Locus 2010 Burgarella et al Sept 2010	^RH 2010	Rate/Gen 2010	Gen/Mut 2010	2010 Years(@30)/ Mutation	2010 50 marker (NMCM*) Slow to Fast Rank Order	FtDNA LOCUS1	^RH FtDNA Locus1	FtDNA Locus1 Order	FtDNA Rate/Gen	FtDNA Locus1 Slow to Fast Rank Order	Speed	FtDNA Gen/Mut	FtDNA Years(@30)/Mutation	2010 Gen/Mut Change from FtDNA	2010 Years/Mutation Change from FtDNA
DYS472	0.0060	0.000006	166,667	5,000,000	1	472	0.0100	45	0.00001	1	Very slow	100,000	3,000,000	66,667	2,000,000
DYS455	0.0080	0.000008	125,000	3,750,000	2	455	0.1600	16	0.00016	4	Very slow	6,250	187,500	118,750	3,562,500
DYS590	0.0230	0.000023	43,478	1,304,348	3	590	0.5400	42	0.00054	21	Slow	1,852	55,556	41,626	1,248,792
DYS641	0.0430	0.000043	23,256	697,674	4	641	0.1800	44	0.00018	6	Very slow	5,556	166,667	17,700	531,008
DYS454	0.0440	0.000044	22,727	681,818	5	454	0.1600	17	0.00016	5	Very slow	6,250	187,500	16,477	494,318
DYS640	0.0600	0.00006	16,667	500,000	6	640	0.3400	65	0.00034	15	Slow	2,941	88,235	13,725	411,765
DYS537	0.1240	0.000124	8,065	241,935	7	537	0.5700	43	0.00057	23	Slow	1,754	52,632	6,310	189,304
DYS568	0.1420	0.000142	7,042	211,268	8	568	0.5300	62	0.00053	20	Slow	1,887	56,604	5,155	154,664
DYS490	0.1430	0.000143	6,993	209,790	9	490	0.1900	54	0.00019	9	Very slow	5,263	157,895	1,730	51,895
DYS531	0.1430	0.000143	6,993	209,790	10	531	0.3700	38	0.00037	16	Slow	2,703	81,081	4,290	128,709
DYS492	0.1440	0.000144	6,944	208,333	11	492	0.4200	66	0.00042	17	Slow	2,381	71,429	4,563	136,905
DYS436	0.1460	0.000146	6,849	205,479	12	436	0.1800	53	0.00018	7	Very slow	5,556	166,667	1,294	38,813
DYS450	0.1760	0.000176	5,682	170,455	13	450	0.2000	56	0.0002	10	Very slow	5,000	150,000	682	20,455
DYS487	0.2100	0.00021	4,762	142,857	14	487	0.9700	63	0.00097	26	Slow	1,031	30,928	3,731	111,929
DYS511	0.2100	0.00021	4,762	142,857	15	511	1.2800	47	0.00128	30	Medium	781	23,438	3,981	119,420
DYS426	0.2140	0.000214	4,673	140,187	16	426	0.0900	7	0.00009	3	Very slow	11,111	333,333	-6,438	-193,146
DYS388	0.2180	0.000218	4,587	137,615	17	388	0.2200	8	0.00022	11	Very slow	4,545	136,364	42	1,251
DYS565	0.2330	0.000233	4,292	128,755	18	565	0.8700	67	0.00087	25	Slow	1,149	34,483	3,142	94,273
DYS572	0.2360	0.000236	4,237	127,119	19	572	2.1200	64	0.00212	40	Medium	472	14,151	3,766	112,968
DYS442	0.2500	0.00025	4,000	120,000	20	442	3.2400	36	0.00324	50	Medium	309	9,259	3,691	110,741
DYS460	0.2880	0.000288	3,472	104,167	21	460	4.0200	26	0.00402	52	Fast	249	7,463	3,223	96,704
DYS594	0.3230	0.000323	3,096	92,879	22	594	0.2900	52	0.00029	12	Slow	3,448	103,448	-352	-10,569
DYS444	0.3230	0.000323	3,096	92,879	23	444	3.2100	57	0.00321	48	Medium	312	9,346	2,784	83,533
DYS578	0.3330	0.000333	3,003	90,090	24	578	0.0800	39	0.00008	2	Very slow	12,500	375,000	-9,497	-284,910
DYS391	0.3350	0.000335	2,985	89,552	25	391	2.6500	4	0.00265	46	Medium	377	11,321	2,608	78,231
DYS393	0.3680	0.000368	2,717	81,522	26	393	0.7600	1	0.00076	24	Slow	1,316	39,474	1,402	42,048
DYS617	0.4270	0.000427	2,342	70,258	27	617	0.4200	61	0.00042	18	Slow	2,381	71,429	-39	-1,171
GATAH4	0.4920	0.000492	2,033	60,976	28	GataH4	2.0800	27	0.00208	39	Medium	481	14,423	1,552	46,553
DYS389I	0.4940	0.000494	2,024	60,729	29	389i	1.8600	10	0.00186	36	Medium	538	16,129	1,487	44,600
DYS520	0.5940	0.000594	1,684	50,505	30	520	2.4500	59	0.00245	44	Medium	408	12,245	1,275	38,260
DYS437	0.6040	0.000604	1,656	49,669	31	437	0.9900	19	0.00099	27	Slow	1,010	30,303	646	19,366
DYS392	0.7220	0.000722	1,385	41,551	32	392	0.5200	11	0.00052	19	Slow	1,923	57,692	-538	-16,141
DYS389B	0.7670	0.000767	1,304	39,113	33	389ii-i	2.4200	12	0.00242	43	Medium	413	12,397	891	26,717
DYS456	0.7950	0.000795	1,258	37,736	34	456	7.3500	30	0.00735	60	Fast	136	4,082	1,122	33,654
DYS448	0.8520	0.000852	1,174	35,211	35	448	1.3500	20	0.00135	33	Medium	741	22,222	433	12,989
DYS446	0.8570	0.000857	1,167	35,006	36	446	3.6500	60	0.00365	51	Fast	274	8,219	893	26,787
DYS19	0.9700	0.00097	1,031	30,928	37	19	1.5100	3	0.00151	34	Medium	662	19,868	369	11,060
DYS534	0.9790	0.000979	1,021	30,644	38	534	8.3200	55	0.00832	63	Fast	120	3,606	901	27,038
DYS439	1.0080	0.001008	992	29,762	39	439	4.7700	9	0.00477	54	Fast	210	6,289	782	23,473
DYS438	1.0520	0.001052	951	28,517	40	438	0.5500	37	0.00055	22	Slow	1,818	54,545	-868	-26,028
DYS576	1.2560	0.001256	796	23,885	41	576	10.2200	32	0.01022	65	Fast	98	2,935	698	20,950
DYS557	1.2600	0.00126	794	23,810	42	557	3.2100	51	0.00321	49	Medium	312	9,346	482	14,464
DYS570	1.2640	0.001264	791	23,734	43	570	7.9000	33	0.0079	61	Fast	127	3,797	665	19,937
DYS447	1.4620	0.001462	684	20,520	44	447	2.6400	18	0.00264	45	Medium	379	11,364	305	9,156
DYS607	1.4810	0.001481	675	20,257	45	607	4.1100	31	0.00411	53	Fast	243	7,299	432	12,957
DYF406S1	1.4840	0.001484	674	20,216	46	406s1	1.5400	46	0.00154	35	Medium	649	19,481	25	735
DYS458	1.5030	0.001503	665	19,960	47	458	8.1400	13	0.00814	62	Fast	123	3,686	542	16,275
DYS390	1.8950	0.001895	528	15,831	48	390	3.1100	2	0.00311	47	Medium	322	9,646	206	6,185
DYS449	3.2540	0.003254	307	9,219	49	449	8.3800	21	0.00838	64	Fast	119	3,580	188	5,639
DYS481	5.2720	0.005272	190	5,690	50	481	5.4400	58	0.00544	55	Fast	184	5,515	6	176

List of 2010 Study = Additional STRs Studied

* Non Multi-Copy Marker (NMCM) 2010 Study = List of STRs Not Studied

Locus 2010	^RH 2010	Rate/Gen 2010	Gen/Mut 2010	2010 Years(@30)/		FtDNA LOCUS1	^RH FtDNA	FtDNA Locus1	FtDNA Rate/Ge	FtDNA Locus1 Slow	Speed
DYS434	0.3590	0.000359	2,786	83,565		385a	2.2600	5	0.00226	41	Medium
DYS435	0.1280	0.000128	7,813	234,375		385b	2.2600	6	0.00226	42	Medium
DYS441	1.0320	0.001032	969	29,070		395s1a	0.3100	40	0.00031	13	Slow
DYS443	0.6440	0.000644	1,553	46,584		395s1b	0.3100	41	0.00031	14	Slow
DYS445	0.2720	0.000272	3,676	110,294		413a	2.0200	49	0.00202	37	Medium

DYS452	0.4120	0.000412	2,427	72,816		413b	2.0200	50	0.00202	38	Medium
DYS461	0.6190	0.000619	1,616	48,465		425	0.1800	48	0.00018	8	Very slow
DYS462	0.4900	0.00049	2,041	61,224		459b	1.3200	15	0.00132	32	Medium
DYS463	1.3070	0.001307	765	22,953		464a	5.6600	22	0.00566	56	Fast
DYS476	0.0510	0.000051	19,608	588,235		464b	5.6600	23	0.00566	57	Fast
DYS480	0.0220	0.000022	45,455	1,363,636		464c	5.6600	24	0.00566	58	Fast
DYS485	0.5850	0.000585	1,709	51,282		464d	5.6600	25	0.00566	59	Fast
DYS488	0.1380	0.000138	7,246	217,391		CDYa	35.3100	34	0.03531	66	Fast
DYS491	0.0830	0.000083	12,048	361,446		CDYb	35.3100	35	0.03531	67	Fast
DYS494	0.0480	0.000048	20,833	625,000		YCAIIa	1.2300	28	0.00123	28	Medium
DYS495	0.5860	0.000586	1,706	51,195		YCAIIb	1.2300	29	0.00123	29	Medium
DYS497	0.1830	0.000183	5,464	163,934							
DYS504	3.1830	0.003183	314	9,425							
DYS505	0.6290	0.000629	1,590	47,695							
DYS508	0.6410	0.000641	1,560	46,802							
DYS510	0.6640	0.000664	1,506	45,181							
DYS513	0.5600	0.00056	1,786	53,571							
DYS522	0.4850	0.000485	2,062	61,856							
DYS525	0.1870	0.000187	5,348	160,428							
DYS530	0.0160	0.000016	62,500	1,875,000							
DYS532	1.6870	0.001687	593	17,783							
DYS533	0.3500	0.00035	2,857	85,714							
DYS540	0.1530	0.000153	6,536	196,078							
DYS544	0.0380	0.000038	26,316	789,474							
DYS549	0.2750	0.000275	3,636	109,091							
DYS552	0.9710	0.000971	1,030	30,896							
DYS554	0.0380	0.000038	26,316	789,474							
DYS556	0.3010	0.000301	3,322	99,668							
DYS561	0.1510	0.000151	6,623	198,675							
DYS567	0.1640	0.000164	6,098	182,927							
DYS569	0.0170	0.000017	58,824	1,764,706							
DYS573	0.2080	0.000208	4,808	144,231							
DYS575	0.0270	0.000027	37,037	1,111,111							
DYS579	0.0040	0.000004	250,000	7,500,000							
DYS580	0.0090	0.000009	111,111	3,333,333							
DYS583	0.0230	0.000023	43,478	1,304,348							
DYS587	0.7430	0.000743	1,346	40,377							
DYS588	0.4140	0.000414	2,415	72,464							
DYS589	0.7060	0.000706	1,416	42,493							
DYS593	0.4870	0.000487	2,053	61,602							
DYS596	0.6390	0.000639	1,565	46,948							
DYS618	0.1130	0.000113	8,850	265,487							
DYS622	0.9170	0.000917	1,091	32,715							
DYS630	1.1740	0.001174	852	25,554							
DYS634	0.2410	0.000241	4,149	124,481							
DYS635	0.9670	0.000967	1,034	31,024							
DYS636	0.1490	0.000149	6,711	201,342							
DYS638	0.0970	0.000097	10,309	309,278							
DYS6434	1.0000	0.001	1,000	30,000							
DYS645	0.1220	0.000122	8,197	245,902							
DYS709	0.6510	0.000651	1,536	46,083							
GATAA10	1.0110	0.001011	989	29,674							
YPENTA1	0.5170	0.000517	1,934	58,027							
YPENTA2	0.8020	0.000802	1,247	37,406							

Mutation rate estimates for 110 Y-chromosome STRs combining population and father–son pair data
Concetta Burgarella and Miguel Navascués

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Table 1. Mutation rate estimates (measured in mutations per generation), obtained from combined meiosis data from 29 publishec
studies (listed in supplementary table S2) and predicted from the logistic model, for 110 Y-STR lo
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