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Introduction

Hello, and welcome to the May 2012 issue of DNA Tribes® Digest. This month's feature article explores the complex genetic landscape near the Caucasus Mountains. In the ancient world, this region was associated with the early development of metallurgy.

To illuminate this little studied region, our article discusses early contacts linking the Caucasus Mountains with Europe and the Near East, based on the archaeologist Evgeny Chernykh's analysis of early Eurasian metallurgy during the Copper Age and Bronze Age.

Best regards,
Lucas Martin
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Early Links between Europe and the Caucasus (SNP)

Historical Background

One of the puzzles of prehistory is the relationship between early farming and pastoralist populations during the Copper Age and Bronze Age. During the favorably humid and warm period of the Holocene climatic optimum (7,000 to 3,200 BCE), farming communities flourished throughout Southeastern Europe. When the climate became more cool and arid around 3,200 BCE, new cultures emerged near the Black Sea that instead emphasized pastoralism (animal herding) and a tendency towards a mobile lifestyle.

This transition to pastoralism brought European populations in contact with neighboring societies of the Caucasus Mountains. No written records describe how this transition affected cultural and population links in this area. However, the archaeologist Evgeny Chernykh has described the formation of several "metallurgical provinces" during these periods.[1] Each metallurgical province linked populations in a particular geographical area: first, among farming cultures of Southeastern Europe (the Balkan Peninsula); later, among pastoral cultures near the Black Sea (the Pontic-Caspian Steppe).

This article will summarize Chernykh's metallurgical provinces as a starting point to help decipher the complex genetic structure among populations near the Caucasus Mountains. These include genetic links with several parts of Europe, including geographically distant Northwest Europe.

"Old European" Farmers of the Balkan Peninsula (CBMP): Between approximately 5,500 and 3,500 BCE, farming cultures of Southeastern Europe participated in the Carpatho-Balkan Metallurgical Province (CBMP) (see map in **Figure 1**). This common metallurgical province attests interactions among early farming settlements throughout Southeastern Europe. These communities of up to 15,000 people each were related to the "Old European Civilization" described by the archaeologist Marija Gimbutas. According to Gimbutas, the "Old European" settlements were originally characterized by a more matrifocal and egalitarian form of society, which was later replaced by more hierarchical and patrifocal societies that expanded during the Bronze Age.[2]

The primary area of CBMP interactions was the northern Balkan Peninsula and Carpathian Mountains (see **Figure 1**). However, the CBMP also had some marginal links to neighboring cultures, such as the Cucuteni-Trypillian culture along the Dniester River (near present day Romania, Moldova, and Ukraine; see **Figure 1**).

Where did the farmers go? Around 3,200 BCE, the CBMP disintegrated due to drought and change in climate that made farming more difficult than pastoralism (animal herding). However, it is unknown how this change affected the former farming populations. According to Marija Gimbutas, some of these farming populations migrated southward towards the Aegean Sea. Near the Aegean, "Old European" traditions were preserved longer than in other parts of Europe, later re-emerging in the context of the Minoan civilization.[3]

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[1] See "The 'Steppe Belt' of stockbreeding cultures in Eurasia during the Early Metal Age" by Evgeny Chernykh, available at http://tp.revistas.csic.es/index.php/tp/article/view/149/150.

[2] For more recent archaeological analysis of the "Old European" civilization, see The Lost World of Old Europe: The Danube Valley, 5000-3500 BC, edited by David W. Anthony and Jennifer Y. Chi.

[3] See The Kurgan Culture and the Indo-Europeanization of Europe by Marija Gimbutas, p. 130. For instance, the use of unfortified settlements and the relative absence of weapons characterized both the early "Old European" farmers and the later Minoan civilization (in contrast to pastoralist cultures of the Bronze Age).

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Other "Old European" farmers are thought to have migrated eastward to become part of the increasingly mobile pastoralist cultures developing in the Pontic-Caspian Steppe. For instance, the hybrid Usatovo culture combined elements of Cucuteni-Trypillian farming cultures with pastoralist cultures of the Pontic-Caspian Steppe and traded metal goods with the Caucasus Mountains. A more distant journey to the east has been suggested for the Afanasevo culture of Siberia, possibly descended from a group that separated from the pastoralist cultures emerging near the Black Sea.[4]

Early Pontic-Caspian pastoralists (CMP): In the wake of this climate change, new lifeways emerged near the Pontic-Caspian Steppe that emphasized pastoralism (animal herding). Predecessors of these cultures had already been developing alongside the "Old European" farming cultures. For instance, the North Pontic (Dniepr-Donets) culture involved Mesolithic hunting-fishing societies at the perimeter of the "Old European" farming settlements prior to the climate shift.[5] However, fully formed pastoral societies coalesced and expanded to generate a new Circumpontic Metallurgical Province (CMP) around the Black Sea between 3,000 and 2,000 BCE (see **Figure 1**).

Maykop and Kura-Araxes: The origins of the CMP remain somewhat mysterious: the metallurgy techniques were different from those used by the Balkan Peninsula farming societies (CBMP). The new CMP style first emerged in the Maykop burial on the Pontic Steppe, which has recently been dated to as early as 4,000 BCE. The rich artistry of the Maykop metalwork is unprecedented in any nearby society (including early Mesopotamia), except for the Nahal Mishmar "Cave of the Treasure" discovered in the Levant far to the south.[6] However, Maykop's exact origins remain a mystery.

Maykop is also linked the Kura-Araxes culture (see **Figure 1**) that emerged near the Caspian Sea and expanded throughout the Transcaucasus.[7] West Asian artwork in this period suggests further links to the oasis settlements of the BMAC (see **Figure 1**).[8] One possibility is these connections between the Transcaucasus, Levant, and BMAC involved Indic influenced Hurrian cultures, whose language was distantly related to the present day Lezgin and Dargin languages of Daghestan.

Mature CMP: As the CMP matured around 3,000 BCE, two zones emerged that coexisted for a long period: a pastoralist northern zone (Yamna); and a farming southern zone (Catacomb) linked to the Black Sea (see **Figure 1**). The Catacomb culture produced more sophisticated metalwork. However, the Yamna culture was more geographically expansive and reached eastward toward Asia.

Later expansions in Asia: The CMP became the progenitor of the later Eurasian Metallurgical Province (EurAsMP) between 2,000 and 1,000 BCE. In Asia, an East Asian Metallurgical Province (EasAsMP) emerged near the Sayan-Altai Mountains and briefly expanded westwards as the Seima-Turbino phenomenon between 2,200 and 1,700 BCE (see **Figure 1**).

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[4] The Afanasevo culture emerged near the Mongolia and the Tarim Basin, where Tocharian languages were attested later in antiquity. This far eastern culture is an anomaly due to its lack of archaeological links with the neighboring Andronovo horizon of Siberia. Similarly, the *centum* Tocharian languages were unrelated to the *satem* branch of Indo-European languages usually associated with Asia.

[5] Later cultures (possibly North Pontic related) constructed dolmens for collective burials in the Western Caucasus (present day Abkhazia). These were different from the single burials of the Yamna culture and might reflect early Black Sea maritime links to Europe. See The Peoples of the Hills by C. Burney and D. Lang, pp. 78-85.

[6] Herodotus and other classical writers persistently claimed that the Colchians (in present day Georgia) were in some way related to ancient Egyptian cultures. Although contested, it has been argued that furnace based copper metallurgy first developed in the southern Levant and then spread to the Caucasus and throughout Asia and Europe. See http://www.ajaonline.org/sites/default/files/AJA1134Amzallag_0.pdf.

[7] For more information, see http://dnatribes.com/dnatribes-digest-2011-12-01.pdf.

[8] See Sarianidi, cited by B. B. Lal at http://www.archaeologyonline.net/artifacts/19th-century-paradigms-7.html.

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Summary: Archaeological data suggest several periods of potential migrations to the Caucasus. These include farming cultures migrating from the Balkan Peninsula and maritime North Pontic cultures linked to Central Europe. Other links include the mysterious Maykop culture (possibly related to Copper Age cultures of the southern Levant); the Kura-Araxes culture (linked to the Transcaucasus and perhaps Central Asia); and finally, Seima-Turbino and other cultures expanding from North Asia.

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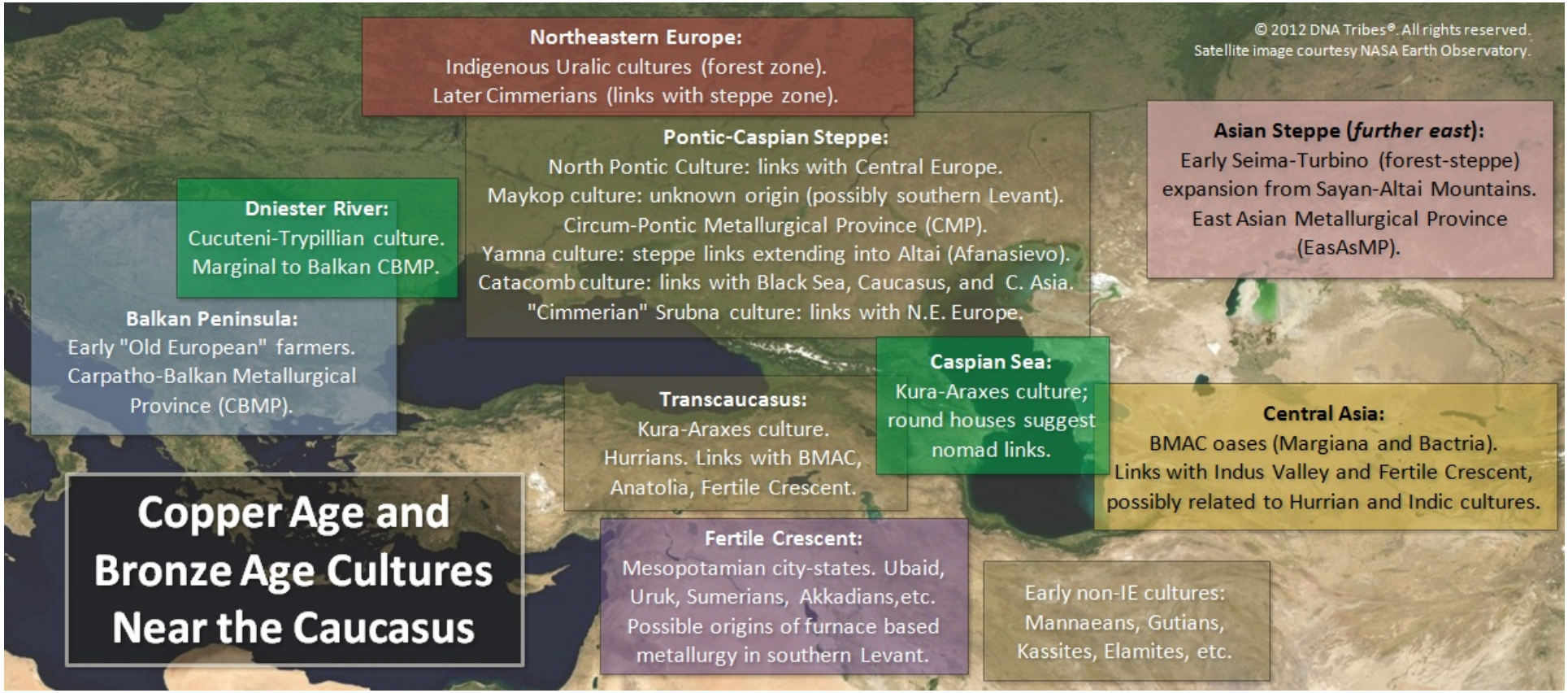

Figure 1: Copper Age and Bronze Age cultures near the Caucasus.

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Non-Local Genetic Components Near the Caucasus Mountains (SNP)

Non-local genetic components in populations of near the Caucasus Mountains were identified based on autosomal SNP data.[9] Results are summarized in **Table 1** and illustrated in **Figure 2**.

Population	Iberian	Baltic-Urals	Northwest European	Indus Valley	Arabian	Mongolian	Other
Abhkazian	29.7%	2.0%	4.0%	37.1%	27.2%	-	-
Adyghe	23.0%	13.3%	7.3%	37.2%	19.2%	-	-
Armenian	33.5%	-	-	24.8%	41.6%	-	-
Balkar	20.7%	10.1%	10.9%	36.5%	19.7%	2.1%	-
Bulgaria	71.8%	15.4%	2.9%	5.1%	-	-	4.8%
Chechen	14.9%	12.3%	15.0%	38.7%	19.1%	-	-
Cyprus	39.7%	-	-	5.0%	55.3%	-	-
Dargin Urkarah Dagestan	0.1%	9.9%	32.5%	44.3%	13.2%	-	-
Druze Israel-Carmel	27.8%	-	-	12.0%	60.2%	-	-
Georgia	33.8%	-	3.1%	32.6%	30.4%	-	-
Hungary	14.7%	23.8%	53.0%	4.0%	-	-	4.5%
Kumyk Daghestan	18.4%	13.2%	5.3%	44.1%	18.0%	0.9%	-
Kurdish	21.2%	-	-	39.7%	39.1%	-	-
Lezgin Daghestan	9.0%	5.5%	25.1%	43.3%	17.1%	-	-
Nogay	19.3%	14.7%	5.6%	27.8%	12.9%	14.7%	5.0%
North Ossetia	24.5%	10.8%	4.2%	38.0%	20.3%	2.2%	-
Romania	40.2%	17.9%	17.3%	11.9%	12.7%	-	0.1%
Tajik	5.5%	10.9%	5.8%	62.4%	4.6%	7.5%	3.4%
Turkey	34.5%	3.7%	-	29.0%	30.4%	1.5%	0.9%
Turkmen	10.5%	3.7%	3.8%	47.9%	20.2%	7.0%	6.9%
Ukraine	7.9%	70.9%	17.7%	-	-	-	3.5%
Uzbek Central Asia	2.8%	16.1%	3.2%	31.2%	7.1%	24.7%	14.8%

Table 1: Regional admixture (**excluding local Caucasus-Anatolian admixture**[10]) in populations near the Caucasus Mountains (highlighted in red) and surrounding areas (italicized) based on autosomal SNP data. This list includes some populations not displayed in Figure 2.

Discussion: Results in **Table 1** indicate several European components in populations near the Caucasus Mountains. Iberian components (primarily associated with Southwest Europe) were identified in most

[9] For more information about *DNA Tribes® SNP* analysis, see http://www.dnatribes.com/snp.html.
[10] For regional admixture analysis of these populations not excluding Caucasus-Anatolian components, see http://dnatribes.com/dnatribes-snp-admixture-2012-03-12.pdf.

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populations. Near the Caucasus, the Iberian component is largest in Georgia (33.8%) and Armenians (33.5%). This Iberian component is shared with populations of Southeastern Europe (such as Bulgaria and Romania) and the East Mediterranean (such as Cyprus). However, the Iberian component is smallest in Dargins (0.1%) and Lezgins (9.0%) near the Caspian Sea.

One possible source of Iberian admixture in the Caucasus might be dispersions of "Old European" farming populations following the breakup of the CBMP during the period of climate change around 3,200 BCE. These genetic links might also reflect older patterns of contact related to Neolithic farming communities of Europe and West Asia.

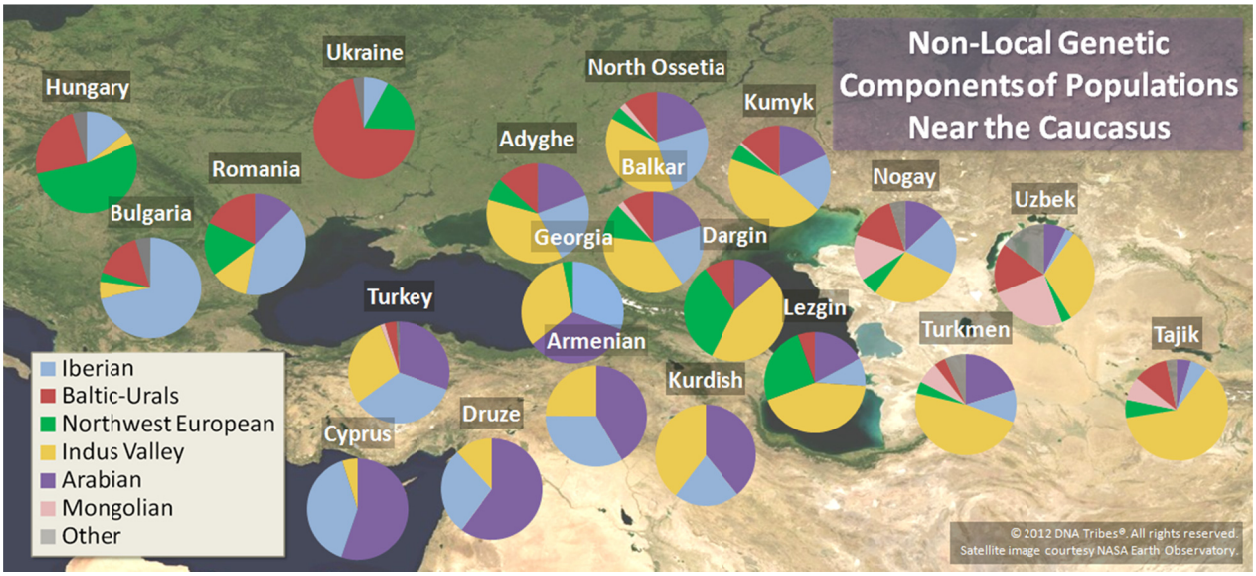

Figure 2: Regional admixture in populations of the Caucasus and nearby (**excluding local Caucasus-Anatolian admixture**) based on autosomal SNP data. For SNP admixture components not excluding Caucasus-Anatolian admixture, see http://dnatribes.com/dnatribes-snp-admixture-2012-03-12.pdf.

A second European component in the Caucasus was Baltic-Urals. This was highest in Nogay (14.7%) and Adyghe (13.3%). The Baltic-Urals component was generally found in populations north of the Caucasus Mountains, but was not identified in Transcaucasus populations such as Georgia (0.0%), Armenians (0.0%), or Kurds (0.0%). However, a Baltic-Urals component was also found in Central Asian Uzbeks (16.1%) and Tajiks (10.9%). These Baltic-Urals genetic links might express contacts with Northeast European populations, including indigenous Uralic cultures in contact with steppe pastoralists, as well as the Cimmerians described by ancient Greek and Assyrian sources (see **Figure 1**).

A third European component in the Caucasus was Northwest European. This was highest in Dargins (32.5%) and Lezgins (25.1%) near the Caspian Sea. Given the substantial distance from Northwest Europe, the origins of this component are more difficult to identify. However, these populations are located near the ancient Kura-Araxes culture that included present day Azerbaijan and Daghestan.[11]

[11] It is unknown whether the name Daghestan has any links to ancient *Dahae* tribes attested east of the Caspian Sea during the Classical period, which might have been related to fortress building pre-Indic Hurrian related cultures of the BMAC.

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Possible source populations for the Northwest European component include Hungary, the Ukraine, or Romania. For instance, this component might express genetic traces of early expansions from the Cucuteni-Trypillian settlements of the Dniester River. Alternatively, an earlier period of contact with Central Europe might be the North Pontic culture and dolmen burials discovered near present day Abkhazia (see **Figure 1** and previous section of this article).

Other non-local components of Caucasus Mountains populations included Indus Valley components. These were highest in Dargins (44.3%), Kumyks (44.1%), and Lezgins (43.3%) near the Caspian Sea. Larger Indus Valley components were observed in Central Asian Tajiks (62.4%) and Turkmen (47.9%). This suggests that Caspian and Central Asian populations have mediated genetic links between South Asia and West Asia. These might have included Bronze Age Hurrian cultures, which spoke Northeast Caucasian (Caspian) related languages but used some Indic (South Asian) personal names and cultural concepts (attested in records of the Bronze Age Levant, such as the 14th century BCE Hittite-Mitanni inscriptions and Amarna Letters).

Another non-local component in the Caucasus was Arabian. This was largest in Transcaucasus and Anatolian populations such as Armenians (41.6%) and Turkey (30.4%), possibly expressing ongoing links between the Fertile Crescent and highland West Asia.

Finally, Mongolian components were identified for some populations, such as Nogay (14.7%), North Ossetia (2.2%), Balkars (2.1%), and Turkey (1.5%). Mongolian components were identified in Central Asian Uzbeks (24.7%), Tajik (7.5%), and Turkmen (7.0%). Many of these populations have historical links with Turkic cultures (such as Uzbek and Nogay) and more ancient Scythian cultures (such as Ossetians). Even more ancient links with North Asia include the early Seima-Turbino expansion (see **Figure 1** and previous section of article).

In summary, results indicated diverse genetic components for Caucasus Mountains populations. These suggest a variety of early relationships, including the possibility of early links with more distant regions such as Northwest Europe and Mongolia. Results also indicated genetic links with Southwest Europe (possibly related to "Old European" farming societies) and the Indus Valley (possibly related to Hurrian cultures and the Bronze Age BMAC oasis civilization).

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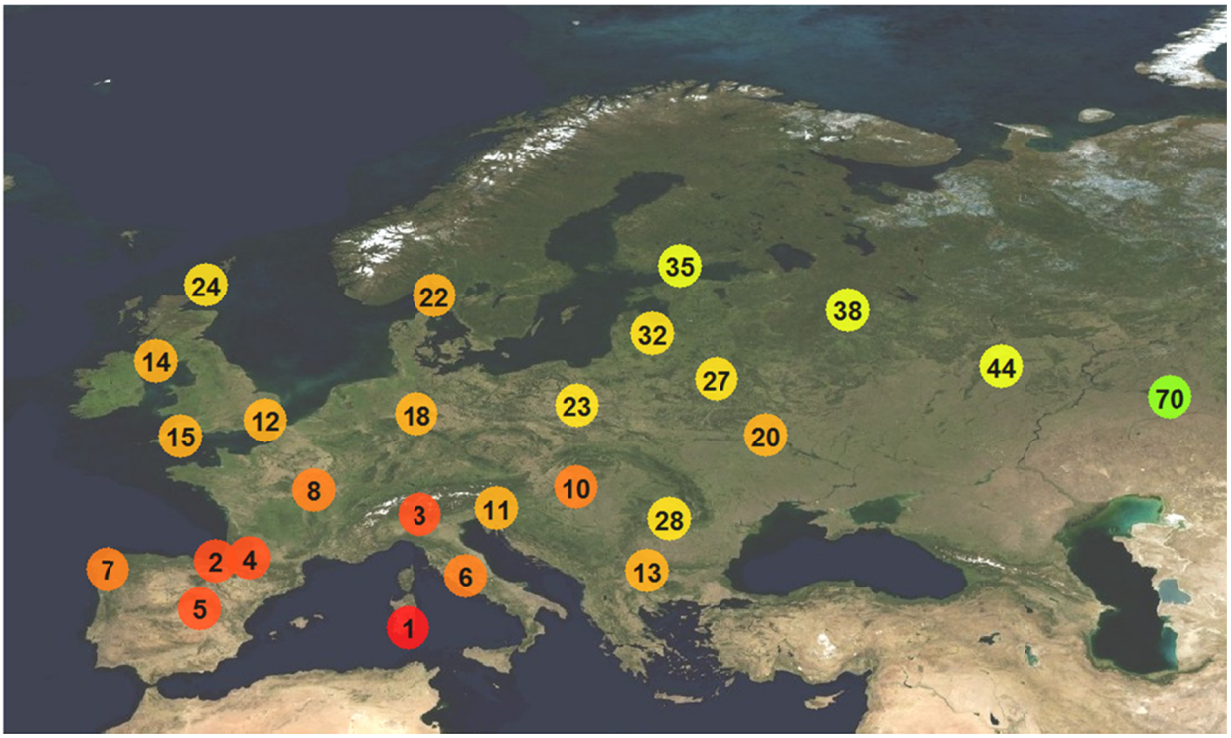

We are pleased to announce a new update for *DNA Tribes® SNP* analysis:

New SNP populations: Several new populations have been incorporated in *DNA Tribes® SNP*:

New African populations:

- Somalia

New European populations:

- Basque Spain
- Galicia Spain
- Germany and Netherlands
- Poland and West Slavic (mixed)
- Scandinavia
- Western Scotland and Ireland

New Middle Eastern populations:

- Arab (Doha, Qatar)

New Modern Diasporic populations:

- African (Doha, Qatar)
- Canary Islands
- Persian and South Asian (Doha, Qatar)

New South Asian populations:

- Bengali India
- Bhunjia India
- Brahmin Tamil Nadu India
- Brahmin Uttar Pradesh India
- Brahmin Uttaranchal India
- Chamar India
- Chenchu India
- Dharkar India

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New South Asian populations (continued):

- Dhurwa India
- Dusadh India
- Gond India
- Hakkipikki India
- Kanjar India
- Kol India
- Kshatriya Uttar Pradesh India
- Kurmi India
- Kurumba India
- Lambadi India
- Mawasi India
- Kol India
- Kshatriya Uttar Pradesh India
- Kurmi India
- Kurumba India
- Lambadi India
- Mawasi India
- Meena India
- Meghawal India
- Muslim Uttar Pradesh India
- Naga India
- Nihali India
- Piramalai Kallar India
- Pulliyar India
- Scheduled Caste Tamil Nadu India
- Scheduled Caste Uttar Pradesh India
- Tharu India
- Velama India

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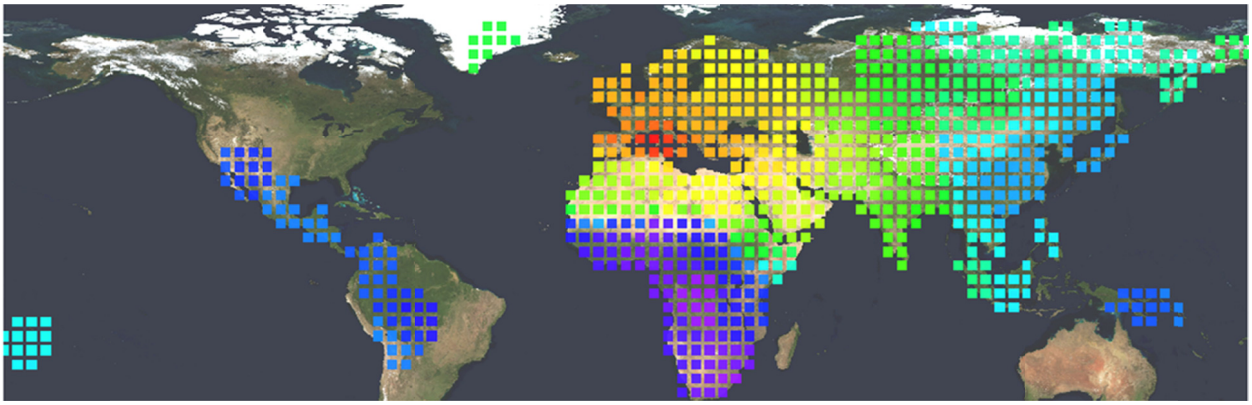

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