

Session 1 ORIGINS AND DIFFUSION OF CULTIVATE PLANTS

Posters

FARMERS OR GATHERERS? THE FIRST ARCHAEOBOTANICAL STUDY ON THE MESOLITHIC SOUTH CAUCASUS

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The increased archaeological and archaeobotanical evidence during the last twenty years revealed that plant cultivation was introduced to the South Caucasus at around 6000 cal. BC at the latest. However, there was no site in which we could observe the shift from hunter-gathering to farming, and the neolithization process in this region still needs much investigation.

In this paper, we focus on the transitional phase from gathering to farming based on the macrobotanical remains excavated from Damjili Cave and Hacı Elamxanlı, west Azerbaijan. We discuss the intercourses between indigenous populations and immigrants in this period.

Key-words: Azerbaijan, Neolithization, Damjili Cave, Hacı Elamxanlı Tepe

PLANT REMAINS FROM THE EARLY BRONZE AGE LAKESHORE SETTLEMENT OF BEINWIL AM SEE ÄGELMOOS: THE FIRST ARCHAEOBOTANICAL RESULTS FROM LAKE HALLWIL, SWITZERLAND

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The site of Beinwil am See Ägelmoos is only the third Early Bronze Age lake shore settlement in Switzerland, from which archaeobotanical material (micro- and macrofossils) was studied. The site lies today under the lake surface and the archaeological layers were threatened by erosion. Before covering them with textiles and gravel deposits, sediment samples were taken by an underwater archaeology team. The sediment and the remains contained in it are generally well preserved, but heavily penetrated by roots. Some layers are mainly composed of animal dung. Barley (*Hordeum vulgare*) and emmer wheat (*Triticum dicoccon*) are the main cereals of the samples, and spelt wheat is also regularly present. There is also a small number of finds of broomcorn millet (*Panicum miliaceum*), but it is unclear if that species was already cultivated. Flax (*Linum*

usitatissimum) is present in good numbers, together with two typical weed species associated with it: *Silene cretica* and *Cuscuta epilinum*. A small number of remains of gold-of-pleasure (*Camelina sativa*) indicates that this oilseed crop was possibly in use in the Early Bronze Age.

Key-words: Early Bronze Age, Switzerland, lake shore settlement, Camelina sativa

WATERLOGGED WOOD, SEEDS AND FRUIT IN THE WELL-CISTERN OF THE FORTRESS OF ELS VILARS (CATALONIA, SPAIN): EXPANDING KNOWLEDGE ON PLANT RESOURCES AND THEIR USE DURING THE IRON AGE

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The Iron Age Fortress of Els Vilars (775 cal.BC - 300 BC) represents a clear model of the process of economic and social transformation taking place in the northeast of the Iberian Peninsula during the Iron Age. Its last phases of occupation are the least known due to modern destruction. They are only preserved in certain features such as the well-cistern (converted into a rubbish tip toward 300 BC). This study focuses on the archaeobotanical remains it contained, notably the waterlogged materials but also the charred and mineralised remains. These waterlogged finds add to the understanding of the data from the rest of the site where the plant remains are mostly charred.

The finds comprise a great variety of wood remains ranging from 1 cm to 1 m in length. The nature of certain can be identified (e.g., a decorated comb of boxwood), while others suffered high depositional and postdepositional fragmentation. They correspond basically to architectural and other elements of utility that are unique to the northeast of the Peninsula in this timeframe. The taxa of the waterlogged material coincide with the carbonised finds (Aleppo pine, scots/black pine, evergreen and deciduous oaks, Lamiaceae) except for certain species such as elm.

The assemblage also comprises seeds and fruit, and taxa and parts of plants that are unknown elsewhere. These include the domes of acorns, flax capsules and seeds, many weeds, as well as oak and rosemary leaves.

Key-words: Waterlogged remains, manufactured wood, weeds, Iberian culture

A PRELIMINARY AND COMPARATIVE STUDY ON CROP PLANT SELECTION FROM THE BEGINNING OF AGRICULTURE TO THE LATE OTTOMAN PERIOD IN NORTHWEST ANATOLIA

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This research aims to understand and document the crop range in Northwest Anatolia between the Late Neolithic and the Late Ottoman periods and to model the differences between crop plants. Barcın Höyük, a site containing the earliest agricultural data (ca. 6600 BC) in the region, constitutes the key settlement of this research. The first farmers, settling in Barcın Höyük brought most of

the economic plants with them upon their initial arrival in the region. Similar agricultural practices were found in the settlements of Menteşe, Ilıpınar X-IX, Aktopraklık C (Northwest Anatolia), Fikirtepe, Pendik, Yenikapı (Marmara Region). The people living in these settlements had a similar material culture and shared common traits regarding their plant subsistence economy. Northwest Anatolia related geographically to Eastern Thrace, the Marmara Region and the Eskişehir Corridor yields coastal, lowland and highland settlements throughout the Neolithic, Chalcolithic, Bronze Age, Iron Age periods showing variable economies regarding plant use. The main question of this research concerns the question: How did crop selection change through time and is it possible to create a sophisticated comparative economic plant chart for the region?

Key-words: Archaeobotany, Early Farming, Northwest Anatolia, Barcın Höyük

MACROBOTANICAL REMAINS FROM RAQEFET CAVE, A LATE NATUFIAN BURIAL SITE IN MOUNT CARMEL, ISRAEL

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The Archaeobotany of Epipalaeolithic communities in Mount Carmel was commonly limited to studies of microscopic remains such as pollen, phytoliths and starch, as charred macro-botanical remains are scarce. However, in recent years a new approach based on retrieval, identification and dating of charred seeds and charcoal fragments provides new insights into environmental fluctuations and past use of plants by local hunter-gatherers and sedentary/semi-sedentary groups. This study focuses on Raqefet Cave, a site used by the Late Natufians as a burial location. Excavations revealed the graves of ca. 30 individuals, some buried on a layer of green and flowering plants, as interpreted by the identification of dozens of imprints. Previous studies of phytoliths and starch remains from graves and stone mortars indicate the use of cereals and other species at the site, including inferred beer brewing and storage in fiber baskets. Here we present and discuss macro-botanical remains from the site. These include several specimens of legumes (i.e. *Lens* sp. and *Vicia* sp.), cereals (*Hordeum* sp.) and weeds. Identified specimens of oak (*Quercus calliprinos* and *Quercus ithaburensis*) and almond (*Amygdalus* sp.) suggest that these Mediterranean species grew around the site during the Late Natufian. Stable Isotope analysis are therefore to be applied to the Raqefet Cave remains together with absolute ¹⁴C dating to reconstruct paleoenvironmental changes in the Carmel area at the end of the Pleistocene.

Key-words: Epipaleolithic, Natufian, Mount Carmel, Anthracology, Isotope Analyses

LATE HOLOCENE PLANT EXPLOITATION FOR CHARCOAL PRODUCTION AND GRAZING IN NORTHERN APENNINES INFERRED FROM CHARCOALS ANALYSIS

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Monte Cimone and Corno alle Scale are two protected mountains included in the Natura 2000 Network. The top of these mountains is characterized by *Vaccinium* and *Nardus* meadows and the timberline, formed by coppice beech forest, reaches 1600-1700 m a.s.l. Historical sources show the importance of these mountains for pastoral activities, which have been practiced until the 1950s, and then decreased drastically. Many pastoral structures, found (but not dated) in the current grassland of Monte Cimone, are witness of the ancient pastoral activity. Charcoal analysis provided information on the past wood vegetation changes in response to climate change and human impact, with details at the scale of the slope. Two altitudinal transects were carried out for the pedoanthracological study: nine pits were excavated and sampled from 1650 to 2078 m a.s.l at Monte Cimone, and eight pits from 1600 to 1860 m a.s.l. at Corno alle Scale. Moreover, an anthracological study was carried out on eight charcoal platforms. A total of 14 taxa were identified (e.g. Ericaceae and *Fagus sylvatica*). Almost all radiocarbon dates refer to the Late Holocene. Charcoal analysis data suggest that the inhabitants of the two mountain areas have exploited the natural physical conformation of the territory to use and manage the natural resources through the sylvo-pastoral activities, thus using the wood on the steep slope for charcoal production and the plateau for grazing activity.

Key-words: Anthracology, Pedoanthracology, Tuscan-Emilian Apennines, Charcoal kilns, forest

CARPOLOGICAL STUDY AT SAN CRISTÓBAL ROCK-SHELTER (BASQUE COUNTRY, SPAIN)

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The San Cristóbal rock-shelter is located in Rioja Alavesa (Basque Country, Spain) at 900 m above sea level in the Sierra de Cantabria. The rock-shelter contains 13 prehistoric levels which range from the end of the Ancient Neolithic to the Bronze Age. During this period, the stratigraphy of the rock-shelter shows episodes of seasonal and cyclical stabling, and cleaning practices after the end of the period, by burning dung and waste generated during the stay of the animals. In the Middle Ages, the site was used for the construction of a hermitage and the dug of a burial pit.

The use as a pen from the Ancient Neolithic to the Chalcolithic reaffirms the occupation of the rock-shelter by farmers; this situation indicates an exploitation of plant resources to animal feeding. The carpological study shows the presence of synanthropic vegetation and domesticated plants (*Triticum*, *Setaria italica/Panicum miliaceum*) which confirm the existence of agricultural practices possibly in the plain; and the transfer of the synanthropic plants to the rock-shelter for animal feeding. Small legume seeds are the most abundant seeds in this site and have provided information regarding animal feeding. And, perhaps, the first evidence of *Papaver* in the Basque Country is an extraordinary find in north of the Iberian Peninsula.

POLLEN ANALYSIS IN THE EARLY MIDDLE AGES FLORENCE (ITALY)

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In the summer of 2018, during the repaving works of *Piazza della Repubblica* in Florence (Italy), the excavations revealed anthropized levels from the Roman age up to today.

The modern *Piazza* lies upon the ancient *foro* of *Florentia*, a roman colony founded in 59 BC. The *foro* was a paved square adorned with monumental buildings, among which the Capitoline Temple. In the Middle Ages the square became the “Old Market” of the city, surrounded by the towers of the most prominent Florentine families.

The excavation works in the square offered the opportunity to collect pollen samples from a stratigraphic sequence dated to the Early Middle Ages (6th-7th centuries), a moment of severe instability in the city. The analysis revealed rather good pollen preservation and high absolute pollen frequencies. Most part of the grains belonged to herbaceous plants, with a constant presence of primary (mainly cereals) and secondary anthropogenic indicators and a noticeable amount of hygrophilous plants (Cyperaceae and Poaceae *Glyceria* type), suggesting the possible presence of puddles of stagnant water on the ground.

Key-words: Archaeobotany, Florentia, anthropogenic indicators, Urban palynology

TRACING THE INTRODUCTION AND FIRST DISPERSAL OF MILLET IN UKRAINE

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The present contribution shows the results of newly radiocarbon-dated charred broomcorn millet (*Panicum miliaceum*) grains from different sites in Ukraine. Based on macro-remain record compared to isotopic evidence known from literature, this study aims at identifying the moments of first known adoption and widespread use of this C4 cereal in an area that lies geographically at the westernmost Asiatic and the easternmost European borders. The radiocarbon dates come from archaeological sites spanning from the Chalcolithic and the Bronze Age through to the Iron Age. The new dates indicate that first evidence of millet occur in the mid-second millennium BC (17th–15th century BC), at the site of Vinogradnyi Sad of the Sabatinovka culture in the Southern Bug steppe area. The Ukrainian millet dates are discussed in the frame of on-going research about the spread of millet across Asia and its introduction in Europe.

Key-words: Broomcorn millet, Panicum miliaceum, Ukraine, Bronze Age

**EARLY AGRICULTURE AT THE CROSSROAD OF CHINA AND SOUTHEAST ASIA:
NEW INSIGHTS FROM ARCHAEOBOTANY, ECOLOGY AND CLIMATE**

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Very little is known about the timing and trajectories of the beginning of an agricultural lifestyle in Yunnan province, Southwest China. Combining previously unstudied archaeobotanical datasets, with ecology and paleoclimate data, this paper presents an overview of the early agricultural system in the region between the late 3rd and 1st millennia BC. Particular focus will be given to comparative morphometrics analyses of crop remains (i.e. rice, millets, soybean and buckwheat) from sites in Yunnan and already published datasets from Central and East China. This will plot the evolution of the crops and their adaptation to the specific environmental conditions of Southwest China. This study will help us gain a deeper understanding of early human-environment interactions in the adoption of agriculture, and provide proxies for the spread of agriculture to Southwest China and beyond.

THE BEGINNINGS OF AGRICULTURE IN THE SOUTHERN CAUCASUS: NEW PERSPECTIVES BETWEEN THE ARAXES AND KURA VALLEYS

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The beginnings of agriculture in the Southern Caucasus are still poorly known. Recent excavations of Neolithic sites in the Kura and Araxes valley allow us to present a synthesis for this period. Two sites, among the oldests for that period in Azerbaijan, are of particular interest: Kіçik Tepe in the Kura Valley and Kūltepe I in the Araxes Valley. This paper will aim at summarizing the main results of their archaeobotanical studies and will then be compared with the results from other Neolithic sites in the area (Mentesh Tepe, Gadachrili Gora, the Mil Plain sites and Aruchlo) in order to present a general synthesis for this period in the Southern Caucasus. Through a multidisciplinary approach, including the study of seeds, fruits and charcoal fragments, we will try to answer several questions, like which plants were cultivated or collected by the first farmers. Nowadays these sites are located in slightly different climate zones. In this light we will discuss the differences between agriculture and fire wood management visible in the material from the sites and in a wider perspective between the two valleys.

Key-words: Caucasus, Neolithic, seeds and fruits study, anthracology

SPATIAL DISTRIBUTION OF ARCHAEOBOTANICAL REMAINS AND ARCHAEOLOGICAL INTERPRETATION IN A MEDIEVAL VILLAGE IN NORTHWESTERN SARDINIA

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The paper illustrates the informative potential of analyzing the spatial distribution of archaeobotanical remains in the abandoned medieval village of Geridu (Sorso, Sardinia). The case study chosen is a house in the rural village, destroyed by fire in the mid-fourteenth century: the collapse of the tiled roof on the floor, which occurred during the fire, caused a partially anaerobic combustion of the roof beams, which are they are partly charred. The survey of the spatial distribution of high concentrations of carbon allowed to interpret the orientation of the roof beams and, subsequently, the tree species to which they belong. The documentation of other coal concentrations has allowed us to interpret significant aspects of the simple furnishing of this country house. A wooden trunk, present inside the room, was leaning against a wall: in the excavation a concentration of coals was identified in adherence to a wall of the house, in addition to the metal closing parts of the trunk. The analysis of the coals made it possible to determine that the settle was made of chestnut wood: the metal closing element had a gilding and the decoration of a lily. The cross-study with the contemporary archival documentation suggests that this chestnut wood furniture was imported from Tuscany and was therefore the most representative object of this house.

ARCHAEOBOTANICAL RESEARCHES IN ORUMIYEH LAKE BASIN: HAJJI FIRUZ AND PISDELI

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During '50s and '70s the sites of Hajji Firuz and Pisdeli were excavated in the frame of the *Hasanlu Project* developed by the University of Pennsylvania Museum, the Metropolitan Museum of Art, and the Archaeological Service of Iran. These sites, dated to Neolithic and Chalcolithic periods, are located in the south-western shore of the Orumiyeh Lake, in the Iranian province of West Azerbaijan. That project saw also an Italian partnership for the archaeobotanical analysis, preliminary presented in a brief report published in *East and West* journal. This contribution is intended to present new archaeobotanical data, in the frame of the recent environmental studies of the region. Plant remains were retrieved through flotation of samples collected in the sites. The collection was composed of 10 samples from Hajji Firuz and 4 samples from Pisdeli. More than 500 plant remains from Hajji Firuz and 100 plant remains from Pisdeli, occurred in the examined samples, in which cereal grains and spike remains of einkorn/emmer and barley were the dominant remains. Few remains of pulses, like *Lens* sp., and weed seeds were present. The results of this investigation provided useful information about the agrarian economy and ecology of this region of Iran, between prehistory and protohistory.

Key-words: Hajji Firuz, Pisdeli, plant remains, Neolithic, Chalcolithic

LATE NATUFIAN AND EARLY NEOLITHIC RYE EXPLOITATION IN THE EUPHRATES VALLEY. NEW EVIDENCES FROM THE ACERAMIC NEOLITHIC SITE OF DJA'DE EL-MUGHARA

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During the Aceramic Neolithic hunting and gathering gave way to new subsistence strategies represented by herding and cultivation and then domestication. Rye is one of the cereals recovered on archaeological sites during this period particularly in the Euphrates valley but its status as to being cultivated/gathered, domesticated/wild, introduced/imported remains uncertain. Rye spikelet bases can be easily identified but this is not the case for wild rye grains which are difficult to distinguish from wild two-grained einkorn. In this paper I will provide new biometric data from Dja'de el-mughara in northern Syria to allow us to reassess previous studies and gain a better understanding of the use and the sudden disappearance of rye at the end of the Early PPNB in the Euphrates valley.

Key-words: Pre-Pottery Neolithic, Levant, Rye, plant exploitation

SIDELINER OR PROTAGONIST? ECONOMIC STATUS OF 'NEW TYPE' GLUME WHEAT IN THE NEOLITHIC AND BRONZE AGE CENTRAL BALKANS

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Einkorn, emmer and 'new type' wheat constitute the hulled/glume wheat repertoire in prehistory of the central Balkans. Additionally, spelt wheat was tentatively reported for few Neolithic sites; more substantial and more secure record of this type derives from the Late Bronze and Early Iron Age sites. Based on the current evidence, 'new type' glume wheat is rare in the Neolithic assemblages from this region. Usually, only small amounts of grain and/or glume bases are detected in the deposits dominated by einkorn or emmer. It seems that, in the very early days of prehistoric farming in the Balkans, 'new type' glume wheat was only a random, accidental accompaniment to the staple crop – a 'sideliner'. This may have changed in the Bronze Age, if judging by the more frequent presence of this wheat type in the analysed assemblages, and the large, high-density deposit of pure 'new type' glume wheat (grain+chaff) derived from the Late Bronze Age layer at Feudvar, northern Serbia. The Bronze Age was the time when some other crops were introduced in, or became more prominent components of, the cultivated crop spectrum – not only in the Balkans, but across Europe. This likely had multiple ramifications to the farming economy. Our poster discusses the apparent shift through time in the economic role of 'new type' glume wheat in the prehistoric central Balkans and how this articulated with other coeval developments in the agrarian system.

Key-words: 'new type' glume wheat, major crop, minor crop, prehistoric Balkans

IN THE SEARCH OF THE EARLIEST CULTIVATED PLANTS IN BELARUS – SEM ANALYSIS OF GRAIN IMPRINTS IN POTTERY

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Plant impressions in pottery is an important source of information for the use of wild and cultivated plants in prehistoric societies. However, in most of the cases it is difficult to accurately identify species of the impressed plants using only naked eye or stereomicroscope. The application of SEM to investigate silicon replicas of plant impressions allows to inspect and evaluate not only the shape and size of the imprint but also the surface elements of the objects, therefore, allowing the precise identification of the impressed objects. In this study more than 7000 pottery shards from Southern Belarus Neolithic and Bronze Age sites were examined for the imprints which visually resembled grains of cultural plants. Next step was to make silicon casts of the imprints. Finally it was photographed using SEM, producing high quality images for the analysis and identification of the impressed objects. Here it is presented the first results of method application to study the plant impressions on pottery from prehistoric settlements in river Prypiat basin, Belarus.

Key-words: SEM, Belarus, plant imprints in pottery

ARCHAEOBOTANICAL INVESTIGATIONS FOR *TRITICUM* SP AND *HORDEUM* SP DURING CHRISTIAN PERIODS IN SUDAN

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Wheat *Triticum* sp and barley *Hordeum* sp appears from Prehistoric, New kingdom, Kushite, Christian and Islamic periods as one of important economical plants in Sudan. This paper will focus on the evidences of *Triticum* sp and *Hordeum* sp during Christian periods from three Archaeological site El Ga'ab depression, Nauri and Soba (500-1500 BC) with comparison with that evidences from historical sources 823- 1525 A.D “ Arab texts and documents”. The method were adopted in this research include comparative analysis for the Archaeobotanical methods were done on the three archaeological sites sieving, flotation, positive cast and microscope examinations, add to analysis the historical texts. The results show that *Triticum* sp and *Hordeum* sp play a major role in Christin economy depending on archaeological and historical evidences, and also the positive cast of *Triticum* sp and *Hordeum* sp from El Ga'ab depression consider the first recorded of impressions for that both plants come from the Christian sites in Sudan.

Key-words: Triticum sp, Hordeum sp, Christian, El Ga'ab, Positive cast, historical texts

ARCHAEOLOGICAL AND ARCHAEOBOTANICAL APPROACH IN THE STUDY OF AGRICULTURAL PRACTICES AT EARLY BRONZE AGE SETTLEMENT MOUND “HIMITLIYATA”, BULGARIA

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Settlement mound “Himitliyata” is located in Upper Thracian, Southeastern Bulgaria. The available paleobotanical data indicates that during the Early Bronze Age local environmental conditions were favorable and probably affected the agricultural potential. A reconstruction of field management, storage, processing and consumption of plants is proposed mainly on the basis of archaeological evidence and archaeobotanical remains recovered from recent excavations at the site. In this current case, the study of routine activities and practices involves systematic and probabilistic sampling within representative features, located in the central area of the settlement. These include stationary grain storage facilities, *pithoi*, hearths and ovens. All charred plant macroremains are recovered by the means of manual water flotation. Laboratory methods include quantitative measures, light microscope and SEM examinations. The archaeobotanical assemblage is comprised of annual cereal crops and legumes. Several common ruderal species, widespread in the crop fields, represent the probable field management and crop processing methods. However, among the most interesting archaeobotanical finds are the charred bread remains and a big amount of desiccated and agglutinated grains. These findings provide a good opportunity for more-detailed analyses of cereal food processing during the Early Bronze Age and contribute to raising the awareness of such finds within the archaeological record.

MIDDLE NEOLITHIC FARMING IN SE FRANCE: ARCHAEOBOTANICAL INVESTIGATIONS OF THREE WELLS FOUND AT THE SITE OF LES BAGNOLES (ISLE-SUR-LA-SORGUE, DÉP. VAUCLUSE, FRANCE)

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The Middle Neolithic site of Les Bagnoles has more than a thousand negative features, among which three were identified as wells. These wells reached below the current groundwater table. Consequently, the plant remains are extremely well preserved, in a waterlogged state. Large amounts of sediment were sieved with the wash-over method to retrieve fragile waterlogged plant remains. More than 100 taxa (mostly wild plants) have been so far identified, including several domestic crops, such as naked and glume-wheats, barley, flax, pea and opium poppy. These results show more diversity and insight into plant economy when compared with other Middle Neolithic sites in Southern France. Additionally, they offer a better intra-site comparison since the chronology of the wells indicates that they were not contemporaneously but sequentially used and abandoned. The first one (Structure 250) was filled at the end of the 5th millennium BCE and then abandoned, the second (Structure 990) covers the transition to the 4th millennium BCE while the third seems to date to the early 39th century BCE. We can thus observe changes in crop choice in one settlement through three small time-windows within a period of ca. 300 years. The results obtained will be put into the context of the current state of knowledge on Neolithic farming in this period in SE France.

CROPS CULTIVATION IN THE VIKING AGE: CASE STUDIES FROM NW LITHUANIADalia Kisielienė¹, Karolis Minkevičius²*1. Nature Research Center, Lithuania.**2. Vilnius University, Lithuania.*

Until the last several decades systematic archaeobotanical studies were not included in the East Baltic archaeological research. This resulted in severely limited our understanding of the development of agricultural practices in the region. In this paper we attempt to summarize the evidence of carbonized plant macrofossils recovered from three major Viking Age (8th – 11th c. AD) hillforts from NW Lithuania. The datasets represent the final stages of hillfort development in prehistoric Lithuania and shed some light on variety of domestic plants and possible farming strategies. The project primarily focused on revision and reassessment of soil samples taken during legacy excavations. Over eight taxa of cultivated plants were identified. Our findings suggest that barley and rye were the dominant crops in the coastal Lithuania, while emmer was of lesser importance. Remains of bread wheat and pea were also recorder, however never in significant quantities. Small amount cultivated oat (*Avena sativa*) grains were reported in two cases. The lack of preserved floret bases in the last one did not allow to identify the remains of *Avena* sp. down to species level. In all cases oats alongside broomcorn millets constituted a negligible portion of botanical samples. The results of this study present a relatively uniform picture of plants cultivated in NW Lithuania throughout the Viking age. While it is similar in sites located in eastern Lithuania, some regional variations can be observed.

Key-words: crop, Viking Age, hillfort, Lithuania

PRELIMINARY ANALYSIS OF CHARRED PLANT REMAINS FROM THE EARLY NEOLITHIC SETTLEMENT OF PONTOKOMI-SOULOUKIA IN KOZANI REGION, NORTHERN GREECE

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This poster describes the results of the preliminary analysis of charred archaeobotanical remains retrieved during rescue excavations 2014-2017 at Pontokomi-Souloukia, a low tell in the area of Kozani, Northern Greece, dating to the early Neolithic period. Their study in combination with the archaeological finds will provide the opportunity to consider plant-related practice and their socio-economic implications at the site.

A large number of soil samples (1070) were taken systematically from all the excavated units include a residential area with burnt houses as well as a non-residential area with pits and a ditch. Plant remains are represented by a remarkable variety of cereal and pulse species as well as fruits and seeds of weed species indicating the importance of their cultivation in the area. What is more important is that these charred plant remains will shed significant light on the nature of plant use during the early Neolithic period in kozani region, adding more information to the few known material from this period.

Key-words: Northern Greece, Kozani region, early Neolithic, plant use

EARLY NEOLITHIC PLANT REMAINS FROM THE CARPATHIAN FOOTHILLS: NEW DATA FROM THE SETTLEMENT OF GWOŹDZIEC, SITE 2 (SOUTH-EAST POLAND)

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The aim of this presentation is the study of charred plant remains obtained from archaeological features of the Linear Pottery culture at Gwoździec, site 2, located in the Carpathian Foothills. The settlement is dated to two chronological phases: I –5400-5300 BC and II –5000-4900 BC. During the field excavations of this settlement, more than 300 archaeobotanical samples were collected. Cereal remains recovered from this settlement suggest that the early Neolithic inhabitants cultivated glume wheats, mostly *Triticum dicoccon* and less frequently *T. monococtum*. Other cultivated plants were scarcely represented, and included flax *Linum usitatissimum* and Fabaceae. Most of the wild grown herbaceous plants represented field and ruderal weeds (e.g. *Bromus* sp., *Echinochloa crus-galli*, *Fallopia convolvulus* and *Chenopodium album*). In the charcoal assemblages, 12 taxa of trees and shrubs were recognized. The most common taxon is oak *Quercus* sp. followed by *Corylus avellana*. Other frequently found taxa were *Acer* sp., *Fraxinus excelsior*, *Ulmus* sp. and Maloideae. Taxonomic composition and quantity proportions of charcoals indicate the presence of mid-Atlantic oak forest communities. During the second occupation phase, an increase of Maloideae was observed, which could be related to the human impact on local woodlands. The occurrence of more open forests and hedges might have favored the spread of fruit trees (e.g. Maloideae, *C. avellana* and *Quercus*), which likely were important food sources in the ancient diet. This might be suggested by the findings in Gwoździec of the oldest Neolithic remains of crab apple *Malus sylvestris*. This study was financially supported by the National Science Centre in Poland through grant No. 2014/15/B/HS3/02460, headed by A. Czekaj-Zastawny.

Key-words: cereals, flax, charcoal, Neolithic, Poland

AGRICULTURE AND THE ORIGINS OF URBANISM IN WESTERN ANATOLIA

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Results are presented from the first year of doctoral research into the social and economic implications of agricultural strategies employed in Late Chalcolithic to Late Bronze Age western Anatolia. The research is based on a primary analysis of a large archaeobotanical assemblage from Çeşme-Bağlararası, Liman Tepe, Bakla Tepe, and Kocabaş Tepe, Izmir province. Together, the sites present a sequence of marked changes in settlement organisation from village to fortified citadel with a lower town. The latter settlement form is characteristic of Bronze Age urban centres within the region.

As such, the sites are uniquely placed to develop a focused case study into how populations were supported and shaped by agricultural practices associated with specific forms of urbanism and socio-political hierarchy. Two hypotheses will be tested: that early western Anatolian urbanisation was associated with increasingly labour efficient (and land intensive) agricultural practices as population pressure pushed agricultural land further from settlements, and that intra-population differences in agricultural production contributed to the formation of socio-political inequality. The hypotheses will be addressed through an intensive suite of archaeobotanical analyses, including FIBS and stable isotope analysis, utilised to reveal trends in crop cultivation and consumption within and between communities.

Key-words: archaeobotany, agriculture, urbanism, hierarchy, western Anatolia

LBK AGRICULTURE AND LAND USE IN THE AMMERTAL, SW GERMANY

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A collaboration project of the University of Tübingen and the Cultural Heritage of Baden-Württemberg is investigating an area in Southwest Germany where already archaeological sites of LBK, beginning with the oldest phase are known. Until now little archaeobotanical evidence is available from the Upper Neckar area and the analysis of two early Neolithic sites from Ammertal fills this gap. Numerous finds of charred plant macrofossils throw light on the agricultural practices and land use in the area. The systematic sampling of the pits and ditches excavated revealed not only “settlement noise” but also mass finds of hulled wheat and peas. Further crops proven are lentils and flax. The evidence of wild growing vegetation in the macrobotanical record is dominated by indicators of synanthropic habitats (weeds and ruderals). Wood charcoal analysis complements information on the land use of the surrounding area. The results of the study are considered in a broader context of the neolithisation of the Neckar region.

Key-words: LBK, Agriculture, South-West Germany, Neolithic, mass finds of crop

BRONZE AGE EVIDENCE OF MILLET CULTIVATION IN THE CARPATHIAN MOUNTAINS

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Charred remains of broomcorn millet have been found at two sites, Teius-Fantana Viilor and Petelca-Cascada, in the Apuseni Mountains (SW Transilvania). These sites have been investigated as part of the Bronze Age Transylvanian Survey (BATS) Project aimed at understanding settlement patterns and socio economic change in an important mining district of the Carpathian Mountains. The seeds have been radiocarbon dated to the second half of the second millennium BCE. While millet has been attested in the Carpathian basin since the Neolithic, the Transylvanian finds add to our knowledge of the increasing importance of this plant during the late BA and carry interesting implications for interregional contacts with the Asian steppes through the Mureş river corridor.

PLANT ADAPTATION IN GEOGRAPHICAL MARGINS: CASE STUDY FOR HIGHLANDS OF KYRGYZSTAN

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The array of animal and plant species domesticated in southwest Asia or China started to colonize the highland valleys of Central Asia only from the middle of the 3rd millennium BC. This is several thousands of years later after their domestication. Little research has been done on understanding the adaptation strategies by humans and their domesticates in the new environmental niches of continental climate of Central Asian highlands. In this presentation I evaluate the rate of prehistoric agriculture expansion and crop species selection for the establishment of successful agriculture in mountain landscapes (2000 masl). I will discuss on variation in crop species morphotypes that could have developed in mountainous settings as well as what the weed assemblage can tell us about landscapes and crop management in the highlands.

Key-words: Naked barley, hulled barley, irrigation, compact crop varieties, highlands

AGRICULTURAL SETTING AT THE BRONZE AND IRON AGE FORTRESS OF TEL LACHISH/ISRAEL (PRELIMINARY RESULTS OF THE 2017 AND 2018 SEASONS)

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Lachish is situated in the Shephelah region, approximately 40 km south-west of Jerusalem. It was one of the most prominent urban centers and significant garrison town during the Bronze Age and the Iron Age.

In 2018 a total of 41 archaeobotanical samples, accounting to 1300 liters of sediment, have been collected and processed using a flotation machine. Despite significant modern contamination, the macro-remains are well preserved and show differences in terms of taxa composition and preservation between two areas of sample origin: Area P with the Judean palace-fort zone and Area S, a trench on the western edge of the tell that was originally excavated during an expedition between the years 1973 and 1987. The number of taxa is high and diverse including economic plants such as *Olea europaea*, *Vitis vinifera*, *Hordeum vulgare*, *Triticum dicoccum*, *Triticum aestivum/durum*, *Linum usitatissimum*, *Lens culinaris*, *Ficus carica* but also wild plants such as *Lolium* sp., *Phalaris* sp., *Cephalaria syriaca* or *Chenopodium album*. The currently practiced systematic approach provides new information about plant economy at the site and contributes to our understanding of cultural history of such type of influential cities in the Southern Levant.

Key-words: Lachish, Bronze Age, Iron Age, Southern Levant economy, Agriculture

PALAEOLITHIC PLANT USE IN THE EASTERN FERTILE CRESCENT: THE CASE STUDY OF GHĀR-E BOOF

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Beside its chorological importance for understanding the Neolithization process the Zagros Mountains region has attracted attention for its role as a probable migration route of anatomically modern humans. At least since the 1960s archaeological research addressed the character of the evolution of the Upper Palaeolithic (UP) of the Zagros Mountains, leading to differentiation of two main cultural groups, the early UP Baradostian and the late UP or Epipalaeolithic Zarzian and a number of other regional typological groups.

Ghār-e Boof, a cave site in Iran (Fars Province), and situated in the southern Zagros has been excavated by the Tübingen-Iranian Stone Age Research Project (TISARP) starting in 2005. The lithic assemblage has been determined as UP Rostamian, according to similarity to the Dasht-e Rostam assemblages.

A rich archaeobotanical assemblage has been extracted from the Upper Palaeolithic stratigraphic sequence at Ghār-e Boof. While previous analysis focused on the younger layers (II-IV) dating between 36-31 kyr BP, recent excavations resulted in assemblages older than 36.000 BP (layer V). The taxa diversity of the layers is generally very high with considerable numbers of small-seeded grasses and large-seeded legumes.

Preliminary data on seed remains from the older layers of site Boof are discussed for their functional and environmental meaning, with the aim to improve our understanding of the behavioral repertoire of late Pleistocene hunter-gatherer groups in the southeastern region of the Fertile Crescent.

Key-words: Upper Palaeolithic, southeastern Zagros, pulses, grasses

ARCHAEOBOTANY IN URBAN SITES: THE MIDDLE AGE OF MODENA (NORTHERN ITALY)

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This contribution refers to the palaeoenvironmental reconstruction of the Modena town (northern Italy) in the Medieval Age. The archaeobotanical study of ten archaeological sites provided useful information to reconstruct palaeoethnobotany, history and plant landscape of the area from the 7th century to the 13th century AD.

A total amount of 250,000 carpological remains has been isolated (sieved from more than 600 l of soil), corresponding to more than 350 taxa, from the eight study sites (two of them are still under study).

The taphonomic diversity of the deposits allowed to obtain information on: - availability of voluptuary products, as abundant and diversified fruit; - availability of plant products to be a luxury item, and some condiments; - evidence of cultivation traditions typical of the area; - evidence of a wide range of cereal crops; - evidence of plant and care of ornamental species. Paleoecological reconstructions show the presence of wetland environments, peculiar to the area, in fact the medieval Modena was a “water city” characterized by an extended network of canals, considered as the main vector of commerce.

Finally, the floristic list suggests that in the Medieval period the biodiversity was higher than in the modern city; such floristic richness is also supported by the findings of numerous wild species worthy of attention, some of them unknown in earlier sources, others that disappeared during the 20th century and many considered rare.

Key-words: Middle Age, seed/fruit, biodiversity, ethnobotany, northern Italy

BIOGEOGRAPHY AND USE OF PISTACHIO (*PISTACIA* SPP.) IN PRE-POTTERY NEOLITHIC CYPRUS

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Besides cultivated pistachio, the genus *Pistacia* L. comprises more than ten wild species, among them the three emblematic trees of the modern Cypriot flora: *Pistacia atlantica*, *P. lentiscus* and *P. terebinthus*. The frequent occurrences of pistachio endocarps and charcoal on Pre-Pottery Neolithic sites excavated on the island indicate that pistachio trees constituted a currently used resource during the Neolithic period. Due to the the absence of systematic studies of the morphology of endocarps, the archaeobotanical remains of pistachio have so far seldom been identified to the species level, a lack of precision that has deprived us of important information on their past geographical distribution and uses. This poster presents the first results of the study of seed and anthracological material from the sites of Ayios Tychonas-*Klimonas* (ca. 9500 BC), Parekklishia-*Shillourokambos* (ca. 8400-7000 BC) and Khirokitia-*Vounoi* (ca. 7000-5500 BC). Morphological and morphometric approaches are used to explore, describe and identify the archaeobotanical material. The results obtained allow us for the first time to identify the pistachio remains (*Pistacia* spp.) to the species level and thus to discuss their presence in terms of the composition of the local vegetation cover and the various uses of tree resources in early Neolithic Cyprus.

Key-words Pre-Pottery Neolithic; Cyprus; Pistacia; endocarps; wood

USAGE OF PLANTS IN THE NORTHERN PART OF THE XIONGNU EMPIRE: ARCHAEOBOTANICAL STUDY ON THE IVOLGA FORTIFIED SETTLEMENT (TRANSBAIKALIA, RUSSIA)

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Fortified settlement Ivolga is the only known site of the nomadic Xiongnu Empire with signs of a city, locates on the left bank of Selenga River in 150 km to the south from Baikal Lake. It was an administrative, craft, cultural center in the northern part of the Empire.

The water flotation conducted in 2017, 2018 provided the numerous macro botanical remains (seeds, nuts and chaff) from several storage and rubbish pits. Their analysis is continued. We have gotten 2470 seeds and 1138 pieces of chaff. 1432 seeds (or 60% of the remains) belong to cultigens of 5 species - *Hordeum vulgare* var. *nudum*, *H. vulgare* var. *vulgare*, *Triticum aestivum*, *Panicum miliaceum* and *Setaria italica* subsp. *italica*. The seeds of broomcorn millet (973) are dominant. Almost of 45% of them are immature. Seeds of other cultural plants are not so numerous: 201 caryopses of 6-row hulled and naked barley, 102 seeds of foxtail millet and 3 caryopses of bread wheat. The chaff is represented by fragments of various remains – glumes, fragments of spikelets and their bases, awns, nodes etc. Many weed seeds (960) indicate a strong contamination of crops. Our results show the high role of plant food in the subsistence system of Ivolga population, who was engaged in the local cultivation of two species of millet, naked and hulled barley and probably bread wheat. The main plants were broomcorn millet and barleys. Foxtail millet played a smaller role, obviously. The value of wheat has not yet been precisely determined. The data have greatly enhanced knowledge about the agriculture of sedentary population in the northern periphery of the Xiongnu Empire.

Key-words: Xiongnu, multicultural local agriculture

ARCHAEOBOTANICAL EVIDENCE FROM THE NEOLITHIC SITE OF TEPE GAVKOSHI: ESFANDAGHEH PLAIN, SOUTHEASTERN IRAN

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This article aims to present the results of archaeobotanical studies of Tepe Gavkoshi located in the Esfandagheh plain in the Halil Rud basin. The site is dated back to the Neolithic period (6700 BC) and is the oldest settlement identified so far in the southeastern part of Iran. It is very important to collect as more as possible data about the bio-archaeological conditions in this part of Iranian plateau. Moreover, these data could be compared with similar evidence from other Indo-Iranian Borderlands sites to obtain an exhaustive image of agriculture evolution and vegetation cover in a larger zone. The preliminary archaeobotanical results from Tepe Gav Koshi indicate that the inhabitants of the site had access to a wide range of vegetal resources such as planted and wild species, like cereals (Einkorn, Emmer and barley), wild grasses (brome grasse and eremopyrum), oil seeds

(sesame), wild fruits (pistachio), wild pulses (milkvech and clover), wild plants (goat's head, borage family, seepweeds, goosefoot family, buckwheat family, smartweed, pink family, nightshades family, bindweed family, sedges family and cruciferae family) and trees like tamaris (*Tamarix*), willow or poplar (*Salix/Populus*), locust (*Robinia*) pistachio (*Pistacia khinjuk/atlantica*), junipers (*Juniperus*), oleaster family (Elaeagnaceae) and gossefoot family (chenopodiaceae). These plant remains were used as food, fodder and fuel by the people during the Neolithic period. The obtained results are comparable to the data already collected from other adjacent Neolithic sites such as Tepe Yahya, Tepe Gaz Tavileh in Kerman region, Tepe Rahmat Abad, Tol -i Jari, Tol-I Bashi and Tol-i Mushki in Fars as well as Mehrgarh in the Kachi plain. The archaeobotanical data are completely in concordance with zooarchaeological data (bone remains of goat, cattle, wild sheep, gazelle, wild ass, boar and turtle). Other archaeological finds such as obsidian tools, grindstone/millstone and retouched blades found in the ancient layers of Gavkoshi may also indicate agricultural activities. For collecting more data about the cultivation of the plants and the evolution of agriculture, it is necessary to realize more detailed and systematic archaeobotanical studies in the region.

Key-words: Archaeobotany, Vegetal resources, Neolithic, Esfandagheh Plain, south-eastern Iran.

FARAGLIONI VILLAGE (MBA): FIRST RESULTS OF THE BOTANICAL ANALYSES FROM USTICA ISLAND (PALERMO, SICILY)

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Ustica is a small island off the coast of Palermo city (Sicily, Italy). It was occupied by human settlements since Neolithic times. During the Middle Bronze Age (half of 2nd millennium BC) it was interested by the presence of an important fortified village (Spatafora F., Ustica tra il Tirreno e la Sicilia, in BTCGI, XXI, Pisa-Rome-Naples 2012, 427-439). First analyses on the samples (both charcoals and seeds) coming from the vases and the soils of the cultural area of the village are here presented, discussed and contextualized in the framework of 2nd millennium BC analyses from Thyrranian area.

Key-words: Middle Bronze Age; Island archaeobotany; cultural site

THE ARCHAEOBOTANY OF MUTAMBA, A THIRTEENTH CENTURY MAPUNGU-BWE SETTLEMENT IN NORTHERN SOUTH AFRICA

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This paper presents a report on the results of archaeobotanical analysis of macrobotanical (carpological) material from Mutamba, a 13th century Middle Iron Age settlement located in the Soutpansberg Mountain of northern South Africa. It provides base-line data concerning the variety

and utilisation of plants found at the settlement, a period in which the role of plants is poorly understood in southern Africa. Through the analysis of 100 randomly selected domestic context samples, 11 species and 2 genera were identified. These were *Sorghum bicolor* (Sorghum), *Pennisetum glaucum* (pearl millet), *Eleusine coracana* (finger millet), *Vigna radiata* (mung bean), *Vigna unguiculata* (cow pea), *Sclerocarya birrea* (Marula/ Moroela), *Gossypium herbaceum* (Cotton), *Adansonia digitata* (Baobab), *Ziziphus zeyheriana* (Dwarf Buffalo thorn), *Brachiaria deflexa* (False signal grass), *Brachiaria nigropedata* (Spotted signal grass), *Grewia* and *Acacia*. A tentative crop package composing of *E. coracana* (finger millet), *S. bicolor* (sorghum), *P. glaucum* (pearl millet), *V. unguiculata* (cowpea) and *V. radiata* (mung bean) was identified and all Poaceae taxa were subjected to the Hubbard and Al Azm's (1990) preservation and distortion index. Additionally not only does Mutamba provides the first documented case of *V. radiata* forming part of a crop package but it also offers a cautious indication of beer brewing in the form of malted grains and a more substantial link between *Gossypium herbaceum* and the practise of cotton spinning, formerly based only on ethnography.

Key-words: Agriculture, Archaeobotany, Mutamba, Middle Iron Age, South Africa

THE ARCHAEOBOTANY OF MEDIEVAL BARDA, AZERBAIJAN

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'The Landscape of Medieval Bərdə, Azerbaijan 6th - 13th Centuries AD' project is an environmental archaeological research initiative aiming to chart the history of the medieval Caucasian regional capital of Bərdə, Azerbaijan through the study of archaeobotanical material. In studies of medieval Azerbaijan, traditional approaches to archaeological recording are mainly employed, focusing on artefacts and structures, with few environmental analyses occurring. This has resulted in a lack of archaeobotanical material for regional analysis, and consequently little research has been conducted in the field of archaeobotany. This project will bring scientific approach, pioneering the use of modern environmental techniques, previously undeveloped in medieval archaeology in Azerbaijan, and apply them to Bərdə to understand the social, agricultural and economic practices of the region in this period. This project will generate new archaeobotanical data through analysis of plant remains from a current fieldwork project, The Archaeological Exploration of Bərdə (AEB), based at the Faculty of Oriental Studies, University of Oxford. This research will draw from and feed into the larger AEB project, revealing new insights into agriculture, society and urban rural interactions in the region.

Key-words: Azerbaijan, medieval, Islamic, Sassanian

IRON AGE SETTLEMENTS IN MAVROPIGI, NORTHERN GREECE: AN ARCHAEOBOTANICAL INVESTIGATION

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Archaeological research in the site of Mavropigi, near the city of Kozani in Northern Greece, the last few years has revealed an area of dense settlement complex dated to Prehistoric Ages. Four

Iron Age settlements are being investigated for archaeobotanical remains: Varkaris, Dasos, Kouri and Agios Ni-kolaos. All of these sites are situated near the area called Kitrini Limni, on 680-740 m above sea level and generally are neighboring each other. Clay constructions, post-holes, storage vessels and pits were revealed during the excavation. It remains possible that seeds and other species detected in the soil samples were used as food since archaeobotanical research so far has demonstrated the presence of crop plants at all four sites. Plant remains are represented by pulses, cereals, fruits and nuts while the significant presence of grapes, that it is likely to be stored in some storage vessels, is under discussion.

Key-words: Iron Age, settlements, Mavropigi, Greece, crops

WINEPRESS DATING BACK TO 3000 BCE SHOWS THE EARLIEST WINEMAKING TECHNOLOGY IN THE WESTERN MEDITERRANEAN

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During the archaeological excavations conducted in the Bronze Age archaeological settlement of Monte Zara in southern Sardinia (Italy), a sandstone pressing machine was found. The 14C data were able to date this artefact to the Late Bronze Age (1401–1112 cal BC, 2σ).

Chemical analysis of ancient organic compounds absorbed in the winepress by liquid chromatography quadrupole time-of-flight mass spectrometry (LC-QTOF-MS) and mass spectrometry analysis (GC-MS) allowed the detection of two wine biomarkers related to tartaric and syringic acids. These results prove that this winepress was used to extract juice from crushed black grapes during winemaking production in the Bronze Age period. Moreover, this machine represents the oldest technology used for winemaking in the western Mediterranean.

Key-words: Vitis vinifera; winemaking; mass spectrometry; tartaric acid; syringic acid

REVIEW OF PREHISTORIC PLANT CULTIVATION IN FINLAND BASED ON MACROFOSSIL FINDS

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A systematic review of the finds of cultivated plants in Finland is presented in this paper. The review is based on AMS-radiocarbon dated plant remains and assemblages of plant remains. The review shows that naked barley and free-threshing wheat were cultivated on the Åland islands during 3300–2600 BC by seal hunters of the Pitted Ware Culture. No cultivated plants have been found at Corded Ware culture (2800–2300 BC) sites. Cultivated barley occurs in mainland Finland

first time during the second millennium BC and continuously after this. Knowledge of cultivated plants BC is very limited and richer assemblages have been discovered only from AD 0–550. These show that cultivation focused on barley, both hulled and naked, with minor cultivation of rye, emmer, hemp and flax. During AD 550–1200 barley remained the main crop, whereas rye increased in the end of this period. Naked barley and emmer, however, phased out. In addition, naked wheat, oat, flax, hemp and gold-of-pleasure were cultivated during this period. The development of plant cultivation follows similar lines as in the surrounding regions. The earliest cultivation on Åland derives from East-Central Sweden. Corded Ware culture spread via eastern Baltic where domestic animals have been traced, but only few cultivated plants appear. During the Bronze Age we have again influence from Sweden, but also from Russia. Appearance of hemp during the Roman Iron Age shows that Finland was part of continental networks.

Key-words: Cultivation history, Finland, Stone Age, Bronze Age, Iron Age

SUPPLIES FOR THE MINERS - INVESTIGATING FOOD AND WOOD RESOURCE MANAGEMENT AT THE LATE BRONZE AGE MINING SITE OF PRIGGLITZ-GASTEIL (LOWER AUSTRIA)

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Due to their high degree of specialisation, mining communities rely on external resources: Food, tools, timber and fuel wood need to be provided from outside in presumably highly organised supply chains. The excavation of an opencast copper mine at Prigglitz-Gasteil “Cu I” revealed two Late Bronze Age (11th–9th c. BCE) settlement/workplace terraces unearthing a massive waste heap rich in refuse from various human activities (tools, pottery, bronze finds, animal bones, charcoal). Flotation samples were taken in a high-resolution approach in order to allow for the reconstruction of spatial and temporal patterns in the occurrence of possibly important plant species, basing on both charcoal and other charred plant macroremains. The rare finds of cultivated crops are primarily represented by millet grains (*Panicum miliaceum* and *Setaria italica*) and processed foodstuffs based on barley (*Hordeum vulgare*), accompanied by potentially gathered wild fruit such as *Rubus idaeus*, *Malus/Pyrus* sp. and *Rosa* sp. However, the most abundant macroremains are vast numbers of fir (*Abies alba*) and spruce (*Picea abies*) needles. While these might suggest burning of mainly two coniferous species, charcoal analyses reveal a much larger spectrum of burned woody taxa. Hence combined analyses and comparison to previously analysed mining sites will allow for a further comprehensive reflection of the prehistoric environment of Prigglitz-Gasteil, and enable generating plant-based supply management models for the people living and working at the copper-mine.

Key-words: Urnfield culture, copper mine, eastern Alps, subsistence patterns, supply chains

WHEN AND HOW DID WHEAT COME INTO CHINA

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After being introduced into China from West Asia, wheat gradually replaced such varieties of millet as *Setaria italica* and *Panicum miliaceum* to become the main dry-land farming crop in northern China, forming China's current agricultural production pattern of rice in the south and wheat in the north. To date, there have been dozens of reported archaeological discoveries about early wheat remains. According to those newly unearthed findings, wheat was introduced into China through at least two routes between 4500 and 4000 years ago. One is the grassland route from West Asia, through Central Asia, the Bronze Age cultures of the Eurasian Steppe, Northern Cultural Zone in northern China to the middle and lower reaches of the Yellow River. The other is the oasis route from West Asia, through Central Asia, the Pamir's, oases on both sides of the Tarim Basin, Hexi Corridor and to the Loess Plateau of northern China.

LENTIL SOUP, HUMMUS OR FABA BEANS? THE PROTEIN DIET OF THE EARLY FARMERS OF THE JUDEAN HILLS. NEW ARCHEAOBOTANICAL DATA FROM THE PRE-POTTERY NEOLITHIC SITE OF MOTZA (ISRAEL).Valentina Caracuta¹, Elisabetta Boaretto², Hamoudi Khalaily³, Jacov Vardi³*1. Institute of Evolution Sciences of Montpellier (ISEM), France.**2. Kimmel Center for Archaeol. Science and D-reams Radiocarbon Lab., Weizmann Inst. of Science, Rehovot, Israel.**3. Israel Antiquities Authority, Jerusalem, Israel.*

The rescue excavation carried out in Motza (Israel) in 2018 brought to the discovery of a new massive Pre-Pottery Neolithic (PPN) site on the Judean hills. The site, which is very well distinct from the previous site identified in the Motza district in the early 2000's and dated to the Early PPNB, yielded a rich archaeobotanical assemblage.

The macroremains come from a silo and present the typical traits of legumes, such as two cotyledons, hilum print and radicle. Among the finds, lentils (*Lens* sp.) was the most attested and accounts for 95% of the assemblage. Other legumes were chickpeas (*Cicer* sp.), faba bean (*Vicia faba*), and unidentified big legumes. Altogether chickpea, faba and the unidentified legume correspond to the 4% of the entire assemblage. The remaining 1% was made of by hulled wheat (*Triticum dicoccum/dicoccoides*).

Lentils and chickpeas' morphology was analyzed under a binocular microscope (Leica M80), and seed's size (i.e. length, breadth, thickness and diameter) was measured using an imaging analysis program (LAS V 3.8). The lentils were found to be significantly larger than those from Ahihud, the Early PPNB site in Lower Galilee (Israel) that provides unique information about the onset of farming legumes and is the closest comparable case-study.

The biometric study of the chickpea revealed a similar trend. The seeds were found bigger than those found in Early PPNB site of Tell el Kherk (Syria), the closest comparable case-study.

In the light of the new study, the finds from Motza offer new insights into the process of domestication of staple legume and the role of protein food as meat substitute for the early farmers.

The present study received funding from the European Union's Horizon 2020 research and innovation program under the Marie Skłodowska-Curie grant agreement N.792373.