



fDNA Tribes® Digest June 1, 2013

Copyright © 2013 DNA Tribes®. All rights reserved.

To request an email subscription to DNA Tribes® Digest, email digest@dnatribes.com with the subject heading "Subscribe." To unsubscribe from DNA Tribes® Digest, email digest@dnatribes.com with the subject heading "Unsubscribe." Previous issues of DNA Tribes® Digest are available online at <http://dnatribes.com/library.html>.

Table of Contents:

Eurasian and Oceanian Ancestry in the Malay Archipelago	2
Background: Austronesian Expansions and Bronze Age Transmissions	2
Non-Local Genetic Components in Southeast Asia (STR).....	5
Population Admixture in Sampled Malay Singaporeans (SNP)	8
Conclusion	10
DNA Tribes® SNP Update for May 2013.....	11

Introduction

Hello, and welcome to the June 2013 issue of DNA Tribes® Digest. To expand on the recent MDS analysis of "macro" or continent scale genetic relationships in Asia,¹ this month's article features an analysis of the non-local genetic components in Island Southeast Asia, including ancestral links with both Eurasian and Oceanian populations.²

In particular, the Historical Background discusses archaeological evidence of possible links between Thailand and Siberia during the Bronze Age. This might reflect contacts (direct or indirect) with early migratory populations that transmitted metallurgical technology throughout Eurasia during this period, stimulating the development of new local cultures in Southeast Asia.

Some of the non-local genetic relationships that are discussed in this article are unexpected, because they indicate ancestry from geographically distant populations of South Asia and possibly West Asia. These results are presented to stimulate future data collection and analysis (potentially including ancient DNA) using new SNP based technologies.

Best regards,
Lucas Martin
DNA Tribes

DNA Tribes® is on Facebook.
Find us at <http://facebook.com/DNATribes>

¹ Multi-Dimensional Scaling (MDS) analysis of the large scale relationships between world populations is available at <http://dnatribes.com/dnatribes-digest-2013-04-02.pdf> and <http://dnatribes.com/dnatribes-digest-2013-05-01.pdf>.

² For STR analysis of the Malay Archipelago not excluding local Southeast Asian components, see <http://dnatribes.com/dnatribes-digest-2009-01-31.pdf>.

Eurasian and Oceanian Ancestry in the Malay Archipelago

Background: Austronesian Expansions and Bronze Age Transmissions

The Malay Archipelago encompasses a massive group of over 25,000 islands stretching between Mainland Southeast Asia and Australia. During the period of European colonialism, this area was known to navigators as part of the “East Indies” due to the enduring influence of South Asian culture in this maritime extension of the Eurasian continent.

The Malayo-Polynesian languages spoken here are part of the larger Austronesian family that also includes several deeply rooted aboriginal languages of Taiwan, as well as native languages spoken in Hawaii, Easter Island, and Madagascar. Traditionally, linguists have inferred an Austronesian expansion from Taiwan (possibly influenced by Neolithic cultures from Southern China) beginning sometime between 5,000 and 2,500 BCE (see **Figure 1**).

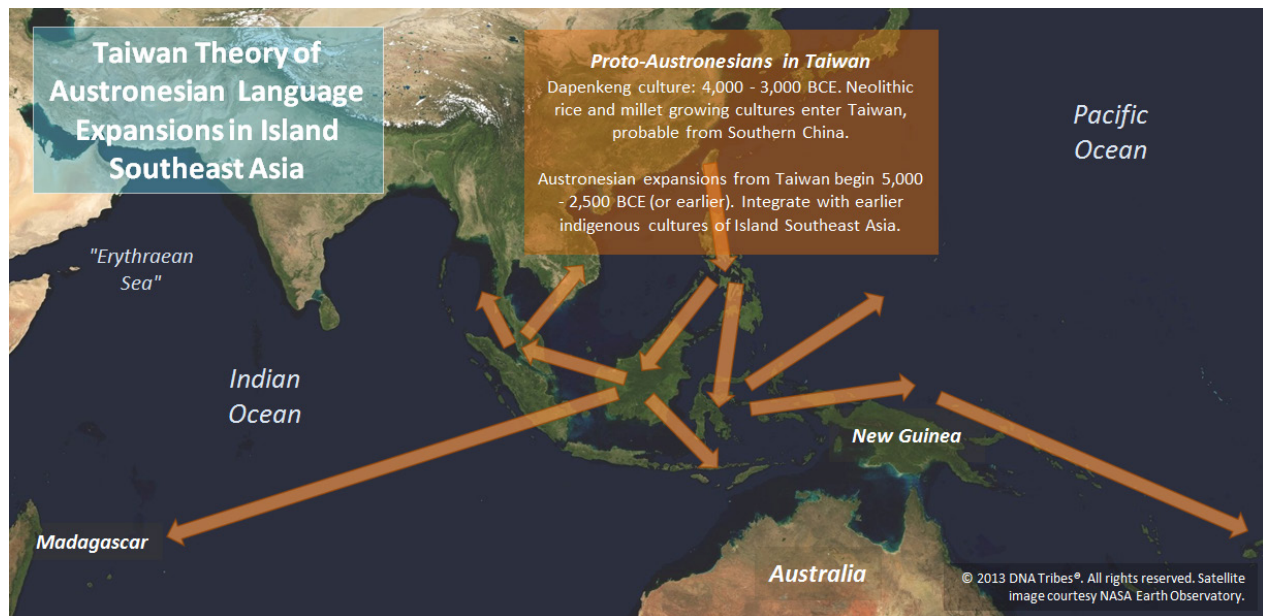


Figure 1: Map summarizing the traditional academic model of Austronesian language expansions from Taiwan (where Austronesian languages are most diverse today), beginning some time since the Neolithic period.

This model of Austronesian expansions is based partly on the deeply rooted linguistic diversity found among Taiwan Aboriginal cultures, which is interpreted as evidence of Proto-Austronesian origins in or near Taiwan. However, as genetic analysis in other parts of the world (such as the Mediterranean) has suggested,³ islands and other geographically isolated or remote locations can preserve traces of archaic population structure (also sometimes reflected in retention of local language isolates).

In the course of these maritime expansions, Austronesian speaking cultures are thought to have absorbed pre-existing populations of Island Southeast Asia, known in Malay languages as *Orang Asli*

³ For instance, a discussion of Sardinian and Basque populations in the context of Indo-European language expansions in the Mediterranean Sea is available at <http://dnatribes.com/dnatribes-digest-2013-04-02.pdf>.

(“original peoples”). These indigenous Sundanese populations are thought to be distantly related to indigenous cultures of the Andaman Islands, Australia, and New Guinea. This older layer of culture includes some of the few surviving world cultures that still erect megalithic constructions. However, most of these cultures speak Austronesian languages. In a possible link with Mainland East Asia, scholars have also suggested a possible “Austro-Tai” relationship between Austronesian languages and the Tai-Kadai languages (possibly due to early contacts in Southeastern China).

Today, one of the primary Austronesian languages spoken in Island Southeast Asia is Malay. In contrast to the Taiwan theory of Austronesian expansions, it has been suggested that the Proto-Malay cultures emerged near present day Yunnan, China and migrated southwards along the Mekong River System of Southeast Asia between 2,500 and 1,500 BCE. In later periods (since the Iron Age), these Proto-Malay cultures are thought to have been influenced by a wave of Austroasiatic speaking cultures (related to Mon-Khmer) of Mainland Southeast Asia.

In later history, Malay societies of Island Southeast Asia established trade links with East Asia and South Asia, resulting in early “Indianized” cultures. Intriguingly, local Malay traditions recall several local kingdoms founded by figures traveling from ancient India with links to cultures of the ancient West Asia and Central Asia. For instance, both the Kedah Annals (*Hikayat Merong Mahawangsa*) and Malay Annals (*Sejarah Melayu*) mention royal founders descended from the figure “Iskander Dzulkarnain” (usually associated with Alexander the Great).⁴

In nearby Mainland Southeast Asia, the cultural terms “Khmer” (cf. Assyrian *Khumri*) and “Cambodia” are said to refer to early Kambojas, an Saka (Indo-Scythian related) culture that were described in Iron Age Sanskrit literature as *Mlecchas* (“barbarians”; cf. *Meluhha*) and *Asuras* (cf. *Aššur*, “Assyria”) speaking a non-Indian language (possibly Avestan).⁵

However, recent archaeological work in Southeast Asia has uncovered evidence for even older contacts with distant parts of Eurasia during the Bronze Age (see **Figure 2**). New analysis of the Ban Chiang culture of Thailand has suggested a possible “rapid transmission” of bronze technology from the Seima-Turbino complex of South Siberia (possibly via Gansu and Yunnan) approximately 2,000 BCE.⁶ Remarkably, this technological transmission to Thailand might predate the emergence of bronze metallurgy in the Central Plain of China and emphasizes an unexpected role of the North Eurasian “barbarian” cultures in transmitting new technology in this period.

The cultural context of this migration or diffusion of technology is unknown. However, Seima-Turbino emerged in areas later associated with Turkic and Uralic languages, and the route to Thailand might have involved early Tocharian (Afanasevo related) and/or Tibeto-Burman speaking cultures.⁷ Notably, some scholars have suggested that these technologies derived from innovations that first developed in a local trade corridor between Anatolia and the Southern Levant, and then later spread into more distant parts of Eurasia (possibly transmitted by guild-like itinerant metallurgists).⁸

⁴ Scholars are unsure of the historical figure named in a medieval riddle or kenning as *Zul-Qarnain* (cf. Skt. *Karna*; Heb. *qaran*; Celt. *Cernunnos*). Similarly, the Aegean-Anatolian epithet “Alexander” (“protector of men”) predated Alexander the Great and appeared as a title of Paris in Homer’s *Iliad* and “Alaksandu of Wilusa” in Hittite records.

⁵ Scythian related influences have also been suggested for the Iron Age Dian Kingdom of Yunnan.

⁶ See <http://penn.museum/sites/mmap/publications/WhiteJWP.pdf>, but also <http://www.academia.edu/622420/>.

⁷ In a later period, Chinese records describe a similar migration of “Little Yuezhi” from the Tarim Basin to seek refuge among Qiang peoples (possibly Tibeto-Burmans) after defeat by the Xiongnu.

⁸ See http://www.ajaonline.org/sites/default/files/AJA1134Amzallag_0.pdf. Similar iconography appears in the Near East and Central Asia. For instance, compare *Were These King Solomon’s Mines? Excavations in the Timna Valley* by B. Rothenberg, plates 101 and XVIII; *The Origin of the Indo-Iranians* by E. E. Kuz’miina, fig. 56, 90. Some

Another remarkable feature of the Bronze Age in Thailand was its egalitarian form of society based on household metallurgical production, with few weapons and no evidence of centralized social hierarchy. However, Thailand's unusual Bronze Age was transformed during the Iron Age (after 500 BCE), when populations increased and a more centralized and hierarchical form of society emerged, together with increased craft specialization, and new trade connections with neighboring societies.⁹

Later expansions from the Mainland Southeast Asia transmitted these changes into the Malay Archipelago, such as the rice cultivating Dong Son culture (1,000 BCE - 1 BCE) that emerged from Mekong River populations near Cambodia since 3,000 BCE. Another mainland culture that spread to the islands was the Cham (Austronesian) related Sa Huynh culture (1,000 BCE - 200 CE), known for an extensive trade network with China and the Philippines and a distinctive practice of urn burials.¹⁰ For instance, these interactions influenced the Sundanese Buni culture (400 BCE - 100 CE), thought to be related to the Indianized Taruma Kingdom that left Sanskrit inscriptions near present day Jarkarta.

In summary, the history of the Malay Archipelago includes a long pattern of contacts with Mainland Southeast Asia, often related to cultural processes that were also active in the Indian Subcontinent. Further, archaeological evidence indicates contacts with more distant cultures of Eurasia during the Bronze Age (see **Figure 2**), possibly including links (direct or indirect) with ancient migratory populations (possibly no longer extant) that were active in Siberia and Central Asia.

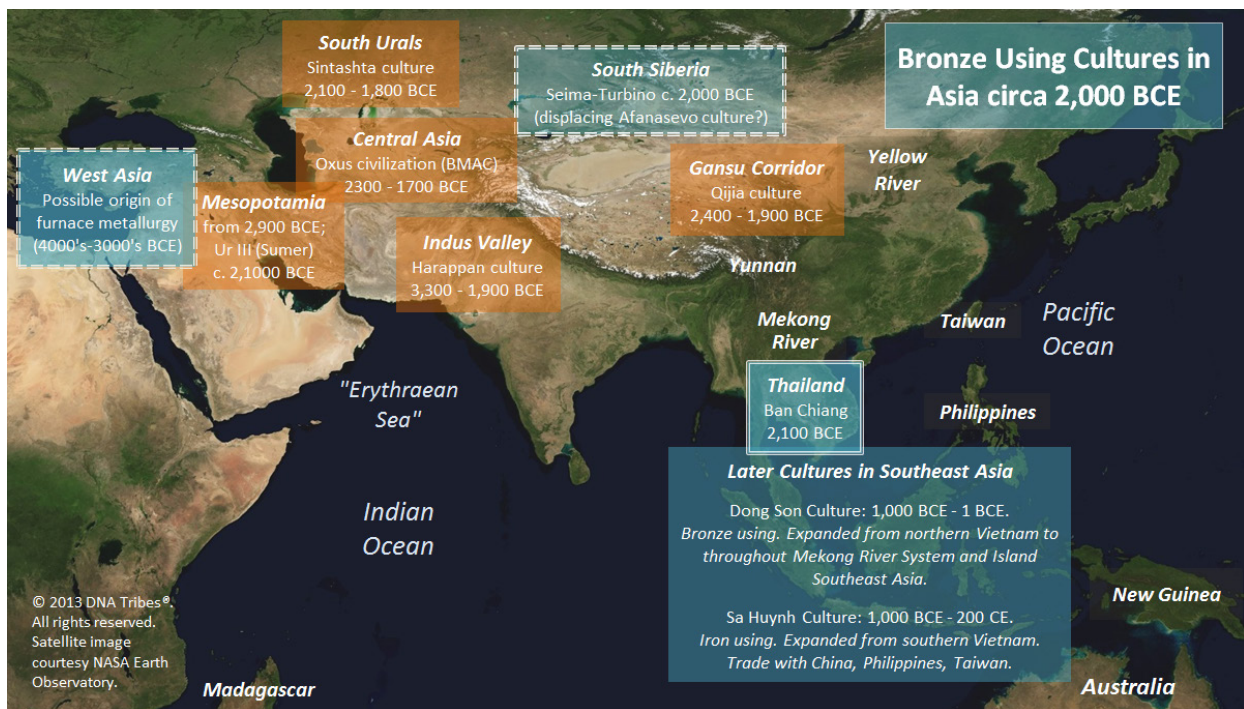


Figure 2: Map of bronze using cultures in Asia contemporary with the Ban Chiang culture of Thailand (2,000 BCE).

substrate words in Sanskrit are similar to West Asian terms (cf. *atharvan/auran*; Heb. *aharon*; Hittite *araunah*). See also discussion of Bronze-Iron Age West Asia an inter-cultural nexus at <http://www.academia.edu/2446857/>.

⁹ See <http://www.academia.edu/460957/>.

¹⁰ See also the Laotian "Plain of Jars." These Southeast Asian jar or urn burials are reminiscent of South Asian (Cemetery H) and European (Urnfield) traditions, as well as the Jar-Burial culture of West Asia and burial urns of Bronze Age Canaan. Jar or urn burial appeared in Megalithic Southern India and Sri Lanka several centuries BCE.

Non-Local Genetic Components in Southeast Asia (STR)

Non-local genetic components in several populations of Southeast Asia (excluding local Southeast Asian and Malay Archipelago components) were identified based on autosomal STR data.¹¹ Results are summarized in **Table 1** and illustrated in **Figure 3**.

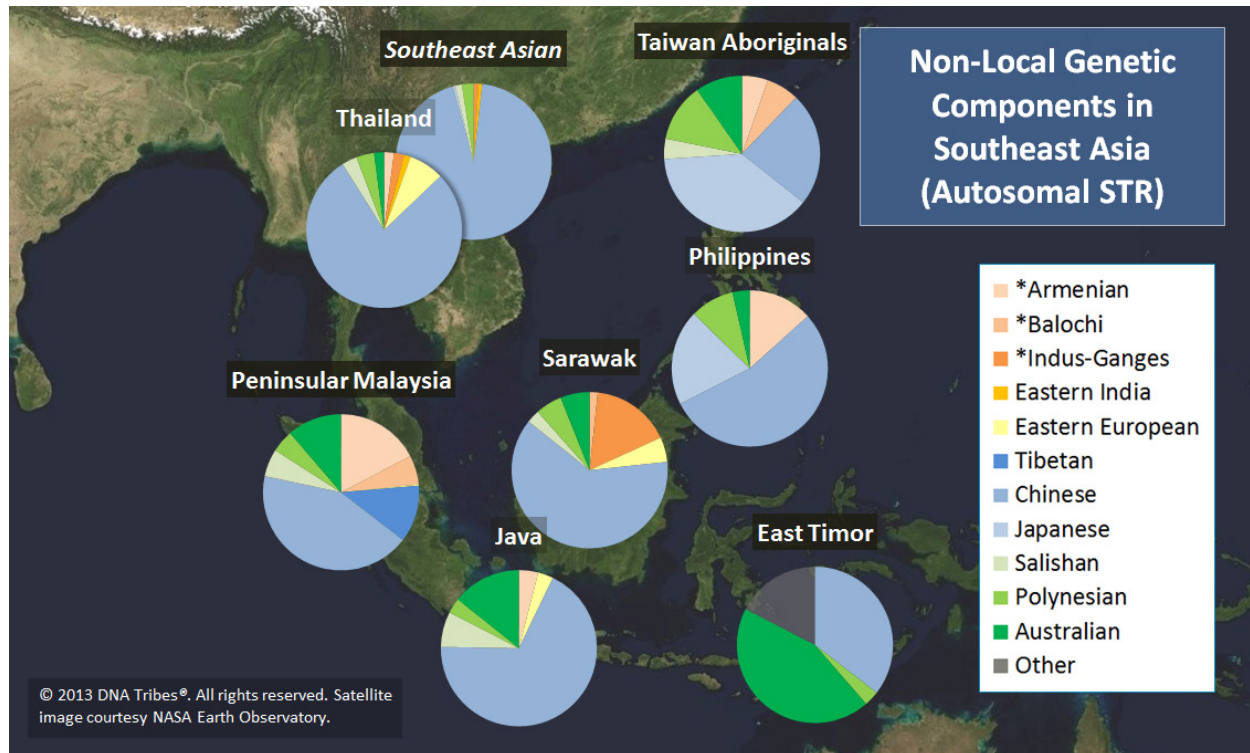


Figure 3: Non-local genetic contributions to several populations from the Malay Archipelago and nearby based on autosomal STR data. This analysis excluded local Southeast Asian and Malay Archipelago percentages. Components labeled with an asterisk (*) include more specific West Asian and South Asian genetic groupings in addition to the 39 world regions distinguished in *DNA Tribes*® 15, 21, and 27 Marker Kit STR tests.

Discussion: Results in **Table 1** indicate non-local genetic contributions to Southeast Asian populations from both nearby regions of East Asia and Oceania, as well as more distant regions of Eurasia. This analysis excluded local Southeast Asian and Malay Archipelago contributions, so that any genetic relationships with more distant populations could be expressed.

For all studied populations, the largest component was from the **Chinese genetic region** that encompasses the Yellow River and surrounding areas of East Asia. This region was the seat of early Neolithic and Bronze Age populations and later became known as the “cradle of Chinese civilization.” In the context of Southeast Asian prehistory, these Chinese related genetic components might express

¹¹ For descriptions of regions, see <http://dnatribes.com/populations.html>. For STR analysis of the Malay Archipelago not excluding local Southeast Asian components, see <http://dnatribes.com/dnatribes-digest-2009-01-31.pdf>.

population expansions from East Asia since at least the Neolithic period. These expansions might have included the Neolithic Dapenkeng culture of Taiwan (possibly derived from Southern China) and the Dong Son and Sa Huynh cultures that spread bronze and iron metallurgy from the Mekong River Valley to the Malay Archipelago (see Historical Background section of this article).

Chinese genetic components were largest in the Mainland Southeast Asian region (93.9%) and Thailand (78.2%) and smallest in East Timor (35.5%) and Taiwan Aborigines (23.5%). This would be consistent with geographical expansions primarily in Mainland Asia that also reached Island Southeast through secondary expansions of mixed maritime populations that retained elements of indigenous population structure (such as historical Malay communities).

Japanese genetic components were identified for only two studied populations: Taiwan Aborigines (38.3%) and the Philippines (19.8%). This might reflect elements of archaic Asian-Pacific Island genetic structure preserved in Japan, Taiwan, and the Philippines but less represented in other populations of Southeast Asia. Alternatively, this could reflect local population expansions in later periods (such as Neolithic or Bronze/Iron Age expansions) that did not reach beyond these areas.

Results also expressed **Oceanian genetic components** for most studied populations, including both Polynesian and Australian (Australian Aboriginal and Melanesian) percentages. Polynesian components were expressed for all studied populations and were largest in Taiwan Aborigines (12.1%) and the Philippines (9.1%). This might reflect traces of Austronesian population movements, including possible Malayo-Polynesian expansions from Taiwan that reached throughout the Malay Archipelago and eventually Polynesia and Madagascar. Polynesian components were smallest in Mainland Southeast Asia (2.4%), consistent with a primarily maritime orientation for early Malayo-Polynesian migrations.

Australian components were expressed for most studied populations and were largest for East Timor (43.9%) and Java (14.3%) but were not expressed for Mainland Southeast Asia (0.0%). These Australian genetic components might reflect ancestry from indigenous Sundanese populations that have been absorbed by expanding Austronesians in Island Southeast Asia.

Region or Population	*Armenian	*Balochi	*Indus-Ganges	Eastern India	Eastern European	Tibetan	Chinese	Japanese	Salishan	Polynesian	Australian	Other
East Timor	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	35.5%	0.0%	0.0%	3.2%	43.9%	17.4%
Java	4.0%	0.0%	0.0%	0.0%	3.2%	0.0%	68.1%	0.0%	7.3%	3.2%	14.3%	0.0%
Mainland Southeast Asia (general region)	0.0%	0.0%	1.0%	0.8%	0.0%	0.0%	93.9%	0.5%	1.4%	2.4%	0.0%	0.0%
Peninsula Malaysia	17.4%	6.0%	0.0%	0.0%	0.2%	11.8%	42.9%	0.0%	5.7%	4.6%	11.3%	0.0%
Philippines	13.3%	0.0%	0.0%	0.0%	0.0%	0.0%	54.2%	19.8%	0.0%	9.1%	3.6%	0.0%
Sarawak	0.0%	1.7%	16.5%	0.0%	5.1%	0.0%	62.4%	0.0%	2.7%	5.5%	6.1%	0.0%
Taiwan Aborigines	5.4%	6.8%	0.0%	0.0%	0.0%	0.0%	23.5%	38.3%	4.2%	12.1%	9.8%	0.0%
Thailand	2.0%	0.0%	2.1%	1.4%	7.3%	0.0%	78.2%	0.0%	3.2%	3.7%	2.1%	0.0%

Table 1: Non-local genetic contributions to several Southeast Asian populations based on autosomal STR data. This analysis excluded local Southeast Asian and Malay Archipelago contributions. For STR analysis of the Malay Archipelago not excluding local Southeast Asian components, see <http://dnatribes.com/dnatribes-digest-2009-01-31.pdf>.

In addition to expected genetic components related to neighboring Asian-Pacific populations, the non-local genetic components expressed in Southeast Asia also include possible relationships with several more geographically distant **West Asian and South Asian regions**. These include Armenian, Balochi, Indus-Ganges (northern India proper), and Eastern India components. These varied from population to population, but the largest of these were the Armenian-like component in Peninsular Malaysia (17.4%) and the Indus-Ganges-like component in Sarawak (16.5%).

These genetic components might reflect early contacts with **ancient Eurasian populations that are no longer extant** (see **Figure 2**) but are to some degree represented by present day populations of West and South Asia. For instance, Armenian components might reflect links with ancestral Indo-European populations (possibly expanding from West Asia or the Balkan Peninsula since the Copper Age) that transmitted Indo-European languages to the Indian Subcontinent and Central Asia.¹² However, the modern West and South Asian populations available for genetic analysis have also been affected by subsequent migrations and patterns of contact not necessarily related to Southeast Asia and might not fully represent this ancient population structure.

These early genetic relationships in Asia might have involved **complex patterns of migration, expansion, and in some cases resettlement** due to climate change and other factors. For instance, some archaeologists, have suggested that Neolithic populations of Mehrgarh periods I-IIA (in the Kashi Plateau) were more similar to present day Southeast Asians; in contrast, the Chalcolithic (Copper Age) population of Mehrgarh period III was more similar to West Asians.¹³ Later during Bronze Age, the Harappan Civilization was disrupted by climate changes around 1,800 BCE (affecting local rain patterns and river systems) that caused populations to relocate eastwards within the Indian Subcontinent.¹⁴

The various West Asian and South Asian components expressed in Southeast Asia in this case provide a preliminary indication of population relationships not limited to the local Asian-Pacific zone, but extending further to the west. Folk traditions of the Malay Archipelago suggest the possibility of periodic contacts with western populations (primarily through small groups of merchants and technologists together with local religious and political elites; see the Historical Background section of this article). However, more data (including both more detailed SNP sampling in Southeast Asia, as well as ancient DNA) would be needed to clarify these genetic relationships.

Results also express non-local genetic components in Southeast Asia that are represented (to some degree) by present day populations of **Eastern Europe**. These are largest in Thailand (7.3%), Sarawak (5.1%), and Java (3.2%). Similar to West Asian and South Asian components, these European like genetic components might also reflect ancestral contacts with **early Eurasian populations that are no longer extant** (such as Tocharians or other populations that might have mediated contacts between Seima-Turbino and Southeast Asia). However, these early populations might that have been absorbed or replaced by subsequent waves of steppe migrations, such as Bronze Age Andronovo cultures, Iron Age Scythians, classical period Xiongnu, and medieval Turkic expansions.

Finally, results expressed non-local genetic components in Southeast Asia that are related to indigenous **Pacific Coast (Coast Salish) populations of North America**. Salishan components were largest for Java (7.3%) and Peninsular Malaysia (5.7%). This reciprocates the Asian-Pacific genetic components identified for some Pacific Coast natives but not expressed in other sampled Native

¹² For more detailed analysis, see <http://dnatribes.com/dnatribes-digest-2012-11-01.pdf>.

¹³ See *Ancient Cities of the Indus Valley Civilization* by J. M. Kenoyer, p. 48. Citation courtesy harappadna.org.

¹⁴ The Central Asian Oxus Civilization (BMAC) was disrupted around the same period. A few centuries later, Sanskrit like words appeared in West Asia (including Hittite, Hurrian, Kassite, and Canaanite contexts).

American populations.¹⁵ This suggests a possibility of specific contacts between maritime Asian-Pacific populations and some Pacific Coast Native Americans in addition to the more general ancestral relationship between Native Americans and North Asians.¹⁶

Alternatively, another possibility is that the Salishan like genetic components in Southeast Asia reflect contacts with archaic Siberian populations that are no longer extant (such as Bronze Age Seima-Turbino related cultures). More extensive reference data (such as new SNP data from both Southeast Asia and North America) would be necessary to clarify these relationships.

Population Admixture in Sampled Malay Singaporeans (SNP)

To further explore non-local genetic components in the Malay Archipelago, population admixture analysis was performed for a group of sampled Malay Singaporeans (“**Malay Singaporean Group 2**”) for which larger non-local genetic components are expressed based on autosomal SNP data.¹⁷ To allow genetic relationships with non-local populations to be more directly expressed, this admixture analysis excluded the following Southeast Asian populations: Burma, Cambodia, Dai China, Iban Borneo, Lahu China, Malay Singaporean Group 1, Malay Singaporean Group 2, Miao China, Thailand, and Vietnam.

This analysis included unlinked SNP markers, so that results can express not only ancestral relationships in recent history, but potentially can also express genetic traces of more ancient relationships with other world populations. However, this analysis uses present day populations sampled in the *DNA Tribes®* SNP database. For this reason, results do not necessarily express recent contacts with present day ethnic groups, but might provide geographical clues to the early migration routes that might have affected ancestral Malay populations.

Results in **Tables 2-4** express admixture percentages for the “Malay Singaporean Group 2” population as a whole. Results expressed percentages of East Asian and Oceanian ethnic groups, as well as populations from more distant populations of South Asia.

Population (East Asian)	Percentage
Han Southern China	44.0%
Han Beijing China	6.3%
Tujia China	2.3%
She China	2.3%
Naxi China	2.2%
Yi China	2.2%
Japan	1.1%
Total East Asian %	60.3%

Table 2: East Asian population percentages in Malay Singaporean Group 2.

Population (Oceanian)	Percentage
Tonga	5.8%
Samoa	5.5%
Melanesian Bougainville	0.9%
Papuan New Guinea	0.7%
Total Oceanian %	12.8%

Table 3: Oceanian population percentages expressed for Malay Singaporean Group 2

¹⁵ For more information, see <http://dnatribes.com/dnatribes-digest-2012-12-01.pdf>.

¹⁶ See <http://dnatribes.com/dnatribes-digest-2013-05-01.pdf>.

¹⁷ For comprehensive admixture tables (not excluding local Southeast Asian genetic components) based on our current SNP database as of May 2013, see <http://www.dnatribes.com/dnatribes-snp-admixture-2013-05-14.pdf>. For general information about DNA Tribes® SNP analysis, see <http://dnatribes.com/snp.html>.

Results in **Tables 2-3** express non-local percentages of several **East Asian** (total 60.3%) and **Oceanian** (total 12.8%) populations for this subgroup of Malay Singaporeans. The largest East Asian population percentage expressed is from Han of Southern China (44.0%). This might reflect population expansions to the Malay Archipelago from Mainland East Asia, possibly including Yellow River related Neolithic communities, as well as later Chinese ethnic groups during the historical period.

The largest Oceanian percentages expressed are from sampled Tongan (5.8%) and Samoan (5.5%) populations (both Austronesian speaking). Percentages for sampled Melanesians and Papua New Guineans are smaller. This suggests a closer ancestral relationship between Malay Singaporeans and Austronesian speaking Polynesian populations than between Malay Singaporeans and Melanesians. However, more data would be needed to clarify these relationships; in particular, SNP samples from many Andamanese, Sundanese, and Oceanian populations are not yet available.

Population (South Asian)	Percentage
Gujarat India	3.4%
Brahmin Tamil Nadu India	3.3%
Mala Andhra Pradesh India	2.6%
Kol India	2.2%
Dalit Tamil Nadu India	2.1%
Nepal	1.8%
Chamar India	1.8%
Irula South India	1.6%
Brahmin Andhra Pradesh India	1.6%
Burusho Pakistan	1.1%

Population (South Asian cont'd)	Percentage
Brahmin Uttar Pradesh India	1.0%
Kshatriya Uttar Pradesh India	0.8%
Dusadh India	0.6%
Kanjar India	0.5%
Dharkar India	0.3%
North Kannadi India	0.1%
Total South Asian %	25.1%
Other %	1.8%

Table 4: South Asian population percentages expressed for Malay Singaporean Group 2.

Results in **Table 4** express non-local percentages from several **South Asian** populations (total 25.1%) for the sampled Malay Singaporeans. Based on available SNP samples, the largest South Asian percentages were expressed from Gujarati (3.4%) and Tamil Brahmin (3.3%) populations.

This is consistent with Malay traditions of contacts with westerly populations, primarily mediated through the Indian Subcontinent. However, it should be noted that these modern South Asian populations are themselves the product of migration and admixture (including demographic processes related to the settlement of Mehrgarh, the Harappan Civilization, and the spread of Indo-European languages). These possibly include local population changes in South Asia that have taken place subsequent to contacts with ancestral Malay populations. Nevertheless, these results are consistent with Malay ancestral components related to more westerly populations of Asia.

Another factor not fully characterized based on available SNP data, but suggested by STR results might be genetic components related to present day Timorese and Australian Aboriginal populations. In particular, ancestral relationships with Timorese and Australian populations might relate to the South Asian and Oceanian population percentages expressed based on available data.

To fully explore these relationships, a fuller SNP sampling of Malay Archipelago and other Asia-Pacific and Oceanian populations, as well as ancient DNA from both Asian-Pacific and Siberian and Central Asian populations would be needed.



Conclusion

Both STR and SNP analysis of Island Southeast Asians express ancestral relationships with East Asian and Oceanian populations, consistent with the geographical location of the Malay Archipelago. In addition, both STR and SNP results indicate genetic relationships with more distant world populations.

For STR analysis, these included possible genetic relationships with South Asian and West Asian populations, as well as smaller genetic components related to populations of Eastern Europe. For SNP analysis, admixture percentages included ancestral components related to populations of South Asia. These results might express relationships with **early populations that are no longer extant but are to some degree represented by present day West Eurasians.**

For instance, these might reflect early contacts between Southeast Asia and archaic Eurasian populations that were active in Central Asia and the Indian Subcontinent during the Bronze Age. These might have included early Indo-European speaking populations active in South Asia (possibly related to populations from the Balkan Peninsula or Western Asia), as well as the Siberian or Central Asian related populations that transmitted Seima-Turbino metallurgy technology to Thailand (possibly related to early Turkic, Tocharian, and/or Uralic speaking cultures).

If so, these archaic Eurasians might not be fully represented by present day populations, which have been affected by subsequent processes of local admixture and migration in South Siberia and the Indian Subcontinent. However, more data (both ancient DNA and from present day Southeast Asians) would be needed to clarify these ancestral relationships.

DNA Tribes® SNP Update for May 2013

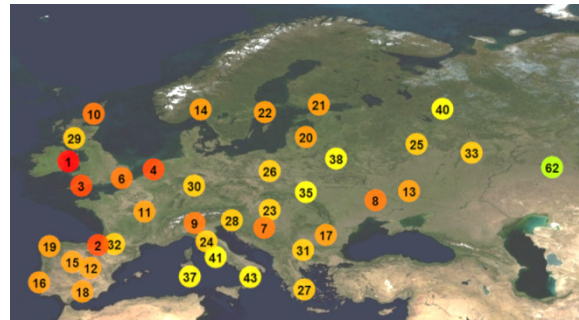
We are pleased to announce a new update for *DNA Tribes® SNP* analysis. This includes:

- *New Populations*
- *Updated More Detailed Populations*
- *Updated World Regions*
- *Updated Admixture Tables*

New Populations: Several new populations have been included in *DNA Tribes® SNP* admixture, MDS, and Total Similarity analysis:

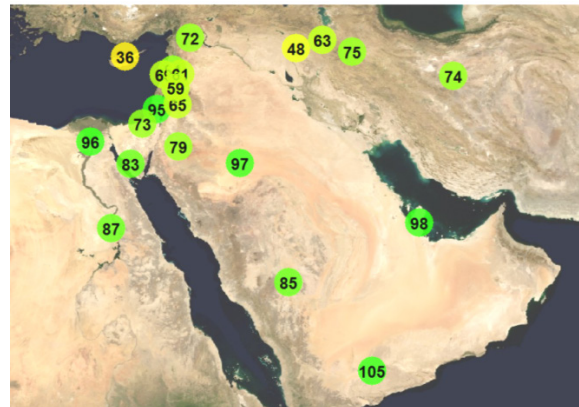
New European populations:

- Ukraine (Northeast)
- Ukraine (Western)



New Middle Eastern populations:

- Lebanese Christian
- Lebanese Druze
- Lebanese Muslim



New Diasporic populations:

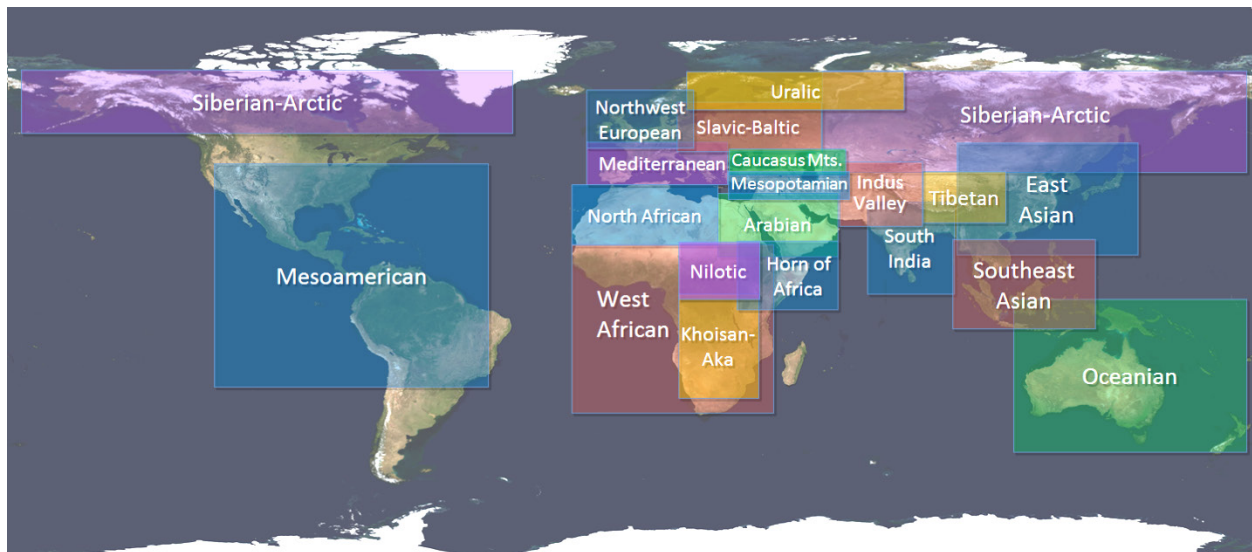
- Romani (Europe)

Update More Detailed Populations: Some samples in our database have been subdivided on a genetic basis for more detailed mixture, MDS, and Total Similarity analysis:

- Malay Singaporean *Group 1*: More similar to Southeast Asians.
- Malay Singaporean *Group 2*: Also primarily Southeast Asian, but with slightly larger percentages expressed for South Asian genetic components.
- Bedouin Negev Desert *Group 1*: More similar to Levantine populations.
- Bedouin Negev Desert *Group 2*: More similar to Arabian Peninsula populations.

Updated World Region Analysis: Our updated regional admixture and MDS analysis now includes several updated regions based on new data.

Updated World Region (May 2013)	Description of World Region (May 2013)	Other Related Populations
Arabian	Arabian Peninsula; Levant; Northeast Africa.	Southwest Asia; Mediterranean Sea.
Mediterranean	Iberian Peninsula; Italy; European Jewish; Aegean and South Balkans.	Throughout Continental Europe; Levant.
Mesopotamian	Anatolia; Transcaucasus; Kurds; Persians.	Southwest Asia; Balkan Peninsula; Mediterranean.
Slavic-Baltic	Eastern and Central Europe; Balkan Peninsula.	Western Europe.
Uralic	Finland; Ural Mountains.	Scandinavia; Northern Russia; West Siberia.



Updated on Website World Admixture Tables: Updated admixture tables listing the continental and regional percentages expressed for populations in our SNP database are available at: <http://www.dnatribes-snp-admixture-2013-05-14>.

Updated on Website Sample Reports: Updated DNA Tribes® SNP reports for several world populations are available at <http://dnatribes.com/snp.html>.

Update Your Personal SNP Analysis New SNP analysis orders (\$39.99 with submitted grandparent information form) and SNP updates (\$19.99) be ordered at <http://dnatribes.com/snp.html>.