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Recent interdisciplinary evidence on Austronesian origins

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The dominant story



Hemudu:
rice at 5000 BCE

- Full domestication by 4500 BCE
- Large grains
- Permanent fields with water control

Nan Kuan Li East:
Rice after 3000BCE

- Rice is morphologically primitive
- small grains
- No permanent fields

Sagart, L. (2005) Sino-Tibetan-Austronesian: an updated and improved argument. In L. Sagart, R. Blench and A. Sanchez-Mazas (eds) *The peopling of East Asia: Putting together Archaeology, Linguistics and Genetics* 161-176. London: RoutledgeCurzon.

SINO-TIBETAN–AUSTRONESIAN

An updated and improved argument

Laurent Sagart

In several articles (Sagart 1990, 1993, 1994) I have argued from sound correspondences, shared vocabulary and shared morphology that Chinese and An are genetically related within a macrophyllum which I called ‘Sino-Austronesian’. The accuracy of the Chinese and An material used in the comparisons has not been faulted, and neither have the sound correspondences underlying the comparisons. Criticism has concentrated on three points: first, paucity of comparisons involving basic vocabulary; second, the position of TB outside Sino-Austronesian; third, sound correspondences that leave out non-final syllables of An words. I present here an updated and improved argument which answers these issues.

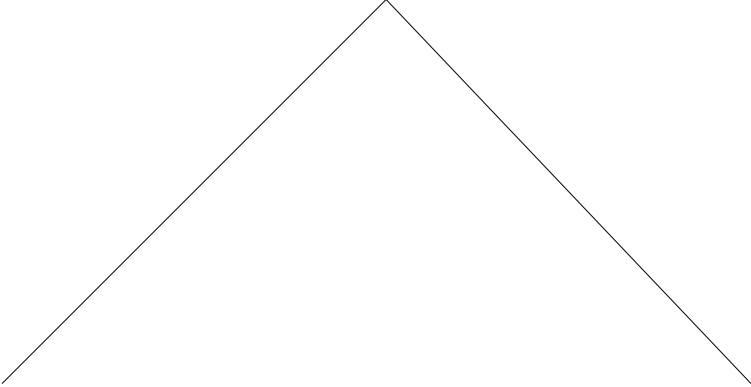
In this chapter, Old Chinese (OC, *c.*2,500 BP) is reconstructed according to the system presented in Sagart (1999), a modification of Baxter (1992). PAN reconstructions are drawn from the literature, a few are mine. I adhere to the view that PAN was spoken in Taiwan from around 5,500 BP on, on archaeological grounds. The first diversification of PAN took place on the West coast of Taiwan. Soon one group of West coast speakers moved to the East coast where a second diversification occurred, resulting in a dialect linkage (ECL). Later on, perhaps around 4,500 BP, a group of ECL speakers left Taiwan to settle the northern Philippines. Their language, PMP, is ancestral to all conventionally recognised An languages outside of Taiwan. Another group of early An speakers left Taiwan to settle coastal areas in Guangdong or Guangxi, where their language, which I call AAK was to a great extent relexified by a local language, later to become Proto-Kadai (more on this in Chapter 10, this volume). The subgrouping of An is therefore as in Figure 9.1 (based on Ho 1998 with modifications).



STAN

Sino-Tibetan

Austronesian



Linguistic evidence for STAN

- lexical comparisons (61 basic, 14 cultural)
- sound correspondences
- morphological parallels

Homeland

- in the Yellow Valley, north China
- Cishan-Peiligang culture
- 9000-7500 BP (true date may be older)
- Population expansion fueled by millet domestication

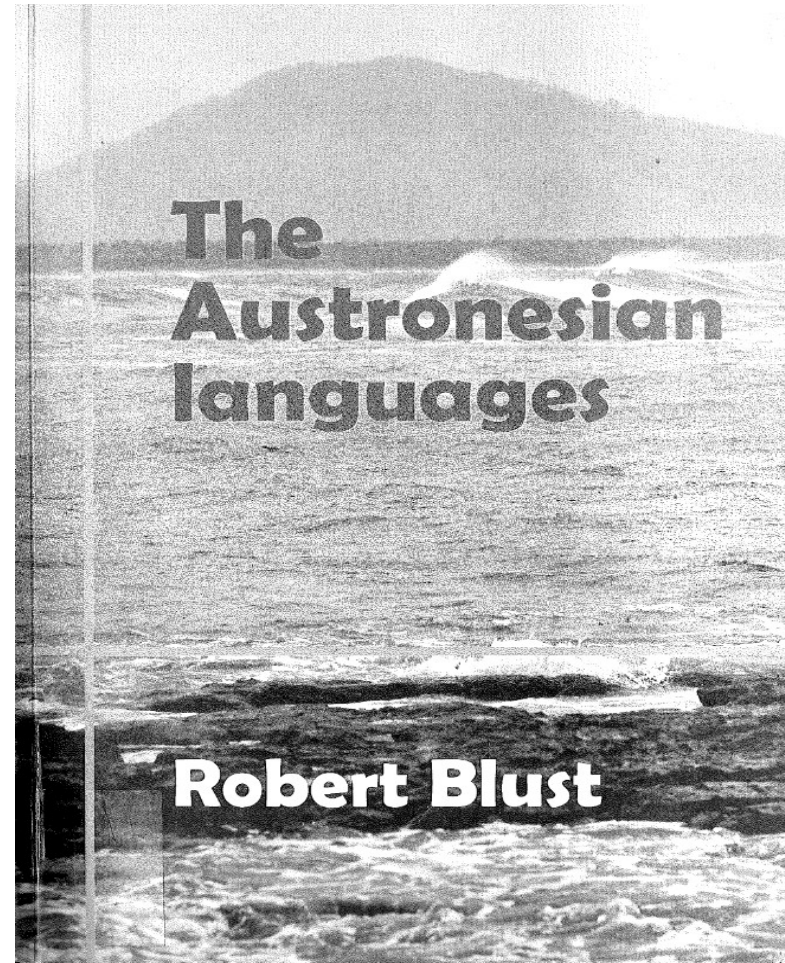
foxtail millet plant

- PAN *beCen̄
 - Old Chinese 稷 *[ts]ək
 - Trung *təjaʔ*⁵⁵
 - Lhokpu *cək*
- ST #CVtsək
 - -C- : ts-
 - -e- : -ə-
 - -ŋ- : -k-



Criticism of the lexical comparisons

- Blust 2009



Criticism of the morphology

- Kaufman, Daniel. 2013. *Reviewing the place of PAn within Asia*. Paper presented at SEALS 23, May 29-31, Bangkok, Thailand

my response:

The wider connections of Austronesian

A response to Blust (2009)

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1. Introduction

1.1 The homeland and external connections of Austronesian

Most Austronesianists today agree that the Austronesian (AN) homeland was located in Taiwan and that the first Austronesians arrived there from the Chinese mainland, across the Taiwan Strait, c. 4000–3000 BCE. I have shown (Sagart 2005, 2008) that Sino-Tibetan is Austronesian's closest mainland relative and that the pre-AN population expansion originates in Northeast China. Blust (2009) criticizes the lexical comparisons in Sagart (2005). He himself (1996) accepts the 'Austriac' theory, that Austronesian is coordinate with Austroasiatic. In his view, the time depth of Austriac makes searching for lexical comparisons and sound correspondences useless. He relies in large part on morphological arguments in Reid (1994),¹ of which the principal are:

- a causative *pa-;
- a causative *ka-;
- an agentive infix *⟨um⟩;
- a nominalizing infix *⟨in⟩.

However, a causative prefix *p(V)- or *b(V)- can also be found in Sino-Tibetan (ST). Whether Proto-Austronesian (PAN) had a causative *ka- is highly doubtful:

1. Reid writes: "with the accumulation of evidence presented by Sagart ... that AN can also be shown to be related to the Sino-Tibetan family of languages, and his claim (Sagart, p.c.) that some of the lexical items and affixes claimed to be shared by AA and AN are found also in the Sino-Tibetan languages, the possibility exists that the relationship between AA and AN is more remote than earlier considered. The concept of 'Austriac' may eventually need to be abandoned in favour of a wider language family which can be shown to include both AA and AN, but not necessarily as sisters of a common ancestor" (2005: 150).

Diachronica 33, 2:255-281
(2016)

The path of the Austronesian expansion (Sagart 2008)

5 The expansion of *Setaria* farmers in East Asia

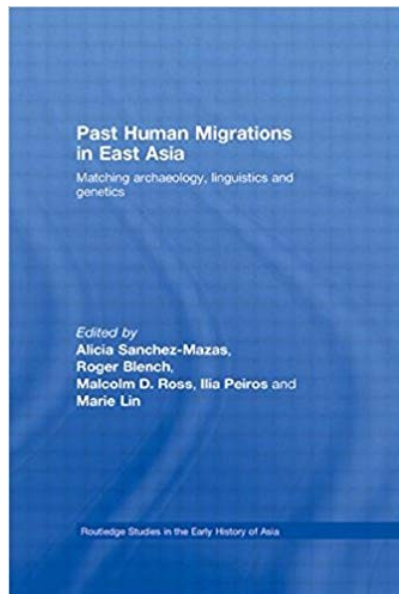
A linguistic and archaeological model

Laurent Sagart

1. The farming/language dispersal hypothesis

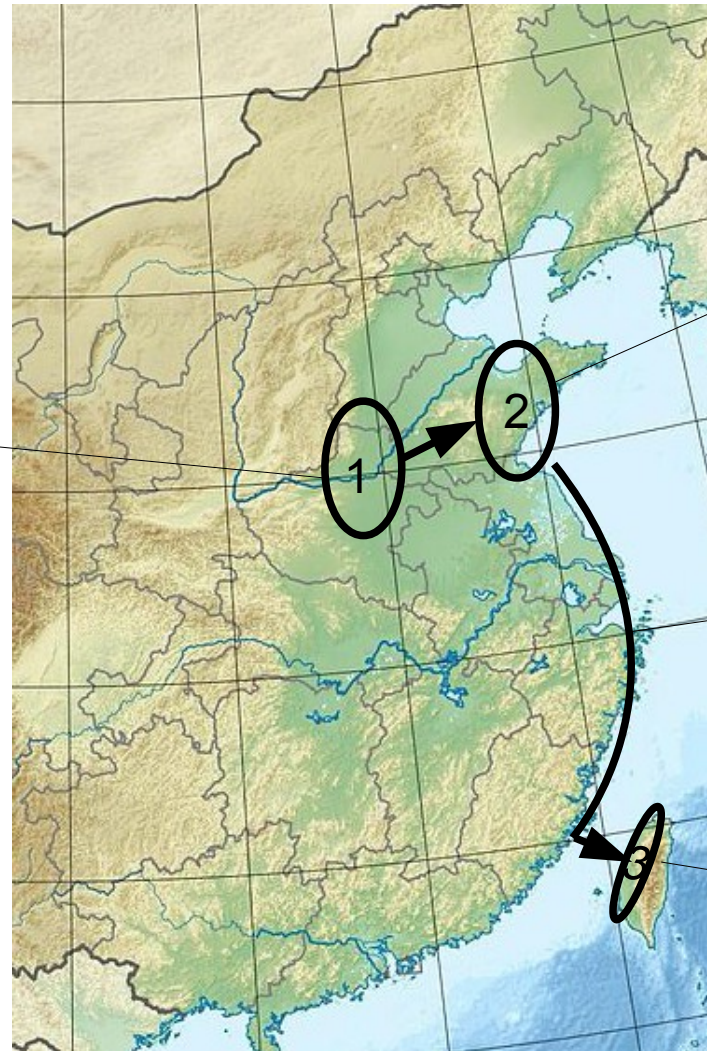
The farming/language dispersal hypothesis (Bellwood 2001; Renfrew 1996; Bellwood and Renfrew 2003) claims that the formation of some of the world's major language families followed from the establishment of sustainable agricultural economies: a resulting increase in population densities led to founding dispersals by populations originally speaking dialects of the same language seeking new agricultural lands; in time these dialects evolved into diversified language families. The farming/language dispersal hypothesis – which should not be taken as an absolutist theory claiming that *all* language families have their origins in an agricultural dispersal, or that all agricultural dispersals result in identifiable families (see Bellwood 2005) – is an attractive explanatory mechanism, because shift to agriculture will normally produce an increase in population densities, because farming populations with expanding demographics and plenty of available land around them will normally expand to occupy this land, and because once-homogeneous languages will normally undergo distance-based linguistic differentiations when spoken over large geographical areas.

Published in: Sanchez-Mazas A., Blench R., Ross M., Peiros I., Lin M., eds. *Past human migrations in East Asia: matching archaeology, linguistics and genetics*, 133-157. Routledge Studies in the Early History of Asia, London: Routledge.



From PSTAN to PAN

PSTAN
Cishan-Peiligang culture
c. 9000-7500 BP



Houli, Beixin,
Dawenkou
cultures
c. 8000-7000 BP

coastal expansion
7000-5500 BP

PAN
Taiwan west coast
5200 BP

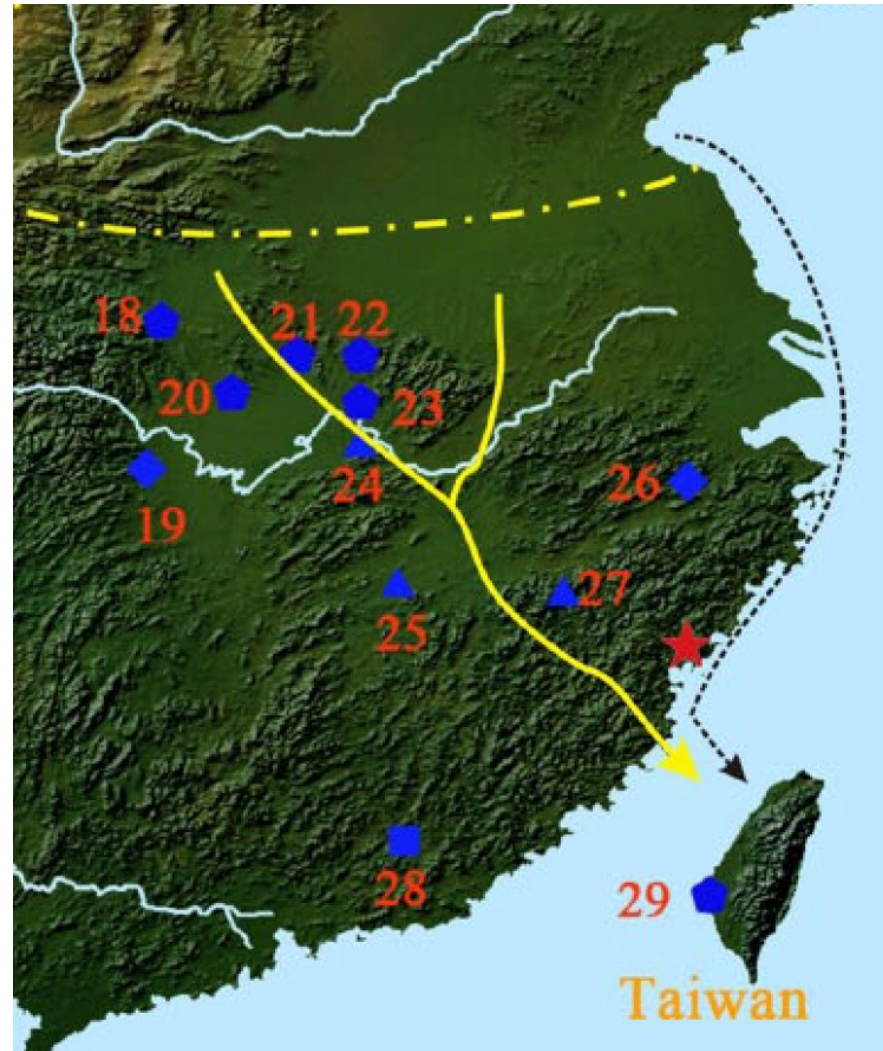
**Chris J Stevens, Charlene Murphy, Rebecca Roberts,
Leilani Lucas, Fabio Silva and Dorian Q Fuller (2016)**

“A strong case for the movement of crops through rapid long-distance migration of small groups is suggested for the [entry of agriculture into Taiwan from Shandong](#), a journey of some 1400 km mostly by sea (see Sagart, 2008; Stevens and Fuller, in press).”

Between China and South Asia: A Middle Asian corridor of crop dispersal and agricultural innovation in the Bronze Age. [The Holocene](#) 1–15, 2016

Deng et al. 2017

Zhenhua Deng, Hsiao-chun Hung, Xuechun Fan, Yunming Huang and Houyuan Lu (2017) The ancient dispersal of millets in southern China: New archaeological evidence. [The Holocene](#), 1-10.



Even Bellwood...

- Bellwood 2017

“But the early Austronesians were not ‘Chinese’ – they did not speak Sinitic languages or have any obvious direct connections with the roots of Chinese culture in the Yellow River Valley (although I should add here that [linguist Laurent Sagart](#) believes there were such connections during the Neolithic, and to me this possibility is extremely interesting).”

Evidence for this scenario

I. Agriculture

- An agriculture based on two millets:

foxtail millet



broomcorn millet



- with rice as a third cereal

early AN agriculture and Shandong agriculture

- the two millets were domesticated in north China: oldest sites belong to Cishan-Peiligang culture (stage 1, PSTAN)
- the Shandong cultures (stage 2) rely on the millets with a little rice
- Nan Kuan Li East (Tainan, 3000-2200 BCE) has all three cereals
- This system still in place today in Taiwan: rice has grown in importance but foxtail millet is central to religion.
- millets absent in or south of the Yangtze before 4000 BCE

II tooth ablation

- ritual ablation of upper lateral incisors
- in young men and women
- generalized in the earliest Formosan neolithic

Source: Pietrusewsky M, Lauer A, Tsang C-h, Li K-t, Douglas MT. 2016. [Tooth ablation in early Neolithic skeletons from Taiwan](#). In Burnett SE, Irish JD, editors. *A World View of (Bio)Culturally Modified Teeth: Past and Present*. Gainesville: University Press Florida.



Han and Nakahashi (1996)

A Comparative Study of Ritual Tooth Ablation in Ancient China and Japan

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Abstract This paper comparatively examines ritual tooth ablation in ancient China and Japan. In China, as far as it is known at present, ritual tooth ablation first appeared among the people of the Shandong-North Jiangsu region, at least 6500 years ago, and then became very popular amongst the people of the Dawenkou culture of coastal China. In Japan, on the other hand, this custom was performed extensively among the people of the Late-Final Jomon period. This results in a time lag in their periods of prevalence of about 2000 years. There are also significant differences in the form of tooth ablation in ancient China and

Yang Shiting (2005)

略论我国古代的拔牙风俗

杨式挺

【摘要】 本文以我国东部及东南沿海各省区考古发现的史前墓葬的拔牙材料为主，结合文献有关“凿齿之民”、东夷与百越的关系，以及百越后裔诸民族有关拔牙的原因，在前人研究成果的基础上，探讨我国拔牙风俗的起源、演变和流传。

【关键词】 古越人；拔牙风俗

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【中图分类号】 C95 **【文献标识码】** A **【文章编号】** 1004- 454X (2005) 03- 0145- 008

Discussion on Custom of Tooth Extraction in Ancient China Yang Shiting

Abstract: The article combines the relation among people of tooth extraction, ancient tribes Dong Yi and Bai Yue in east, with the reason related to the tooth extraction for every minorities descendants of ancient tribes Bai Yue, and makes key research on the materials for tooth extraction found in former ancient graves in coastal provinces and autonomous regions in eastern and southeastern China. Based on the former research achievements, this article also discusses the origin, evolvement and spreading of custom of tooth extraction in our country.

Ritual tooth ablation

- originates in Shandong c. 5000 BCE
- gradually spreads south along coastal route

Han and Nakahashi (1996)

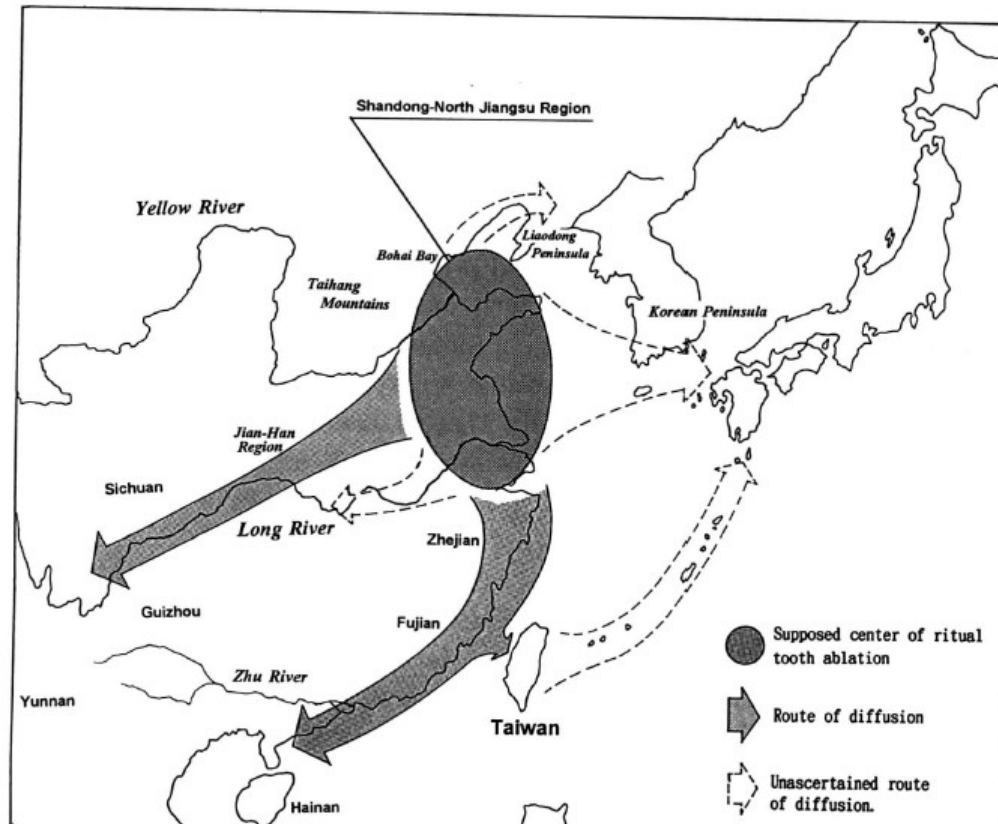
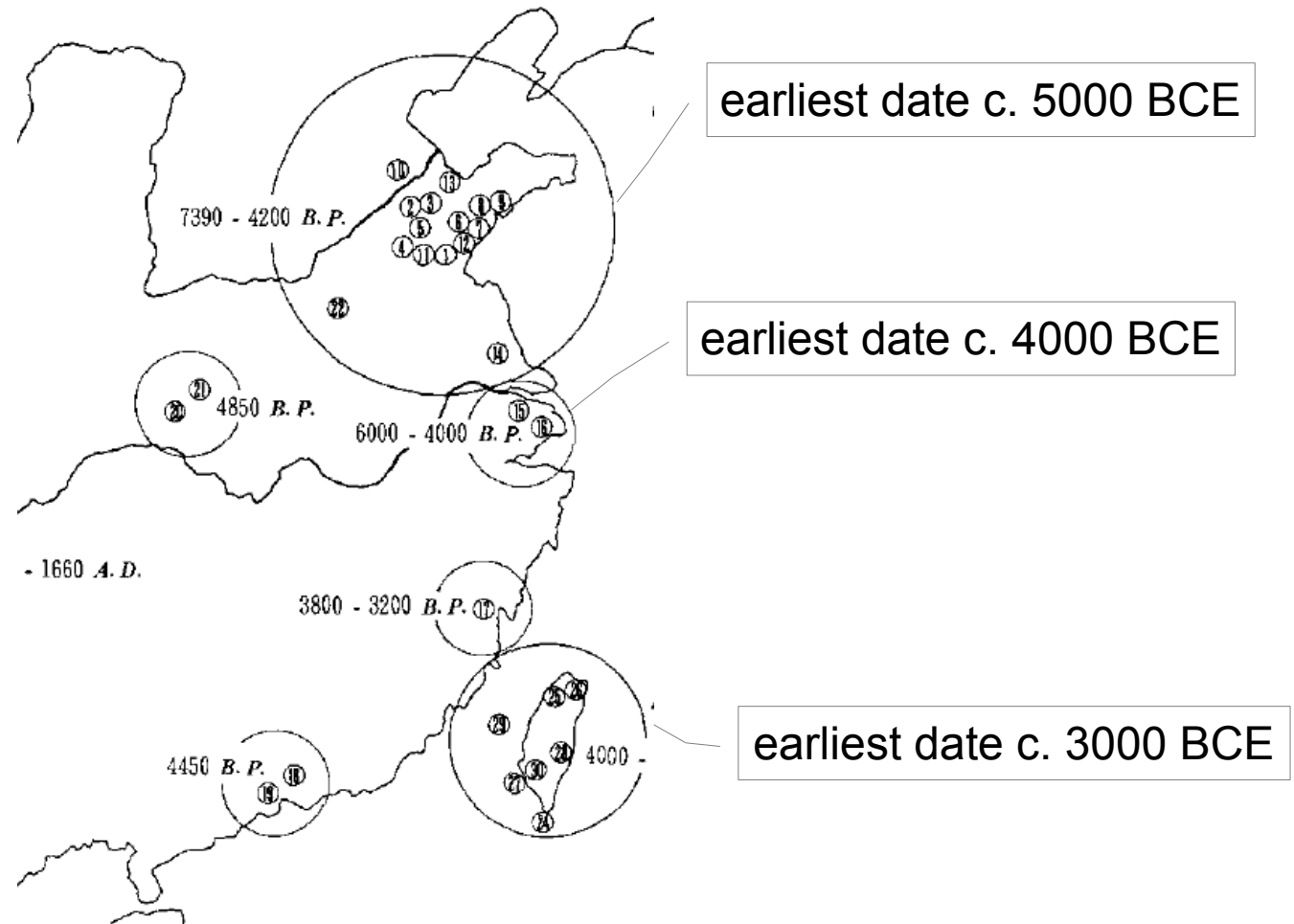


Fig. 2. Supposed geographical spread of ritual tooth ablation.

Han and Nakahashi (1996)



III mtDNA — Ko et al. 2014

Early Austronesians: Into and Out Of Taiwan

Albert Min-Shan Ko,¹ Chung-Yu Chen,² Qiaomei Fu,¹ Frederick Delfin,^{1,3} Mingkun Li,¹ Hung-Lin Chiu,⁴ Mark Stoneking,^{1,*} and Ying-Chin Ko^{5,*}

A Taiwan origin for the expansion of the Austronesian languages and their speakers is well supported by linguistic and archaeological evidence. However, human genetic evidence is more controversial. Until now, there had been no ancient skeletal evidence of a potential Austronesian-speaking ancestor prior to the Taiwan Neolithic ~6,000 years ago, and genetic studies have largely ignored the role of genetic diversity within Taiwan as well as the origins of Formosans. We address these issues via analysis of a complete mitochondrial DNA genome sequence of an ~8,000-year-old skeleton from Liang Island (located between China and Taiwan) and 550 mtDNA genome sequences from 8 aboriginal (highland) Formosan and 4 other Taiwanese groups. We show that the Liangdao Man mtDNA sequence is closest to Formosans, provides a link to southern China, and has the most ancestral haplogroup E sequence found among extant Austronesian speakers. Bayesian phylogenetic analysis allows us to reconstruct a history of early Austronesians arriving in Taiwan in the north ~6,000 years ago, spreading rapidly to the south, and leaving Taiwan ~4,000 years ago to spread throughout Island Southeast Asia, Madagascar, and Oceania.

Introduction

The expansion of the Austronesian language family, one of the world's largest expansions across Island Southeast Asia and Oceania, began in Taiwan.¹ However, genetic evidence has been equivocal, with some mitochondrial DNA (mtDNA) studies showing a minor genetic contribution from Taiwan in extant Austronesian-speaking groups.^{2,3} Moreover, a limited panel of Y chromosome and autosomal STR loci indicate that Taiwan aboriginals are genetically close to the Daic speakers from southern China,^{4,5} but based on contemporary populations it suggests only that they share recent ancestry, because there are no Austronesian speakers in China, and linguistic evidence further argues that the link with Daic speakers may be a result of back migration of south Formosan ancestors.⁶

Crucially, there is a lack of relevant fossil material pertaining to the origin or the genetic diversity of the various groups of aboriginal Formosans, nor has information concerning genetic diversity among the various groups of aboriginal Formosans been incorporated into investigations of the Austronesian expansion. Here, we combine ancient DNA analysis of a relevant skeleton (Liangdao Man; [Figure 1](#)) with complete mtDNA genome sequences from 550 individuals that include 8 aboriginal (highland Formosan) groups to investigate the peopling of Neolithic Taiwan and the origins of the Austronesian expansion.

The Liangdao Man skeletal remains were discovered on the Liang Island of the Matsu archipelago in December 2011 and transported to the Matsu Folklore Museum. Matsu is located on the Min River estuary, 24 km from Fujian and 180 km northwest of Taiwan ([Figure S1](#) available online). It represents one of the shortest crossings

from the mainland into Taiwan. The skeleton is 70% complete and that of a robust male about 160 cm in height. The C14-AMS dating of a thoracic rib yields a date 8,060–8,320 Cal BP (at 95% probability; [Figure S3](#)). The Liangdao Man has a shell mound above it that contains artifacts such as pottery, stone tools, and bone tools. The radiocarbon dates of the shells and charcoal from the layers above the Liangdao Man range from 7,500 to 7,900 years ago (ya), verifying the burial to be from the earliest phase of the shell mound. Thus, both the age and location of Liangdao Man position it at an appropriate time and place to potentially provide insights concerning the early Austronesian expansion into Taiwan as well as a genetic link to southern China.

Material and Methods

Samples

A total of 565 individuals from 12 ethnic groups were recruited in Taiwan from 1998 to 2001. We included eight highland Formosan tribes (Ami, Atayal, Bunun, Paiwan, Puyuma, Rukai, Saisiat, and Tsou) that represent the branches of Blust's linguistic classification⁷ and relate to the Proto-Austronesian, a reconstructed linguistic ancestor ([Figure S18](#)). We included four other groups: Makatao (lowland Formosan), Tao (Orchid Islanders offshore Taiwan), and two Han Taiwanese (Hakka and Minnan, who migrated to Taiwan from Fujian and Guangdong less than 300 ya). The demographic details ([Table S1](#)) and sampling locations in Taiwan ([Figure S1](#)) are provided, as well as the descriptions of the Liangdao Man archeology ([Appendix A](#)). All aboriginal samples were collected at major township centers, and ancestry was ascertained by requiring both parents to be in the same tribe. The ethics committees of the China Medical University, the Taiwan National Health Research Institutes, and the University

The American Journal of
Human Genetics 94, 426–
436, March 6, 2014

split between 6000 and 8000 BC

mtDNA Haplogroup E

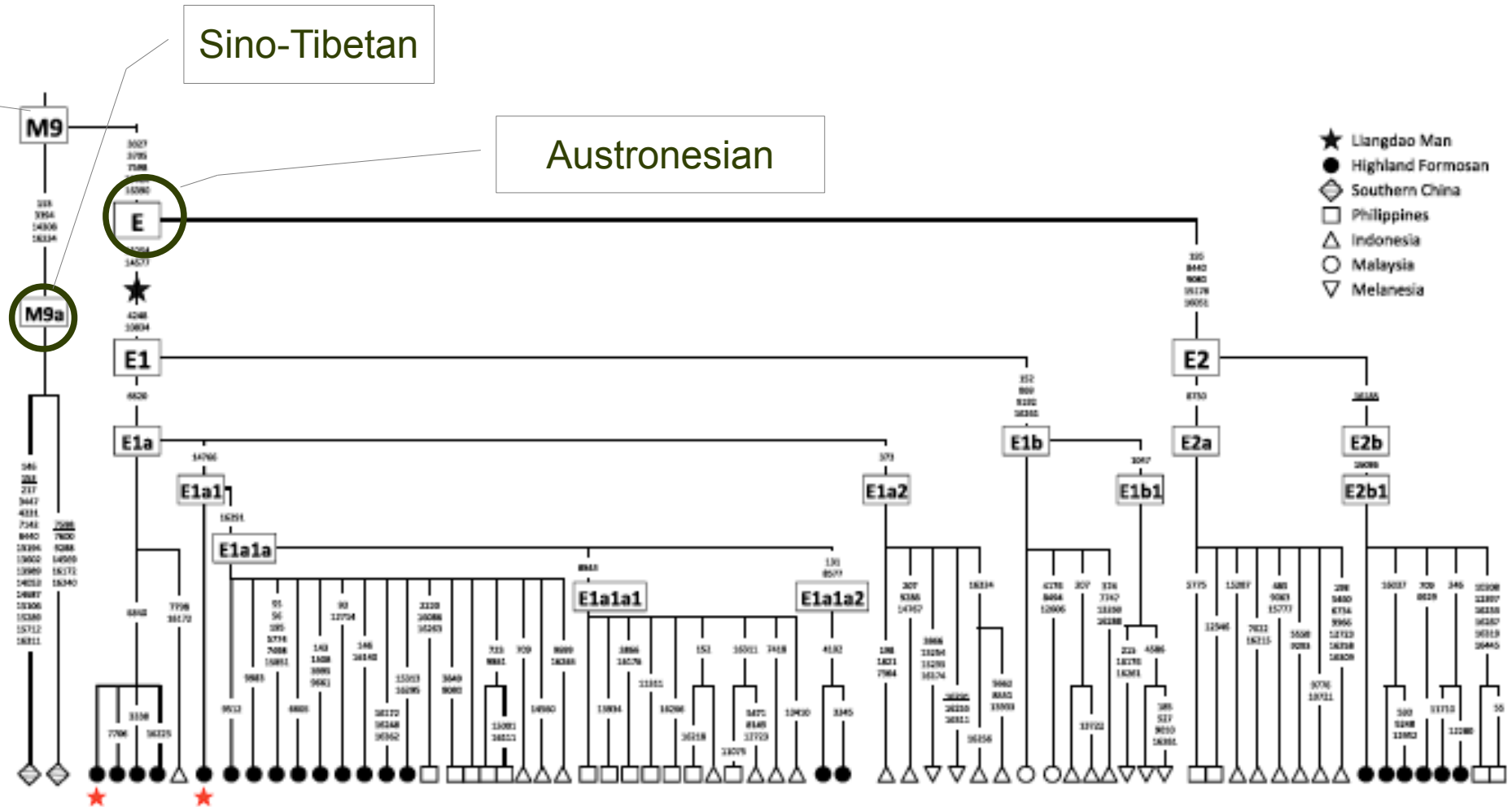
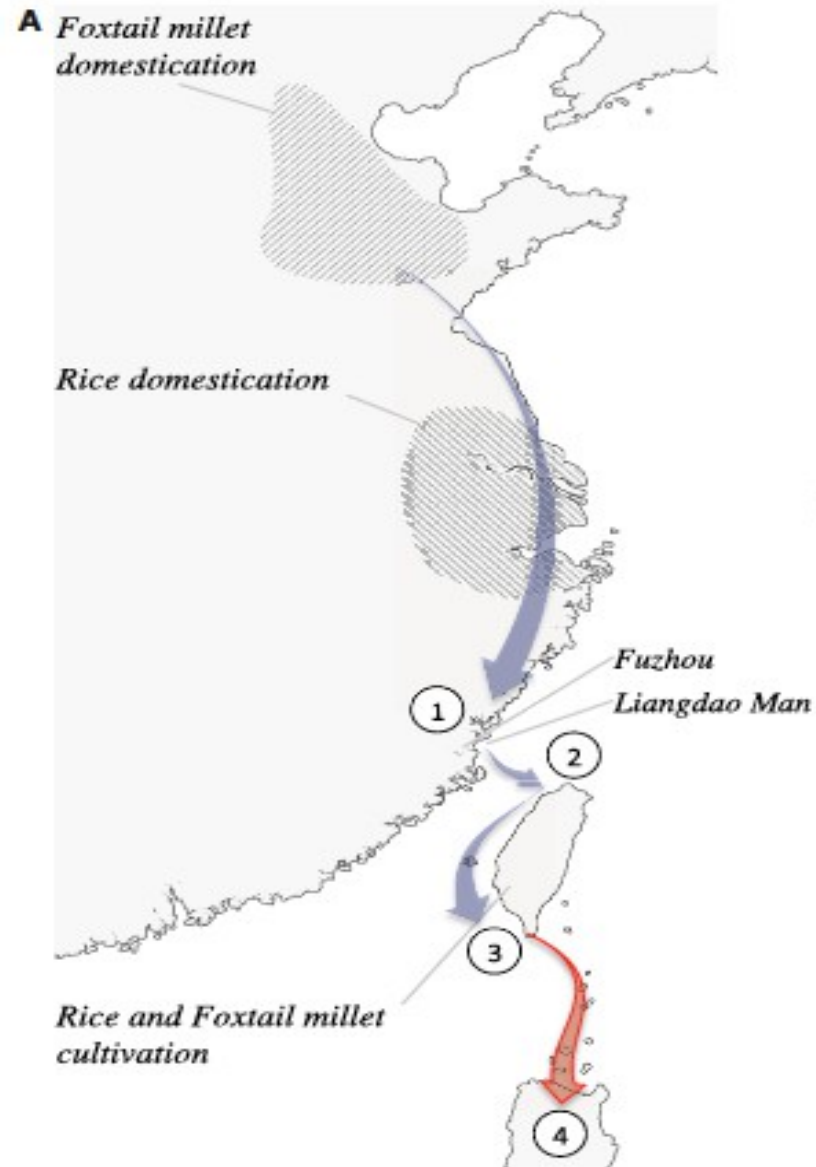


Figure 3. Haplogroup E among Austronesian Speakers Related to the Liangdao Man

migration route suggested by Ko et al. (2014)



IV. Y-chromosome: Wei et al. 2017

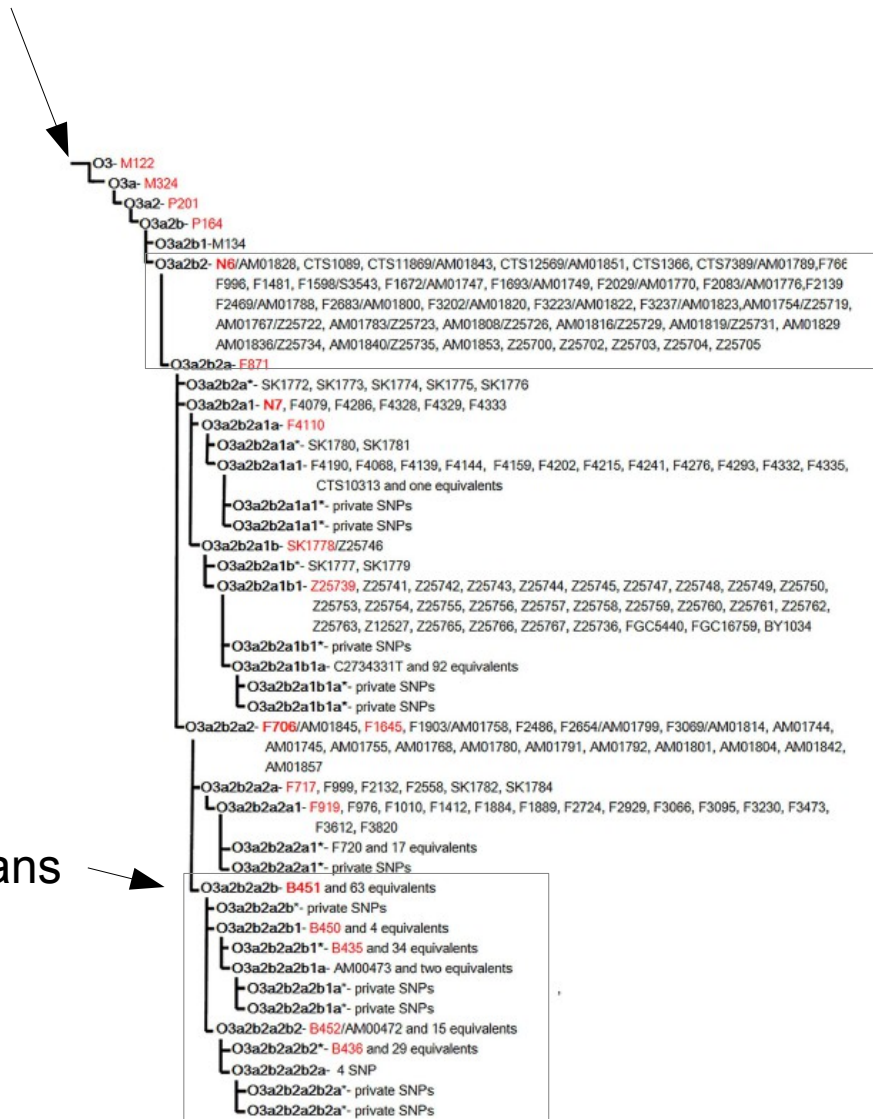


RESEARCH ARTICLE

Phylogeography of Y-chromosome haplogroup O3a2b2-N6 reveals patrilineal traces of Austronesian populations on the eastern coastal regions of Asia

Lan-Hai Wei^{1,2}✉, Shi Yan¹✉, Yik-Ying Teo³, Yun-Zhi Huang¹, Ling-Xiang Wang¹, Ge Yu¹, Woei-Yuh Saw³, Rick Twee-Hee Ong³, Yan Lu⁴, Chao Zhang^{4,5}, Shu-Hua Xu^{4,5,6,7}, Li Jin^{1,7}, Hui Li¹*

Haplogroup M122, predominant among Sino-Tibetans, Hmong-Miensi, Austronesians



distributed along the east coast of China, from Korea to Vietnam

unique to Austronesians

Fig 1. The revised phylogenetic tree of the Y-chromosome haplogroup O3a2b2-N6.

Abstract

Austronesian diffusion is considered one of the greatest dispersals in human history; it led to the peopling of an extremely vast region, ranging from Madagascar in the Indian Ocean to Easter Island in Remote Oceania. The Y-chromosome haplogroup O3a2b*-P164(xM134), a predominant paternal lineage of Austronesian populations, is found at high frequencies in Polynesian populations. However, the internal phylogeny of this haplogroup remains poorly investigated. In this study, we analyzed -seventeen Y-chromosome sequences of haplogroup O3a2b*-P164(xM134) and generated a revised phylogenetic tree of this lineage based on 310 non-private Y-chromosome polymorphisms. We discovered that all available O3a2b*-P164(xM134) samples belong to the newly defined haplogroup O3a2b2-N6 and samples from Austronesian populations belong to the sublineage O3a2b2a2-F706. Additionally, we genotyped a series of Y-chromosome polymorphisms in a large collection of samples from China. We confirmed that the sublineage O3a2b2a2b-B451 is unique to Austronesian populations. We found that O3a2b2-N6 samples are widely distributed on the eastern coastal regions of Asia, from Korea to Vietnam. Furthermore, we propose- that the O3a2b2a2b-B451 lineage represents **a genetic connection between ancestors of Austronesian populations and ancient populations in North China, where foxtail millet was domesticated about 11,000 years ago.** The large number of newly defined Y-chromosome polymorphisms and the revised phylogenetic tree of O3a2b2-N6 will be helpful to explore the origin of proto-Austronesians and the early diffusion process of Austronesian populations.

migration route

The connection of Austronesian-specific O3a2b2a2b-B451 with modern samples from the coastline of North China could explain the appearance of foxtail millet (*S. italica* L. Beauv.) in the Dabenkeng culture in Taiwan. Given that rice is the dominant food crop in South China [18], the appearance of complex foxtail millet planting technology in the Dabenkeng culture in Taiwan suggests a migration of populations from North China along the eastern coastline of Asia [17, 21]. Hence, we deduced that the paternal lineage O3a2b2a2b-B451 may be derived from ancient populations in North China, where foxtail millet was the dominant food crop.

Conclusion

- Convergent evidence from:
 - agricultural archaeology
 - tooth ablation
 - mtDNA, Y chromosome
- the Pre-Austronesians expanded south from Shandong along the East China coast
- before reaching Taiwan c. 3500 BCE.

Thank you for your attention.