Introduction

Hello, and welcome to the March 2013 issue of DNA Tribes® Digest. This month’s article explores the emergence of new African cultures during the Iron Age. Starting approximately 1,000 BCE and continuing through the 19th century CE, one of the most important processes in world history took place: the Bantu Migrations that reshaped the cultural landscape of Africa.

Scholars believe the Bantu migrations began near present day Cameroon and Nigeria and spread innovative agricultural and iron technologies throughout Sub-Saharan Africa. By the modern period, Bantu speaking cultures had been established as far as present day Kenya and South Africa.

Over three millennia, these migrations generated a rich cultural network of 250 Bantu languages and 535 Bantu dialects (according to some counts). Bantu societies have adapted to diverse environments, ranging from the Western Congo Basin (home to the Aka people) to the South African savanna of KwaZulu-Natal (home of the Zulu people).

This month’s article will explore cultural processes that reshaped Iron Age Africa. This will provide a background for two genetic analyses: first, a STR based analysis of local regional links in Tropical West Africa, where Bantu cultures probably first emerged; and second, a SNP based analysis of the genetic components of Bantu cultures throughout Sub-Saharan Africa.

Best regards,
Lucas Martin
DNA Tribes

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Bantu Languages and the African Classical Age

Background

Like several other parts of the ancient world, Africa was transformed during the period known as the Iron Age, when the spread of iron (first developed in West Asia and India\(^1\)) accompanied widespread social changes and migrations. These changes are best documented in the East Mediterranean and Mesopotamia, where written records were kept since the Bronze Age. In places where writing spread later (such as Sub-Saharan Africa and Western Europe), scholars deduce these changes from the archaeological record and the cultural and linguistic landscape.

In Sub-Saharan Africa, archaeologists have discovered evidence of early iron use dating to at least 1,000 BCE. This pre-dates the widespread adoption of iron in Egypt and Nubia, suggesting a separate development of iron technology in Sub-Saharan Africa. These changes were associated with several African cultures, including the Sao civilization of Lake Chad (possibly associated with early Chadic languages); the Nok culture of Nigeria (possibly related to Yoruba peoples); the Urewe culture of Lake Victoria (possibly an early center of Bantu speaking cultures); and the Egyptian-Kushite Kingdom of Meroe along the Upper Nile (known for its undeciphered Meroitic script and enigmatic Nubian pyramids; see map in Figure 1).

![Figure 1: Map of early iron using cultures in Sub-Saharan Africa (1,000 BCE – 500 BCE), with possible languages (italics). Arrows illustrate possible Bantu migrations from West Africa to East and Southern Africa.](http://antiquity.ac.uk/projgall/tewari/tewari.pdf)
These early African cultures are just beginning to be understood by scholars. For instance, the iron using **Sao civilization** developed around Lake Chad and probably involved early Chadic speaking cultures. Traditional accounts preserved by Chadic peoples recall early pre-Islamic cultural founders led by “Nimrod Canaan,” said to have migrated from an island beyond the great desert (possibly somewhere in the East Mediterranean) and built urban settlements near Lake Chad. However, the migrations related to these early Sao cultures (perhaps via the Nile Valley, Horn of Africa, or Sahara Desert trade routes) are unknown.

Another group of Iron Age societies that helped reshape Africa were the **Bantu cultures**. The Bantu languages are related to other Niger-Congo languages of West Africa and are thought to have spread from near present day Cameroon and Nigeria (possibly around 1,000 BCE) to eventually reach locations as distant as Kenya and South Africa.

One early center of Bantu culture established outside of West Africa was the **Urewe culture** of Lake Victoria. Between approximately 1,000 BCE and 400 CE, Bantu cultures in East Africa participated in what historian and linguist Christopher Ehret has termed the “**African Classical Age**.” In this innovative period, Bantu speaking populations spread new farming and iron working technologies among multiple cultures near the African Great Lakes. According to Ehret, the prime movers in this African Classical Age were the Mashariki Bantu (possibly migrants from the west), who established settlements interspersed among other peoples and eventually assimilated neighboring populations in a flourishing and eclectic regional culture.

To the south, later Bantu cultures (possibly Shona or Lemba peoples) built **Great Zimbabwe** during the 11th century CE. This Southern African trade city attests the success of the Iron Age Bantu cultures in spreading new patterns of culture far throughout Sub-Saharan Africa. Present day Bantu cultures in Southern Africa also include the Zulu and Xhosa of South Africa, descendants of the several Nguni peoples united by Shaka Zulu during the 1600’s. This successful spread of Bantu culture among populations throughout Sub-Saharan Africa is a legacy of the Bantu expansions that exemplifies the concept of **ubuntu**, or the interconnectedness of cultures.

To explore the genetic landscape of present day Sub-Saharan Africa (reshaped by these Iron Age cultures), this month’s article will first explore the non-local genetic links of the Tropical West African region based on autosomal STR data. Second, the article will discuss the regional genetic components of Bantu speaking populations throughout Sub-Saharan Africa based on autosomal SNP data.

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3 Like the Chadic figure “Nimrod Canaan,” the Biblical figure Nimrod was the son of Cush, who was also associated with Africa and separately mentioned in Ethiopian texts such as the *Book of Aksum*. Similar legendary origins from Nimrod of Canaan have been described for Yoruba cultures of West Africa. For more discussion, see *ibid*.

STR Analysis of the Tropical West African Region

Genetic contributions to the Tropical West African region were identified based on autosomal STR data. Results are summarized in Table 1 and illustrated in Figure 2.

![Map of Africa showing genetic contributions](image)

Figure 2: Non-local components of the Tropical West African region based on autosomal STR data. This analysis excluded local Tropical West African contributions. Note: The Southern African STR region includes Bantu speaking populations, which have migrated to South Africa as part of the Bantu expansions discussed in this article.

Discussion: Results indicate Tropical West African genetic links with several neighboring regions of Africa. The largest link was with the Southern African region (38.9%) that includes present day Bantu speaking cultures that migrated to Mozambique and South Africa during the course of the Bantu expansions. This does not necessarily suggest migrations from Southern Africa to Tropical West Africa, but suggests that genetic continuity between these regions has been retained over large distances during the course of the Bantu migrations.

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5 For more information about DNA Tribes® STR based 15, 21, and 27 Marker Kit tests, see [http://dnatribes.com/index.html](http://dnatribes.com/index.html).

6 DNA Tribes® SNP results currently express both West African and Khoisan-Aka (indigenous Central and Southern African) components in South African Bantu populations, described in more detail in the next section of this article.
Results also indicate links with the Sahelian region (26.2%) that includes Chadic speaking populations associated with the Sao civilization discussed in this article. This might in part reflect longstanding contacts between Tropical West Africa and indigenous populations near Lake Chad, as well as population expansions related to the emergence of Sahelian urban centers beginning in the Iron Age.

The non-local links of Tropical West African populations also include African Great Lakes (25.4%), which might in part reflect contacts between West Africa and East African centers such as Urewe (near Lake Victoria) during the African Classical Age. As with the Southern African component, these genetic links might in part reflect migrations from West Africa to the African Great Lakes that are preserved in the genetic structure of present day East Africans.

Finally, results also identify a smaller genetic link with the Horn of Africa region (8.8%), which might reflect genetic traces of contacts with Northeast Africa, possibly including early links with Nubian or other Nilo-Saharan speaking cultures.

Notably, non-local genetic components of Tropical West Africans express links with several regions that have participated in the emergence and spread of iron technology in Africa since 1,000 BCE (illustrated in Figure 1), including: the Bantu speaking cultures of Southern Africa (Southern African region); the Sao civilization (Sahelian region); the Urewe culture (African Great Lakes region); and the Kingdom of Meroe (Horn of Africa region).

<table>
<thead>
<tr>
<th>World Region</th>
<th>Estimated Contribution (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southern African (including Bantu*)</td>
<td>38.9%</td>
</tr>
<tr>
<td>Sahelian</td>
<td>26.2%</td>
</tr>
<tr>
<td>African Great Lakes</td>
<td>25.4%</td>
</tr>
<tr>
<td>Horn of Africa</td>
<td>8.8%</td>
</tr>
<tr>
<td>Other</td>
<td>0.7%</td>
</tr>
</tbody>
</table>

Table 1: STR based genetic contributions to the Tropical West African region. This analysis excluded local Tropical West African contributions. Note: The Southern African STR region includes Bantu speaking populations, which have migrated to South Africa as part of the Bantu expansions discussed in this article.
SNP Analysis of Bantu Speaking Populations of Sub-Saharan Africa

Regional genetic components of several Bantu speaking populations throughout Sub-Saharan Africa (not excluding West African components) were identified based on autosomal SNP data. Results are summarized in Table 2 and illustrated in Figure 3.

<table>
<thead>
<tr>
<th>Population</th>
<th>West African</th>
<th>Khoisan-Aka</th>
<th>Nilotic</th>
<th>Horn of Africa</th>
<th>North African</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aka Central African Republic</td>
<td>46.6%</td>
<td>52.9%</td>
<td>0.4%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.1%</td>
</tr>
<tr>
<td>Fang Cameroon</td>
<td>90.6%</td>
<td>8.1%</td>
<td>0.9%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.5%</td>
</tr>
<tr>
<td>Hema East-Central Africa</td>
<td>42.5%</td>
<td>5.6%</td>
<td>30.4%</td>
<td>16.4%</td>
<td>1.6%</td>
<td>3.4%</td>
</tr>
<tr>
<td>Herero Namibia</td>
<td>83.8%</td>
<td>13.7%</td>
<td>1.7%</td>
<td>0.3%</td>
<td>0.1%</td>
<td>0.4%</td>
</tr>
<tr>
<td>Kongo</td>
<td>94.2%</td>
<td>3.5%</td>
<td>2.3%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Luhya Kenya</td>
<td>69.4%</td>
<td>4.2%</td>
<td>24.3%</td>
<td>1.1%</td>
<td>0.0%</td>
<td>1.0%</td>
</tr>
<tr>
<td>Nguni South Africa</td>
<td>74.1%</td>
<td>22.7%</td>
<td>2.6%</td>
<td>0.4%</td>
<td>0.0%</td>
<td>0.1%</td>
</tr>
<tr>
<td>Pedi South Africa</td>
<td>73.6%</td>
<td>23.6%</td>
<td>0.9%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>1.9%</td>
</tr>
<tr>
<td>Sotho South Africa</td>
<td>65.6%</td>
<td>33.1%</td>
<td>1.2%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.1%</td>
</tr>
<tr>
<td>Tswana South Africa</td>
<td>58.6%</td>
<td>39.5%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>1.8%</td>
</tr>
</tbody>
</table>

Table 2: SNP regional components Bantu speaking populations (West African components not excluded).

Discussion: Results in Table 2 indicate several regional components in Bantu speaking populations. Two of these (West African and Khoisan-Aka) are expressed for all studied populations; three of these components (Nilotic, Horn of Africa, and North African) appear for some but not all Bantu populations.

West African components are largest for Kongo (94.2%) and Fang (90.6%), both located close to the possible origin territory of the Bantu languages (near Cameroon and Nigeria). However, the West African percentage expressed for Herero, living far to the south in Namibia, is also comparably large (83.8%). In contrast, West African components were smallest for the Aka (46.6%) and Hema (42.5%) populations.

These results suggest that Bantu populations expanding from West Africa absorbed a larger proportion of indigenous populations in Central and Eastern Africa than in Southwest Africa. The West African components of Southeast African Bantu populations ranged from a local minimum of 58.6% for Tswana and a local maximum of 74.1% for Nguni. Although these West African proportions are not as high as Herero, they suggest Bantu populations expanded over substantial distances while maintaining genetic continuity with West Africans.

Khoisan-Aka components are highest for Aka in Central Africa (52.9%) and Tswana in South Africa (39.5%) and are lowest for West African Kongo (3.5%) and East African Luhya (4.2%). This suggests the Khoisan-Aka component to some degree reflects the absorption of pre-Bantu cultures by expanding Bantu populations. However, this component is found in all studied Bantu speaking populations, which suggests that indigenous Central and Southern Africans (including ancestral Khoisan

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and Aka related cultures) played a part throughout the Bantu expansions. Notably, the Aka are sometimes thought to retain traditions predating the Bantu expansions; nevertheless, the Aka speak a Bantu language and share a West African genetic components with Bantu speaking populations throughout Africa.

![Genetic Components in Bantu Speaking Populations (SNP)](image)

**Figure 3:** Regional genetic components (not excluding West African components) of Bantu speaking populations throughout Sub-Saharan Africa based on autosomal SNP data.

**Nilotic** components are highest for Hema (30.4%) and Luhya (24.3%), both located near the eastern range of the Bantu languages and near the Nilo-Saharan speaking cultures of Northeast Africa. Smaller Nilotic components are also expressed for other Bantu populations, including Nguni (2.6%), Kongo (2.3%), Herero (1.7%), and Sotho (1.2%). This suggests that Nilotic related populations might have played a substantial part in establishing ancestral Hema and Luhya cultures, and that this role was less pronounced in other parts of Africa.

**Horn of Africa** components are expressed for Hema (16.4%) and Luhya (1.1%), but are lower or absent for other studied Bantu populations. As with the Nilotic component, this suggests that Hema and Luhya populations were more influenced by Horn of Africa related populations (possibly including Cushitic cultures) than other Bantu speakers. Notably, Hema and Luhya are located near the Urewe culture mentioned in the historical background of this article. This suggests that diverse cultures might have been involved in the Urewe culture and African Classical Age, possibly including Nilo-Saharan and Cushitic speaking populations.
However, it is notable that Nilotic and Horn of Africa components were proportionally less represented than West African components in South African Bantu populations. These results suggest that based on autosomal data, the ancestral Bantu that migrated to South Africa might have been genetically distinct from present day Luhya or Hema. This difference is perhaps due to a separate Bantu migration path into Southeast Africa, or else due to subsequent mixture in East Africa after ancestral Nguni and other South African Bantu peoples had already moved to the south.

Finally, a small North African component (1.6%) is expressed only for Hema, but not for other studied Bantu populations. This suggests that North African Berber related populations did not play a substantial role in the Bantu expansions.

Conclusion

Both STR and SNP results reflect the complexity and interconnectedness of genetic links in Sub-Saharan Africa. This is encapsulated in the South African philosophy of ubuntu, which emphasizes the principal of interrelatedness and mutuality between diverse individuals and cultures.

STR analysis identified West African genetic links with Southern African, Sahelian, African Great Lakes, and Horn of Africa populations. These might reflect genetic links between these regions and ancestral Bantu and other Niger-Congo cultures in West Africa prior to the Bantu expansions. In addition, this might also express partial genetic continuity with West Africans retained by Bantu peoples as they expanded into East and Southern Africa.

SNP analysis identified several genetic components of Bantu speaking populations of Sub-Saharan Africa. All studied Bantu populations shared West African components. This suggests a continuity of West African related ancestry in Bantu speaking populations throughout Sub-Saharan Africa (reaching as far as South Africa). Shared Khoisan-Aka genetic components further suggest a consistent presence of Khoisan-Aka populations (possibly reflecting pre-Bantu populations that were absorbed or participated in the formation of Bantu societies).

However, Nilotic, Horn of Africa, and North African components were expressed for some but not all Bantu populations. This suggests variable contacts between expanding Bantu cultures and neighboring Nilo-Saharan and Cushitic cultures during the Bantu migrations. Finally, results suggest that Berber speaking populations might not have played a substantial role for most Bantu societies.
DNA Tribes® SNP Update for February 2013

We are pleased to announce a new update for DNA Tribes® SNP analysis.

**New Populations:** Several new populations have been added to our SNP database:

**New African populations:**
- Afar (Ethiopia)
- Anuak (Ethiopia)
- Ari Blacksmith (Ethiopia)
- Ari Cultivator (Ethiopia)
- Bantu (South Africa)
- Gui and Gana San (Botswana)
- Gumuz (Ethiopia)
- Herero (Namibia)
- Juoansi San (Tsumkwe, Namibia)
- Karretjie San (Colesberg, South Africa)
- Khomani San (Askham, South Africa)
- Khwe San (Caprivi, Southern Africa)
- Nama Khoe (Windhoek, Namibia)
- Somali (Ethiopia)
- South Sudanese
- Wolayta (Ethiopia)
- Xun San (Menongue, Angola)

**New European populations:**
- Argyll and Bute (Scottish Highlands)
- Ireland
- Norway
- Sweden

**New Diasporic populations:**
- Coloured (Colesberg, South Africa)
- Coloured (Wellington, South Africa)
- Native American (US and Canada)
**Enhanced World Region Analysis:** Our updated regional admixture and MDS analysis now includes several new and updated regions:

<table>
<thead>
<tr>
<th>World Region</th>
<th>Description of World Region</th>
<th>Other Related Populations</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Mediterranean</td>
<td>Cyprus; European Jewish; Malta.</td>
<td>Levant; Anatolia; Italy.</td>
</tr>
<tr>
<td>Khoisan-Aka</td>
<td>Khoisan; Aka; Mbuti.</td>
<td>South African Bantu.</td>
</tr>
<tr>
<td>Mesopotamian</td>
<td>Anatolia; Transcaucasus; Kurds; Persians.</td>
<td>Southwest Asia.</td>
</tr>
<tr>
<td>Nilotic</td>
<td>Nilotic speaking populations of East Africa.</td>
<td></td>
</tr>
<tr>
<td>Slavic-Baltic</td>
<td>Eastern and Central Europe; Balkan Peninsula.</td>
<td>Western Europe.</td>
</tr>
<tr>
<td>Uralic</td>
<td>Finland; Northern Russia; Ural Mountains.</td>
<td>Scandinavia; West Siberia.</td>
</tr>
<tr>
<td>West African</td>
<td>Western Africa.</td>
<td>Bantu speaking populations of East and Southern Africa.</td>
</tr>
</tbody>
</table>


**Updated on Website Sample Reports:** Updated DNA Tribes® SNP reports for several world populations are available at [http://dnatribes.com/snp.html](http://dnatribes.com/snp.html).

**Update Your Personal SNP Analysis** New SNP analysis orders (Sale Price $49.99) and SNP updates (Sale Price $19.99) be ordered at [http://dnatribes.com/snp.html](http://dnatribes.com/snp.html).