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Announcement of Population Data

Assessment of phylogenetic structure of Berber-speaking population of Azrou using 15 STRs of Identifiler kit

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ABSTRACT

Allele frequencies for 15 STR autosomal loci of Identifiler kit (D8S1179, D21S11, D7S820, CSF1PO, D3S1358, TH01, D13S317, D16S539, D2S1338, D19S433, vWA, TPOX, D18S51, D5S818 and FGA) in the Moroccan population of Berber-speaking of Azrou, were assessed from a sample of 201 unrelated individuals. Markers D18S51, D2S1338, FGA and D21S11 present the highest power of discrimination (PD) values while D21S11 was the most polymorphic locus in the studied population. The phylogenetic tree established among worldwide populations, shows that Berber-speaking population of Azrou was so close to the Berber-speaking population of Asni but also to the Arab-speaking population of southern Morocco. Nevertheless, a significant distance was observed between populations of Azrou and Bouhria even they share the same dialect (Amazigh) and belong to the same geographical area (Morocco). The 15 STR loci studied appear to be highly discriminating, thus providing a powerful tool for forensic applications, paternity investigation, individual identification and anthropological studies.

Introduction: Some Moroccan populations have been characterized in term of allele frequencies of 15 autosomal short tandem repeats (STRs) [1–3]. Their forensic parameters and their phylogenetic position among worldwide populations have been assessed. Nevertheless, many other Moroccan populations are not yet characterized, so their forensic parameters and phylogenetic situation still ignored. Berber-speaking of Azrou is one of these populations. In fact, data about Berber-speaking populations may help in forensic and anthropological investigations. On the other hand, only language and some cultural traits permit to distinguish Berbers from Arabs. Then, genetic characterization comes to give great answers about biological identity. In Morocco, about 40% acknowledge a Berber identity, though many more have Berber ancestry.

Historically, Berbers lived in North Africa long before the arrival of the Arabs, and their culture probably dates back more than 4000 years. Berber states known as Mauritania and Numidia existed in classical times. They comprise a clear majority of the population of North Africa in terms of ethnicity, but in terms of identity, a considerable minority. It is essential to understand this difference between ethnicity and identity in order to grasp the meaning of being Berber. The influx of Arabs in North Africa has been too insignificant throughout history to justify those large numbers of people now claiming to be Arabs. And the influx of other peoples in North Africa has not been of any significance since the Vandals in the 5th century.

In this study, we used 15 STR of Identifiler kit to provide their allelic distribution and their forensic parameters in the Berber-speaking population of Azrou (Morocco). These markers will help to situate genetically the studied population among the local and worldwide populations.

Linguistics parameters: Berber belongs to the Afro-Asiatic language family, and has many dialects. The three main dialects used in Morocco are Tachelhit, Tamazight and Tarifit. Collectively, they are known as "shelha" in Arabic. The populations of Asni, Azrou and Bouhria speak, respectively, these three dialects and belong respectively to Berbers of Atlas, Souss and Rif. Fig. 1 shows the geo-

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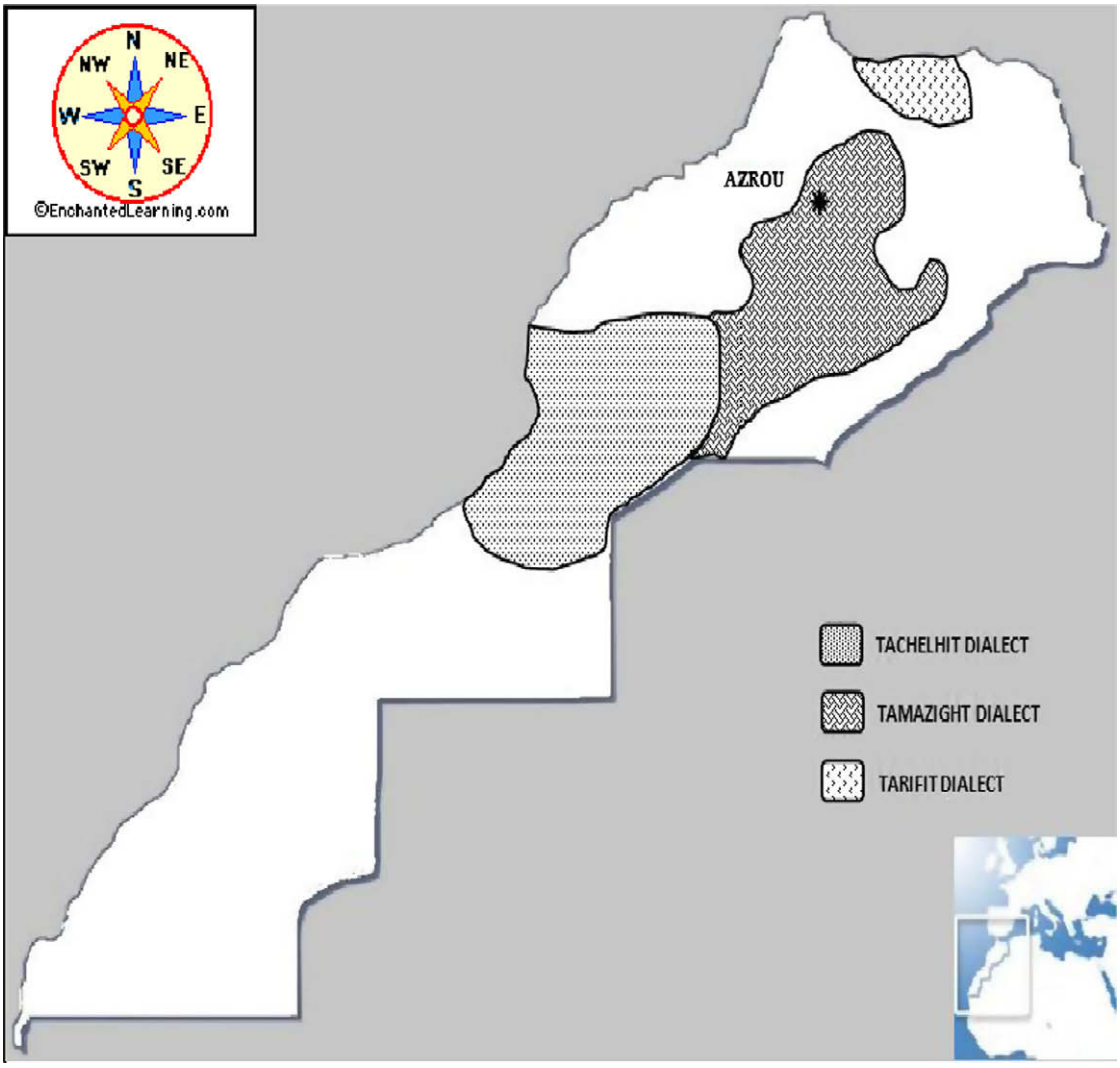

Fig. 1. Repartition of ethnolinguistic groups in Morocco.

graphical distribution of the different ethnolinguistic groups in Morocco.

- *Tachelhit* (sometimes known as "soussi" or "chleuh") is spoken in south-west Morocco, in an area between Ifni in the south, Agadir in the north and Marrakech and the Draa/Sous valleys in the east.

- *Tamazight* (or Berber, Amazigh, Zaian) is spoken in the Middle Atlas Azrou, between Taza, Khemisset, Azilal and Errachidia.

- *Tarifit* (or Rifia) is spoken in the Rif area of northern Morocco. This dialect continues along the Algerian border in eastern Morocco all the way to Figuig.

Population information: Blood samples were obtained from 201 unrelated healthy individuals of Berber-speaking population of Azrou in Morocco. Their ancestry was traced back at least two generations.

DNA extraction: Genomic DNA was extracted using the standard Phenol–Chlorophorm method [4] and purified by ethanol precipitation.

PCR: PCR amplification was performed for 15 STR loci using AmpFl STR® Identifiler™ kit (Applied Biosystems, Foster City, CA, USA) according to manufacturer's specifications [5].

Typing: The PCR products were detected with the ABI PRISM® 3130*xl* Genetic Analyzer (Applied Biosystems) and sized with GeneScan-500 LIZ internal lane size standard. Allelic calls and genotyping were carried out by comparison to the reference allelic ladder included in the kit, using GeneMapper ID v3.2 (Applied Biosystems).

Quality control: Identifiler™ kit included allelic ladder and positive control.

Statistical and phylogenetic analysis: For data analysis the Arlequin software package version 3.1 [6] was used to assess Hardy–Weinberg equilibrium (HWE) using Fisher's exact test [7]. Several forensic parameters were also examined including power of discrimination (PD), polymorphic information content (PIC) and power of exclusion (PE) using the PowerStats program v1.2 [8,9]. STR allele frequencies of 14 worldwide populations previously published [2,3], were introduced in the analysis to build phylogenetic tree using Neighbor-Joining (NJ) program within PHYLIP 3.67 software [10] (Table 1). Phylogenetic tree was built using MEGA v4 [22].

Access to data: Complete data can be acquired upon request to helossmani@yahoo.fr.

Results: Refer to Table 1 and Fig. 2.

Other remarks: Table 2 shows that all markers have high PD values (>0.865). High values of PD and PIC were observed for D18S51, D2S1338, FGA and D21S11 with the highest ones in mar-