



ADAM MICKIEWICZ
UNIVERSITY
POZNAŃ



Treasures of Time

Research of the Faculty of Archaeology
of Adam Mickiewicz University in Poznań



Location of the main research areas.
Numbering, compare the table of Contents.



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Mirosław, Greater Poland Voivodeship, site 37. Part of the burial equipment.
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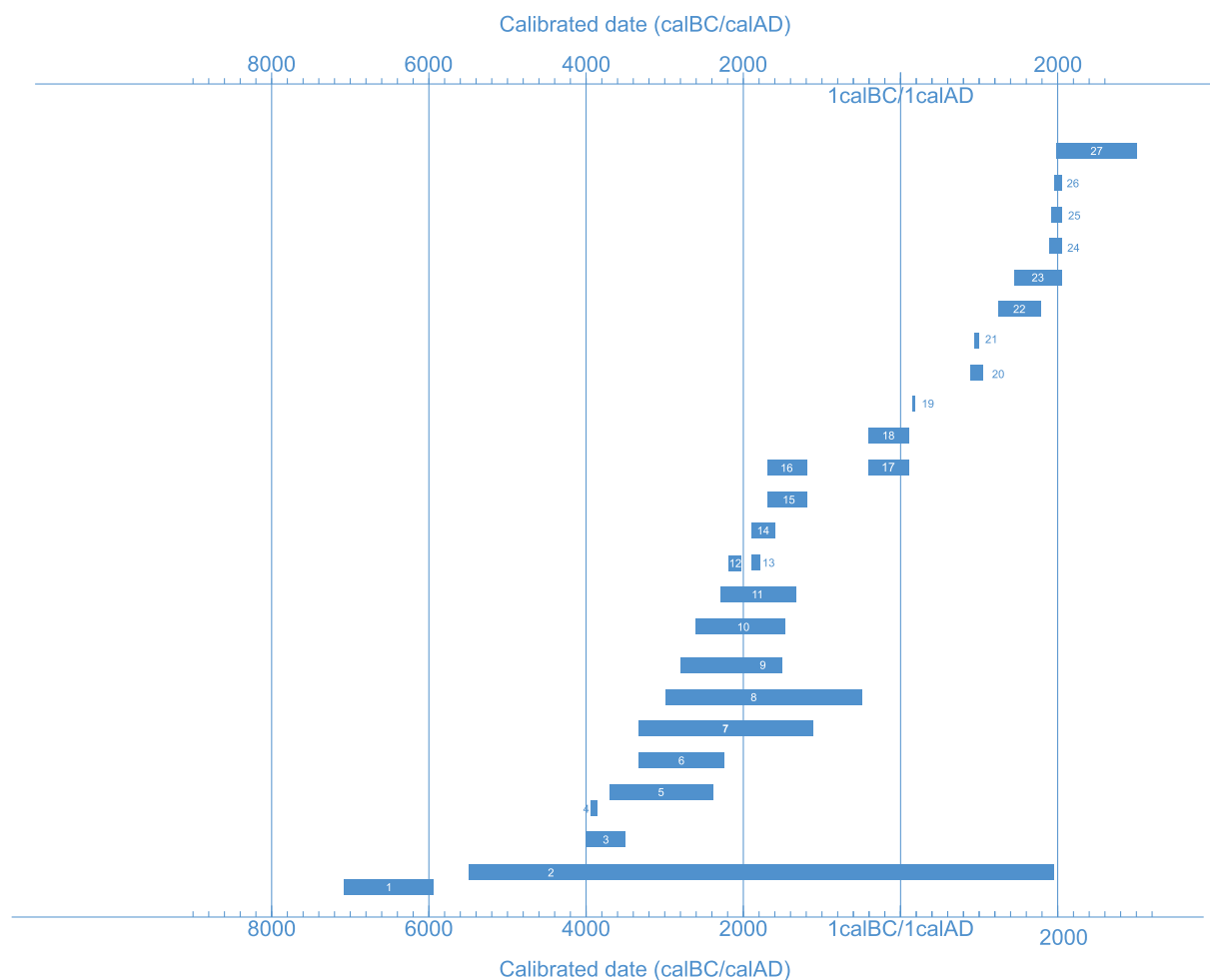
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Treasures of Time: Research of the Faculty of Archaeology of Adam Mickiewicz University in Poznań

Introduction

In 2019, archaeology at the Adam Mickiewicz University in Poznań celebrated its honourable 100th anniversary! The establishment of archaeology at this university was associated with the strong influence of the authority of Prof. Józef Kostrzewski and a succession of eminent scholars, many of whom we today call Masters.

The year 2019 was a real breakthrough. We started the second century of existence within the Alma Mater Posnaniensis with a new structural independence and quality that the academic archaeology of Poznań had not yet known for its one hundred years of existence. This change, the formation of the first Polish Faculty of Archaeology, has opened new chances and possibilities of which we are now taking advantage.



Calibrated date
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Currently, the Faculty of Archaeology of Adam Mickiewicz University is formed by a number of teams, each with their own leaders. In the majority of cases, these teams are united by interdisciplinarity, which integrates within selected projects the experience of many so-called 'auxiliary' sciences of archaeology. This trend is paralleled by the development of specialised laboratories armed with the latest equipment in the Faculty of Archaeology.

This publication presents the current scientific interests creatively developed by such teams at the Faculty of Archaeology of Adam Mickiewicz University. The research of these teams covers vast areas in time and space, summing up at least the last 9,000 years of prehistory. The following articles, arranged in chronological order, allow us to explore the prehistory of various areas.

The adventure begins around 7100 BC, in the Neolithic settlement of Çatalhöyük located in Turkey. Then, we move on to the loess uplands near Krakow, where the first farmers from the south of Europe had just arrived (5500 BC). A little later (4000-3500 BC), and a little farther north, in the area of Greater Poland, some of the first megalithic constructions in this part of the world were built. Around the same time, about 800 km to the southeast, a settlement

of the Trypillia culture remains in the phase of development (3950 BC). The end of the Stone Age in Poland was described in the history of Late Neolithic communities on a hill in the center of Kujawy region (3700-2400 BC). Farther east, in the forest-steppe area of Ukraine, significant cultural and social changes resulted in the formation of the Yamnaya culture (3350-2250 BC), beginning the Bronze Age.

Intense elements of this era can be traced in the area of southern Europe in the Greek Anthemous Valley (3350-1150 BC), in Attica (3000-500 BC) on the plains of the Hungarian Lowlands (2600-1450 BC) and to the Upper Dniester Valley, where numerous burial mounds were formed (2800-1500 BC). A similar chronological range is presented in the articles devoted to a unique site in Bruszczewo, Greater Poland (2300-1350 BC), which not only accumulates valuable metal artefacts, but is also the subject of interest of an interdisciplinary team focused on reconstructing its environmental context.

The next text take us far to the east, to the area of Iraqi Kurdistan, where we can appreciate the importance of Mesopotamian influences in shaping the picture of the Early Bronze Age (2200-2150 BC).

Subsequent texts describe the discoveries of Poznań scientists in Syria (1906-1787 BC) and in Greater Poland (1900-1600 BC). These two distant points describe various aspects of life in contemporary communities in the Middle and Early Bronze Age.

The characteristic archaeological materials of the later centuries of the Bronze Age (1800-1200 BC) reveal an intensification of military conflicts and migration processes (1700-1200 BC). The turn of the eras is illustrated in this volume by texts on the interpretation of representations on ancient Greek and Roman sculpture (400 BC-100 AD), as well as the cultural situation in the Polish lands (400 BC-100 AD).

We are introduced to the new era by an article on the funerary customs of communities from the Polish lowlands describing discoveries at the site of Mirosław (160-175 AD). Moments of the formation of elements of Polish statehood are referred to in texts describing towns at Grzybowo (919-1050 AD) and Poznań in the early Middle Ages (950-1000 AD).

Later parts of the Middle Ages are described by sacral monuments located also in the area of the contemporary city of Poznań: the Collegiate Church of St Mary Magdalene (1263-1802 AD) and the still extant Church of the Blessed Virgin Mary on Ostrów Tumski, founded around 1431 AD in the immediate vicinity of the previously described early medieval site of the 'origin' of the city of Poznań.

The final texts of the volume do not refer directly to a particular period of prehistory, but present the history of Polish archaeological research on the Iberian Peninsula, the contemporary perception of prehistoric art by the inhabitants of present-day Canada and Siberia, and the development of methodological thought among Poznań archaeologists.

The volume closes with a text describing one of the many perspectives currently faced by the staff of the Faculty of Archaeology of Adam Mickiewicz University in Poznań: the new ArchaeoMicroLab.

We look to the future with great hope that the Staff of the Faculty will provide ideas for many more volumes of Treasures of Time. We trust that this set of articles will present archaeology at the Adam Mickiewicz University in Poznań in its new structure as a Faculty and show its potential. We would thus like to encourage you to get acquainted with our Poznań perspective on archaeological studies, and to reflect on ways of exploring the past.

Andrzej Michałowski

Danuta Żurkiewicz



Location of the main research areas.
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1800-1200 BC

Treasures of Time:

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Migration and kinship in East-Central Europe in the 1st half of the 2nd millennium BC

Przemysław Makarowicz

Abstract

This article presents the results of research conducted within the framework of a multi-disciplinary project investigating the issues of migration, mobility, and kinship of the Middle Bronze Age communities inhabiting East-Central Europe, more specifically the Upland belt of modern Poland and western Ukraine. The main objective of the project is to verify or falsify two hypotheses provided by the literature. The first one concerns the issue of the migration of the Trzciniec Cultural Circle (TCC) population from the Lowland belt of East-Central Europe southwards into the Upland belt. The other considers kinship as a fundamental factor generating the emergence, rules of aggregation, and shape of the 'Trzciniec' social structures. In addition, the project addresses a number of issues related to the social structure, rituals, and diet of the study communities.

An application of the methods that are specific to humanities (archaeology and cultural anthropology) and sciences (physical anthropology, molecular biology – genetics, isotope geochemistry, physics, chemistry, and statistics), and possible genetic affiliations of the 'Trzciniec' communities and the population of the preceding Early Bronze Age groups (mainly the Mierzanowice and Strzyżów cultures) are presented; the potential kinship pattern of the deceased buried in the graves representing these cultural groups are also indicated. The results of Bayesian modelling of the ¹⁴C date series for the TCC collective burials – a key factor in the study of the kinship and the mortuary rituals of this group – are highlighted. Finally, the paper discusses the current results of research on the mobility and diet of the communities from the late 3rd and 2nd millennia BC undertaken within the frame of this project as well as in cooperation with other research programmes.

Keywords: ancient DNA, stable isotopes, Middle Bronze Age, migration, kinship, Trzciniec Cultural Circle, collective burial

Introduction

The early 2nd millennium BC was one of the most dynamic and transformative periods in the development of social structures in East-Central Europe. It was defined by the rise of the phenomenon known to archaeologists as the Trzciniec Cultural Circle (TCC), which can be considered a long *durée* unit (Braudel et al., 1994) – a macrostructure characterized by a long duration and occupation of a considerable territory, in this case stretching roughly from the drainage basins of the Prosna and Warta rivers in the west to the Desna and Seym in the east, the Vistula and Neman in the north, and the Dniester and Prut in the south (Figure 1; Makarowicz, 2010, 2011). The TCC emerged first in the northern – Lowland – portion of the above-delineated area (1850-1800 BC), but in the course of a single century (four to five generations), Lowland cultural patterns ('fully-formed' culture) appeared in the Upland belt from Lesser Poland to as far south as Podolia and Volhynia. The interpretation of the reception mechanisms of these patterns has been intensively debated by prehistorians of East-Central Europe (Kempisty, 1978; Górski & Kadrow, 1996; Górski, 2007; Makarowicz, 2010).

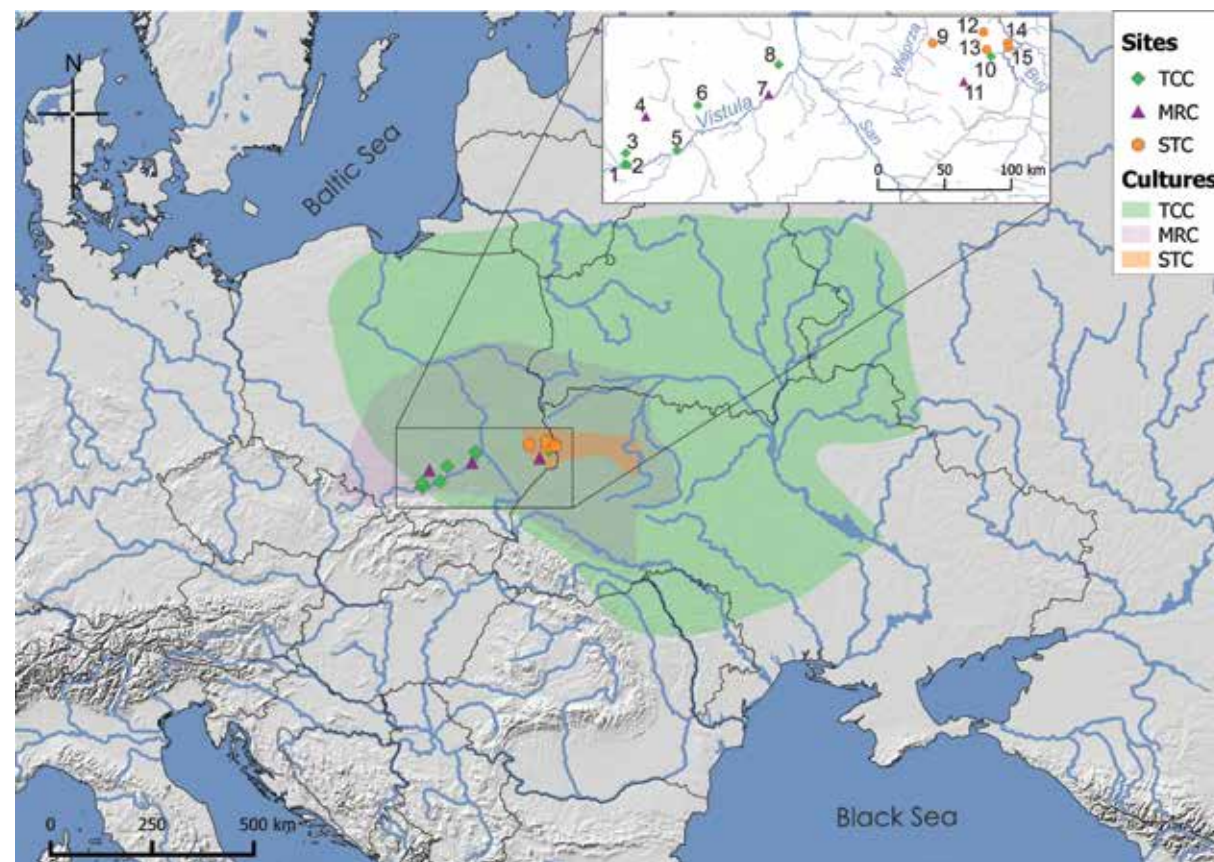


Figure 1. Spatial range of the Trzciniec Cultural Circle (TCC), Strzyżów culture (STC) and Mierzanowice culture (MCC), and sites involved in aDNA studies. (1) Kraków Nowa Huta Cło; (2) Kraków Nowa Huta Mogiła; (3) Pielgrzymowice; (4) Koszyce; (5) Żerniki Górne; (6) Dacharzew; (7) Brodzica; (8) Pieczeniogi; (9) Świniary Stare; (10) Zubowice; (11) Stryków; (12) Raciborowice; (13) Nieleś; (14) Hrebennie; (15) Strzyżów (after Juras et al., 2020).

Since 2015, an international team of scholars from different scientific institutions in Poland, Sweden, and Ukraine have conducted an interdisciplinary project financed by the Polish National Science Centre which indirectly relates to the discussion of the TCC origins in the Uplands and the nature of factors forming the social structure of this cultural complex. The project's objective is to verify or falsify two crucial hypotheses which prevail in the literature. The first concerns the question of the migration of the TCC populations from the Lowlands of East-Central Europe towards the south and the Uplands (Kempisty, 1978; Górski & Kadrow, 1996, 2001; Górski, 2007; Makarowicz, 2010, 2011). The other one considers kinship as the principal factor contributing to the rise and shape of the 'Trzciniec' social structures and defining their 'aggregation principles' (Makarowicz, 2003, 2010). A vital part of the project is the study of the burial ritual, mobility, and diet of the communities occupying Central and Eastern Europe at the turn of the millennia – 3rd and 2nd BC for both the TCC communities and the groups preceding this cultural circle.

The main sources of data for the outlined research questions are cemetery materials, mainly derived from the Upland zone situated in south-eastern Poland and the neighbouring lands of Ukraine.

The investigation of the issues raised in the title is made possible by the availability of new research tools for the comprehensive testing of the hypotheses cited above. The project makes use of the cumulated potential of many fields including archaeology and new research methods employed in 'archaeological sciences'. Comprehensive laboratory analyses were the key to the success of the adopted research strategy. They comprised: radiocarbon determinations, analyses of stable (carbon, nitrogen, oxygen) and radiogenic (strontium) isotopes, anthropological analyses, and ancient DNA analyses. The majority of analyses of bones focused on bones belonging to TCC graves. For comparative purposes, the remains of the deceased representing the communities of the Mierzanowice and Strzyżów cultures, i.e. the Early Bronze Age groups preceding the 'Trzciniec' communities occupying the Upland zone, were also analysed. Some of the archaeological, chronometric, anthropological, archaeogenetic and isotopic analyses have already been carried out while others are still underway.

Ancient DNA studies

Studies on ancient DNA (aDNA) conducted over the last several years have already provided strong evidence about migrations in various periods of prehistory. After a long period of depreciation of this factor of socio-cultural and population change by post-processualist critics, a new archaeo-genetic narrative has emerged (written by molecular biologists rather than by archaeologists) which explains the aforementioned transformations with more or less massive population migrations. This largely applies to the beginnings of the Neolithic way of life in Europe in the 7th millennium BC, starting from the area of Anatolia, and including the participation of hunter-gatherer groups in its creation, as well as the intrusion of steppe pastoral communities of the Yamnaya culture in the early 3rd millennium BC and the significant remodelling of the gene pool of the populations of the time (e.g. Haak et al., 2010, 2015; Lazaridis et al., 2014; Allentoft et al., 2015; Mathieson et al., 2015; Olalde et al., 2018).

Evidence and interpretations of these large-scale migrations have dominated the discourse on population mobility in prehistory.

Analyses of aDNA in Central and Eastern Europe are being carried out as part of the project with the aim to determine kinship of the individuals buried in necropolises at the end of the 3rd and 2nd millennia BC and to perform population studies to reveal genetic affinities with various communities from the earlier periods of prehistory. The largest pool of data pertains to the individuals buried collectively in the cemeteries of the TCC community, but the research also included the deceased buried in individual graves, both of the 'Trzciniec' and other cultural circles – mainly the Mierzanowice and Strzyżów cultures. Currently, the mitochondrial aDNA research has been completed and the analyses of the Y-chromosomes are in their final stage.

Mitochondrial genomes were obtained for 80 individuals, most of them radiocarbon dated using the AMS method, from several cemeteries located in the Upland zone of southern and south-eastern Poland. The aim of these analyses was to reveal the origins and genetic affinities of the Bronze Age populations from the region of southern and south-eastern Poland and to trace matrilineal kinship patterns present in the burials of those populations (Juras et al., 2020).

Studies on the mitochondrial aDNA indicate genetic continuity of the communities, which in the archaeological record are associated with the Late Neolithic Corded Ware culture (CWC) and the subsequent Bronze Age groups of the Mierzanowice culture and TCC. Also, the independent development of the Strzyżów culture community, a group inhabiting the Lublin Upland and an adjacent part of the Volhynian Upland in Ukraine in the late 3rd and early 2nd millennia BC, and its close genetic affinity with steppe populations (the Yamnaya and the Catacomb Grave cultures and later also the Scythians) were recorded. Furthermore, mitochondrial patterns identified in the Bronze Age communities from south-eastern Poland indicate examples of potential kinship through the female line occurring mainly among individuals representing the TCC (Juras et al., 2020).

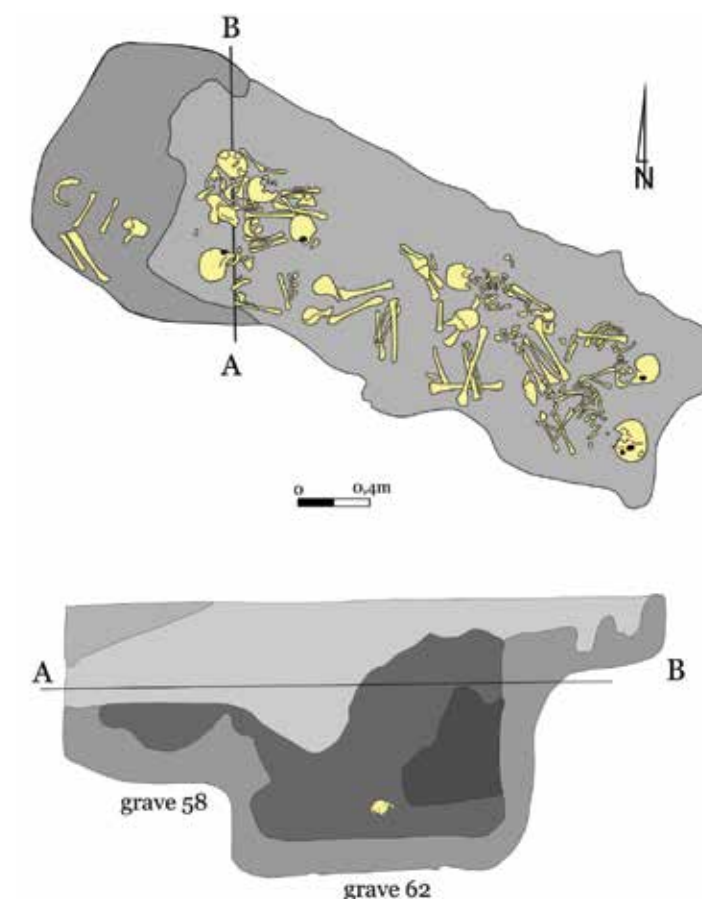
Collective burials and Bayesian modelling

Collective burials, which are the key diagnostic feature of the mortuary rites of the TCC community and are related to the issue of kinship, are one of the most important aspects of the TCC funerary customs. The literature suggests a long-lasting use of graves in which, in some cases, a dozen or more individuals – representatives of specific descent groups, were buried. However, in the past, this view was based solely on observations of the stratigraphy of the graves and the arrangement of the remains of the deceased and was not supported by any analytical studies. In this project a series of over 90 AMS dates were obtained from 18 TCC cemeteries with collective burials in Poland and Ukraine. Using Bayesian modelling, the absolute chronology of the occurrence of the custom of collective burial of the dead was determined as c. 500-600 years (1800/1700-1200 BC). Collective burials, both cremated and skeletal and in both barrow and flat graves, were first recorded in the Upland zone and the custom generally 'spread' from the south-east to the north-west. Bayesian modelling of ¹⁴C dates from a dozen mass graves in the cemetery at Żerniki Górne in the Lesser Poland



Figure 2. Examples of the 'Trzciniec' collective burials. Above – Pielgrzymowice, site 9, grave 669 (Photo: A. Lasota-Kuś). Below – Żerniki Górne, site 1, grave 62 (Drawing by J. Romaniszyn).

Upland – the largest 'Trzciniec' necropolis – confirmed its functioning for about 300 years. Partially synchronous use of graves was found and a scenario of spatial and chronological development of this cemetery was presented (Makarowicz et al., 2021). The collective graves were used for several dozen to over 200 years, with several to 30 individuals found in 'antipodal' arrangements, i.e. with their heads towards the shorter sides and long bones towards the inside of the grave (Figure 2). The next bodies were placed one by one or in groups of several at a time, after moving the remains of their predecessors. As a result, piles of bones were formed.



Investigations on diet

The project also included studies on the diet of the Bronze Age communities mainly in the Upland zone of Central and Eastern Europe. More than 120 AMS radiocarbon dates were measured on human and animal bones ('reference data') from an interval of about 1000 years (2200-1200 BC). A noticeable increase in $\delta^{13}\text{C}$ ratios in human bone collagen was recorded in the mid-15th century BC, which was associated with increased consumption of C4 plants (Pospieszny et al., 2021). The first stage of the research on the diet of the communities representing that period was therefore focused on an issue which has been very popular in the literature for at least several years. Measurements of stable isotopes of carbon ($\delta^{13}\text{C}$) showed a steady increase in its values which peaked in the mid-13th century BC. This could be related to the local cultivation of broomcorn millet (*Panicum miliaceum* L.), a cereal with a C4 photosynthetic pathway that is one of the most significant plants in prehistory, originally domesticated in China ca. 6000 BC (Filipovič et al., 2020) and subsequently spread across Eurasia. In Europe, however, it is well documented only in the Middle Bronze Age, thanks to the direct dating of the charred grains of this cereal (Motuzaitė-Matuzevičiūtė et al., 2013). Analyses of stable isotopes of carbon and nitrogen, performed within the framework of the project at 37 sites from Poland and Ukraine, helped trace changes in the amounts of broomcorn millet in the 2nd half of the 2nd millennium BC (Figure 3). The regularities in this aspect of the diet of the individuals buried in the same collective graves correlated with the passage of time – from no millet in the menu, through its small admixture, to a high proportion of 33-56% – are of particular cognitive value (Pospieszny et al., 2021).

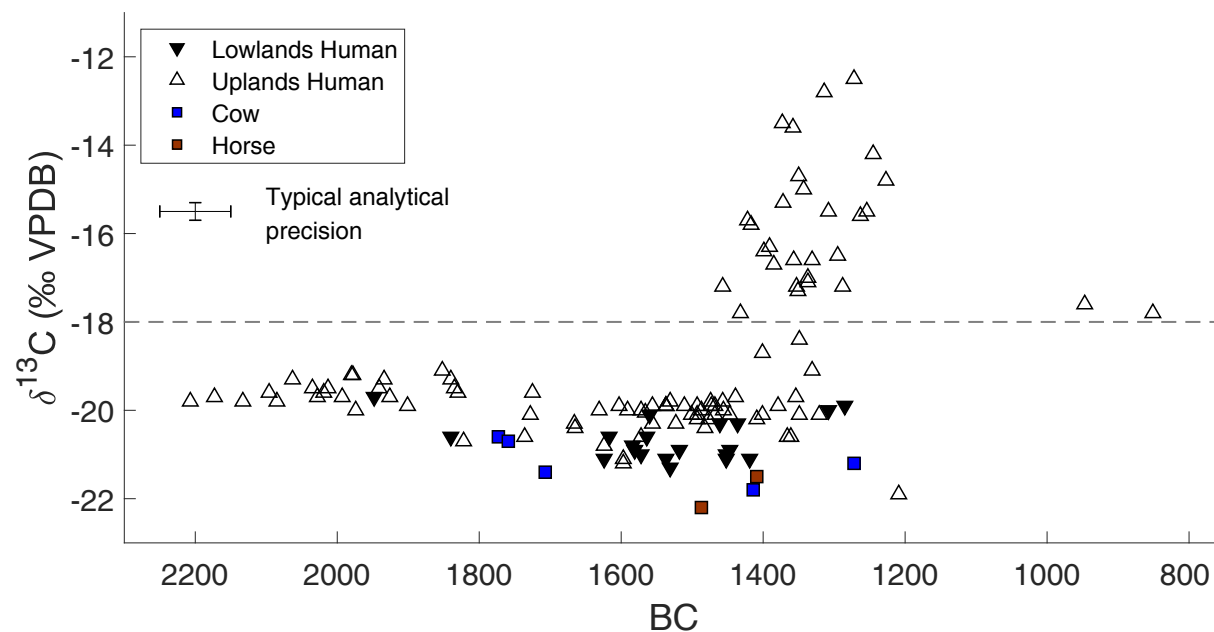


Figure 3. $\delta^{13}\text{C}$ values for Bronze Age and Early Iron Age human and animal bone samples plotted against their calibrated absolute ages. The broomcorn millet "threshold" is marked with dashed line (after Pospieszny et al., 2021).

The mortuary goods discovered in the majority of the graves in which the 'millet eaters' were buried were local in character, but in a few cases the style of the discovered bronze vessels and other goods indicated contacts with the Otomani-Füzesabony culture groups from the Carpathian Basin. It is likely that this was the area from which broomcorn millet was introduced to the Uplands of modern Poland and south-western Ukraine, 2-3 generations after its occurrence in the Carpathian Basin (Pospieszny et al., 2021).

An alternative is the spread of millet from the Pontic steppes, where it has been well documented (dated charred grains) at the end of the first half of the 2nd millennium BC or possibly earlier (Filipovič et al., 2020). The increase in millet consumption to the levels of a staple crop in the mid-15th century BC could have been caused by demographic growth, well evidenced in archaeological record (Makarowicz, 2010; Górski, 2017). Millet is a drought-tolerant cereal with a short growing cycle and it was a good source of plant protein in case of a demographic crisis.

The research on the introduction of broomcorn millet cultivation realised within this project was also used in a larger project on the chronology of the initiation and dissemination of this cereal in Europe which included over 100 ^{14}C determinations. Bayesian modelling of these dates showed that, contrary to earlier opinions, millet did not occur on the European continent until the 16th century BC; it became widespread over the next two centuries (Filipovič et al., 2020), confirming the validity of the previously cited results of the East-Central Europe study (Pospieszny et al., 2021) at a larger scale.

A comprehensive summary of the results of research on the diet of communities inhabiting the Central and Eastern European borderlands is nearing completion. At the current stage of the study, it can be concluded that the carbon and nitrogen isotopic compositions of bone collagen indicate an omnivorous diet that included C3 and C4 terrestrial plant and animal resources, in which plant foods dominated.

Studies on mobility

As in archaeogenetic research, studies of population mobility based on the strontium and oxygen isotopic composition of human dental enamel have provided archaeologists with a new tool to trace the mobility and provenance of individuals. Research on the main topic of the project, i.e. the verification or falsification of the well-documented archaeological and chronometric hypotheses about the migration of TCC communities from the Lowlands to the Uplands of Central and Eastern Europe, is currently in its final stages. Nevertheless, it can already be concluded that most of the analysed samples from Lesser Poland, Lublin, and the Volhynian Uplands have local strontium isotope signals; there are few individuals that can be seen as newcomers ('non-local'). However, this could be due to the peculiarity of the analysed material which does not come from the initial phase of presence of the 'Trzciniec' culture communities in the Upland zone (no bone remains from this period have been preserved), but from the phase of relative stability of the settlement.

The results of the isotope analyses obtained in the course of this project also contributed to another project on the community of the Final Neolithic Corded Ware culture (2900-2300 BC) in south and south-eastern Poland (The Lesser Poland Upland and the Subcarpathian region). Measurements of strontium isotopes indicated the local origin of individuals from Lesser Poland and revealed a significant frequency of individuals with non-local origin in the Subcarpathian region (Szczepanek et al., 2019).

The outlined project can help to better our understanding of the complex nature of the processes underlying dynamic social transformations in East-Central Europe in the Early and Middle Bronze Ages. In particular, aDNA and strontium and oxygen isotope analyses have supplied new evidence explaining the questions of continuity/discontinuity in the late 3rd and early 2nd millennia BC in the Uplands on the borderland between Central and Eastern Europe.

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