

# A study of STR loci (D18S51, FGA, TH01, TPOX) in sub-Saharan populations

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**Abstract.** As a part of a research project on molecular variation in sub-Saharan Africa, we analyzed four microsatellites (HUMTPOX, HUMTH01, FGA and D18S51) in the Bamileke (Cameroon), the Fon (Benin), the Sidama (Ethiopia), the Tutsi (Rwanda) and the Wairak (Tanzania). © 2003 Elsevier B.V. All rights reserved.

*Keywords:* Africa; STR; AmpF/STR identifier; Population data; Allele frequencies

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## 1. Introduction

Due to the scarcity of data referring to African populations, and more specifically to the sub-Saharan context, an overview of four STRs in five sub-Saharan African populations is reported.

## 2. Material and methods

Four autosomal STR markers (TH01, TPOX, D18S51 and FGA) were typed using the Applied Biosystems AmpFLSTR<sup>®</sup> Identifier<sup>™</sup> kit. Amplification products were analyzed in ABI Prism<sup>®</sup> 3100 Genetic Analyzer. Allele frequencies were calculated using the gene counting method. Hardy–Weinberg proportions were verified by an exact test and were performed by using GENEPOP 3.1. Correspondence analyses were carried out using the NTSYS-pc version 1.70.

## 3. Results and discussion

The population database for six sub-Saharan African populations is shown in [Table 1](#). A multivariate analysis, including other populations apart from the sub-Saharan region, is shown in [Fig. 1](#) (Projection I/II). The projection defined by axes I/II explains up to 67.93% of the total cumulative variance. Axis I is basic in the clustering of sub-Saharan populations, which occupy the positive portion of this axis, setting them apart from Caucasian populations.

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Table 1  
Allele frequencies of the STRs TH01, TPOX, D18S51 and FGA in the populations studied

Locus	Allele	Tutsi	Sidama	Wairak	Fon	Bamileke	
TH01	6	0.2016	0.1855	0.2549	0.1250	0.0962	
	7	0.4032	0.4355	0.3137	0.4904	0.4423	
	8	0.1452	0.1694	0.1373	0.2308	0.2692	
	9	0.2016	0.1694	0.2059	0.1154	0.1154	
	9,3	0.0161	0.0403	0.0294	0.0289	0.0385	
	10	0.0323	0.0000	0.0588	0.0096	0.0385	
<i>p</i> -val		0.1221	0.9153	0.5712	0.7759	0.3718	
<i>N</i>		124	124	102	104	104	
TPOX	6	0.0403	0.0000	0.0192	0.0673	0.0926	
	7	0.0242	0.0082	0.0096	0.0289	0.0370	
	8	0.2823	0.4180	0.3173	0.2692	0.2315	
	9	0.3387	0.2541	0.3269	0.2981	0.2963	
	10	0.0726	0.0738	0.0865	0.1058	0.0556	
	11	0.1936	0.2131	0.2404	0.1731	0.2778	
	12	0.0484	0.0328	0.0000	0.0481	0.0093	
	13	0.0000	0.0000	0.0000	0.0096	0.0000	
	<i>p</i> -val		0.7565	0.3022	0.4051	0.5575	0.3826
	<i>N</i>		124	122	104	104	108
	D18S51	10.2	0.0185	0.0170	0.0000	0.0000	0.0000
		11	0.0000	0.0424	0.0400	0.0098	0.0000
		12	0.0185	0.0932	0.0800	0.0980	0.0283
13		0.0556	0.0339	0.0300	0.0196	0.0566	
13.2		0.0185	0.0085	0.0000	0.0294	0.0000	
14		0.0370	0.0593	0.0600	0.0294	0.0283	
14.2		0.0000	0.0000	0.0000	0.0098	0.0377	
15		0.2130	0.1525	0.0900	0.1275	0.1415	
15.2		0.0093	0.0085	0.0400	0.0000	0.0000	
16		0.1482	0.1017	0.2200	0.1667	0.2358	
16.2		0.0000	0.0170	0.0200	0.0000	0.0000	
17		0.1574	0.0848	0.1000	0.1275	0.1604	
17.2		0.0000	0.0085	0.0200	0.0000	0.0000	
18		0.2037	0.1441	0.1100	0.1471	0.1226	
18.2		0.0000	0.0085	0.0100	0.0000	0.0000	
19		0.0926	0.1102	0.0600	0.1078	0.0755	
19.2		0.0000	0.0000	0.0100	0.0098	0.0000	
20		0.0278	0.0848	0.0600	0.0490	0.0472	
20.2		0.0000	0.0000	0.0100	0.0098	0.0000	
21		0.0000	0.0110	0.0100	0.0392	0.0566	
21.1		0.0000	0.0000	0.0200	0.0098	0.0000	
22		0.0000	0.0000	0.0100	0.0000	0.0094	
23		0.0000	0.0170	0.0000	0.0000	0.0000	
25		0.0000	0.0000	0.0000	0.0098	0.0000	
<i>p</i> -val			0.0044	0.0640	0.1777	0.5516	0.4834
<i>N</i>		108	118	100	102	106	
FGA	13	0.0000	0.0091	0.0000	0.0000	0.0093	
	15	0.0088	0.0000	0.0000	0.0000	0.0000	
	16.1	0.0000	0.0000	0.0100	0.0000	0.0000	
	17	0.0000	0.0000	0.0000	0.0192	0.0000	
	18	0.0088	0.0182	0.0300	0.0096	0.0000	
	18.2	0.0175	0.0000	0.0000	0.0000	0.0000	

(continued on next page)

Table 1 (continued)

Locus	Allele	Tutsi	Sidama	Wairak	Fon	Bamileke
	19	0.0351	0.0273	0.0500	0.0577	0.0185
	20	0.0790	0.0727	0.0400	0.0000	0.0833
	20.2	0.0000	0.0000	0.0000	0.0000	0.0093
	21	0.0702	0.1091	0.0400	0.0577	0.0926
	22	0.2281	0.2364	0.1700	0.1923	0.1481
	23	0.0965	0.1273	0.1900	0.1827	0.2037
	24	0.1404	0.1909	0.1600	0.2404	0.2500
	24.2	0.0000	0.0091	0.0000	0.0000	0.0000
	25	0.1140	0.0909	0.0400	0.1346	0.0556
	26	0.1053	0.0273	0.0400	0.0577	0.0556
	27	0.0614	0.0091	0.0400	0.0192	0.0370
	28	0.0000	0.0273	0.0800	0.0192	0.0278
	29	0.0088	0.0182	0.0300	0.0000	0.0000
	30	0.0000	0.0273	0.0600	0.0096	0.0000
	30.2	0.0088	0.0000	0.0200	0.0000	0.0000
	31.2	0.0000	0.0000	0.0000	0.0000	0.0093
	32.2	0.0088	0.0000	0.0000	0.0000	0.0000
	43.2	0.0088	0.0000	0.0000	0.0000	0.0000
<i>p</i> -val		0.0636	0.3142	0.0094	0.3241	0.4834
<i>N</i>		114	110	100	104	108

*p*-val: Hardy–Weinberg equilibrium, exact test.

### Acknowledgements

This work was partially supported by the Xunta de Galicia through Grant XUGA 20011B98. M. R. has been supported by a Xunta de Galicia fellowship.

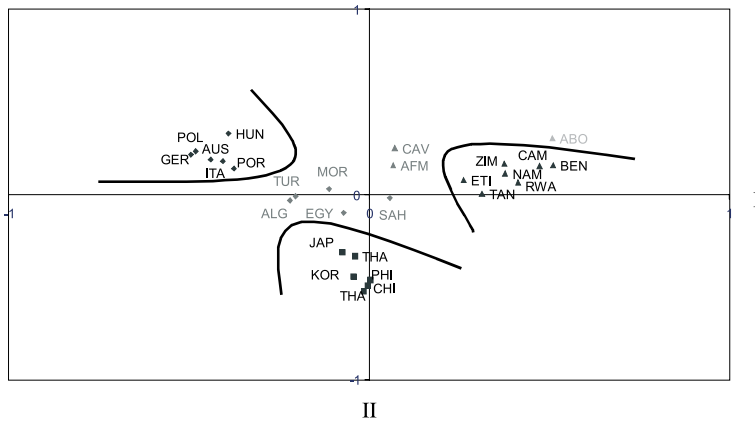


Fig. 1. Correspondence analysis, Projection I/II. Populations analyzed. Caucasian populations: (◆) European: POL (Poland), GER (Germany), HUN (Hungary), AUS (Austria), ITA (Italy), TUR (Turkey), POR (North Portugal); (◆) North African populations: MOR (Morocco), EGY (Egypt), ALG (Algeria), SAH (Western Sahara); (■) Asian populations: JAP (Japan), CHI (China), TAI (Taiwan), THA (Thailand), KOR (Korea), PHI (Philippines); Australian populations: (▲) ABO (Australian aborigines); African populations: (▲) CAV (Cape Verde), AFM (Afroamericans); (▲) sub-Saharan populations: ZIM (Zimbabwe), NAM (Namibia), BEN (Benin), TAN (Tanzania), CAM (Cameroon), ETI (Ethiopia), RWA (Rwanda).