Chapter 46

Transeurasian unity from an archaeological perspective

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Abstract

Northeast Asia attracts researchers' attention for its environmental, cultural, linguistic, and genetic diversity. Population migration and cultural contact both go back early in human history there. The Transeurasian (TEA) model hypothesizes about the relatedness among the Mongolic, Tungusic, Turkic, Koreanic, and Japonic languages; also, it sees farming as the driving force for the dispersal of the Proto-Transeurasian across Northeast Asia. In this chapter, I review the finds of millets or rice from key archaeological sites, as well as the perspectives on the beginning of millet or rice farming, in Northeast China, the Russian Far East, the Korean Peninsula, and the Japanese Archipelago. Then, focusing on evidence related to agriculture, I examine some assumptions underlying the TEA model. I conclude that the TEA model has both merits and weaknesses and that archaeological evidence in different regions and periods supports the Transeurasian unity to varying degrees.

Keywords: Northeast China, Proto-Transeurasian, Farming-Language Dispersal Hypothesis (FLDH), Transeurasian (TEA), millet, rice

46.1 Introduction

Using the classical historical-comparative method, Robbeets and colleagues argue that Japonic, Koreanic, Tungusic, Mongolic, and Turkic are genealogically related and that all belong to the Transeurasian language family (e.g., Johanson and Robbeets 2010a: 1–2; Robbeets 2005, 2009b: 262–263). Robbeets further proposes that the five languages above share a common ancestor, namely the Proto-Transeurasian, and that each daughter language split off at different time depths (Robbeets 2017d). To understand when and how the five Transeurasian languages split off from Proto-Transeurasian and reached their present-day locations, Robbeets (2017d; this volume: Chapter 44) turns to the farming/language dispersal hypothesis (hereinafter FLDH) first proposed by Renfrew (1987) and, on the basis of the FLDH, she suggests the Transeurasian model (hereinafter the TEA model). Seeing millet farming as a driving force for the initial dispersal of Proto-Transeurasian, Robbeets (2017a) believes that (1) the early separation among the Transeurasian languages was driven by population growth and expansion resulting from the adoption of millet farming, and (2) that the linguistic split was due to, and further fostered by, human subsistence adaptations.

In addition to millet farming, Robbeets (2017d) proposes that wet-rice agriculture, when introduced from the Shandong-Liaodong peninsulas to the Korean Peninsula and from there to the Japanese Archipelago, should also be a factor in the further split between Proto-Japonic and Proto-Koreanic between 3000 to 4000 BP. The Proto-Koreanic-speaking populations developed into the millet/rice farmers of the Late Chulmun/Early Mumun period between 2000 and 4000 BP while Proto-Japonic people into the Yayoi rice/millet farmers starting from 3000 BP.

According to the TEA model, millet farming was the most important driving force for the initial human and language expansions starting from 8200 BP. By contrast, rice farming as a cause of language and gene dispersal had not become evident until 4000 BP, and it seemed to have influenced the Korean Peninsula and the Japanese Archipelago more strongly than elsewhere in Northeast Asia. If, as Robbeets argues, the Transeurasian languages as a unity owe its dispersal in Northeast Asia to the FLDH, archaeologically it is possible to notice continuity—but more importantly spatial and temporal variations—in agriculture-related material cultures across Northeast Asia. An examination of archaeological millet and rice in this regard would help explore and evaluate the role of farming in the spread of Neolithic and Bronze Age farmers, and their languages as well, in Northeast Asia.

To such an end, this chapter begins with a summary of archaeological millets or rice in four major regions of Northeast Asia—i.e., Northeast China, the Russian Far East, the Korean Peninsula, and the Japanese Archipelago. I draw my attention to the four regions for their geographical proximity, long history of contact with each other, and key geographic locations in the dispersal of Transeurasian languages. While introducing the viewpoints on the beginning of millet or rice farming in each region, I intend to examine the structural pattern underlying Robbeets' TEA model mainly in archaeological and archaeobotanical data, in the hope of analyzing to what degree Northeast Asian archaeology supports the FLDH. By comparing lines of evidence cross-regionally and cross-culturally, I relate the beginning and spread of millet or rice farming to the hypothetical agricultural-driven dispersal of Transeurasian languages and conclude the chapter by commenting on the "fitness" between the two.

46.2 Millet farming in the West Liao River valley of Northeast China

"Northeast China", as used here, refers to the geographical region that encompasses Liaoning, Jilin, and Heilongjiang provinces as well as the eastern part of the Inner Mongolia Autonomous Region of China. This region witnessed the rise and fall of many regional cultures between 2500 and 9000 BP. Some well-known Neolithic cultures are the Xiaohexi (8500–9000 BP), Xinglongwa (7400–8200 BP), Zhaobaogou (6500–7500 BP), Fuhe (7000–7200 BP), Hongshan (5000–6500 BP), and Xiaoheyan (4000–5000 BP) (Sun 2014: 2; Yan 1993). Two successive Bronze

Age cultures that stood out in the region are the Lower Xiajiadian (3200–4000 BP) and the Upper Xiajiadian (2600–3200 BP) (e.g., Chifeng 2011: 22; Li and Gao 1984). The cultures above have their material remains densely distributed within the western part of the Liao River valley (hereinafter the West Liao River valley), which is well known for old remains of domesticated millets. Many scholars agree that the West Liao River valley is one center for the origin of millet agriculture in Northeast Asia (e.g., Guo 2005; Li and Zhang 2004; Liu et al. 2012; Yan 1993; Yuan 2016; Zhao 2004, 2011, 2014). Figure 46.1 shows the location of the Liao River valley in Northeast Asia.

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Figure 46.1 Location of the Liao River valley (indicated by the green line) in Northeast Asia. The yellow shaded area suggests the western part of the Liao River valley (namely the West Liao River valley)

Our knowledge about the Xiaohexi culture is limited due to the few (excavated) sites and the lack of radiocarbon dates (Yang and Liu 2009). Stratigraphy and cross-dating of cultural remains, however, suggest the Xiaohexi have an earlier start date than the Xinglongwa, therefore making Xiaohexi the earliest culture in the West Liao River valley (Sun 2014: 2). Opinions vary among scholars regarding whether the Xiaohexi people were the ancestors of the Xinglongwa people, but researchers generally agree that the two cultures share similarities in house plans, construction techniques, and some artefactual assemblages (Yang and Liu 2009: 6; Sun 2014: 2). At the Xiaohexi site, three semi-subterranean houses, each having a hearth in the central part, were excavated. Unearthed stone tools include hoes, grinding stones, and pestles. Some scholars interpret these tools as an indication of agricultural activities (Suo 2005; Suo and Li 2008). Flotation and identification of archaeobotanical remains at Xiaohexi suggest a predominance of fruits and nuts, with rare domesticated plants (Shelach 2017). Recently, isotope analyses of human bones report that C4 plants (most likely millets) comprised 30% of the Xiaohexi people's diet (Zhang et al. 2017). Consumption of wild C4 grasses alone would not have resulted in such a high proportion in the human diet (Zhang et al. 2017). Thus, it is likely that millet cultivation started in the Xiaohexi period.Compared to the few Xiaohexi sites (44 as recorded by national and regional surveys), there are 110 sites of the Xinglongwa culture, within the Upper West Liao River valley (Sun 2014: 102). A few Xinglongwa sites yield some of the earliest domesticated millets in Northeast Asia. For example, at Xinglonggou, a Middle Xinglongwa village, archaeobotanists collected more than 1400 carbonized broomcorn millet seeds and 60 foxtail millet seeds, all with characteristics of domestication (Zhao 2004, 2014). Some millet grains were radiocarbon dated to 7600 to 7800 years old (Zhao 2011). The excavators also found hoes—outnumbering other tool categories and presumably used for plowing in agricultural production—at Xinglonggou (Inner Mongolian 2004). On the other hand, grinding stones unearthed at Xinglonggou retain starch grains sourced from both wild plants and domesticated millets (Liu et al. 2015). Furthermore, isotope analyses suggest that millets contributed to 60–70% of the Xinglonggou people's diet (Zhang et al. 2017). Other sites with the Xinglongwa cultural remains, such as Baiyinchanghan (7400–7600 BP) and Chahai (7200–7500 BP), also have starch grain evidence on grinding tools, suggesting on-site millet consumption (Tao et al. 2011; Wu et al. 2013). In short, there is clear evidence for the farming of domesticated millets in the Xinglongwa period and millets—even if they were not the single crop—contributed much more to the human diet than before (Liu et al. 2015).

A total of 98 and 38 sites respectively belong to the Zhaobaogou and the Fuhe cultures within the Upper West Liao River valley (Sun 2014: 103–105). The Zhaobaogou and Xinglongwa cultures are similar especially in their spatial extent of cultural materials, settlement patterns, and artefactual assemblages (i.e., Z-motif and geometric patterns on pottery, stone constricted-waist hoes, and jade *jue*-slit rings) (e.g., Chifeng 2011: 101–108; Liu 2001). Therefore, the Zhaobaogou culture succeeded the Xinglongwa culture (e.g., Institute of Archaeology 1997: 216). Unfortunately, there has been no flotation or archaeobotanical studies at sites of the Zhaobaogou culture, and thus no millet grains are known (Xi and Teng 2011). Nor are there published microbotanical (phytoliths and starch grains) or isotope analyses. A good number of stone tools are the only clues to understanding the Zhaobaogou people’s subsistence strategies. At Zhaobaogou, Xiaoshan, Nantaidi, Shuiquan and Baiyinchanghan, the excavators found many hoes, axes, grinding stones, and pestles, all presumably related to food production (e.g., plowing and food processing) (Wang 2006; Xi and Teng 2011). Despite the absence of harvesting tools, many scholars would still believe that there was millet agriculture in the Zhaobaogou period (Liu 2000; Wang 2006). The same can be said of the Fuhe culture.

Beginning in 6500 BP, Hongshan communities emerged in the West Liao River valley, and they later developed into the first chiefly societies in Northeast China. The influence of the Hongshan culture crossed the boundaries of the West Liao River valley and reached in, for example, present-day Jilin and Heilongjiang provinces, as painted pottery (Zhao and Ren 2016) and finely-made jade (Yu 1992) have suggested. The number of sites increased to 967 in the Upper West Liao River valley during this period. Large settlements (centers) were formed, surrounded by many smaller settlements (Chifeng 2011: 109–116; Peterson et al. 2014: 49–69). Additionally, there is a diversity of agricultural tools for plowing, harvesting, and food processing (e.g., cutting, crushing, and grinding) (Xue and Zhang 2011). Macro- and micro-botanical remains suggest millet farming at many Hongshan sites (Sun and Jia 2016). It is a common phenomenon that at Hongshan sites two species of millets—broomcorn and foxtail—were the central cultivated plants (Lu 2009). At Weijiawopu, an Early to Middle Hongshan site, archaeobotanists collected 33 foxtail and 13 broomcorn millets (Sun and Zhao 2013). At Haminmangha, a Late Hongshan (5000–5500 BP) site, archaeobotanists collected 20 foxtail and 615 broomcorn carbonized millet grains (Fu and Sun 2015; Sun, Zhao, and Ji 2016). Isotope analyses reveal that millets contributed to 70% of the human diet in the Early Hongshan while 80% in the Late Hongshan (Zhang et al. 2017). Overall, in Hongshan times millet agriculture was well established and widely practiced at or around occupation sites, sustaining more humans and animals (pigs).

The number of sites decreased to 82 in the Xiaoheyan period (Sun 2014: 106), and the cultural materials correspondingly became rarer. So far, there are no millet remains reported for sites of the Xiaoheyan culture (Sun 2014). However, isotopic reconstructions (Liu et al. 2016) on human bones unearthed at Jiangjialiang, an Early Xiaoheyan site in Yangyuan County of Hebei Province, show that the Early Xiaoheyan people—although living outside of the West Liao River valley—consumed high proportions of C4 plants (millets). Their carbon isotopic values are close to those noticed for populations who consumed millets as the only plant foods in their diet (Liu et al. 2016). In other words, the practice of millet farming continued, and the consumption of millets was high, in the Xiaoheyan period.

The two Bronze Age cultures—the Lower Xiajiadian and the Upper Xiajiadian—created an unprecedentedly large number of sites and material remains in the West Liao River valley. Sites of the Lower Xiajiadian culture numbered 2964 (Sun 2014: 107), and large towns—sometimes heavily fortified—emerged for the first time, in the West Liao River valley (Chifeng 2011: 120). In addition, the distribution of sites shifted southward within and beyond the river valley; pottery shapes and forms suggest strong connections with, and influence from, the Longshan Culture in the Central Plains; stone agricultural tools are abundant; and there are many large storage pits—containing carbonized millets—and domesticated animals (cattle, sheep, pigs, and dogs) (He 1986; Li and Gao 1984). At Dadianzi, a Lower Xiajiadian site, archaeologists unearthed nearly 1000 tombs and found pigs or dogs buried in most of them. Pigs are omnivores, and they eat C4 plants, making them an indicator of (highly developed) millet production (e.g., Li 1987; Liu et al. 2012). At Erdaojingzi, another Lower Xiajiadian site dated to about 4000 BP, broomcorn and foxtail millets account for respectively 16.5% and 72.6% of the 250,419 domesticated plant seeds at this site (Sun et al. 2014). Recent isotope analyses suggest that millets contributed to 100% of the Lower Xiajiadian people’s diet (Zhang et al. 2017).

The Upper Xiajiadian societies also practiced well-developed millet farming with long-term sedentism. Large storage pits with carbonized millets and domesticated animals (60% pigs, 11% dogs, 11% sheep and 11% cattle at the Dashanqian site in Chifeng) indicate that people relied heavily on millet farming (Yuan 2016). However, unlike the Lower Xiajiadian people who relied strongly on agriculture, the Upper Xiajiadian people adopted herding strategies and maintained certain mobility in their lives (e.g., Inner Mongolian and Ningcheng 2008: 461–462). Figure 46.2 shows the sites mentioned in the text, as well as their locations in the Liao River valley.

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Figure 46.2 Sites mentioned in the text and their locations in the Liao River valley

46.3 Millet farming in the Primorye region of the Russian Far East

The Primorye Province, also referred to as “the Primorye region”, is located in the southernmost part of the Russian Far East. It is bordered by two provinces of Northeast China, Heilongjiang, and Jilin, on its east side; Rajin and Sonbong cities of the Democratic People's Republic of Korea (North Korea) on its southernmost tip; and the waters of the Sea of Japan on its west side. The Primorye region has the oldest millets in the Russian Far East, and radiocarbon dating results suggest millet agriculture should have begun in this region as early as some 5000 years ago (Aikens et al. 2009: 230; Kuzmin 2013), in the Zaisanovska culture (a Late Neolithic cultural complex) period.

Direct evidence for millet agriculture in the Primorye region are carbonized millet grains with characteristics of domestication. About ten Late Neolithic to Bronze Age sites in the southern Primorye and one other site in the eastern Primorye have reported such evidence. At Krounovka-1, archaeologists collected 27 broomcorn millet grains—though five of them remain uncertain—and one possible foxtail millet grain (Sergusheva 2008: 187). Radiocarbon dating reports a date of 4640–4670 cal BP for the cultural layer to which the millets above belong. So far, therefore, Krounovka-1 has the oldest millets in the Russian Far East (Kuzmin 2013: 3).

Eight other sites yielded younger domesticated broomcorn or foxtail millets, all dated between 2500 and 4800 BP. Seven of these sites belong to the Zaisanovka culture period (3100–5400 BP) (Zhushchikhovskaya 2006: 113) and one to the

Lidovskaya culture period (2400–3000 BP). From older to younger, these eight sites are: Bogolubovka-1 (one broomcorn millet seed), Sheklyaevo-7 (one broomcorn millet seed), Kirovsky (foxtail millet grains), Gvozdevo-4 (one broomcorn millet grain), Zaisanovka-1 (foxtail millet grains in a small quantity), Novoselishche-4 (broomcorn millet grains), and Rettikhovka-Geologicheskaya (both broomcorn and foxtail millet grains, in large numbers) (Kuzmin 2013; Sergusheva 2008: 194). Recently, at the Risovoe-4 site, also located within the Primorye region, Russian archaeologists collected broomcorn and foxtail millet grains and identified pollens in the soil samples suggestive of millet cultivation. Although radiocarbon dates for Risovoe-4 are not yet available, cross-dating of cultural strata suggest the millet finds might belong to the Late Neolithic to the Early Bronze Age (Sergusheva et al. 2016).

Indirect evidence for millet agriculture in the Primorye region is pollen of cultivated cereals or stone tools supposedly used in agricultural production. For example, pollen of cultivated cereals (*Cerealia*) was present at Zaisanovka-2 (Kuzmin and Chernuk 1995: 483) and Valentin-peresheek (Kuzmin 2013: 5). The strata, from which the pollen was recovered, were dated to 4500–5000 BP and 4200–4400 BP (Kuzmin et al.1998a: 815), respectively. At Boisman-2, with a stratum date of 3710 BP (Kuzmin et al. 1998a: 815), there was a large quantity of *Cerealia* pollen. As for stone tools, Kruhanov once examined stone tools unearthed from the Amur River Basin and the Primorye Province and he, based on functional analysis, argued that millet farming took place in these two regions by the third to the second millennium BC (c.f., Kuzmin et al. 1998b: 681–682). At Zaisanovka-7, archaeologists found handheld plows, hoes, reaping knives and other tools very likely related to agricultural activities (Sergusheva 2008: 194; Sergusheva and Vostretsov 2009: 210; Vostretsov et al. 2015: 221). Neither pollen analysis nor functional analysis of stone tools point out the exact species of domesticated plants. They are most likely broomcorn or foxtail millets, however, according to our current knowledge about farming activities at this period (Kuzmin et al. 1998a: 813; Kuzmin 2008: 6).

In short, two species of millet were the early cultivars in the Russian Far East, and millet farming in this region can be reliably traced back to 4600–4800 BP. Some scholars have gone further and argued for millet agriculture as early as 5000–6000 BP (e.g., Cassidy and Vostretsov 2007; Lee 2011). Whichever dates are more accurate, millet agriculture appeared in the Russian Far East two to three millennia later than in Northeast China.

Currently, scholars acknowledge that millet was not domesticated independently in the Russian Far East but rather introduced from the surrounding regions. The popular idea is that the Russian Far East owes its millet farming to Northeast China (e.g., Cassidy and Vostretsov 2007; Kuzmin 2013; Lee 2011; Sergusheva and Vostretsov 2009). However, questions remain open as to who first brought the millet farming, from where exactly in Northeast China and through which possible ways, to the Russian Far East. While some researchers (e.g., Yaroslav Kuzmin, Personal Communication, July 8th–10th, 2017) consider it impossible to illustrate the routes given the missing data, others have made attempts to this end. For example, Lee (2011) proposed that millets in Northeast China be introduced eastward to the inhabitants of the Zaisanovka culture in the southern Primorye region. Miyamoto (2014), on the other hand, explicitly argues that millet agriculture was introduced to the southern Russian Far East from the upper Mudanjiang River valley. Figure 46.3 shows locations of the sites mentioned in the text.

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Figure 46.3 Sites with millet consumption in the Primorye region of the Russian Far East

46.4 Millet- and rice-farming on the Korean Peninsula

Both broomcorn and foxtail millets were among the plant species first cultivated on the Korean Peninsula (e.g., Lee 2011), but opinions differ among scholars as to when millet agriculture first appeared in Korea. Choe once stated that millet cultivation could be traced back to the second millennium BC at the latest (Choe 1982: 520). Nelson held a similar viewpoint, suggesting that the Korean populations should not have included millet-based farming in their subsistence economy until 3000–4000 BP (cf. Crawford 2006: 16). More recently, many researchers suggest an earlier date—by the latter half of the Middle Chulmun (3500–2200 BC)—for the beginning of millet agriculture on the Korean Peninsula (e.g., Lee 2011; Miyamoto 2014; Norton et al. 1999; Norton 2000; Shin et al. 2012).

While the Middle Chulmun millet cultivation has gained wider acceptance, there is a debate on the intensity and scale of millet cultivation. For instance, Ahn proposes that millet-based field agriculture was already widespread across the Korean Peninsula by the Middle Chulmun (cf., Kim 2015: 15). Crawford, Chen and Nelson, however, suggest only small-scale, or a low level of, plant cultivation during the Chulmun period (Bale 2001; cf., Kim et al. 2015).

Chitam-ni and Namgyung-ni are sites in North Korea well known for old charred millets or stone farming tools (e.g., sickles) (Chard 1960; Norton 2000). Some researchers believe that Chitam-ni has the best preserved, and also the earliest (ca. 4000 BC, determined by pottery chronology and cross-dating), evidence for millet cultivation, given the finding of foxtail and possibly broomcorn millets inside a pot (e.g., Bale 2001; Miyamoto 2014). Others are reluctant to accept it because no radiocarbon dates are available and the species identification may be incorrect (e.g., Crawford 2006: 16).

By contrast, South Korea has more sites with evidence for millet cultivation and consumption. At Neunggok-dong, researchers collected both foxtail and broomcorn millets from the dwelling structures, which are radiocarbon dated to 4740±26 uncal BP (Kim et al. 2015). Archaeologists also collected the two species of millets (foxtail millets radiocarbon dated to 3360 cal BC) in a Chulmun house at Tongsam-dong (Kim et al. 2015; Miyamoto 2014); and they believed that Tongsam-dong people had started cultivating millet on a small scale by the Middle Chulmun (Choe and Bale 2002). Other sites that yielded foxtail or broomcorn millets include Sanchon-ri, a Chulmun site dated to 2920–2200 BC (Choe and Bale 2002; Kim et al. 2015); Pyeonggeo-dong, 4700–5000 BP (Kim et al. 2015; Lee 2011); Oun 1, an Early Mumun site dated to 3610±280 BP (Ahn 2010); Soktal-li dated to 3000 BP (Bale 2001); Asan Shindoshi area I, dated around 5500 BP (Shin et al. 2012); Bibong-ni, a Middle Chulmun site (Shin et al. 2012); and Dunsan (Shin et al. 2012).

How can we explain the beginning of millet agriculture on the Korean Peninsula? Researchers now recognize that the Korean Peninsula is a secondary millet-growing center and the millet farming there has its origin in Northeast China (e.g., Ahn 2010; Crawford and Lee 2003; Lee 2011; Norton 2007; Yan 1993). When and how millet agriculture landed on the Korean Peninsula remains unclear, however. Given the information currently available, there are uncertainties about the dates of millets in North Korea. But, if the dates of Chitam-ni and other North Korean sites (Masan, Namgyong, and Socheon-ni) are acceptable for their millet remains, their seemingly deeper time depth suggests that millet agriculture took place first in the northern part around 4000 BC and then spread to the central-southern Korean Peninsula by 3500 BC (Miyamoto 2014). Regarding the dispersal routes, Choi hypothesizes that millet agriculture came from the Liaodong region to the central-west Korean Peninsula and, from there, spread to the southern Korean Peninsula (cf., Kim 2015: 15). Miyamoto (2014) and Lee (2011) hold a similar point of view but take into consideration the more North Korean millet finds, arguing that millet agriculture, when introduced from the Liaodong Peninsula, first arrived on the northwestern Korean Peninsula and then spread to the southern and eastern parts.

Rice farming was also introduced from China (e.g., Ahn 2010; Choe 1982; Kim 1982; Norton 2000) but it did not seem to land on the Korean Peninsula until the Late Chulmun/Early Mumun (2000–1500 BC) (Ahn 2010). Although the Chulmun rice still awaits further investigation (Ahn 2010), current data suggest that rice and millets were important crops beginning in the Early Mumun (especially in the southern Korean Peninsula), as early as 3500 to 3000 years ago (e.g., Bale 2001; Choe and Bale 2002; Nelson 2008: 44). Other remains and objects—such as dolmens, cist-tombs, and bronze weaponry—also support the more active contact between Korea and North China in the Mumun period (e.g., Norton 2000; Rhee and Choi 1992; Shin et al. 2012).

Rice was first domesticated and cultivated in the Lower Yangtze River valley 9000–10,000 years ago (e.g., Zuo et al. 2017). The most popular hypothesis holds that japonica rice diffused northward from the Yangtze River valley and reached the Shandong Peninsula and, while developing there, spread to Korea (first northern Korea and then central-southern Korea) via the Liaodong Peninsula (e.g., Ahn 2010; Choe 1982; Kim 2003; Nelson 1982). Many scholars have accepted this hypothesis, wholly or partially. However, other routes—wherein, for example, rice was dispersed to southwestern Korea directly from the Yangtze River valley across the sea—may also be possible (e.g., Kim 1982). Figure 46.4 shows locations of the Chitam-ni and other key sites mentioned in the text.

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Figure 46.4 Key sites mentioned in the text and their locations on the Korean Peninsula

46.5 Millet- and rice-farming on the Japanese Archipelago

In Japanese archaeology, the term “millet” can refer to broomcorn and foxtail millets or Japanese barnyard millet (*Echinochloa utilis*). The latter has been an important food source in Japan since ancient times. Some researchers believe that barnyard millet was domesticated independently on the Japanese Archipelago some 4000 to 5000 years ago (e.g., Crawford 2006: 22; Crawford 2008, 2011; Nasu and Momohara 2016; Takase 2009; Yabuno 1987). In prehistoric and historic times, Japanese barnyard millet was cultivated and consumed intensively in northeastern Japan, but its wide presence in other parts of Japan has also been visible (e.g., Takase 2009). Given that Japanese barnyard millet has its history of domestication and cultivation in Japan and that it did not seem to have influenced other regions of Northeast Asia, my discussion on “millet” here is limited to broomcorn and foxtail millets.

Cultigens—in the form of pollen or stone tools—are present at a very few Early Jomon sites dated to 5000–3470 BC (Takase 2009). Notably, the pollen at Ubuka Bog in southwestern Honshu led some researchers to suggest plant husbandry, possibly including millet cultivation, in the Early Jomon (Crawford 2006: 29). However, direct evidence for millet cultivation and consumption—i.e., carbonized grains or microfossils—has never been found for the Early and Middle Jomon periods (e.g., Crawford 2006: 20; Matsui and Kanehara 2006).

By contrast, there is a growing body of both direct and indirect evidence for millet cultivation in the Late to Final Jomon (Late: 2500–1220 BC; Final: 1220–800 BC. For the chronologies in Japanese archaeology, see: Kawashima 2008; Nakao et al. 2016; Rhee et al. 2007; Takase 2009). For instance, foxtail millets, together with Japanese barnyard millets, were found at Usujiri B, dated to 3800–4000 BP (D'Andrea 1995). Also, pollen possibly belonging to millets was reported for the Final Jomon levels (3000 BP) of Ukinuno Pond (D'Andrea 1995). At the Kazahari site in northeastern Japan, one broomcorn and seven foxtail millet grains were recovered from a Final Jomon (ca. 900–800 BC) context. These millet gains are all morphologically domesticated, therefore representing the most unequivocal evidence for millet cultivation at the end of the Final Jomon (e.g., Crawford 2006: 23; D'Andrea 1995; D'Andrea et al. 1995). At Nabatake, a site in northern Kyushu, a single foxtail millet was recovered from the Level 11 of Units CI-CIV. Given the dating results for the levels from which cultigens were unearthed at Nabatake, the foxtail millet is another piece of evidence for millet cultivation at the very end of the Final Jomon (Crawford 2006: 19; Nasu and Momohara 2016). The oldest broomcorn millets, on the other hand, were unearthed from the Ryugasaki A site and dated to 2550±25 uncal BP (Nasu and Momohara 2016).

All in all, it seems possible that broomcorn and foxtail millets were cultivated in southwestern and northeastern Japan, as early as in the second millennium BC (e.g., Crawford 1992: 121). However, not until the end of the Final Jomon or the beginning of the Yayoi did cultivation of the two millets become evident in archaeological evidence. Clearly, in comparison to China, Korea, and the Russian Far East, millets were cultivated late in Japan.

As for rice, a few Final Jomon sites—i.e., Nabatake and Uenoharu, both in southwestern Japan—are reported to have cultivated rice in a dry-field setting back to about 3000 years ago (e.g., Crawford 2006: 18; Takamiya 2001). Beginning in the Yayoi period (Crawford 2006: 17), wet-rice agriculture was practiced in many parts of the Japanese Archipelago. With the wet-rice farming techniques, rice became a staple food on the Japanese Archipelago and contributed significantly to the human diet. Wet-rice agriculture triggered dramatic socio-political and economic changes in many aspects of life on the Japanese Archipelago (Takamiya 2001). Rice and wet-rice agriculture were therefore rooted in the Yayoi culture and distinguished it from the Jomon culture. Direct evidence for the wet-rice agriculture increased significantly, alongside the transition from the Final Jomon to the Yayoi period. For example, by the year of 1968, Okazaki noticed charred rice grains or sherds with rice-hull imprints at more than 100 Yayoi sites. By comparison, only a very few Final Jomon sites were claimed to have consumed rice (Kim 1982). Recently, Nasu and Momohara (2016) examined the rice-related remains in Japan and argued that rice cultivation was introduced to Japan only by the very end of the Final Jomon.

Archaeologists (e.g., Takamiya 2001) proposed three possible routes for the introduction of wet-rice farming to Japan, namely the Northern route, the Yangtze River route, and the Southern route. The Northern route is a land route, assuming that the wet-rice farming left the lower Yangtze River valley, moved north and at some point landed on the Liaodong Peninsula; then, it continued moving eastward, through the Liaodong and Korean peninsulas, and finally landed in southwestern Japan. The Yangtze River route is a sea route by assuming that wet-rice farming left the lower

Yangtze River valley, crossed the sea, and landed on the southern Korean Peninsula; it then moved to Kyushu in southwestern Japan. It is also possible that wet-rice farming left the lower Yangtze River valley and landed on Kyushu directly via seafaring. The Southern route hypothesizes that wet-rice farming left the lower Yangtze River valley, moved south, landed on Taiwan and from there, continued moving north and finally landed on Kyushu. Currently, many researchers consider the Yangtze River route as the most probable; they, however, cannot reject the other two paths (Takamiya 2001). Figure 46.5 shows the key sites mentioned in the text and their locations in Japan.

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Figure 46.5 Key sites mentioned in the text and their locations in Japan

46.6 Assumptions underlying the TEA model examined in archaeological evidence

Robbeets' hypothesis about the dispersal of Transeurasian languages has at its core the idea that, (1) the adoption of millet or rice farming results in population increase, and (2) the farmers, when their population size grows, tend to move into wider territories where they replace the pre-existing hunting-gathering populations including shifts in language and genes (Robbeets 2017a: 211–212). This farming-driven Transeurasian dispersal, or the TEA model, has some assumptions, both general and specific. The farming related finds that I have summarized in previous sections allow for a critical examination of the assumptions underlying the TEA model.

The TEA model (Robbeets 2017a: 211–212) has three general assumptions. It assumes that: first, farming, once adopted, stimulates an increase in populations at the local (and possibly also regional) levels; second, increasing populations result in the dispersal of people (and therefore their genes and languages) into wider territories; and third, the immigrants who are acquainted with farming, even when entering a region where a hunting-gathering population had already existed, will eventually replace those hunter-gatherers.

Taking the number of sites as an indicator for population level, there is a noticeable and consistent population growth, especially after the earliest millet domestication and cultivation appeared, in the Upper West Liao River valley. Stable isotopic analyses (Zhang et al. 2017) suggest that the Xiaohexi people are among the first farmers in the region. From the Xiaohexi to the subsequent Xinglongwa and Zhaobaogou, then to the Hongshan, the number of sites increased from 44 to 110 and 98, then abruptly to 967, in the Upper West Liao River valley (Sun 2014: 102–106). Population growth beginning among the early farming populations is also evident by regional population estimates. For example, in Chifeng of the Upper West Liao River valley, it is estimated that within a survey area of 1234 km^2 the regional population was 100–200 for the Xinglongwa culture period. By contrast, the number increased respectively to 700–1300 and 2300–4600 for the subsequent Zhaobaogou and Hongshan periods (Chifeng 2011: 101–116). Overall, a good, positive correlation seems to have existed between the adoption of millet farming and regional population growth, especially for this particular region and the early populations living there.

Does regional population growth result in the dispersal of people? The spatial variation in the distribution of sites over time may shed some light on this question. As summarized in Sun (2014: 102–106), of the 44 sites of the Xiaohexi culture identified in the Upper West Liao River valley, 40 are located to the south of the Xila Mulun River while only 4 to the north of it. All Xiaohexi sites are located on the loess slope or high terraces, surrounded by mountains and close to the rivers. In the Xinglongwa period, a similar pattern persists with 83 sites located to the south and only 27 to the north, of the river. While loess slopes and high terraces were still favored as locations for occupation sites, river terraces started to attract attention, beginning in this period. Clear evidence for the much wider dispersal of material culture was for the first time noticed in the Hongshan times, which resulted in the formation of a Hongshan culture area of some 300,000 km^2. More Hongshan sites are found to the north of the Xila Mulun river than to the south of it (99 compared to 79), and still 680 sites are found in the Laoha River valley, suggesting not only a higher density of sites but also an overall greater regional population level and a wider spatial distribution of the people. Unlike in previous periods, people in Hongshan times showed a strong interest in the low-lying, flat areas between hills or mountains. Furthermore, Hongshan materials are found well beyond—sometimes hundreds of kilometers away from—the West Liao River valley, as evidenced by jade (Feng 2003; Yu 1992), painted pottery (Zhao and Ren 2016), and stone tools supposedly for agricultural production (Feng 2003). In brief, from the Xiaohexi to the Hongshan, the overall regional population increased and some people spread from a relatively small region to wider territories, ultimately creating a wider culture area.

If, for whatever reasons, people who are acquainted with farming spread to wider territories already occupied by non-farming populations, will they eventually replace those hunter-gatherers (and thus their languages and genes)? Suppose that population migration occurred as speculated and the answer is affirmative, one explanation for that may be that farming populations are technologically superior to hunter-gatherers and once they demonstrated their superiority in, for example, economic production, the farming group will become a dominant population in the region and eventually their languages and genes will replace those of the hunter-gatherers.

Currently, however, it is difficult to find convincing archaeological support for this assumption, in the West Liao River valley in particular or in Northeast China in general. Robbeets (2017d) relates one group of Hongshan people to the speakers of Proto-Altaic and suggests that Proto-Altaic further split into Tungusic and Mongolic-Turkic. If the FLDH holds true for the TEA model, Tungusic came into being as a new daughter language due to the replacement of local hunter-gatherers by immigrants who originally lived in the West Liao River valley and introduced millet farming to the Amur River and neighboring regions. Millet cultivation first began in the southern Primorye of the Russian Far East around 5000 BP (Cassidy and Vostretsov 2007; Kuzmin 2013; Kuzmin et al. 1998a) and it very likely has its origin in Northeast China (Kuzmin 2013; Sergusheva and Vostretsov 2009). In this regard, the introduction of millet farming initially from the West Liao River valley is not unlikely.

However, archaeological evidence suggestive of massive population replacement in pre-Hongshan and Hongshan times is lacking, either in the northeastern part of Northeast China or in southern Primorye. In Northeast China, no conflict or warfare is known for the pre-Hongshan and Hongshan periods; the population levels never reached to the extent that exerted great pressure on the environment; and the climate, rainfall, and temperature—despite their temporal and spatial variations—were overall suitable for millet agriculture (Chifeng 2011). That said, the common conceivable driving factors for population dispersal—conflict and warfare, population pressure, and climate change—were not supported by archaeological data in Northeast China, at least at first glance. On the other hand, without stable isotope data, it is hard to estimate to what degree millet farming contributed to the human diet in the Amur River and surrounding regions. After all, millet finds are very few in this broad area and animal and fish bones suggest a heavy reliance on hunting and fishing (Yuan 2016). In contrast to the assumptions of the TEA model, farming did not replace hunting/gathering and neither did it seem to play an important role in the subsistence economy, in this particular region. To summarize, this last assumption is difficult to prove with current archaeological data. Ancient DNA and isotope analyses may better approach the answer to this question.

A few additional assumptions underlying the TEA model are specific. Some of them can be critically examined by archaeological, archaeobotanical, or paleodietary data. Firstly, the TEA model assumes that the Xinglongwa and Zhaobaogou people were the speakers of the Proto-Transeurasian language (Robbeets 2017d). The TEA model, however, did not take into account the Xiaohexi culture, whose exact dates are not yet available but the cultural remains suggest a start date around 6500–6200 BC or earlier (Sun 2014: 2; Yang and Liu 2009). Stable isotope analyses confirm that the Xiaohexi people were among the earliest millet farmers in the West Liao River valley (Zhang et al. 2017). Furthermore, it is argued that the Xinglongwa culture was developed mainly from the Xiaohexi culture (c.f., Suo 2005). For the reasons above, it seems unwise to completely exclude the Xiaohexi people from the candidate speakers of Proto-Transeurasian.

Secondly, Robbeets refers to the West Liao River valley as the homeland of the Proto-Transeurasian language (Robbeets 2017a: 215–216) because a center of linguistic diversity has characterized the geographic region comprising Inner Mongolia, southern Manchuria, and Korea; and because prehistoric loanwords are detectable in this large region. Archaeological evidence also supports the West Liao

River valley as a good candidate region for the following reasons. First, it is one of the very few areas where human activities were especially intensive since the Holocene, creating nearly a 10,000-year sequence of cultures and leaving very rich material evidence (Sun 2014: 1–2). Second, in both prehistoric and historic times, the peoples in the West Liao River valley made active contact—in the form of cultural diffusion or population migration—with those living elsewhere in Northeast Asia (e.g., Cui et al. 2013; Yan 1993). Their influence on other Northeast Asian populations and cultures was sometimes huge, noticeably in pottery production and use, jade working, metallurgy, burial rites, and farming technologies (Yan 1993). Third, the West Liao River valley is one center for the origin of millet farming (Zhao 2004, 2011) and, as suggested in previous sections, millet farming technologies in the adjacent regions (e.g., the Russian Far East and the Korean Peninsula) owe their origin to the West Liao River valley (Yan 1993). Lastly, beginning in the early Neolithic, the West Liao River valley witnessed regional population growth and dispersal associated with the adoption of millet farming across a wider landscape. In brief, should the speakers of the Proto-Transeurasian language have settled down in Northeast Asia, the West Liao River valley preserves the more convincing evidence for their presence and therefore is the probable homeland of the Proto-Transeurasian.

Thirdly, the TEA model assumes that there is a unilineal development in the West Liao River valley, following the “Xinglongwa—Zhaobaogou—Hongshan—Lower Xiajiadian” sequence. In particular, it sees the cultural sequence as indicators for genetic relationships. Such thinking may be true for some periods and cultures but not for others, however. For example, the TEA model hypothesizes that “through transitional post-Hongshan cultures, Hongshan developed into Lower Xiajiadian” (Robbeets 2017d: 21). There is an l000-year gap between the final Hongshan and the early Lower Xiajiadian, which is usually assigned to the Xiaoheyan culture (4000–5000 BP). The Hongshan and Xiaoheyan cultures share many common features, leading to the conclusion that the majority of the Xiaoheyan culture was developed from the Hongshan culture (and so was its population) (Ma 1996; Zhang 2006; Zhang 1997). By contrast, the Hongshan and the Lower Xiajiadian are very different in their material culture, with, for example, bronze weaponry, painted pottery li-tripods, oracle bone divination, clay molds for casting, and fortified settlements present in the latter but all absent from the former (Guo 2005: 12–20). Scholars differ very much on the relationship between Hongshan/Xiaoheyan and the Lower Xiajiadian. Some (e.g., Guo Dashun) believe that the Lower Xiajiadian was developed mainly from the Hongshan/Xiaoheyan; while others (e.g., Xia Nai) suggest that the Lower Xiajiadian was influenced more strongly by the Longshan culture in the Central Plains (cf., Gao 2008: 22–23). This latter argument receives support from recent ancient DNA analysis (Cui et al. 2013), which reveals migration of people from the Yellow River valley to the West Liao River valley during the Lower Xiajiadian period. Nevertheless, cultural similarities do not translate into close genetic relationships literally and archaeological data alone can hardly address the issue. Genetic relationships between different populations are essential for testing the linguistic structural patterns and should be investigated further by analyses of cultural elements and ancient DNA.

Fourthly, the TEA model suggests (Robbeets 2017d) that speakers of Proto-Japonic-Koreanic lived on the Liaodong Peninsula some 6500 years ago; around 5500 BP, a group of these people moved eastward, landed on the Korean Peninsula and started cultivating millets there; these millet farmers developed into the Proto-Koreanic-speaking population by 4000 BP. Archaeological evidence in support of this assumption mainly lies in four aspects. First, the Liaodong and Korean peninsulas are geographically close, being only about 150 km apart; and they have similar vegetation and environmental settings, simplifying the adoption of a new food production technique (Pearson 1976). Second, millet farming was introduced from the Liaodong Peninsula of Northeast China to Korea, following an inland route (Lee 2011; Miyamoto 2014). Third, millet farming was practiced on the Korean Peninsula no later than 5500 BP and it remained as a regular food strategy ever since (Lee 2011; Norton 2007). And fourth, the Chulmun and Mumun cultures are different in many aspects—e.g., site location, size of dwellings, and artefactual assemblages (Norton 2000; Rhee and Choi 1992). If we accept the Chulmun and Mumun cultures as created by two largely different populations, it is not unreasonable to argue that the Proto-Koreanic-speaking population took shape by 4000 BP. In this assumption, immigrants from China could undoubtedly be the basis for the replacement of the Chulmun by the Mumun. However, current archaeological data do not suffice to prove a significant population movement. Besides, even if future DNA studies suggest large-scale population migration in the Chulmun-Mumun transition, it would still be difficult to conclude a farming-driven population replacement.

Finally, the TEA model assumes (Robbeets 2017d) that the Proto-Japonic-speaking population did not come into being until 3000 BP and that they are hypothetically the rice/millet farmers who landed in southwestern Japan via Korea and created the Yayoi culture. Archaeological evidence is not against this hypothesis, for some reasons. First, the transition from the Late Jomon to the Initial Yayoi took place around 1000 BC (Rhee et al. 2007). Second, the Jomon and Yayoi people created material cultures significantly different from each other and the wet-rice farming helped define the Yayoi people and their culture. Third, millet and rice cultivation began in Japan at approximately the same dates (2500–3000 BP) (Nasu and Momohara 2016; Takamiya 2001; Takase 2009). If we see the Final Jomon and the Initial/Early Yayoi as created by two largely different populations, we will accept the idea more easily that rice and millet farmers of the Yayoi culture are the Proto-Japonic speakers. Nevertheless, the hypothesis awaits confirmation by direct evidence (such as ancient DNA) which supports population migration or replacement in the Jomon-Yayoi transition or suggests genetic admixture between the Final Jomon/Early Yayoi people and the Bronze Age populations on the Shandong Peninsula.

46.7 Concluding remarks

In this chapter, I briefly reviewed the archaeological evidence (mainly finds of millets and rice) and introduced the beginning of millet or rice farming in Northeast China, the Korean Peninsula, the Russian Far East, and the Japanese Archipelago. Overall, the TEA model is appropriate to investigate the four regions above for their linguistic unity. In particular, the TEA model has merits to explain the rise and fall—and also the relatedness—of some most important cultures in Neolithic and Bronze Age Northeast Asia. Indeed, the West Liao River valley is a suitable candidate region for the homeland of the Proto-Transeurasian and the earliest millet farmers in the area are promising speakers of the Proto-Transeurasian language.

Nevertheless, there are uncertainties and limitations in the TEA model. For example, the TEA model assumes that millet farming was the most important driving force for the dispersal of the Proto-Transeurasian language within and beyond the West Liao River valley; and that the people who had knowledge and skills about farming were technologically superior and would have ultimately replaced pre-existing hunter-gatherers. This is not necessarily the case. Taking the split of Proto-

Tungusic from Proto-Altaic as an example, the TEA model assumes that the people who introduced millet farming to the Amur River and neighboring regions later developed into the speakers of Proto-Tungusic. Archaeologically, it is known that millet farming was practiced in present-day Heilongjiang of Northeast China and southern Primorye of the Russian Far East around 5000 BP. However, millet farming seems unlikely to have replaced hunter/gathering because people for thousands of years relied heavily on hunting and fishing in the region. Therefore, the dispersal of farming alone does not explain the formation of Proto-Tungusic.

It is also questionable to take for granted that there were population migrations and sometimes large-scale population replacements in Neolithic and Bronze Age Northeast Asia. It may be true for some regions and periods but not so for others. The splitting of a particular daughter language from Proto-Transeurasian always has the underlying assumption that a group of people migrated into a new region, whether occupied by pre-existing populations or not. However, currently available archaeological data do not suffice to prove a migration of people from one region to another, or to justify the genetic admixture between a farming population and a group of hunter-gatherers. Not until ancient DNA studies are carried out for target regions and cultures will there be a more conclusive answer to the question.

Finally, it is worth pointing out that although farming is a key to the understanding of the dispersal of languages across the landscape, it is not the only one. As pointed out by Norton (2000: 326–327), it is vital to understand the process of “why” because people do not simply begin depending more heavily on agricultural resources and, if they do, there must be a strong motivation for it. Understanding the motives other than farming, should there be any, is therefore crucial to testing the TEA model further.

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