

Genetic profile of the Ecuadorian Black population (Ecuador–South America) by using the Power Plex[®] 16 system kit

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Abstract. Allele frequency data for the 15 STR systems and Amelogenine were determined in a population sample of healthy Black unrelated individuals. All loci met Hardy–Weinberg expectations and the high discrimination power of combined system showed the forensic efficiency of these genetic markers. There is a lack of information on Ecuadorian population from a genetic point of view and therefore no previous publications on the distribution of STRs on Black population is available. Blackas are descendents of slaves procedentes of Africa. © 2004 Published by Elsevier B.V.

Keywords: Ecuador; STRs; Forensic genetics; Population data; Black population; Power Plex 16

Population sample: Whole blood was obtained in EDTA vacutainers tubes by venipuncture from healthy unrelated Black born and living in Ecuador. Samples came from the Paternity Test Bank of the Cruz Roja Ecuatoriana, Genetics Laboratory [1]. *DNA extraction:* The DNA was extracted using Wizard Genomic DNA Purification Kit System[®] (Promega, Madison, WI, USA) and the quantity was estimated by UV absorbance (Gene Quant Calculator[®], Pharmacia, Uppsala, Sweden). *PCR:* Amplification was performed in a Techne Thermal Cycler, model Genius[®] following the manufacturer's recommendations [2]. *Typing:* By ABI Prism 310. Fragment size and allele designation of different loci were determined by comparison with allelic ladders distributed into the kit PowerPlex 16 (Promega) [2]. The recommendations of the DNA Commission of the International Society of Forensic Haemogenetics for analysis of STRs systems were followed [3,4]. *Analysis of data:* See Tables 1 and 2. Evaluation of Hardy–Weinberg expectations was

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Table 1
Allele distribution of 15 STR loci and Amelogenin in a population sample of Ecuadorian Black population (n = 104)

Allele	PENTA E	D3S1358	FGA	D18S51	D21S11	PENTA D	VWA	D8S1179	D7S820	D13S317	D5S818	D16S539	TH01	CSF1PO	TPOX
2.2	—	—	—	—	—	0.089	—	—	—	—	—	—	—	—	—
3.2	—	—	—	—	—	0.005	—	—	—	—	—	—	—	—	—
5	0.056	—	—	—	—	0.033	—	—	—	—	—	0.009	—	—	—
6	—	—	—	—	—	—	—	—	—	—	—	—	0.257	—	0.037
6.3	—	—	—	—	—	0.047	—	—	—	—	—	—	0.005	—	—
7	0.093	—	—	—	—	0.117	—	—	0.145	0.037	0.014	0.005	0.383	0.037	0.005
8	0.136	—	—	—	—	0.136	—	—	0.089	0.145	0.061	0.201	0.145	0.047	0.421
9	0.037	—	—	—	—	—	—	0.005	0.089	0.145	0.061	0.201	0.084	0.042	0.154
9.3	—	—	—	—	—	—	—	—	—	—	—	—	0.117	—	—
10	0.028	—	—	—	—	0.201	0.005	0.023	0.304	0.051	0.051	0.126	0.009	0.266	0.070
11	0.070	—	—	—	—	0.145	0.009	0.028	0.238	0.271	0.313	0.327	—	0.257	0.234
12	0.107	0.005	—	—	—	0.075	—	0.103	0.192	0.290	0.294	0.168	—	0.299	0.079
13	0.089	0.005	—	—	—	0.103	0.019	0.332	0.033	0.159	0.229	0.131	—	0.042	—
13.2	—	—	—	—	—	0.009	—	—	—	—	—	—	—	—	—
14	0.070	0.061	—	—	—	0.037	0.033	0.304	0.001	0.047	0.014	0.023	—	0.005	—
15	0.126	0.364	—	—	—	0.014	0.173	0.182	—	—	—	—	—	—	—
16	0.061	0.336	—	—	—	0.154	0.271	0.019	—	—	0.005	—	—	0.005	—
17	0.033	0.168	—	—	—	0.178	0.276	—	—	—	—	—	—	—	—
18	0.042	0.051	0.005	—	—	0.112	0.112	—	—	—	—	—	—	—	—
18.2	—	—	0.019	—	—	—	—	—	—	—	—	—	—	—	—
19	—	0.009	0.070	0.070	—	—	0.084	—	—	—	—	—	—	—	—
19.2	—	—	0.005	—	—	—	—	—	—	—	—	—	—	—	—
20	0.019	—	0.089	0.037	—	—	0.019	—	—	—	—	—	—	—	—
21	0.014	—	0.098	0.014	—	—	—	—	—	—	—	—	—	—	—
22	0.005	—	0.159	—	—	—	—	—	—	—	—	—	—	—	—
23	—	—	0.140	0.014	—	—	—	—	—	—	—	—	—	—	—
24	—	—	0.107	—	—	—	—	—	—	—	—	—	—	—	—
24.2	—	—	0.005	—	—	—	0.005	—	—	—	—	—	—	—	—
25	—	—	0.117	—	—	—	—	—	—	—	—	—	—	—	—
26	—	—	0.107	—	—	—	—	—	—	—	—	—	—	—	—
27	0.051	—	0.051	0.037	—	0.037	—	—	—	—	—	—	—	—	—
28	—	—	0.019	0.159	—	0.159	—	—	—	—	—	—	—	—	—
28.2	—	—	0.019	0.005	—	0.005	—	—	—	—	—	—	—	—	—
29	—	—	0.009	0.159	—	0.159	—	—	—	—	—	—	—	—	—
30	—	—	—	0.257	—	0.257	—	—	—	—	—	—	—	—	—
30.2	—	—	—	0.037	—	0.037	—	—	—	—	—	—	—	—	—
31	—	—	—	0.098	—	0.098	—	—	—	—	—	—	—	—	—
31.2	—	—	—	0.107	—	0.107	—	—	—	—	—	—	—	—	—
32	—	—	—	0.014	—	0.014	—	—	—	—	—	—	—	—	—
32.2	—	—	—	0.065	—	0.065	—	—	—	—	—	—	—	—	—
33	—	—	—	0.014	—	0.014	—	—	—	—	—	—	—	—	—
33.2	—	—	—	0.023	—	0.023	—	—	—	—	—	—	—	—	—
34	—	—	—	0.009	—	0.009	—	—	—	—	—	—	—	—	—
34.2	—	—	—	0.005	—	0.005	—	—	—	—	—	—	—	—	—
35	—	—	—	0.009	—	0.009	—	—	—	—	—	—	—	—	—
P (exact-test)	1.0000	0.4798	0.7260	0.6590	0.4532	0.2368	0.9942	0.6914	0.7994	0.2482	0.4308	0.5976	0.2900	0.4780	0.5060
P (chi-square-test)	0.9976	0.6246	0.1506	0.5794	0.3662	0.1282	0.9790	0.1706	0.7551	0.3376	0.2620	0.6930	0.3838	0.2780	0.5408
P (G-test)	0.9998	0.6638	0.7710	0.8184	0.4754	0.2416	0.9800	0.6904	0.9142	0.2728	0.4734	0.5588	0.5026	0.6324	0.3356

Table 2

Forensic value of the analysed systems expressed as various statistical parameters

STR locus	MEC	MEP	PIC	Pm	PD
D3S1358	0.4794	0.4640	0.6716	0.1221	0.8778
HUMTHO1	0.5240	0.5077	0.7070	0.1106	0.8893
D21S11	0.7128	0.7108	0.8386	0.0453	0.9546
D18S51	0.7426	0.7526	0.8620	0.0340	0.9659
PENTA E	0.8280	0.8351	0.9088	0.0186	0.9814
D5S818	0.5333	0.5258	0.7160	0.1026	0.8973
D13S317	0.5923	0.5877	0.7596	0.0800	0.9199
D7S820	0.5779	0.5779	0.7513	0.0820	0.9179
D16S539	0.5942	0.5884	0.7611	0.0783	0.9216
CSF1PO	0.5509	0.5445	0.7292	0.0958	0.9041
PRNTA D	0.7538	0.7584	0.8655	0.0374	0.9625
HUMVWA	0.6094	0.6043	0.7710	0.0717	0.9282
D8S1179	0.5297	0.5195	0.7125	0.1050	0.8949
HUMTPOX	0.5140	0.4853	0.6952	0.1131	0.8868
FGA	0.7815	0.7885	0.8825	0.0275	0.9724

carried out using the exact test and determination of further statistical parameters of forensic interest was carried out by using the computer programme HWE-analysis version 3.3, as previously described [5]. *Other remarks:* Ecuador is a small South American country with almost 12 million inhabitants comprised of three main ethnic groups: (a) Urban populations, usually dihybrid Mestizos or trihybrid and (b) Amerindian natives, more than 100 multiethnic and pluricultural groups, and (c) African-derived populations in fairly isolated communities and descendants of slaves [6,7].

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