCTTAGTAAGCCAGAAGGTG	ACGTTGGATGTCGCTCATGCAATCCAACAG	AGCAGCAAGATGGAC	T,A
W3	ced0001749	ACGTTGGATGTTTACACGACCGAGCATGAG	ACGTTGGATGTGGCCGTGCATCTCATCAAG	GACCGAGCATGAGCTTAAAATTATATA	A,G
W1	ced0001786	ACGTTGGATGTCGAAGGTCGGAAAATAGGC	ACGTTGGATGCTGCATCTGTTTCTCTCTCG	GGCCTCGTCCGCTAC	G,T
W2	ced0001818	ACGTTGGATGCCTGTACAAGCTCTTCATCC	ACGTTGGATGGAGAACCCAGGCAGACATTC	tttccGATGCACACTTAGGCTT	T,C
W3	ced0001839	ACGTTGGATGTTTTGAGATCCATCCAGCAC	ACGTTGGATGACCTGATAATAGTGCAGGCG	ccTCCATCCAGCACATAATA	T,C
W1	ced0001858	ACGTTGGATGGAGAATAGTTGTGGCGGTTG	ACGTTGGATGATTTCTCCTATGATGCGCAC	ggtaTTGGGACCACCAATCTCGGTATCC	T,C
W2	ced0001914	ACGTTGGATGTCCTGGATTTGGGTTCAACG	ACGTTGGATGATGGGTAGATCCGAGTTGTG	ccCGGTGGACCGTACTC	C,T
W4	ced0002075	ACGTTGGATGCTTCCCAGTCAAGTTACTCC	ACGTTGGATGCTGAATTCAGAAATTGCTGAC	CCGACTGCAAGTGGG	G,T
W2	ced0002129	ACGTTGGATGCGCAACCTACATGTGATAG	ACGTTGGATGGAAGGTAACCTCTCAGATTC	AGCTTGATGATTAATAATTTCTTATA	G,A
W1	ced0002179	ACGTTGGATGACTCAACAAGAACTTCCAGC	ACGTTGGATGAGAAGCATAAGAGAAGTGAG	cAGCCGATTCTTACACC	A,G
W1	ced0002243	ACGTTGGATGCTAGCTCTTCAACTTCACTG	ACGTTGGATGCTTAAGGCATGCAAACGAAG	ccAAGTCCTTCAACTTGTTTT	T,C
W3	ced0002278	ACGTTGGATGTGGAGTATCATCAGGACTGC	ACGTTGGATGCCCTTTATCAGCATATTTGAG	aaACAAGAAACCAGAAACAGAT	C,T
W4	ced0002325	ACGTTGGATGTGTTTCCGTTCGGACGTTTC	ACGTTGGATGAGAAGTACAGCCACCCAACG	cTTCGGGAGGGGAGAGG	G,T
W3	ced0002332	ACGTTGGATGAAAATATAGTTGGTGTTCC	ACGTTGGATGAAGGATGAGACAACAACGCC	aacTATAGTTGGTGTTCCGAAATC	C,A
W1	ced0002414	ACGTTGGATGGTGTTGAGATATGCTGGTTC	ACGTTGGATGTGAACCAGCAAGAAATTACC	gattGTTCTGGCTGATTCATTCTC	A,G
W4	ced0002496	ACGTTGGATGTCCCTTTGAGACTGCATTGG	ACGTTGGATGCTTCCTTGCTCCTTATAAAC	gggGACTGCATTGGAGAGTTT	T,C
W1	ced0002691	ACGTTGGATGCTTCTAGGAAGTGCTATTAG	ACGTTGGATGCATAACCAAGATGAGCCATAG	ttaCCTACATTTTCTGATCAATTTT	C,A
W3	ced0002704	ACGTTGGATGGGTAGATAAATTGGATTGAG	ACGTTGGATGGCCTTCCACTTCTATTCCTC	ctatgGAGATAAATTTAGGAGCATAAGA	A,G
W4	ced0002802	ACGTTGGATGCCTTTTCTTGGCAGTTGGAC	ACGTTGGATGAGCCCTCATCACTTCCTAAC	GGCAGTTGGACTTGATTGG	A,T
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W1	ced0002853	ACGTTGGATGGTCGAGTTCTGGTTGATCAAA	ACGTTGGATGGGGTGGCAATTTGTATTGTT	cccccATTACCAGTACCTCAATACA	G,T
W3	ced0002939	ACGTTGGATGGTAGCCATTGGAGCACAGTC	ACGTTGGATGCTCTTGGAATTGCAGAAGTC	tTCTATTTTATTGATCACAAGAATCAT	G,A

W2	ced0003061	ACGTTGGATGGCTGATTCCACATGGGATTG	ACGTTGGATGGTTCAATCCAGTGTGTTGCC	gattGGATTGCCTTTTGTGAT	T,C
W2	ced0003069	ACGTTGGATGCTTTATTCTGAGCTCAAGCG	ACGTTGGATGCTAAAGTGTGTTATAGCTATC	caatCGTAATCATGCAATTATCTACTTA	T,C
W1	ced0003101	ACGTTGGATGGTTTCTAACATAAATGCAAG	ACGTTGGATGTGCACTATTTCCCATATCCC	catgATTATTTGGTATCAGGAAGTTTGG	T,C
W1	ced0003104	ACGTTGGATGCTTGCAACCAAAAAGATTCC	ACGTTGGATGCTGACTTTTGTAAAAGGGTG	AGGGTTTTTCTTGGTCA	G,A
W3	ced0003127	ACGTTGGATGCATACTCATCCATCTGCAAC	ACGTTGGATGGTCTATCTTATTACTCATTG	cccCCCATTGCAAAACTTCATA	C,A
W2	ced0003211	ACGTTGGATGCAGGCTATTCTTCTATTCACC	ACGTTGGATGCGGTTCAATCTAAGACGTTC	cACCAAATTTACTGTCAAAATTCAATT	G,C
W1	ced0003256	ACGTTGGATGGGCGATTGATGGCATTGACG	ACGTTGGATGGGCATATCACATGTGGCTTC	gtttACGCCGATTACCGTTT	C,A
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W4	ced0003410	ACGTTGGATGAGGTGATGTCCATTGGATTC	ACGTTGGATGCATGGATTATTTCTGATTG	CCATTGGATTCATCACAAAAAAC	A,T
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W1	ced0003493	ACGTTGGATGCGCTAAGCCTGATGTTAGAC	ACGTTGGATGCAAATCCTGGTTGCAGTTGG	aGTCTTCTGCCCTAAATCT	A,G
W4	ced0003519	ACGTTGGATGCGCGCTGAGTTCCCTTATTG	ACGTTGGATGGTCCCCAAATACAAACCACG	gTTGATGACAAGTGGCA	T,C
W2	ced0003546	ACGTTGGATGTAAACAGGAGGTGGTTTTCG	ACGTTGGATGGGTAGAATATTCACACCCAG	AGGTGGTTTTCGTGAATC	G,A
W1	ced0003568	ACGTTGGATGTTTGCGCCAGTTCCATTTCC	ACGTTGGATGAATACGATTGGCCGCCATTG	CCTCACTCTCTCCGC	T,C
W3	ced0003772	ACGTTGGATGGCAGTTCATTGATGGGTCTG	ACGTTGGATGTCAGCTTTAGCCTGTTCGTC	CCAGAATGCTAATTCCAC	G,A
W4	ced0003879	ACGTTGGATGGTGAGGAAGGTGTTTTTTGG	ACGTTGGATGACTTGGCATGAGTGCACATC	cttcTGGATCACATGCACG	T,A
W3	ced0004029	ACGTTGGATGGTCAAGATGGTTGTGTGTTC	ACGTTGGATGGTACCCATCATGAACTTCGC	GTGTGTTCCTCCTTCC	G,T
W1	ced0004033	ACGTTGGATGGTTAGAATCCCCTGCTGATG	ACGTTGGATGATGCACCTTAGCAGGAACAG	TGCTGATGTACGGAAAGA	G,A
W2	ced0004043	ACGTTGGATGGCCTAACATAAAGCAGAAAAG	ACGTTGGATGATACATGTCCCAATGCAAGG	gggtgACATAAAGCAGAAAAGAAATCTA	T,C
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W1	ced0004344	ACGTTGGATGTCCTAACATCGAGTCTGCTG	ACGTTGGATGCTTATGCCTGAAGCATGGAG	CTGTCCTCCTCTCCTA	G,C
W1	ced0004354	ACGTTGGATGACGAGCACTTCCACTAGATG	ACGTTGGATGGCTTTATCCTCTTTAGAGCG	ATGGCTCAGCACAAC	T,A
W2	ced0004405	ACGTTGGATGACAAACTCTTCATCGAGTCC	ACGTTGGATGGGTAATTGATGAGGACTACG	ggtgATGAAAATCCCAAACAATGA	C,T

W2	ced0004454	ACGTTGGATGTTGTAGACCTTGATGGTATG	ACGTTGGATGCTAGCACCAAAATGTTTGGC	ctagcAATATATCAAGAGACTTTGGCGA	T,A
W3	ced0004460	ACGTTGGATGTTCAAAGGCCTCAGACATCG	ACGTTGGATGAGACCCAAAAGCTGTGGATG	aaatGTTAATTGCTCAGTCAATGGGATT	G,C
W2	ced0004482	ACGTTGGATGGCACTTCTTGGTTAGCTCAG	ACGTTGGATGTCTCAGATGAGCGAAAAGAG	CAGGAGAATATTTCCCTCCATT	C,T
W1	ced0004706	ACGTTGGATGAGTATGGAAGGGATGGGATG	ACGTTGGATGCATCATTGATTGAGGGCCAG	ATGCGAGGTCAAGTGGGT	C,T
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W2	cedCp111_10566	ACGTTGGATGAGATAATCATAGTCGGTGAG	ACGTTGGATGTTATTTGTGGCCCTGAGGAG	TAGTCGGTGAGAACATTAC	A,T
W1	cedCp111_17175	ACGTTGGATGTTTCTCTACGTGCTTTTTCG	ACGTTGGATGGGATGTGGAAAAATAAAGACC	GCTTTTTCGTTTATTTTATATTTTTCTC	C,T
W1	cedCp111_203	ACGTTGGATGTCAGCTAATCCTCTTATACC	ACGTTGGATGGATTGGTCCTATAATCGTGC	agctcATCCTCTTATACCTTCCGTTAA	A,G
W4	cedCp111_6682	ACGTTGGATGGATTCCGGCTAAAAGCATAC	ACGTTGGATGTACATGGTTACCAGACACCC	cttcgAAAAGCATACAAGTACTGTAATG	C,T
W3	cedCp15_6740	ACGTTGGATGCCAAATCCAATTCTCTCTCG	ACGTTGGATGCGCCAAGATCTCTTCGTTAG	cCTCTCGATATGTTCCTCAAAAAAT	C,A
W2	cedCp15_9864	ACGTTGGATGCTATTTTCTCTCCTATTTAC	ACGTTGGATGGGTTATCCTGCACTTGGAAG	ccctTCCTATTTACTACGGCG	T,C
W4	cedCp17_10080	ACGTTGGATGGGGCGTAATCAAGATAGGAC	ACGTTGGATGTCAGGACTCCTGACAAAGAC	ATTATGAAATGAAAAAAATTAGAGATTA	T,C
W1	cedCp17_3227	ACGTTGGATGGATGTACTAATACCCCACCC	ACGTTGGATGAGAGGAGGCATCTTTTACCC	aatCCCCGAAATCTTGGTTCAA	G,A
W2	cedCp17_3501	ACGTTGGATGTTACTCGAATGTATCAACCG	ACGTTGGATGAGTTGTGCCCAAAAAAATTG	CTCGAATGTATCAACCGATTTATTT	C,A
W3	cedCp2_2763	ACGTTGGATGAGGGCCGTTATGCTCATTAC	ACGTTGGATGGATGATCGATTCAACCTCTG	TAAACTTGTTGAAGAGATGAAATA	G,T
W1	cedCp2_9211	ACGTTGGATGCCCTAGACACTCTAAGATCC	ACGTTGGATGTAGGTGCAATGGGATGTGTC	ccctATCCTTTTTCAAACCTGCTCCC	- ,GGGA
W3	cedCp25_3673	ACGTTGGATGTCGAAAAAGCAAGAAACACG	ACGTTGGATGGCGCTTTTATTTGCGAATCC	CAAGAAACACGGGTCTA	G,T
W2	cedCp4_182	ACGTTGGATGCTTCTATAACGTAAACCAAC	ACGTTGGATGGGGATGGTTCGAAAAATGAG	gtaaaGTAAACCAACTATTCATATCTGA	A,G
W1	cedCp4_24163	ACGTTGGATGTGTCTTTTCTTCTCCCTATG	ACGTTGGATGGGATCCGACTTGTATCATTG	TCCCTATGAATCAAACTTTTC	C,T
W2	cedCp4_4031	ACGTTGGATGCGCAATTTGAAGGACTGTTC	ACGTTGGATGCAAAAAGATTCTCTAATTCG	aattCTGTTCCTAAAGATCCCAAC	A,G
W4	cedCp4_4664	ACGTTGGATGAATGGATCTATGTCCAACGG	ACGTTGGATGTATGTGACTACGGGTCGAAC	AACGGATCACACCTG	G,A
W4	cedCp4_7076	ACGTTGGATGACCATCGTTCCTGACCTTTC	ACGTTGGATGATTCCGCTGAGTAGGATTCG	GACCTTTCTACGCGAAT	G,A
W2	cedCp4_781	ACGTTGGATGCAGAAATCTACAAATACAGG	ACGTTGGATGTTACAATTCCCCAATATCG	tggtcCAGGATATACGACCAAGAG	T,C
W3	cedCp8_1659	ACGTTGGATGAATAGGTCCCTGGTTCGTTC	ACGTTGGATGGGAACCCGTGAATACAGAAG	taCGCCATCCCACCCAA	G,A
W1	cedCp8_20798	ACGTTGGATGCCCGACATTCGGTATAAAAAG	ACGTTGGATGAAACCAAATTCTTCTTGGC	gaagGACTTTTCATAATTTTTTTGCTC	A,G
W4	cedCp8_41296	ACGTTGGATGGTTATTCTTCTGACGGTGGG	ACGTTGGATGGCATGAGTTTCAAACTTGAC	aGGGAGAAAAGATAAAATGAAAAC	G,T
W1	cedCpIN_8_4018	ACGTTGGATGTGGACTCTATAAAAGAACCG	ACGTTGGATGTCCATTTCATCTCAAAACCG	AAGAACCGATGAACAAATCAA	- ,AATC
W3	cedMt114_3097	ACGTTGGATGCCTCAATCTTCACTTTACGC	ACGTTGGATGTGGTATGGAGATTCCCCTTG	TACGCCACGCCGACT	G,A
W2	cedMt118_12231	ACGTTGGATGGGCTAAAAGGAAGAGAGACG	ACGTTGGATGTTGGCCAAGCTAGTCCAATC	ttGAGAGACGACGGGCT	C,T
W1	cedMt122_20991	ACGTTGGATGTCTAGAACGGAAGTGATGGG	ACGTTGGATGTTCAATAGGAGCATCCACCC	tGGGCCTTCTCTCTCCTTAGTAA	C,A

W3	cedMt26_28302	ACGTTGGATGGCGAACACCTGTCTTCTATC	ACGTTGGATGCTCGAAACCAGTAGAGTCGC	tcccGAACTGCCAGTTCGTGAACTC	G,T
W1	cedMt26_42549	ACGTTGGATGTCCCATGTTCCGATCTTTCC	ACGTTGGATGGGATAACCAATCCATTTTC	CCCATTTCTTGGGTAAAGT	G,A
W2	cedMt291_9799	ACGTTGGATGTTGCCCAAATGCCACATCAG	ACGTTGGATGCATTCCTATCCCATCCTTAG	ccGCTATTCGGGATTACCTT	C,A
W2	cedMt347_13824	ACGTTGGATGAATAGCTCTCCTGCTCCTAC	ACGTTGGATGCCCTCCATTCAATCATGACG	AACCCCCTTCCGCTG	G,A
W3	cedMt347_496	ACGTTGGATGTGGATTTTGTGACTCGCACC	ACGTTGGATGGCTAGCTTGCTTCCCACTG	tacaTCACCTACGGCGACCCTTCGCCC	G,C
W3	cedMt3607_1346	ACGTTGGATGGAAAGACTGGTGAATCAGGC	ACGTTGGATGCACGGGCAAAGATGTCGATG	ccacTCAGGCAGCCCCTCTA	G,A
W1	cedMt564_3667	ACGTTGGATGATATGATCAGACCAACGCCC	ACGTTGGATGAAACATCACCAGGCGTGTAG	gggccGTGTTTCGTGGACCTTATG	T,C
W4	cedMt57_8024	ACGTTGGATGGCATAGGACCTTCGATCAAC	ACGTTGGATGGCAACATGAGAAGAGAAGGG	ttagAGGACCTTCGATCAACCATGGGGC	T,C
W2	cedMt5715_363	ACGTTGGATGTTCAACAAGGCTTGCTTCTC	ACGTTGGATGGGTATAGTCTCCCTTTTTGG	tcatAGAATCTCTTCCTTAGACAC	C,T
W2	cedMt593_1887	ACGTTGGATGATGTTATTGCCTTTGCCCCC	ACGTTGGATGGTCGATCAACCAGTAGAGAG	aAGCTGGCTCTCCCATC	C,T
W4	cedMt88_14142	ACGTTGGATGTGAGCACTGACTCCTATTCC	ACGTTGGATGTCCGTGGAGAAGAGAAATGG	TGACTCCTATTCCACTACTA	G,T
W4	cedMt902_4768	ACGTTGGATGTTTCCTTCTTGGCCTTCACC	ACGTTGGATGCATCTCAGGAGCGTTACAAC	GCGAAAGAGTTCATTCCA	C,A
W4	cedMt93_44287	ACGTTGGATGGGTACTAGTTTCAGTGGGAG	ACGTTGGATGCCATTGTCACTGACTCATAC	cccttTGCATGAGAAATCTGGGAGA	G,A
W1	cedMt93_4619	ACGTTGGATGTGCCTGTGGCCTATTCTTTG	ACGTTGGATGCAAGTCATTATAGTCCCCCC	gtTTGAGGAAGATAGCACATTA	C,T
W2	cedMt93_75682	ACGTTGGATGACCATCGGGTCTGCTTTTTC	ACGTTGGATGGTGGGCTACATTAGATATGG	TCCCAAACATCATCGTTATCT	C,T
W2	cedMt94_619	ACGTTGGATGGAGATCCAGGCAAAAATCCG	ACGTTGGATGTCTTGCCCGCGCCTATAAAC	TCGAGTTGACCCCTA	C,A
W4	cedMtIN_26_20208	ACGTTGGATGTGCTTCCTTTGGTTTCATGC	ACGTTGGATGACAGAAGCAGCACTCTTGTC	gggTGCTTCTTCCTTTTCTTTT	CTTTT, -
W3	cedMtIN_902_9344	ACGTTGGATGCGATCATGACGAGAATGGAC	ACGTTGGATGTGGTCGAGAAGGGAGAAAGC	ccctGACTTCTCCGTAATGTAATGTAAT	- ,GTAAT
W4	cedMtIN_94_9725	ACGTTGGATGTTACCCATCCGCTTCCTTTG	ACGTTGGATGGCCGAGATTGCTAGGTTTTC	CGCTTCCTTTGAACATTGATT	- ,TGAC

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