

FOR THE RECORD

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STR Data for the AmpF/STR[®] Identifiler[®] Loci from the Three Main Ethnic Indigenous Population Groups (Iban, Bidayuh, and Melanau) in Sarawak, Malaysia

POPULATION: Iban ($n = 195$), Bidayuh ($n = 195$), Melanau ($n = 128$).

KEYWORDS: forensic science, DNA typing, short tandem repeat, polymerase chain reaction, population genetics, Iban, Bidayuh, Melanau, Sarawak, Malaysia, AmpF/STR[®] Identifiler[®], D8S1179, D21S11, D7S820, CSF1PO, D3S1358, TH01, D13S317, D16S539, D2S1338, D19S433, vWA, TPOX, D18S51, D5S818, FGA

Blood samples from unrelated individual of 195 Bidayuh, 195 Iban, and 128 Melanau in Sarawak were deoxyribonucleic acid (DNA) extracted using the FTA[®] (Whatman International Ltd., Kent, ME) paper extraction protocol (1). Multiplex polymerase chain reaction (PCR) DNA typing was performed using the AmpF/STR[®] Identifiler[®] amplification kit (PE-Biosystems, Foster City, CA). The amplified products were analyzed using the ABI PRISM[®] 3100 Genetic Analyzer (PE-Biosystems) with 3100 Data

collection software (Version 1.0.1). The identification of the alleles was performed using the GeneScan[®] (PE-Biosystems) (Version 3.7) and GenoTyper[®] (Applied Biosystems) Macros (Version 3.7 NT).

Population statistics data are obtained using the DNA-View (Charles Brenner, Oakland, CA) (Version 27.12) (2) and Power Stats (Promega Corporation, Madison, WI) (3). Allele frequencies of the 15 short tandem repeat (STR) loci for the Iban, Bidayuh, and Melanau are as in Table 1, 2, and 3, respectively. The

TABLE 1—STR allele frequency data for the Iban population ($n = 195$).

Allele	D8S1179	D21S11	D7S820	CSF1PO	D3S1358	TH01	D13S317	D16S539	D2S1338	D19S433	vWA	TPOX	D18S51	D5S818	FGA
6	—	—	ND	ND	—	0.074	—	—	—	—	—	ND	—	—	—
7	—	—	ND	0.003	—	0.254	—	—	—	—	—	ND	ND	0.005	—
8	0.003	—	0.197	ND	—	0.133	0.351	ND	—	—	—	0.559	—	ND	—
9	ND	—	0.059	0.010	—	0.295	0.064	0.131	—	ND	—	0.146	ND	0.031	—
9.3	—	—	—	—	—	0.118	—	—	—	—	—	—	—	—	—
10	0.085	—	0.205	0.231	—	0.126	0.200	0.267	—	0.013	—	0.023	ND	0.295	—
10.2	—	—	—	0.003	—	—	—	—	—	—	—	—	—	—	—
11	0.082	—	0.400	0.272	—	ND	0.236	0.295	—	0.003	ND	0.256	ND	0.282	—
12	0.115	—	0.121	0.397	ND	—	0.113	0.164	—	0.054	ND	0.013	0.044	0.267	—
13	0.195	—	0.018	0.079	0.003	—	0.028	0.144	—	0.313	ND	0.003	0.097	0.110	—
13.2	—	—	—	—	—	—	—	—	—	0.046	—	—	ND	—	—
14	0.123	—	ND	0.005	0.059	—	0.008	ND	—	0.159	0.097	—	0.144	0.010	—
14.2	—	—	—	—	—	—	—	—	—	0.085	—	—	ND	—	—
15	0.226	—	ND	ND	0.226	—	ND	ND	ND	0.049	0.046	—	0.282	ND	—
15.2	—	—	—	—	—	—	—	—	—	0.256	—	—	—	—	—
16	0.115	—	—	—	0.351	—	—	—	0.003	0.018	0.095	—	0.226	ND	—
16.2	—	—	—	—	—	—	—	—	—	0.005	—	—	—	—	—
17	0.056	—	—	—	0.254	—	—	—	0.164	ND	0.397	—	0.097	—	ND
18	ND	—	—	—	0.074	—	—	—	0.018	—	0.256	—	0.031	—	0.003
19	ND	—	—	—	0.033	—	—	—	0.292	—	0.105	—	0.036	—	0.059
20	—	—	—	—	—	—	—	—	0.118	—	0.003	—	0.021	—	0.036
20.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
21	—	—	—	—	—	—	—	—	0.008	—	ND	—	0.018	—	0.144
21.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.023

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TABLE 1—Continued.

Allele	D8S1179	D21S11	D7S820	CSF1PO	D3S1358	TH01	D13S317	D16S539	D2S1338	D19S433	vWA	TPOX	D18S51	D5S818	FGA
22	—	—	—	—	—	—	—	—	0.090	—	ND	—	0.005	—	0.259
22.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.033
23	—	—	—	—	—	—	—	—	0.110	—	ND	—	ND	—	0.177
23.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.015
24	—	ND	—	—	—	—	—	—	0.146	—	ND	—	ND	—	0.087
24.2	—	ND	—	—	—	—	—	—	—	—	—	—	—	—	0.026
25	—	0.003	—	—	—	—	—	—	0.044	—	—	—	ND	—	0.113
26	—	ND	—	—	—	—	—	—	0.008	—	—	—	ND	—	0.026
27	—	ND	—	—	—	—	—	—	ND	—	—	—	ND	—	ND
28	—	0.064	—	—	—	—	—	—	ND	—	—	—	—	—	ND
28.1	—	0.005	—	—	—	—	—	—	—	—	—	—	—	—	—
28.2	—	0.008	—	—	—	—	—	—	—	—	—	—	—	—	—
29	—	0.187	—	—	—	—	—	—	—	—	—	—	—	—	ND
29.2	—	ND	—	—	—	—	—	—	—	—	—	—	—	—	—
30	—	0.228	—	—	—	—	—	—	—	—	—	—	—	—	ND
30.2	—	0.077	—	—	—	—	—	—	—	—	—	—	—	—	ND
31	—	0.103	—	—	—	—	—	—	—	—	—	—	—	—	—
31.2	—	0.103	—	—	—	—	—	—	—	—	—	—	—	—	ND
32	—	0.026	—	—	—	—	—	—	—	—	—	—	—	—	—
32.2	—	0.144	—	—	—	—	—	—	—	—	—	—	—	—	ND
33	—	0.008	—	—	—	—	—	—	—	—	—	—	—	—	—
33.2	—	0.033	—	—	—	—	—	—	—	—	—	—	—	—	ND
34.2	—	0.013	—	—	—	—	—	—	—	—	—	—	—	—	—
H_o	0.877	0.846	0.749	0.682	0.764	0.779	0.764	0.821	0.795	0.815	0.692	0.636	0.841	0.744	0.821
P_d	0.957	0.960	0.892	0.861	0.894	0.928	0.905	0.908	0.949	0.932	0.903	0.774	0.942	0.886	0.962
P_e	0.749	0.687	0.508	0.401	0.534	0.562	0.534	0.638	0.590	0.628	0.416	0.336	0.677	0.499	0.638
P	0.781	0.102	0.883	0.441	0.594	0.147	0.214	0.724	0.228	0.950	0.600	0.081	0.003	0.074	0.719

H_o , observed heterozygosity; P_d , power of discrimination; P_e , probability of excluding paternity; P , p -values of the exact tests for Hardy-Weinberg equilibrium are given; —, allele not applicable to that locus; ND, allele not detected in this study; STR, short tandem repeat.

TABLE 2—STR allele frequency data for the Bidayuh population (n = 195).

[illegible]

TABLE 2—Continued.

Allele	D8S1179	D21S11	D7S820	CSF1PO	D3S1358	TH01	D13S317	D16S539	D2S1338	D19S433	vWA	TPOX	D18S51	D5S818	FGA
30.2	—	0.077	—	—	—	—	—	—	—	—	—	—	—	—	ND
31	—	0.049	—	—	—	—	—	—	—	—	—	—	—	—	—
31.2	—	0.051	—	—	—	—	—	—	—	—	—	—	—	—	ND
32	—	0.026	—	—	—	—	—	—	—	—	—	—	—	—	—
32.2	—	0.154	—	—	—	—	—	—	—	—	—	—	—	—	ND
33	—	0.003	—	—	—	—	—	—	—	—	—	—	—	—	—
33.2	—	0.049	—	—	—	—	—	—	—	—	—	—	—	—	ND
34.2	—	0.003	—	—	—	—	—	—	—	—	—	—	—	—	—
H_o	0.800	0.785	0.774	0.723	0.723	0.723	0.754	0.759	0.764	0.738	0.810	0.538	0.790	0.744	0.867
P_d	0.954	0.941	0.898	0.864	0.883	0.906	0.917	0.908	0.935	0.922	0.933	0.759	0.950	0.917	0.939
P_e	0.599	0.571	0.552	0.465	0.465	0.465	0.516	0.525	0.534	0.490	0.618	0.233	0.580	0.499	0.728
P	0.530	0.128	0.624	0.086	0.776	0.068	0.678	0.927	0.006	0.006	0.851	0.268	0.113	0.017	0.074

H_o , observed heterozygosity; P_d , power of discrimination; P_e , probability of excluding paternity; P , p -values of the exact tests for Hardy–Weinberg equilibrium are given; —, allele not applicable to that locus; ND, allele not detected in this study; STR, short tandem repeat.

TABLE 3—STR allele frequency data for the Melanau population ($n = 128$).

Allele	D8S1179	D21S11	D7S820	CSF1PO	D3S1358	TH01	D13S317	D16S539	D2S1338	D19S433	vWA	TPOX	D18S51	D5S818	FGA
6	—	—	ND	ND	—	0.051	—	—	—	—	—	ND	—	—	—
7	—	—	ND	ND	—	0.504	—	—	—	—	—	0.004	ND	0.043	—
8	ND	—	0.176	0.012	—	0.152	0.289	ND	—	—	—	0.547	—	ND	—
9	ND	—	0.059	0.008	—	0.215	0.078	0.247	—	0.027	—	0.137	ND	0.066	—
9.3	—	—	—	—	—	0.039	—	—	—	—	—	—	—	—	—
10	0.180	—	0.172	0.141	—	0.039	0.277	0.313	—	ND	—	0.023	ND	0.273	—
10.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
11	0.164	—	0.395	0.484	—	ND	0.117	0.147	—	ND	ND	0.281	0.008	0.316	—
12	0.063	—	0.172	0.281	ND	—	0.203	0.210	—	0.070	ND	0.004	0.051	0.164	—
13	0.246	—	0.027	0.074	0.004	—	0.031	0.070	—	0.297	ND	0.004	0.008	0.125	—
13.2	—	—	—	—	—	—	—	—	—	0.013	—	—	—	—	—
14	0.176	—	ND	ND	0.016	—	0.004	0.013	—	0.133	0.195	—	0.223	0.012	—
14.2	—	—	—	—	—	—	—	—	—	0.130	—	—	—	—	—
15	0.094	—	ND	ND	0.332	—	ND	ND	ND	0.083	0.047	—	0.195	ND	—
15.2	—	—	—	—	—	—	—	—	—	0.237	—	—	—	—	—
16	0.070	—	—	—	0.316	—	—	—	0.012	0.003	0.109	—	0.258	ND	—
16.2	—	—	—	—	—	—	—	—	—	0.007	—	—	—	—	—
17	0.008	—	—	—	0.273	—	—	—	0.211	ND	0.344	—	0.125	—	ND
18	ND	—	—	—	0.059	—	—	—	0.059	—	0.211	—	0.016	—	0.004
19	ND	—	—	—	ND	—	—	—	0.145	—	0.090	—	0.023	—	0.098
20	—	—	—	—	—	—	—	—	0.098	—	0.004	—	0.020	—	0.035
20.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
21	—	—	—	—	—	—	—	—	0.008	—	ND	—	0.016	—	0.148
21.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
22	—	—	—	—	—	—	—	—	0.090	—	ND	—	0.055	—	0.262
22.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
23	—	—	—	—	—	—	—	—	0.125	—	ND	—	0.004	—	0.145
23.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
24	—	ND	—	—	—	—	—	—	0.172	—	ND	—	ND	—	0.191
24.2	—	ND	—	—	—	—	—	—	—	—	—	—	—	—	—
25	—	ND	—	—	—	—	—	—	0.055	—	—	—	ND	—	0.094
26	—	ND	—	—	—	—	—	—	0.020	—	—	—	ND	—	ND
27	—	ND	—	—	—	—	—	—	0.004	—	—	—	ND	—	0.020
28	—	0.031	—	—	—	—	—	—	ND	—	—	—	—	—	0.004
28.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
28.2	—	0.031	—	—	—	—	—	—	—	—	—	—	—	—	—
29	—	0.219	—	—	—	—	—	—	—	—	—	—	—	—	ND
29.2	—	ND	—	—	—	—	—	—	—	—	—	—	—	—	—
30	—	0.188	—	—	—	—	—	—	—	—	—	—	—	—	ND
30.2	—	0.012	—	—	—	—	—	—	—	—	—	—	—	—	ND
31	—	0.230	—	—	—	—	—	—	—	—	—	—	—	—	—
31.2	—	0.031	—	—	—	—	—	—	—	—	—	—	—	—	ND
32	—	0.043	—	—	—	—	—	—	—	—	—	—	—	—	—
32.2	—	0.160	—	—	—	—	—	—	—	—	—	—	—	—	ND
33	—	0.004	—	—	—	—	—	—	—	—	—	—	—	—	—
33.2	—	0.031	—	—	—	—	—	—	—	—	—	—	—	—	ND
34.2	—	0.020	—	—	—	—	—	—	—	—	—	—	—	—	—
H_o	0.766	0.789	0.750	0.633	0.758	0.703	0.789	0.727	0.898	0.807	0.734	0.672	0.734	0.734	0.820
P_d	0.948	0.946	0.898	0.835	0.847	0.849	0.902	0.905	0.956	0.937	0.911	0.761	0.944	0.912	0.946
P_e	0.537	0.579	0.510	0.332	0.523	0.433	0.579	0.471	0.792	0.611	0.483	0.386	0.483	0.483	0.637
P	0.219	0.104	0.870	0.586	0.614	0.067	0.315	0.070	0.224	0.655	0.329	0.714	0.105	0.253	0.165

H_o , observed heterozygosity; P_d , power of discrimination; P_e , probability of excluding paternity; P , p -values of the exact tests for Hardy–Weinberg equilibrium are given; —, allele not applicable to that locus; ND, allele not detected in this study; STR, short tandem repeat.

observed heterozygosity (H_o) vary from a low of 0.538 (TPOX—Bidayuh) to a high of 0.898 (D2S1338—Melanau). The power of discrimination (P_d) and probability of excluding paternity (P_e) varies from a low of 0.759 (TPOX—Bidayuh) and 0.233 (TPOX—Bidayuh) to a high of 0.962 (FGA—Iban), and 0.792 (D2S1338—Melanau), respectively. The combined probability of match (PM) and the combined probability of excluding paternity (P_e) based on these 15 STR loci of the Iban, Bidayuh, and Melanau are 3.290×10^{-17} and 0.999997, 6.552×10^{-17} and 0.999989, 1.522×10^{-16} and 0.999990, respectively. Possible deviations from Hardy–Weinberg expectations (HWE) were tested using the exact test (4) based on the 2000 shuffling experiments. No deviation from HWE was detected in Melanau, while three deviations were detected in Bidayuh (D2S1338, $p = 0.006$; D19S433, $p = 0.006$; D5S818, $p = 0.017$) and one deviation in Iban at locus D18S51 ($p = 0.003$).

The complete data are available to any interested researcher upon request to the corresponding author at kblim@kimia.gov.my

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