Anatolian farmers in Europe: Migrations and cultural transformation in Early Neolithic period

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Abstract

Humans first started farming and domesticating animals around 9000 B.C. in the Levant and the Central Anatolia. The managing process of different plant and animal species was spreading from the Central Anatolia to Southern and Western Anatolia during 8th millennium BC, and in 7th millennium BC into Southeast Europe by Anatolian farmers. Furthermore, this process appeared in Central Europe in the middle of 6th millennium BC and eventually in north-western Europe in the middle of 4th millennium BC by Anatolian Neolithic farmers. Archaeological evidences as well as ancient DNA studies testify this migrations and cultural exchange of Anatolian farmers which enforced the neolithization in Europe and inevitably changed Europe's face forever. This research is aimed to give a chronological glimpse of that migration and the cultural transformation process from the Central Anatolia to Europe between 9th millennium and 4th millennium BC.

Keywords: Prehistoric migration, Anatolian farmers, Europe

Özet

İnsanlar MÖ 9000 dolaylarında ilk olarak Levant ve Orta Anadolu'da tarım yapmaya ve hayvan evcilleştirmeye başladılar. Farklı bitki ve hayvan türlerinin bu yetiştirme süreci MÖ 8. binyılda Orta Anadolu'dan Güney ve Batı Anadolu'ya ve MÖ 7. binyılda Anadolulu çiftçiler tarafından güneydoğu Avrupa'ya yayılıyordu. Ayrıca, bu süreç MÖ 6. bin yıl ortasında orta Avrupa'da ve MÖ 4. bin yıl ortasında nihayetinde kuzeybatı Avrupa'da ortaya çıktı. Arkeolojik kanıtlar ve eşki DNA araştırmalarıda Avrupa'da Neolitikleşme sürecini güçlendiren ve Avrupa'nın çehresini sonsuza dek değiştiren bu göçler ve kültürel alışverişler tanıklık etmektedir. Bu çalısma MÖ 9. binyıl ve MÖ 4. binyil arasında gerçekleşen bu göç ve kültürel dönüşümler konusunda kronolojik bir bakış açısı getirmeyi amaçlamaktadır.

Anahtar kelimeler: Tarih öncesi göç, Anadolu çiftçiler, Avrupa

Please cite this article as: Siddiq, A. B. (2016). 'Anatolian farmers in Europe: migrations and cultural transformation in Early Neolithic period', In: Kahraman, et al. (eds.) *Proceeding book of 1st International Symposium on Migration and Culture* (Vol. 2): 519-532; Amasya University, ISBN: 978-605-4598-22-9.

Introduction

The beginning of agriculture and animal domestication has fundamentally changed the social system and the relationship of people and their environment around the world. It had all begun in the Early Holocene period in present days Levant (Zeder, 2008; Esin, 1998) and Central Anatolia (Özbaşaran, 2011). The transformation from hunter-gatherer into sedentary Neolithic farming lifestyle was actually occurred locally with an indigenous ecology as well as a gradual process. Moreover, this process took over thousand years to be appeared in most of the human settlements on the continental scale in and around Anatolia. Afterwards, the new Anatolian agricultural communities spread towards north-west direction in Western Anatolia to all across the continental Europe. However, this has taken a long period of more than four thousand years in human history (Özdoğan, 2011). Not only these cultural traits spread, but also the people, who carried along their "hitchiking" traits (Ackland, *et al*. 2007), which can be considered as the most significant migrations for the humanity in the world.

Generally 'demic diffusion' and 'cultural diffusion' are two contrasting views that have received widespread attention in the literature (Lemmen, *et al*. 2011) about the spread of farming and animal domestication from Anatolia to Europe. Demic diffusion is actually the spread of agropastoralism by migrations what has been suggest as one of the earliest hypotheses for explaining the arrival and expansions of Neolithic farming in Europe from Anatolia. On the other hand, the cultural diffusion hypothesis suggests a technological shifting through indigenous adaptations and inventions which was promoted by cultural contact – from Anatolian farmers to indigenous European inhabitants (Price, 2000). However, evidences from archaeological researches and recent genetic studies support 'demic diffusion' more than the 'cultural diffusion' in regards of the spread of Neolithic lifestyle in Europe. It is now wide accepted that there were several waves of migrations of Anatolian farming communities across Eurasia in different stages of the Neolithic as well as Chalcolithic period.

This study deals with the information on the origin of agriculture and animal domestication and the spread of farming from the Central Anatolia to European continent. Besides, this study looks for the nature and the chronological changes of the different stages of Neolithic life-ways across the Anatolian plateau, through which the Neolithic migrations occurred by Anatolian farmers. Evidences from different archaeological settlements of the Central Anatolia, Western Anatolia, Southeastern Europe, Central Europe, west and north-western Europe as well as different archaeogenetic studies are incorporated in this research, aiming to illustrate a chronological picture of prehistoric migrations carried out by the Anatolian farmers into Eurasia.

Origin of agriculture and animal domestication

Sedentism and storage of wild plants were already practiced by the Natufian people (Boyd, 2006) in the Levant between 13000 BC and 11000 BC. However, it is now widely accepted that sedentary farming communities, who were practicing actual agricultural practices and animal herding, emerged in parts of the Fertile Crescent (Bellwood & Oxenham 2008; Bellwood, 2005) and in the Central Anatolia (Özbaşaran, 2009, 2012a; Özdoğan, *et al*. 2012) during the 10^{th} millennium and early 9^{th} millennium calibrated BC. Intensive cultivation, pastoralism and domestication of both plants and animals gradually began during the Younger Dryas and mainly developed in a full scale during the early Holocene (Zeder, 2008; Willcox et al., 2009) primarily in the Fertile Crescent, a mountainous region between the Levantine coast and the Zagros ridge, and in the Central Anatolia, an area between the flanks

of the north Anatolian (Pontic) Mountains in the north and the Taurus Mountains in the south, present days Central Turkey. Although the practice of agriculture and domestication of animals was emerged independently and completely with local process, there were communications and contacts (Gerard & Thissen, 2002; Özbaşaran, 2011) between the Neolithic people in these two regions. However, the spread of farming or alternatively the Neolithic migrations towards continental Europe were encouraged mostly from Central Anatolian Neolithic farming communities.

Neolithic farmers in the Central Anatolia

The Central Anatolian plateau is the place where Agriculture and farming occurred comparatively earlier, in the early phase of Holocene period. There are wide variations in Central Anatolian landscape. This area has very rich michroniches with very wide steppe. Besides, highlands with forested slopes, open steppes, wetlands, and pluvial lakes offered a suitable and biotically diverse environment for the people in this area (Özbaşaran, 2011). Therefore the Early Neolithic (Aceramic Neolithic) communities in the Central Anatolia could start a unique way of lifestyle exploiting their own surroundings and sufficient natural resources around them, which was actually the beginning of the Neolithic in Anatolian plateau. The geology of the Central Anatolia also allowed the people to exploit valuable raw materials (Özbaşaran, 2011) such as obsidian and salt etc. The Central Anatolian plateau mainly includes four basins- The volcanic area of Cappadocia at the eastern end, the Salt Lake (Tuz Golu) basin in the centre, the Konya Plain to the south, and the Beysehir Plain in the eastern part of the Lake District (Atalay, 1995). However, the Konya basin (Konya Ovasi) and the Salt Lake (Tuz Gölü) basin are the two largest basins on the plateau (Apaydin, *et al.* 2011; Spangler, 2014), and both of them are characterized by inland drainage which reinforced the early Neolithic process in the plateau. Archaeological records show that the Neolithic era in Anatolia spanned more than 3,000 years, from around 9500 cal BC to around 6000 cal BC (Baird, 2012b).

There are at least 11 excavated Neolithic settlements (Özbaşaran, 2011) in Central Anatolia display a complete picture about the origin and development of Neolithic way of life in the region and spread towards north-west direction. At least five Central Anatolian Aceramic Neolithic sites e.g. Asikli Höyük, Can Hasan III, Musular, Pinarbasi and Boncuklu Höyük (Baird, 2009, 2012a; Baird, *et al* 2012) show that farming practices were first established in the Central Anatolia by 8300 cal BC or possibly earlier. Moreover, several recent archaeozoological models have proved that animal domestication process also occurred in Central Anatolia by an indigenous occupying process as well as with local ecology and cultural background (Arbuckle, 2014; Buitenhuis, 1996; Baird, 2009, 2014; Baird, *et al.* 2011, 2012; Esin, 1998; Özbaşaran, 2009, 2011, 2012a, 2012b; Özdoğan, 1999; Özdoğan, *et al*. 2012; Peters, *et al*. 2013; Stiner, *et al*. 2014).

Pınarbaşı rock shelter provides the first detailed evidence of Epi-Palaeolithic occupation (Baird, 2012a) as well as the nature of Late Glacial and earliest Holocene environment in the Anatolian Plateau during the second half of the 9th millennium cal. BC. Aşıklı Höyük, a mound site, represents the birth of the Aceramic Neolithic in Central Anatolia dated back to ca. 9,000 cal. BC. Sheep herding and cultivation of wheat took place (Özbaşaran, 2009, 2012b; Stiner, *et al*. 2014) with distinct local characteristics by sedentary village communities of this settlement at least in 8000 cal. BC. During 9th millennium BC, Central Anatolian Neolithic people started to make entirely mud brick house with communication and activity space on the roofs. This type of housing was first emerged in Aşıklı Höyük (Özbaşaran, 2011) and spread all across the Neolithic settlements in Central Anatolia. Boncuklu Höyük is

a mound site which shows the transition from hunter-gatherer-foragers to agriculturalists in Central Anatolia. Mammal species found in Boncuklu Höyük were hunted and they exploited a mosaic of habitats including wetlands, grasslands and woodlands during the half of 9th millennium BC (Baird, 2009; Baird, *et al*. 2012). Boncuklu Höyük, like as Aşıklı Höyük, also has the evidence of very early crop cultivation in Central Anatolia. It is a small settlement mound dating between ca. 8300 and 7500 cal BC (Baird, *et al*. 2012) before the emergence of pottery Neolithic. The excavators suggest that the Boncuklu community consisted of indigenous foragers who adopted small-scale cultivation and possibly experimented with animal herding alongside substantial traditional foraging practices. Neolithic people of Can Hasan III were also made mud houses with flat roofs and roof entrances and they were also lived on both hunting and farming like other Aceramic Neolithic settlements in the region. Ceramic Neolithic and fully farming village were wide spread in Central Anatolia during seventh millennium BC. Settlements like Çatalhöyük, Tepecik-Çiftlik, Erba and Köşk Höyük comprised with completely farming communities (Özbaşaran, 2011) with fully domestic crops and animals. However, the remains of wild animals and wild plants clarify that these farming communities were still practicing hunting and gathering.

People both Aceramic and Ceramic Neolithic settlements in Central Anatolia consumed domesticated and wild plants such as einkorn and emmer wheat, durum wheat, hulled and naked barley, pea, lentil, rye, different types of herbs, walnut, hackberry, wild grape etc. as well as animals like sheep, goats, red deer, roe deer, equids, pigs and small animals like hares, tortoises, snakes, birds, rodents etc. They were also hunted different species of birds and fish. They maintained regional and inter-regional interactions (Gerard & Thissen, 2002) as well as regular contact with each other and the neighbouring communities, especially with the Neolithic communities in the Fertile Crescent, probably via the exchange of materials (Özbaşaran, 2011) like obsidian, salt as well as other raw materials. The remodelled skulls and pressure flaked cores from Köşk Höyük (Öztan, 2012), blades made by pressure technique from Tepecik-Çiftlik (Bıcakci, *et al.* 2012), and the presence of east Anatolian obsidian at Çatalhöyük (Özbaşaran, 2011) are also the witness of this idea.

However, there was a major change and abandonment in Neolithic settlements in all across of Central Anatolia. Evidences at Çatalhöyük (Level VI) as well as other settlements show that the majority of the settlements in the Central Anatolia were abandoned and there was notable population decries around the middle of the 7th millennium BC (Özbaşaran, 2011). This change probably forced or encouraged the Central Anatolian Neolithic farmers for very big waves of migrations towards Northwest Anatolia, Western Anatolia as well as Southeast Europe.

Farming in Western Anatolia

The Aceramic sites discovered to date in the Central Anatolia show that there were waves of Neolithic immigrants coming from the Central Anatolian plateau to Western Anatolia as early as the late Aceramic Neolithic period (Özdogan, 1999). Consequently, farming spread west of Central Anatolian region in 8000 cal BC; and between middle of 7th millennium BC and 6000 BC, farming communities spread all across the Aegean coast and northwest Anatolia.

Archaeological settlements in Northwestern Anatolia or the Marmara region such as Fikirtepe, Pendik, Ilpınar, Menteşe, Demircihöyük, Aktopraklık, Barcın Höyük, Asapı Pinar etc. show significant information about the Neolithic life of this region (Özdoğan, 2011) as well as on the migrations of Central Anatolian farmers into Western Anatolia during mid-7th Millennium BC. Hacılar, Höyücek and Bademapacı are also considered as very notable

Neolithic sites in the Western Anatolia, which are also, support this idea. On the Aegean coast of Western Anatolia, a number of sites show detail picture about the Neolithic life. Hoca Çesme, Ulucak Höyük, Yeşilova Höyük, Ege Gübre, Çukuriçi Höyük and Dedecik-Heybelitepe are particularly important among them.

Radiocarbon dates from Menteşe shows the beginning of the Neolithic in the Marmara region shortly after 6450 cal. BC (Özdoğan, 2011). One of the prominent Neolithic sites, Ulucak Höyük in the Izmir region, also provided a coherent chronological sequence starting at about 6450 cal. BC (Brami & Heyd, 2011). Current other archaeological excavations in the region also suggest that farming spread into west Anatolia by the early seventh millennium cal BC, and shortly after 6450 cal. BC or maybe earlier, almost all across of Western Anatolia were settled by Neolithic farmers.

Western Anatolian Neolithic are mostly pottery Neolithic. This area also stands between areas of primary and secondary Neolithic migrations, e.g. Central and Northwest Anatolia to Southeast Europe. There were full scale regional and inter-regional communications, trade, as well as cultural exchange in Western Anatolian farming communities. Moreover, there were continuous and rapid migrations towards northwest direction. The widespread shifts in the settlement occupation and changes in material practice at the end of Aceramic Neolithic in the Northern Levant as well as in the Central Anatolia provide a clue that repeated migrations from the Central Anatolian plateau, and further on from the Levant, spread farming to Europe, most probably in the second half of the 7th millennium BC. Western Anatolia was used as the bridge of these repeated migrations. Current excavations conducted along the Aegean coast of Turkey and in the broader Marmara region also testify this idea and provide the link of the spread of farming to Southeast Europe.

Migrations of Anatolian farmers into Southeast Europe

The beginning of the Neolithic in Europe is defined by the time of the first appearance of agricultural communities (Milisauskas, 2002) dated back to 7000 to 5500 BC in Southeast Europe. Radiocarbon dates as well as different pottery remains demonstrate various dynamic interactions between Neolithic communities in Western Anatolia and Eastern Europe in the second half of the 7th Millennium BC. Ancient DNA studies of domestic animals also confirm these cultural interactions and the spread of farming (Haak, *et al*. 2010; Larson, *et al*. 2007; Fernandez, *et al*. 2006; Beja-Pereira, *et al*. 2006; Götherström, *et al*. 2005; Brudford, *et al*. 2003) from Anatolia to Europe. Over the past 10–15 years, several archaeological excavations carried out in numerous Neolithic sites in the Aegean coast of Turkey, in the Marmara region and in Thrace region. Ulucak, Hoca Çesme, Aşağı Pinar, Aktopraklık and many other sites show that there was a big wave of migrations and cultural transformations by Neolithic farmers in Western Anatolia into Southeastern Europe. It is now widely accepted that these Early Neolithic farmers in Europe were the Anatolian Neolithic emigrants.

These emigrants (Early Neolithic farmers) in Europe were living in small-scale societies without any centralized political or economic organization. Members of these societies were not ranked in permanent hierarchies. Communities may rarely have exceeded 250 people. People were probably linked by kin relations and they were egalitarian as well as their status was based on age, gender, personal talents, achievements etc. (Milisauskas, 2002). It was hypothesised that Early Neolithic communities in Greece and the Balkans shared a common ancestry with the Neolithic people in Western Anatolia. Surprisingly, current archaeological excavations in Western Anatolian region confirm this link, and provide a more complex and

accurate picture of the spread of farming from Western Anatolia to Southeast Europe (Brami & Heyd, 2011).

Older level of Asağı Pinar, which is located near the Bulgarian border, shows the evidence of human culture related to Pre-Karanovo culture in Southeast Europe and similar to human culture in Fikirtepe of Marmara region. However the younger levels of Asağı Pinar represent the typical characteristics of the Karanovo culture of Bulgaria (Özdoğan, 2011). This evidence of Asağı Pinar suggests a gradual cultural transmission and migrations of Anatolian Farmers into Southern Europe.

Anatolian farmers were migrating into Europe by three main gateways: the Bosporus, the Dardanelles and the Aegean islands (Brami & Heyd, 2011), most probably in the seventh millennium BC. Obsidian remains from Franchthi caves in Argolis (Perles, 2001) and Cyclops caves in Youra (Sampson, 1998) suggest that people crossed Aegean Sea even earlier, in Mesolithic period. However, Aceramic Neolithic or the Pre-pottery Neolithic settlements are not present on European side of Aegean Sea. They are only found on the Anatolian mainland so far. Pottery Neolithic sites appeared more or less simultaneously shortly after 6450 cal. BC on both sides of the Aegean. Domesticated animals and plants were very much involved (McGrail, 2001) in these early migrations across the Aegean. Subsequently, Neolithic farmers inhabited the Southern Balkans, north of the Aegean, inland Thrace and Macedonia in a second step after around 6100 cal. BC. A big wave of emigrations and rapid expansion of agropastoralism actually occurred between 6200 and 6000 BC, and this transformed the entire Balkan region. By 5750 BC, the new subsistence mode has reached the north-western and the easternmost coasts of the Black Sea (Lemmen, et al 2011).

Archaeological evidences suggest that Neolithic farming and migrations were occurring through Northern Anatolia and South-western Anatolia by two independent processes: 1. north-western expansion of Neolithic culture to the Marmara region; and 2. westward expansion of the Neolithic culture to the Aegean coast of Turkey (Brami & Heyd, 2011) which eventually resulted the emergence of Neolithic in Europe. One group of Anatolian farmers were spreading wattle and daub architecture, practices with figurines, pressure-flaking technology, large blades, arrow points, bone hooks and spoons, celts and pottery technology into Europe while they were emigrating in Balkan areas. Another group were spreading mudbrick architecture, sling missiles, pintaderas, steatopygious figurines, ear studs as well as fine red slipped pottery technology while they were migrating into Greece. However, these two Neolithic traditions by two Anatolian Neolithic farming groups were probably merged into each other over time (Brami & Heyd, 2011). These farmer groups were mainly Central Anatolian migrant farmers who were lately settled across western Anatolian. Surprisingly, recent genetic researches indicate that the Central Anatolian Aceramic Neolithic farmers belong to the same gene pool with the first Neolithic migrants (Kilinc, *et al*. 2016) who were the early farmers in Southeast Europe.

Anatolian farmers in Central Europe

A millennium after agriculture was first introduced to Greece and the southern Balkans and half a millennium after its introduction to the northern Balkans, farmers first farmed on the Hungarian Plain near Budapest (Bogucki & Crabtree, 2003). Archaeological evidences illustrate a rapid expansion of farming and herding in the middle of sixth millennium BC from Eastern Europe into the south coast of the Iberian Peninsula around 5500 BC. By the 5400 BC, the Neolithic farmers had emigrated and settled in a vast land from southern Germany to the Ukraine. At 4750 BC, the Neolithic farmers reached the Baltic Sea and they

expanded agropastoralism eastward. Farming and herding have reached the south coast of France and the north coast of Portugal by 4500 BC (Lemmen, *et al*. 2011). It is estimated that the Neolithic farmers were spreading from central Europe to northwest Europe at a rate of 3.5 to 5 kilometres per year (Bogucki & Crabtree, 2003).

The Neolithic farmers established a new way of life in Central Europe and formed a new socio-cultural system which is called the 'Linear band keramik' (LBK) culture. Radiocarbon dates as well as different similarities with Early Neolithic material culture suggest that this culture was originated and spread from the northern Balkans (e.g. Körös) farming settlements in around 5700 BC who were actually the migrated Anatolian farmers. Within a period of seven to eight hundred years, these people had spread through most of central Europe, into Bohemia, Moravia, Slovakia, southern Poland, parts of the Ukraine, Moldavia, northern Romania, Lower Austria, Germany, Alsace, the Dutch Limburg, Belgium, the Aisne Valley, and the Paris basin, and eventually up to the boundary of the North European Plain (Bogucki & Crabtree, 2003). They brought with them new practices not seen earlier in these areas, including agriculture and stock rearing, construction of large and permanent houses, and the production of pottery. They are also called as 'Longhouse people' because of their massive timber longhouses, usually several meters wide and tens of meters in length (Bogucki & Crabtree, 2003).

These farmers were self-sufficient migrants. They had domesticated animals e.g. cattle, sheep, goats, pigs, dogs etc. and agricultural crops e.g. emmer, einkorn, wheat, peas, vetch, flax etc. They were socially connected with their close neighbours and had ties over distances of hundreds of kilometres. They even had trade with the Black Sea and Aegean Sea regions. Some of these settlements acquired their whole flint supply sometimes even from over 200 kilometres (Bogucki & Crabtree, 2003).

Recent mitochondrial DNA (mtDNA) sequences from late European hunter-gatherers (dated back to 11000 BC) with sequences from early farmers (dated back to 5500 BC), as well as with sequences from modern Europeans confirm that Central and northern Europe's first farmers were immigrants (Bramanti, *et al*. 2009) and they had barely any ancestral ties to the modern population. Moreover, they were not related to the previously settled hunter-gatherers in Europe. Instead, they belonged to an immigrant population from southeastern Europe, and eventually from Anatolia. These Anatolian farmers immigrated into Central Europe about 5500 BC, and they settled in central European vast area without mixing with local hunter-gatherers.

Farming in north and north-western Europe

The wider expansion of agropastoralism started around 8500 cal BC, approximately 1000 years after the first appearance of domesticated cereals in the Levant (Lemmen, *et al*. 2011). However, the first clear evidence for emigrants or colonists farmers was found on Cyprus (Peltenburg, *et al*. 2000; Colledge, *et al*. 2004; Willcox, 2005); and the expansion of farming and herding culture ended after 4000 cal BC with the emergence of Neolithic settlements in the British isles and throughout northern Europe (Sheridan, 2007; Whittle, 2007). Though the expansion of farmers into the British Isles and Circum-Baltic area was actually occurring slowly between 5000 BC and 3500 BC, farming communities were fully spread and emigrated in British Isles and other North-Western Europe in 3500 to 3000 BC (Collard, *et al*. 2010; Larsson & Debert, 2013; Milisauskas, 2002) which is considered as the Late Neolithic in Europe. Eventually all of continental Europe has converted to farming as the predominant subsistence system by 3500 BC (Lemmen, *et al*. 2011) by migrants.

Discussion

In the early Holocene period, Neolithic way of life was started due to a favourable climate condition. In that time Central Anatolia were perfect place for different animal herds as well as different types of wild grains. These three privileges, e.g. favourable climate, abundant animal species, and plentiful collectable grains were actually encouraged human groups to live permanently in the Central Anatolia. Gradually humans started to domestic animals like sheep, goats, pigs and lately cattle (Larson, *et al*. 2007; Zeder, 2008). They as well domesticated some staple grains such as wheat, barley, rye, lentils, peas (Willcox, 2005) which eventually supported and secured their regular food supply. Consequently, the food security helped human groups to increase their population, so as they could more invest effort in Agriculture in a rapid rate. This Neolithization occurred in a gradual process. However, there were some climate fluctuations and crises periods (Dolukhanov, 1973; Weninger, *et al*. 2009; Gronenborn, 2009) after the emergence farming. People were forced to migrate into some other places, and it was also very necessary for human groups to move from one location to the other to get food as well as for escaping conflicts, which resulted the Neolithic migrations as well as spread of domestic animals (Coward, *et al*. 2008; Dobney, *et al*. 2013) and agricultural practice from Central Anatolia to north-western direction.

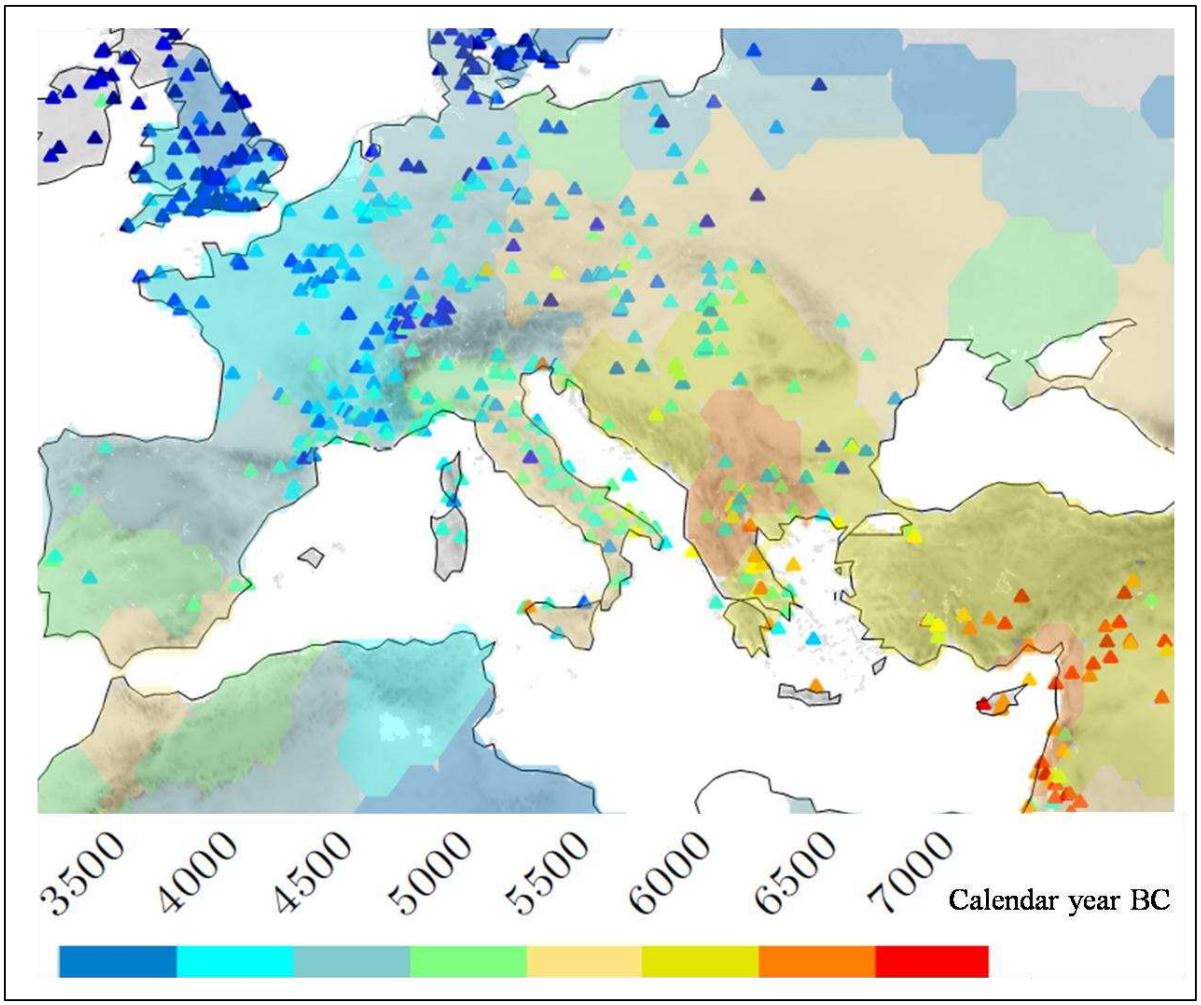

Fig 1: Prehistoric migrations of Anatolian farmers and Neolithic transition from Central Anatolia to north-western Europe (after Lemmen, *et al*. 2011).

Farming started in the Central Anatolian human groups at least 8500 BC (Gerard & Thissen, 2002) and it took around 1500 years to develop full scale farming when farming became the basic means of subsistence in human settlements in Central Anatolia in around 7000 BC. Central Anatolian Neolithic farmers were expanding their farming practices and occupying new areas since the beginning of agriculture, mainly towards north-west and Western Anatolian direction. By 7000 BC, when in was in a mature form in Central Anatolia, farming arrived in Western Anatolia and whole Western Anatolia was occupied by Neolithic farmers within a thousand years.

Anatolian farmers were further expanding their farming activities north-westwards and eventually they reached in Aegean islands and mainland Greece by 6600 BC, and in Balkan areas around 6300 BC. It is also possible that early migrations already occurred in European forest area before and during the seventh millennium and were undertaken by hunter-gatherers or mixed hunter-gatherer horticulturalists from Anatolia (Gronenborn, 2011). Genetic research suggests that Central Anatolian farmers belonged to the same gene pool with early European farmers (Burger & Thomas, 2011; Haak, *et al*. 2010; Kilinc, *et al*. 2016), which confirm the idea about the migrations of the Central Anatolian farmers at least in Neolithic period. Moreover, genetic affinities between later Anatolian farmers and fourth to third millennium BC Chalcolithic south European population also suggest an additional wave of Anatolian migrants (Kilinc, *et al*. 2016). In this process, prehistoric farming population from the Central Anatolian plateau made several waves of migrations in European continent and eventually reached up to west Eurasia.

Anatolian farmers did not mix their culture with the previously settled Mesolithic hunter-gatherer population in their early stage of emigrations in Europe. Rather they gradually pushed the hunter-gatherer forest people towards the continental margins. Archaeogenetic studies have shown the existence of two distinct Mesolithic hunter-gatherer gene pools in west Eurasia: hunter-gatherers ranging from Iberia to Scandinavia and to the Urals; and hunter-gatherers from the Caucasus (Lazaridis, *et al*. 2014; Skoglund, *et al*. 2014). However, recent genetic studies on human skeletons from Central Anatolian Early Neolithic settlements such as Boncuklu Hoyuk, Tepecik-Ciftlik, Northwest Anatolian Neolithic and Chalcolithic settlements such as Barcın, Mentesxe, and Kumtepe, as well as human skeletons from Europe's early and middle Neolithic settlements show that there is no genetic relationship of these Neolithic farmers with the indigenous hunter-gatherers (Kilinc, *et al*. 2016; Szecsenyi-Nagy, *et al*. 2014) from western and eastern Europe, Sweden, and also the hunter-gatherers in the Caucasus.

Significantly genetic studies also show that the genomes of Aceramic and Pottery Neolithic populations in the Central Anatolia belonged to the same group as north-western Neolithic Anatolians as well as the first European farmers of Southeastern Europe (Haak, *et al*. 2010; Kilinc, *et al*. 2016) and the Neolithic farmers in Central Europe as well as north-western Europe. Radiocarbon dates from archaeological sites in north-western Europe also support this result (Collard, 2010). However, Anatolian farmers probably interacted with those hunter-gatherers gradually in the later period. Human skeletons of the Chalcolithic site Remedello from northern Italy also share strong genetic affinity with the human skeletons of Kumtepe in Western Anatolia (Kilinc, *et al*. 2016). It is now thought by archaeological evidence and genetic studies that there were further migrations and cultural exchange in the 4^{th} millennium BC by Anatolian farmers.

Conclusion

Migrations were all behind the spread of agropastoralism into Europe. It was Anatolian farmers, mainly from Central Anatolian plateau, who migrated towards the north-western relatively densely vegetated and thick forest areas, and introduced farming and animal domestication. They established a new way of life which was totally unknown to previously settled hunter-gatherers. They gradually expanded, transformed the landscape and ultimately changed the face of a vast continental area which is now called Europe. There were not only one but several waves of migrations from Anatolia to continental Europe. These migrations were gradual and there are evidences of counter-migrations by which farmers were also returning back from Europe to Anatolia. Moreover, there were regional, inter-regional contacts and trade activities which helped to establish new culture in that new land.

The idea of cultural exchange or cultural diffusion is sometimes brought to explain European Neolithic transition. However, genetic researches confirm that there was no admixture with previously settled hunter-foragers in Europe for a very long period. Cultural exchange and admixture occurred in around 4th millennium BC when Anatolian agricultural communities completely settled down in Europe with a period of over 2000 years. Thus, it is very acceptable that there were only migrations of in the beginning of European Neolithic, and by this demic diffusion, Anatolian farmers independently established a new way of agropastoral life in European continent.

References

Ackland, G. J., Signitzer, M., Stratford, K. & Cohen, M. H. (2007) 'Cultural Hitchhiking on the Wave of Advance of Beneficial Technologies', *PNAS* 104 (21): 8714–8719.

Apaydin, H., Anli, A. S. & Ozturk, F. (2011) 'Evaluation of topographical and geographical effects on some climatic parameters in the Central Anatolia Region of Turkey', *International Journal of Climatology* 31: 1264-1279.

Arbuckle, B. S. (2014) "Pace and process in the emergence of animal husbandry in Neolithic Southwest Asia", *Bioarchaeology of the Near East* 8: 53–81.

Atalay, I. (1995) *Türkiye Bölgesel Coğrafyası*, Ankara, İnkılap Kitabevi.

Baird, D. (2014) 'Origins of caprine herding', *PNAS;* Vol. 111, No. 24, pp.8702–8703.

Baird, D. (2012b) 'The Late Epipaleolithic, Neolithic, and Chalcolithic of the Anatolian Plateau, 13,000–4000 BC', in Potts, D. (ed.) *A Companion to the Archaeology of the Ancient Near East*, Wiley-Blackwell: 431–466.

Baird, D. (2012a) "Pınarbaşı: From Epi-Paleolithic Camp-Site to Sedentarising Village in Central Anatolia", in: Özdoğan, M., Başgelen, N. and Kuniholm, P. (eds.) *The Neolithic in Turkey*, Vol 3 (Central Turkey), pp. 181-218, Archaeology and Art Publications, Istanbul.

Baird, D. (2009) "The Boncuklu Project: Investigating the Beginnings of Agriculture, Sedentism and Herding in Central Anatolia", *Anatolian Archaeology* 15, 9-10.

Baird, D., Fairbairn, A., Martin, L., Middleton, C. (2012) "The Boncuklu Project: The Origings of Sedentism, Cultivation and Heerding in Central Anatolia", in: Özdoğan, M., Başgelen, N. and Kuniholm, P. (eds.) *The Neolithic in Turkey*, Vol 3 (Central Turkey), pp. 219-244, Archaeology and Art Publications, Istanbul.

Baird, D., Yousef, O. B., Baysal, A., Fairbairn, A. (2011) "The First Farmers of Central Anatolia: the Boncuklu Project", *Heritage Turkey* 1, British Institute, Ankara, 15-16.

Bellwood, P. & Oxenham, M. (2008) 'The expansions of farming societies and the role of the Neolithic demographic transition', In: Bocquet-Appel, J. & Bar-Yosef, O. (eds.), *The Neolithic Demographic: Transition and its consequences*, Springer: 13-34.

Bellwood, P. (2005) *First Farmers: The Origins of Agricultural Societies*, Blackwell Publishers.

Beja-Pereira, A. et al (27 authors) (2006) 'The origin of European cattle: evidence from modern and ancient DNA', *PNAS* 103 (21): 8113-8118.

Bogucki, P. & Crabtree, P. J. (eds.) (2003) *Ancient Europe*, Vol. I (the Mesolithic to copper age), Charles Scribners & Sons; p. 259.

Boyd, B. (2006) "On 'sedentism' in the Later Epipalaeolithic (Natufian) Levant", *World Archaeology* 38 (2): 164–178.

Bıcakci, E., Godon, M. & Cakan, Y. G. (2012) 'Tepecik-Ciftlik', In: Ozdogan, M., Basgelen, N. and Kuniholm, P. (eds.) *The Neolithic in Turkey: New Excavations and New Research*, Vol. 3, Central Turkey, Archaeology and Art Publications: 89–134.

Brami, M. & Heyd, V. 2011) 'The origins of Europe's first farmers: The role of Hacılar and Western Anatolia, fifty years on', *Praehistorische Zeitschrift* 86 (2): 165–206.

Bramanti, B. et al. (17 authors) (2009) 'Genetic discontinuity between local hunter-gatherers and Central Europe's first farmers', *Science* 326:137-140.

Brudford, M. W., Bradley, D. G. & Luikart, G. (2003) 'DNA Markers reveal the Complexity of Livestock Domestication', *Nature Rev*. 4: 900-910.

Buitenhuis, H. (1996) 'Archaeozoology of Holocene in Anatolia: A review', *Arc.metry* 94: 411- 442.

Burger, J. & Thomas, M. G. (2011) "The Palaeopopulationgenetics of Humans, Cattle and Dairying in Neolithic Europe", In: Pinhasi, R. & Stock, J. T. (ed.) *Human Bioarchaeology of the Transition to Agriculture,* John Wiley & Sons, Ltd.

Colledge, S., Conolly, J. & Shennan, S. (2004) 'Archaeobotanical evidence for the spread of farming in the eastern Mediterranean', *Current Anthropology* 45: S35–S58.

Collard, M., Edinborough, K., Shennan, S. & Thomas, M. G. (2010) 'Radiocarbon evidence indicates that migrants introduced farming to Britain', *J. of Arc. Sci.* 37: 866–870.

Coward, F., Shennan, S., Colledge, S., Conolly, J. & Collard, M. (2008) 'The spread of Neolithic plant economies from the Near East to northwest Europe: A phylogenetic analysis', *Journal of Archaeological Science* 35: 42-56.

Dobney, K., Colledge, S., Conolly, J., Manning, K., Peters, J. and Shennan, S. (2013) 'Origins and Spread of Stock-Keeping', in: Colledge, S., Conolly, J., Dobney, K., Manning, K. and Shennan, S. (ed.) *The Origins and Spread of Domestic Animals in Southwest Asia and Europe*, 17-26, Left Coast Press.

Dolukhanov, P. (1973) 'The Neolithisation of Europe: a chronological and ecological approach', In: Renfrew, C. (ed.), *The explanation of cultural change, Duckworth*, Gloucester, United Kingdom: 329-342.

Esin, U. (1998) 'Hunted Animals at Aşıklı and the Environment', In: Anreiter, P. *et al*. (ed.) *Man and the Animal World: Studies in Archaeozoology, Archaeology, Anthropology and Palaeolinguistics in Memoriam Sándor Bökönyi*; 215-226.

Fernández, H., Hughes, S., Vigne, J.-D., Helmer, D., Hodgins, G., Miquel, C., Hänni, C., Luikart, G. & Taberlet, P. (2006) 'Divergent mtDNA lineages of goats in an Early Neolithic site, far from the initial domestication areas', *PNAS* 103 (42): 15375-15379.

Gerard, F. & Thissen, L. (ed.) (2002) *The Neolithic of Central Anatolia: Internal development and external relations during the 9th-6th millennium BC*; Proceeding of the International CANeW Table Ronde, Istanbul, 23-24 November 2001. Ege Yayınları, İstanbul.

Götherström, A., Anderung. C., Hellborg, L., Elburg, R., Smith. C., Bradley, D. G. & Ellegren, H. (2005) 'Cattle domestication in the Near East was followed by hybridization with aurochs bulls in Europe', *Proc. Royal Soc*. 272: 2345-2350.

Gronenborn, D. (2009) 'Climate fluctuations and trajectories to complexity in the Neolithic: towards a theory', *Documenta Praehistorica* 36: 97-110.

Gronenborn, D., (2011) 'Neolithic western temperate and central Europe', In: Cummings, V., Jordan, P., Zvelebil, M. (eds.), *Oxford Handbook of the Archaeology and Anthropology of Hunter Gatherers*, Vol. in press. Oxford University Press.

Haak, W. et al (with 17 other authors) (2010) 'Ancient DNA from European early Neolithic farmers reveals their Near Eastern affinities', *PLoS Biol*. 8, e1000536.

Kilinc, G. M. et al (27 authors) (2016) 'The Demographic Development of the First Farmers in Anatolia', *Current Biology* 26: 1-8.

Larsson, M. & Debert, J. (eds.) (2013) *Noth-West Europe in Transition – The Early Neolithic in Britain and South Sweden*, BAR International Series 2475, Archaeopress.

Larson, G. et al. (19 authors) (2007) 'Ancient DNA, pig domestication, and the spread of the Neolithic into Europe', *PNAS* 104 (39): 152-176.

Lazaridis, I., Patterson, N., Mittnik, A., Renaud, G., Mallick, S., Kirsanow, K., Sudmant, P. H., Schraiber, J. G., Castellano, S. & Lipson, M., et al. (2014) 'Ancient human genomes suggest three ancestral populations for present-day Europeans', *Nature* 513: 409-413.

Lemmen, C., Gronenborn, D. & Wirtz, K. W. (2011) 'A simulation of the Neolithic transition in Western Eurasia', *J. of Archaeological Science* 38 (12): 3459-3470.

McGrail, S. (2001) *Boats of the World: From the Stone Ageto Medieval Times*, Oxford Univ. Press.

Milisauskas, S. (2002) 'Early Neolithic the First Farmers in Europe, 7000–5500/5000 BC', In: Milisauskas, S. (ed.) *European Prehistory*, Springer: 143-192.

Özbaşaran, M. (2012b) 'Aşıklı', In: Özdoğan, M., Başgelen, N. and Kuniholm, P. (eds.) *The Neolithic in Turkey*, Vol 3 (Central Turkey), pp. 135-158, Archaeology and Art Publications, Istanbul.

Özbaşaran, M. (2012a) 'Aşıklı: The Earliest Sedentary Community of Central Anatolia', *Actual Archaeology*, 74-89.

Özbaşaran, M. (2011) 'The Neolithic on the Plateau', in S. Steadmann & G. McMahon (ed.) *The Oxford Handbook of Ancient Anatolia: (10.000-323 B.C.E.);* Oxford University Press, 99-124.

Özbaşaran, M. (2009) 'Aşıklı Höyük: The oldest settlement of Cappadocia', *Kapad. Bakış* 4: 34-41.

Özdoğan, M. (2011) 'Archaeological Evidence on the Westward Expansion of Farming Communities from Eastern Anatolia to the Aegean and the Balkans', *Cur. Anth.logy*, 52 (4): S415-S430.

Özdoğan, M. (1999) 'Northwestern Turkey: Neolithic Cultures in between the Balkans and Anatolia', In: Özdoğan, M. and Basgelen, N. (eds). *Neolithic in Turkey: The Cradle of Civilization*, Ancient Anatolians Civilizations Series 3, Istanbul: 203-224.

Özdoğan, M., Başgelen, N. and Kuniholm, P. (eds.) (2012) *The Neolithic in Turkey*, Vol 4 (Western Turkey), Archaeology and Art Publications, Istanbul.

Öztan, A. (2012) 'Köşk Höyük: A Neolithic Settlement in Niğde-Bor Plateau', in: Özdoğan, M., Başgelen, N. and Kuniholm, P. (eds.) *The Neolithic in Turkey*, Vol 3 (Central Turkey), Archaeology and Art Publications, Istanbul.

Peltenburg, E., Colledge, S., Croft, P., Jackson, A., McCartney, C., Murray, M. A., (2000) 'Agro-pastoralist colonization of Cyprus in the 10th millennium BP: initial assessments', *Antiquity* 74, 844-853.

Perles, C. (2001) *The Early Neolithic in Greece*, Cambridge Univ. Press.

Peters, J., Buitenhuis, H., Grupe, G., Schmidt, K. & Pöllath, N. (2013) 'The long and winding road: Ungulate exploitation and domestication in Early Neolithic Anatolia (10000-7000 cal bc)', In: Colledge, S., Conolly, J., Dobney, K., Manning, K. & Shennan, S. (Eds.), *The Origins and Spread of Domestic Animals in Southwest Asia and Europe*: 83-114. Left Coast Press.

Price, T. D. (ed.) (2000) *Europe's First Farmers*; Cambridge University Press.

Sampson, A. (1998) 'The Neolithic and Mesolithic occupation of the Cave of Cyclope, Youra Alonnessos, Greece', *Annu. British School Athens* 93: 1-22.

Skoglund, P., Malmstrom, H., Omrak, A., Raghavan, M., Valdiosera, C., Gunther, T., Hall, P., Tambets, K., Parik, J., Sjogren, K. G., et al. (2014) 'Genomic diversity and

admixture differs for Stone-Age Scandinavian foragers and farmers', *Science* 344: 747-750.

Spangler, J. (2014) 'Anatolian Plateau', in McColl, R.W (eds.) *Encyclopedia of World Geography*, V. 01, Infobase Publishing. pp. 31-32.

Stiner, M. C., Buıtenhuıs, H., Duru, G., Kuhn, S. L., Mentzer, S., Munro, N. D., Pöllath, N., Quade, J., Tsartsıdou, G. and Özbaşaran, M. (2014) 'A Forager-Herder Trade-Off, from Broad-Spectrum Hunting to Sheep Management at Aşıklı Höyük, Turkey', *PNAS* 111/23: 8404-8409.

Szecsenyi-Nagy, A. et al (28 authors) (2014) 'Tracing the genetic origin of Europe's first farmers reveals insights into their social organization', bioRxiv preprint first posted online Sep. 3, 2014; doi: http://dx.doi.org/10.1101/008664.

Weninger, B. et al. (19 authors) (2009) 'The impact of rapid climate change on prehistoric societies during the Holocene in the eastern Mediterranean', *Doc. Praehist.* 902 (4-5): 551-583.

Whittle, A. (2007) 'The temporality of transformation: dating the early development of the southern British Neolithic', In: *Proceedings of the British Academy* 144: 377-398.

Willcox, G. (2005) 'The distribution, natural habitats and availability of wild cereals in relation to their domestication in the near east: multiple events, multiple centres', *Vegetation History and Archaeobotany* 14 (4): 534-541.

Willcox, G., Buxo, R. & Herveux, L. (2009) 'Late Pleistocene and early Holocene climate and the beginnings of cultivation in northern Syria', *Holocene* 1 (1): 151-158.

Zeder, M. (2008) "Domestication and early agriculture in the Mediterranean basin: origins, diffusion, and impact", *PNAS 105*: 11597–11604.